ENVIRONMENTAL STATEMENT

PLANNING APPLICATION FOR PROPOSED ANAEROBIC DIGESTION FACILITY AND ASSOCIATED GRAIN STORE, WHITWICK MANOR, HEREFORDSHIRE

STL Energy Limited

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1.0	19/10/2020	DY		Internal draft
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1 Introduction

1.1 Overview

1.1.1 This Environmental Statement (ES) has been completed in support of proposals for development of an Anaerobic Digestion (AD) plant and associated grain drying operation at Whitwick Manor, Herefordshire. This ES has been undertaken in accordance with The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 ("the EIA regulations").

1.1.2 Reference should be made to the Planning Statement prepared by Bourne Valey Associates Limited (ref: 01113-00) for an in-depth discussion of how the proposals accord with planning policy and also the detailed rationale behind the need for the development.

1.1.3 The proposals will provide the following numerous benefits:

- Management of waste higher up the waste hierarchy;
- Generation of renewable energy through export of gas to grid;
- Contribution to reduction in greenhouse gas emissions;
- Production of a digestate product which will be used as a substitute for fertiliser, creating beneficial environmental impacts;
- Reduction in use of fossil fuels, that would otherwise be used to manufacture fertiliser;
- More sustainable solution for management of local poultry manure arisings;
- Provision of centralised facility for drying of grain, using renewable energy sources;
- Capture of carbon dioxide emissions for the production of dry ice;
- Extensive clean up of process water, ensuring clean water is returned to land;
- Installation of photovoltaic (PV) panels to generate renewable energy; and,
- Generation of four full time jobs.

1.2 Purpose of ES

1.2.1 This ES has been undertaken to assess potential impacts upon the environment as a result of construction of the site and site operations. This has included a mixture of qualitative impact assessment using available sources of data through desk top surveys, and, where further assessment has been deemed necessary, quantitative assessment of impacts.

1.2.2 This document should be read in conjunction with the Planning Supporting Statement prepared by Bourne Valey Associates Limited (ref: 01113-00).

1.2.3 This report contains the following components:

- Overview of site location;
- Description of proposals;
- Discussion of reasonable alternatives;
- Outline of the underpinning Environmental Impact Assessment (EIA) methodology used to complete the ES;
- Assessment of environmental impacts split by topic with consideration to baseline environmental conditions;
- Identification of mitigation measures; and,
- Summary of impacts.

2 EIA Methodology

2.1 Introduction

2.1.1 There are no statutory requirements on the format of an ES. However, Regulations 18(3), 18(4) and 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 outlines information which must be included in an ES as follows, which is quoted from the EIA Regulations:

"18(3) An environmental statement is a statement which includes at least—

(a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development;

(b) a description of the likely significant effects of the proposed development on the environment;

(c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

(d) a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;

(e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and

(f) any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.

18(4) An environmental statement must—

(a) where a scoping opinion or direction has been issued in accordance with regulation 15 or 16, be based on the most recent scoping opinion or direction issued (so far as the proposed development remains materially the same as the proposed development which was subject to that opinion or direction);

(b) include the information reasonably required for reaching a reasoned conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment; and

(c) be prepared, taking into account the results of any relevant UK environmental assessment, which are reasonably available to the person preparing the environmental statement, with a view to avoiding duplication of assessment.

18(5) In order to ensure the completeness and quality of the environmental statement—

(a)the developer must ensure that the environmental statement is prepared by competent experts; and

(b)the environmental statement must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts."

2.1.2 Regulation 18(3) refers to Schedule 4 of the EIA Regulations, which contains additional information for inclusion in an ES. However, in accordance with Regulation 18(3), it is important to note that the ES only needs to include information in Schedule 4 which is relevant to the characteristics of a particular development. Therefore, not all environmental aspects within Schedule 4 of the EIA Regulations will necessarily need to be considered.

2.1.3 This ES accords with the requirements of Regulation 18(3), 18(4) and 18(5) of the EIA Regulations. The following table confirms the sections of this ES which address each of the requirements:

Table 2.1 – Demonstration of Compliance with EIA Regulations

Section of EIA Regulations	Relevant Section(s) of ES
Regulation 18 (3)(a)	Chapter 3
Regulation 18 (3)(b)	Chapters 0 to 16
Regulation 18 (3)(c)	Chapters 0 to 16
Regulation 18 (3)(d)	Section 3.6
Regulation 18 (3)(e)	Document ref: 2102-003-C
Regulation 18 (3)(f)	The relevant parts of Schedule 4 of the EIA regulations are addressed throughout this ES
Regulation 18 (4)(a)	Section 2.4
Regulation 18 (4)(b)	Chapters 0 to 16
Regulation 18 (4)(c)	Chapters 0 to 16
Regulation 18 (5)(a)	Section 2.2

Section of EIA Regulations	Relevant Section(s) of ES
Regulation 18 (5)(b)	Section 2.2

2.2 Project Team

2.2.1 This ES has been compiled and co-ordinated by Oaktree Environmental Ltd who are highly experienced waste management consultants and has included input from a number of additional technical experts. The table below summarises the relevant expertise and/or qualifications of the ES contributors.

Table 2.2 – Expertise of ES Contributors

Consultant	Responsibility	Relevant Expertise/Qualifications
Oaktree Environmental Ltd – Primary contributors - David Young, Chris Greenwood, Tom Benson	Co-ordination of ES, and technical input on Chapters 1, 2, 3, 4, 0, 0, 10, 11, 15, 16 and 17	Primary Author: David Young BEng MSc PhD MIEnvSc MIAQM Contributors: Chris Greenwood BSc MSc CGeol FGS, Tom Benson BSc MIEnvSc TechIOA Oaktree Environmental Ltd are highly experienced waste management consultants and have been preparing and contributing to Environmental Statements for over 13 years. The primary contributors have a combined experience in excess of 45 years working in private sector environmental consultancy specialising in waste and environmental assessments. Work is overseen by the company Managing Director, who has 30 years experience, including having worked for several years previously for Regulatory Authorities. David Young has over 20 years experience in the air quality sector and is a full member of the Institute of Air Quality Management (IAQM) and Institution of Environmental Sciences (IES). He also has over 12 years experience of co-ordinating and drafting Environmental Statements Thomas Benson has over 6 years' experience in environmental acoustics gained in both the private and public sector. Thomas specialises in environmental permitting in respect of regulated industrial and commercial processes and environmental noise monitoring and assessment. Thomas is an associate member of the Institute of Acoustics and holds the Certificate of Competence in Environmental Noise Measurement as well as being a full member of the IES. Chris Greenwood has a BSc (Hons) degree in Geology (major) Geography (minor) and a MSc degree in Hydrogeology from the University of Leeds. Chris Greenwood has 13 years' professional experience working in preparation and management of several hydrogeological, hydrological and geological impact assessments related to the mineral and waste sectors as well es expertise in flood risk assessment. Chris is a chartered geologist.
SCP Transport	Technical input on chapter 7	Primary contributor was Pete Todd, who holds an MSc in Transport Engineering and Planning and is also a member of the Chartered Institute of Highways and Transportation. Pete has over 15 years' experience in providing transport and highways advice on development related matters for a range of development uses

Consultant	Responsibility	Relevant Expertise/Qualifications
United Environmental Services Ltd	Technical input on chapter 8	Toby Hart BSc MCIEEM PIEMA, UES Managing Director, has undertaken survey work and verified the ecological reports submitted as part of this application. Toby holds a level 5 Botanical Society for Britain and Ireland (BSBI) field identification skills certificate (FISC), which certifies him as competent to undertake phase 1 habitat and national vegetation classification (NVC) surveys. He holds Natural England (NE) survey / disturbance licences for great crested newts (GCNs) and all species of bats (licence numbers included within the relevant ecological reports). Alasdair Grubb BSc ACIEEM, UES Ecologist, has also contributed to the ecological works. Alasdair is an experienced ecologist with over 10 years industry experience. He holds a Level 5 BSBI FISC, which certifies him as competent to undertake phase 1 habitat and NVC surveys, and holds Natural England survey licences for GCNs and Barn Owls (licence numbers included within the relevant ecological reports).
Map Archaeological Practice Ltd	Technical input on chapter 12	Primary contributor - Charlie Puntomo. Charlie graduated from the University of Bradford with a BA in Archaeology and a diploma in Professional Archaeological Studies before completing an MSc in Archaeological Practice at Bournemouth University. She works as a project officer at MAP Archaeological practice where she has undertaken numerous Desk Based Assessments and Heritage Statements for a wide range of projects. She is also responsible for undertaking a wide range of field and post-excavation work. Charlie is an accredited member of the Chartered Institute for Archaeologists.
Amalgam Landscape Ltd	Technical input on chapter 13	The LVIA has been drafted by Angela Watts, who is a Chartered Landscape Architect with extensive landscape design and planning experience with particular expertise in Landscape and Visual Impact Assessment

Consultant	Responsibility	Relevant Expertise/Qualifications
MDLandscape	Technical input on chapter 14	Marianne Dobson has over 28 years experience working as a Landscape Architect in the water industry and 14 years experience as an Arboriculturist. She worked as Principal Landscape Architect and Arboricultural Technician for United Utilities between 1994-2015 and more recently works as a self-employed consultant. Marianne has a degree in Landscape Architecture (BA Hons), is a Chartered Member of the Landscape Institute and trades as a registered Landscape Practice. She has a foundation degree in Arboriculture (FdScArb) and is a Member of the Arboricultural Association (MArborA). Marianne has reviewed, authored and contributed to the landscape and arboriculture chapters for SEA and EIA for several projects including: • South West Water, Water Resource Management Plan SEA desk assessment of landscape, arboricultural and heritage constraints and Landscape Character Assessment and author of methodology working with Ricardo EE; • Landscape and Visual Sensitivity Assessment (LVSA) desk and field assessment and co-author of methodology for Shropshire Council with Gillespies LLP; • LVIA desk and field assessment for Phase 2A of HS2, as part of the support to Arup with Gillespies LLP; • Snowdonia Visual Impact Provision (VIP) project for National Grid, co-author of technical note with Gillespies LLP; • West Cumbria Water Supplies Project EIA with United Utilities, Marianne was Client Landscape Lead and reviewer of Jacobs as consultant on the project for landscape and arboriculture chapters; and • LVIA co-author for Beauport to Darwell pipeline EIA South West Water and United Utilities joint venture.

Consultant	Responsibility	Relevant Expertise/Qualifications
Strenger Ltd	Technical input on chapter 9	Assessment was prepared by Dan Cramond, who is a lighting consultant specialising in the environmental assessment of artificial lighting, and is a director of Strenger Ltd, registered at Clavering House, Newcastle upon Tyne. Daniel holds a BEng (Hons) degree in Mechanical Engineering, the Lighting Education Trust (LET) Lighting Diploma and the Institute of Acoustics (IOA) post-graduate Diploma in Acoustics & Noise Control. Strenger Ltd is accredited to international Standard, EN ISO 9001:2015 for the provision of acoustics consultancy, lighting consultancy and compliance testing for various sectors throughout the UK and Europe. Strenger Ltd was established in 2015 and have acted as lighting consultant for a wide range of clients on a range of schemes; including, waste, power generation (incl' nuclear), oil & gas, industrial, residential, sports facilities and transportation schemes. They have a broad experience of large-scale projects, including those falling under EIA regulations, nationally significant infrastructure projects and critical national infrastructure.

2.3 EIA Screening and Pre-Application Advice

2.3.1 The proposed development falls under Schedule 2 of the EIA Regulations. As such, an EIA screening opinion was previously requested from the council. Herefordshire Council (HC) subsequently directed on 20 May 2020 that an EIA would be required. The EIA Screening Opinion is included within Appendix I. Prior to the issue of the EIA Screening Opinion, planning pre-application advice was also sought from HC. Pre-application advice was issued by HC on 11 February 2020.

2.4 EIA Scoping

2.4.1 It should be noted that EIA scoping is not a mandatory process and ultimately it is up to the developer to decide as to the content of the ES. The EIA screening Opinion and pre-application advice provided by HC included detailed discussion of the areas where potentially significant environmental impacts could occur and hence it was considered

that these provided sufficient advice on the requirements for detailed assessments. However, given the time that has passed since the pre-application report and EIA Screening decision was issued, an EIA Scoping Request was submitted to HC on 15th March 2022 to ensure that the issues previously raised are an up to date representation of the issues which need to be considered. Reference should be made to Appendix I for a copy of the formal Scoping Opinion, which was received on 25th April 2022. All aspects of the scoping have been addressed throughout the application.

2.5 Overview of EIA Assessment Topics and Chapter Structure

2.5.1 The EIA is divided into separate chapters for each of the following topics:

- Land Use
- Socio-Economic;
- Landscape and Visual;
- Traffic and Transport;
- Ecology;
- Arboriculture;
- Hydrology, Hydrogeology and Geology;
- Air Quality;
- Noise and Vibration;
- Archaeology and Cultural Heritage;
- Lighting; and
- Cumulative Impacts.

2.5.2 Each of the above chapters are generally divided into the following sub topics, where appropriate:

- Baseline Assessment;
- Construction Phase Impacts;
- Operational Phase Impacts;
- Outline of Proposed Mitigation;
- Residual Impacts;

- Cumulative Impacts;
- Summary of Impacts; and,
- Conclusions.

2.6 Baseline Assessment

2.6.1 Before determining potential impacts, it is first important to determine the current baseline position with respect to environmental conditions. This is because any impacts must be assessed in the context of baseline environmental conditions. The baseline conditions have been determined qualitatively through desk top studies and where deemed appropriate, on a quantitative basis through site specific surveys/quantitative assessment.

2.7 Assessment of Impacts and Mitigation

2.7.1 Once the baseline environmental conditions have been established, assessment of the potential impacts associated with both the construction and operational phase of the farm can be undertaken. Should any significant environmental impacts be identified, mitigation measures are identified to control potential impacts to acceptable levels. The relevant guidance advises that mitigation should be fed into the design stage of a project as part of an iterative process – this is not necessarily limited to construction and operational controls which have a physical manifestation in the scheme, but can also include, for example, dust control measures and noise abatement techniques[1].

2.7.2 The mitigation measures will often be based upon Pollution Prevention Guidelines. These are guidance documents containing statutory controls produced by the EA. These contain good practice measures to ensure that businesses comply with legislation for prevention of pollution to air, land and water. Although the Pollution Prevention Guidelines have recently been withdrawn by the Environment Agency (EA), they are still considered to be

[1] Environmental Impact Assessment: A guide to Good Practice and Procedures: A Consultation Paper, Department for Communities and Local Government, 2006.

a relevant source of guidance for mitigation and have therefore been referred to throughout this ES. Mitigation measures will also include specific control measures that are proposed to be implemented during the construction and operational phase to minimise environmental impacts.

2.7.3 Mitigation measures will also include specific control measures that are proposed to be implemented during the construction and operational phase to minimise environmental impacts.

2.7.4 Once mitigation measures have been identified, as applicable, an assessment of remaining residual impacts is undertaken. Finally, an assessment of any potential cumulative impacts is undertaken, eg impacts that the proposals may have 'in-combination' with other processes. This includes other proposals in the planning process, or recently approved but not yet operational, e.g. are not covered by the baseline assessment.

2.7.5 Impacts have been assessed based upon the generic criteria presented in Section 2.8. Each chapter contains a summary table which outlines significance of impacts before and after mitigation.

2.8 Impact Assessment Criteria

2.8.1 Impact Magnitude

2.8.1.1 The table below outlines the terminology used to determine magnitude of impact. The magnitude of impact determines the scale of change from baseline conditions. For some assessments, this has been assessed quantitively, for example through undertaking site surveys, modelling or monitoring, but has also been assessed qualitatively using professional judgment in some cases, where it has been determined through consultation with the Local Planning Authority that this will be sufficient. The scale used to describe magnitude of impact is outlined within the table below with generic descriptions included. Within the various chapters within this ES, topic specific indicative criteria have

been outlined to grade the magnitude of impact. In addition to scaling the magnitude of the impact, a description is also included on whether the impact is positive or negative.

Table 2.3 – Magnitude of Impact Criteria

Magnitude of Change	Criteria
Major	Major change from baseline conditions
Moderate	Moderate change from baseline conditions
Slight	Small discernible change from baseline conditions
Negligible	No discernible change from baseline conditions

2.8.2 Receptor Sensitivity

2.8.2.1 The tables below show generic descriptors for describing magnitude of impact, receptor sensitivity and the matrix used to determine impact significance from these parameters. It should be noted that the criteria presented for defining magnitude of change and receptor sensitivity are generic descriptions. Within certain topics contained in this ES, topic specific assessment criteria have been developed to describe/determine such parameters. Where this is applicable, it has been outlined within the relevant chapter/assessment.

Table 2.4 - Receptor Sensitivity Criteria

Sensitivity of Receptor	Criteria
Very High	Receptor very highly sensitive to change in environmental conditions
High	Receptor highly sensitive to change in environmental conditions
Medium	Receptor with medium sensitivity to any change in environmental conditions
Low	Receptor with low sensitivity to any change in environmental conditions

2.8.3 Significance of Impact

2.8.3.1 The overall significance of impact is determined by combining the magnitude of impact and receptor sensitivity. The following table presents the generic matrix that is used to grade impact significance. Within certain topics contained in this ES, topic specific assessment criteria have been developed to describe/determine such parameters which

may deviate from the generic matrix/terminology shown below. Where this is applicable, it has been outlined within the relevant chapter/assessment.

Table 2.5 - Impact Significance Matrix

Magnitude of Impact	**Significance of Impact**			
Major	Moderate	Moderate to major	Major	Major
Moderate	Minor to moderate	Moderate	Moderate to major	Major
Slight	Minor	Minor to moderate	Moderate	Moderate to major
Negligible	Neutral	Neutral	Neutral	Neutral
	Low	Medium	High	Very High
	Receptor Sensitivity			

2.8.3.2 Impacts which are described as neutral in significance are those which will be below the level of perception within normal bounds of variation or forecasting error. Impacts which are described as minor in significance may be local issues but are highly unlikely to be important in the decision making process. However, such issues should be considered in relation to site design. Impacts which are moderate in significance are likely to be important on a local scale, but are not likely to be key decision making issues, in isolation. However, the cumulative effect of such issues may lead to more significant impacts on an area or resource which can become key within the decision making process. Impacts which are major in significance will be key to the decision making process and will often relate to, though not exclusively, sites and features of national and international importance.

2.8.4 Describing Nature of Impact

2.8.4.1 Once the impact significance has been determined, the nature of the impact is described using the descriptors below, where applicable, in accordance with the requirements of Schedule 4 of the EIA Regulations:

- Net result of impact (beneficial, negligible or adverse);
- Type of effect (direct or indirect);

- Scale of impact (local, regional, national, global);
- Duration of the impact (short term, medium term or long term);
- Permanence of impact (temporary or permanent); and,
- Reversibility of impact (irreversible or reversible).

3 Site Location and Description of Proposals

3.1 Site Location

3.1.1 The proposed site is located at Whitwick Manor, off the A417, within an area of existing arable land between the villages of Newtown and Ocle Pychard. Reference should be made to Appendix II for a map of the proposed site location and red line planning boundary.

3.2 Site Description

3.2.1 Reference should be made to Appendix III for proposed layout and elevation plans. The centre of the site is located at approximate National Grid Reference (NGR) 360660, 245744. Access to the site is gained via the A417.

3.2.2 The proposed site is bounded and defined as follows:

- To the North and North-East lies the A417 with agricultural land beyond;
- To the East lies agricultural land with the A417 beyond; and,
- To the South and West lies agricultural land.

3.3 Proposed Development Description

3.3.1 Overview

3.3.1.1 The proposals are for the development of an AD plant and associated grain drying operation. AD is a biological process, which breaks down organic matter within the agricultural wastes/products in the absence of oxygen, through the actions of a variety of micro-organisms. The plant will be capable of processing up to 176,000 tonnes/annum of feedstocks. These will comprise up to 100,000 tonnes/annum poultry manure, up to 16,000 tonnes/annum apple pomace and up to 60,000 tonnes/annum of liquid based agricultural wastes from dairy units and drinks industry processes etc. The sources for the feedstocks are discussed in detail within the planning statement (re: 01113-00).

3.3.1.2 The AD process results in the production of biogas, which consists predominantly of methane (CH_4) and carbon dioxide (CO_2) and valuable digestate product.

3.3.2 Construction Phase

3.3.2.1 Reference should be made to Appendix XI for a Construction Method Statement which contains full details of the construction phase, works required and the methods that will be used to manage construction works so as to ensure the activities are undertaken with minimal environmental impact. The method statement includes the following:

- Outline of construction works required;
- Details of construction works phasing;
- Details of materials required for construction works;
- Details of energy demand of construction works;
- Construction Management Action Plan;
- Construction Environmental Management Plan; and,
- Site Waste Management Plan.

Construction Phase Vehicle Movements

3.3.2.2 The construction phase will generate up to 5,368 Heavy Goods Vehicle (HGV) movements over a 12 month period on the surrounding road network. This equates to 14.71 movements per day. In addition, 20 car movements per day and 4 van movements per day are anticipated to be generated.

Temporary Employment Generation

3.3.2.3 At this stage, it is hoped that all workers at the site during construction can be sourced locally. Therefore, there will not be a need to provide bespoke workers' overnight accommodation on the site. However, it is not possible to predict the availability and capacity of local contractors, and workers from further afield may be necessary to undertake the work. Certainly, it would be to the mutual benefit of the applicant and the local community to avoid an over-lengthy construction period and, if bringing in

additional staff can achieve sound time efficiency, then overnight accommodation may prove necessary.

3.3.2.4 As a matter of course, the construction compounds would include facilities for staff welfare. Temporary jobs created during construction works will include the following:

- Ground works and site preparation - 10 people;
- Grain store construction works - 5 people; and,
- AD Plant construction works- 15 people

3.3.3 Operational Phase

Feedstocks and Reception

3.3.3.1 All feedstocks will be received over a weighbridge. The poultry manure will be stored under cover to minimise air emissions and eliminate leachate from rain. The storage clamp will have the capacity store up to approximately 15,000m^3 under cover, equal to approximately 2 months of material when running at full capacity. Any liquid residues and/or recirculation water from the end of the process will be stored in one of the large tanks ready for feeding hourly into the pre-treatment process.

Feeders

3.3.3.2 There will be 4 walking floor feeders of approximately 100m^3 capacity, sufficient for 12 hours. These will be filled twice a day, morning and evening.

Pre-treatment

3.3.3.3 There will be three hydrolysis/pasteurisation tanks, each being 1000m^3 in volume to allow for the feedstocks to be pre-processed by hydrolysis, pasteurisation and de-ammoniafication. Approximately 55% of the ammonia is removed before the digestion process to prevent the nitrogen from inhibiting the digestion process and to extract 55% of the Nitrogen into a concentrated Ammonium Sulphate solution which can be sold as a fertiliser. A large 6250m^3 Ammonium Sulphate storage tank is provided for.

Anaerobic Digestion

3.3.3.4 The pre-treated material is pumped into 4 primary digesters, each 6250m^3 in volume and then into two secondary digesters, also providing 6250m^3 of volume. These will be maintained at over 40 celcius for the digestion process and fully stirred. The biogas that is produced will bubble up to the headspace in the double membrane roofs. The roofspace has support straps and a de-sulphurisation net as well as a flexible gas membrane and air-blown outer weather membrane. The resultant biogas is around 55% CH_4 and 45% CO_2 and is piped via desulphurisation tower(s) for use in the Combined Heat and Power (CHP) units and the biomethane plant.

Nutrient Recovery

3.3.3.5 The digestate overflow will be treated to extract nutrients in a multi-stage process where the majority of the remaining Nitrogen, Phosphates and Potassium are removed. These processes collect the nutrients in a concentrated form including Ammonium Sulphate, Calcium Phosphate, which can be easily transported and then applied as available fertilisers where and when agronomically required.

Digestate Separation

3.3.3.6 The low nutrient digestate is then separated with screw presses and/or decanter centrifuges into a benign solid soil improver and a liquid stream. The liquid stream is still around 1% solids so requires further processing through a reverse osmosis membrane / ion exchange plant to create a liquid stream suitable for re-circulation or final polishing in a reed bed before discharge.

Reed Bed and buffer lagoons

3.3.3.7 An area of around 5.3ha has been allocated for a reed bed system which further cleans the water. A buffer storage lagoon has been provided for to allow for maintenance and process control. A second lagoon has also been provided for to capture rain from the site which can be used in the AD process or discharged to the local ditch network. Reference should be made to Appendix XVIX for detailed information on reed bed design.

Biomethane Plant

3.3.3.8 The biogas is first dehumidified and polished with Carbon filters prior to compression. The clean dry biogas is then compressed to around 15bar before passing through a 3-stage membrane plant which separates out the gas into a c.98% pure CH_4 Biomethane stream and a 99% pure CO_2 stream. The Biomethane stream is then piped to the Network Entry Facility (NEF) and then onto the gas grid. The CO_2 stream is then piped to the CO_2 liquefaction plant.

Network Entry Facility (NEF) and Compressor

3.3.3.9 The NEF unit effectively checks the quality of the Biomethane gas meets the network entry requirements. A propane injection system is required to adjust the calorific value (CV) of the gas to meet network settings and also the gas is required to be compressed up to between 19-21bar to match the network pressure.

CO_2 Plant / Dry Ice manufacture

3.3.3.10 The CO_2 stream is then compressed to around 18bar before cooling to around minus 30 degrees Centigrade to liquify the gas. It passes through a reboiler so that any contaminants including a small amount of residual methane can be separated. This 'reject' gas is then piped back to the AD plant so that the methane can be recovered. A building for a dry ice (solid CO_2) plant can treat a proportion of the CO_2 stream to make dry ice for use in the catering / food delivery industry. The balance of the liquid CO_2 is stored in vacuum insulated tanks prior to collection by HGV tankers.

Combined Heat and Power (CHP) Units

3.3.3.11 Some of the biogas is used directly in two $1MW_e$ CHPs which are provided to supply power to the plant as well as the farm and grain store. In addition to the green electricity generated the units generate around 2MW of heat which is used to heat the digestion tanks, pre-treatment and nutrient recovery processes. It is hoped some surplus will be available in the summer to facilitate any grain drying if required.

Backup Boilers

3.3.3.12 Two 1MW backup boilers which can run on biogas will be provided for periods of extreme weather or when a CHP is taken off-line for servicing to allow the plant to maintain its operating temperature.

Flare

3.3.3.13 A dual stream flare is to be installed to allow either excess biogas or reject biomethane to be burned at a high temperature so as to prevent any methane emissions. In practice, it is anticipated that this will be used rarely, such as during maintenance of equipment or for a few minutes when the biomethane is adjusted prior to injection into the grid.

Grain Store

3.3.3.14 A grain store will be constructed, which will be used to store and dry grain from local farming operations in a sustainable manner, using heat from the AD process.

Vehicle Movements

3.3.3.15 The following table outlines the traffic movements associated with the development.

Table 3.1 – Vehicle Movements Generated by Development (Inclusive of Arrivals and Departures)

Activity	Heavy Goods Vehicles (29 Tonne)	Heavy Goods Vehicles (20 Tonne)	Tractor/Trailer (16 Tonne)	Light Duty Vehicles (Vans/Cars)
	Movements Per Annum			
Grain Import	648		1336	
Grain Export	882			
Poultry Manure import	3448		6250	
Apple Pomace Import	1102			
Liquid Feedstocks Import	2412			
Extra Liquids Required	1724			
Solid Fertiliser Export	4530			

Activity	Heavy Goods Vehicles (29 Tonne)	Heavy Goods Vehicles (20 Tonne)	Tractor/Trailer (16 Tonne)	Light Duty Vehicles (Vans/Cars)
Liquid Fertiliser Export	2550			
Dry Ice Export		1252		
Propane Import		69		
Site Staff				2920
Visitors				1460
LGV Deliveries				1460

Employment

3.3.3.16 The proposals will generate four full time jobs.

Raw Materials and Resource Use

3.3.3.17 Reference should be made to the mass balance in Appendix XVII for details of materials that will be used during the operations.

Residues and Wastes

3.3.3.18 Reference should be made to the mass balance in Appendix XVII for details of residues and wastes associated with the operations.

PV Panels

3.3.3.19 In order to maximise the sustainability of the operations, PV panels will also be installed throughout the site. This will include up to 2,689 solar panels, providing up to 672KW of renewable energy.

Materials Balance

3.3.3.20 Reference should be made to the mass balance in Appendix XVII for details of mass flow throughout the process. The plant will be completely self-sufficient on electricity and heat.

3.4 Carbon Footprint of Development

3.4.1 Calculations have been undertaken by the technical specialist for the project to estimate the carbon footprint of the development. These have taken account of the carbon footprint of the construction works including materials required and the significant carbon savings that will be achieved by the development The table below summarises the carbon credentials. In summary, it is estimated that carbon payback will be achieved within period of 6.8 months of commencement of operations, achieved by the major carbon savings that the development will achieve. Following this period, significant year on year carbon savings will be achieved by the development, compared to the alternative situation, were the development not to proceed. A full breakdown of the calculations and assumptions made can be provided, if required.

Table 3.2 – Carbon Emissions Associated with Development

Activity	Total Carbon Emissions
Construction of AD Plant - groundworks, containment, AD Tanks feeders, clamps/manure Store, digestate Processing equipment, nutrient recovery plant, CHPs, boilers, biomethane Plant, CO_2 plant, dry ice plant and ancillary equipment	10,87 tonnes CO_2-eq
Construction of grain store - groundworks and building completion	2,713 tonnes CO_2-eq
Construction of lagoons, reed beds and water polishing plant	1,498 tonnes CO_2-eq
Saving in carbon emissions as a result of biomethane production and use during operational phase	26,622 tonnes CO_2-eq per annum

3.5 Environmental Regulation

3.5.1 An Environmental Permit (EP) will be required for the operation, which will be regulated on a continual basis by the EA, who will undertake regular compliance inspections to

ensure the site operator is complying with stringent permit conditions so designed to protect air, land and water and human health/amenity. The site operator will implement an Environmental Management System (EMS) during the day to day running of the plant in order to comply with the permit and to protect the surrounding environment.

3.5.2 Paragraph 188 of the National Planning Policy Framework (NPPF) states that the focus of planning policies and decisions should be on whether proposed development is an acceptable use of the land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). It goes on to state that planning decisions should assume that these regimes will operate effectively and directs that such controls should not be duplicated.

3.5.3 The above is also mirrored within paragraph 7 of National Planning Policy for Waste (NPPW) which states that waste planning authorities should concern themselves with implementing the planning strategy in the Local Plan and not with the control of processes which are a matter for the pollution control authorities. Waste planning authorities should work on the assumption that the relevant pollution control regime will be properly applied and enforced.

3.5.4 The above national planning policies are clear and unambiguous and effectively mean there should be no duplication of regulation/assessment across planning and permit applications. For example, the permit will contain conditions controlling emissions to air, land and water from operations on-site and mitigation will need to be agreed with the EA at the permitting stage. In accordance with national planning policy, such controls should not require consideration/assessment as part of the planning application.

3.6 Consideration of Reasonable Alternatives

3.6.1 Overview

3.6.1.1 The regulations require a description of reasonable alternatives studied by the developer which are relevant to the proposed project and its specific characteristics and main reasons for the option chosen, taking into account the effects of the development on the

environment. These should be credible and appropriate alternative options for the project. It is important to note that this does not place an obligation on applicants to consider alternatives, but to report any alternative options that have been studied. The main alternative options to that proposed are as follows:

- 'Do nothing';
- Alternative options for use of feedstocks; and,
- Use of alternative sites.

3.6.1.2 The alternative options presented above have been considered in more detail below, with justification provided to demonstrate why they are not considered suitable alternative options to the proposed development.

3.6.2 Do Nothing

3.6.2.1 The proposals are driven by the need to improve the efficiency and sustainability of farming operations undertaken by the applicant in the local area. The applicant owns a number of agricultural holdings for the production of grain in the local area, totalling 2,360 acres. A centrally located site is required to dry and store the grain produced from all the surrounding parts of the applicants owned land. The AD process will produce renewable heat from feedstocks produced locally, which will be used to dry the grain. In the event that the proposals do not proceed, the grain would have to be transported further afield for drying and storage with increased use of fossil fuels, increasing road miles and associated carbon footprint. At the same time, the AD plant will generate renewable energy for export to the National Grid, whilst providing a local outlet for manure, crops, apple pomace and other farm based feedstocks arising within the local area. The proposals will capture ammonia, CO_2 and methane emissions which would otherwise arise from the spreading of untreated poultry manure. The spreading of manure is also of concern due to runoff into local watercourses and issues as a result of associated phosphates and nitrates. Therefore, the proposals will provide major environmental improvements locally compared to the existing situation. CO_2 will be used to produce dry ice as a more sustainable alternative to traditional manufacturing routes.

As outlined previously, the supply of biomethane to the grid will result in significant reduction in greenhouse gas emissions by offsetting the use of natural gas.

3.6.2.2 Given the above, the do-nothing scenario is not considered a suitable alternative option to the proposed development.

3.6.3 Alternative Use of Feedstocks

3.6.3.1 The plant will import poultry manure and agriculturally based liquid wastes and apple pomace from local sources. The poultry manure is currently spread to land untreated. Alterative options for the manure are to continue land spreading, to utilise in a local recovery scheme such as the proposed AD plant, or to transport over several miles to a suitably authorised facility for incineration. The proposals will provide a more sustainable outlet for the manure compared to the existing situation where it is spread on land, producing a valuable fertiliser and a system for collection of CO_2 for the production of dry ice with cleaned water returned to the local watercourse after extensive stripping and cleaning to remove phosphate and nitrates. At the same time, heat will be recovered for drying grain at a centralised facility and gas exported to the grid. This will introduce significant environmental benefits compared to the spreading of manure to land. Furthermore, the transportation of the manure over several miles for incineration is less sustainable and furthermore has greater potential for environmental impact. Therefore, the alternative uses for the feedstocks are not considered a viable alternative.

3.6.4 Alternative Sites

3.6.4.1 In addition to the 'do-nothing' scenario, consideration has also given to the use of alternative sites. The purpose of the proposals is to provide a centralised facility for drying and storage of grain from local farming operations, whilst at the same time providing a local sustainable output for feedstocks generated from local farming operations. As such, locating the AD plant and associated grain drying and storage operation at an alternative location further afield would be less sustainable. As is demonstrated throughout this ES, there will be no long term significant adverse environmental impacts as a result of locating the proposals at the site and indeed, there will be many benefits to the

proposals. As such, the proposed site location is considered suitable. An in-depth assessment of alternative sites has been included within Appendix XIV. This has demonstrated that the proposals are located within the most suitable site under the control of the applicant.

4 Planning Policy and Legislation

4.1 Reference should be made to the planning statement completed by Bourne Valley Associates (ref: 01113-00) for an in-depth review of relevant local and national planning policies which demonstrates that the proposals fully accord with all relevant policies.

5 Land Use

5.1 Introduction

5.1.1 A desk-based study has been undertaken to establish the potential land use effects of the proposals. Consideration has been given to existing and possible future land uses during both construction and post construction (operational) phases.

5.1.2 Issues for consideration include the impact of the proposals on existing and future land uses, within the site and surrounding area. Potential effects upon adjacent land uses have also been considered.

5.1.3 Many of the potential land use effects overlap with effects considered within other environmental topics. These are cross referenced, where relevant.

5.2 Assessment Methodology

5.2.1 Baseline

5.2.1.1 A desk based assessment was undertaken to gather information on existing and likely future land uses at the site. A study area using a radius 1km from the site boundary was used.

5.2.1.2 Impacts of the proposals on the baseline land uses has been considered at two levels;

- The proposed development site (red line area); and,
- The area immediately around the development site extending about 1km from the site boundary.

5.2.1.3 The future baseline situation has taken into account plans and proposals identified in the development plan (as applicable) and permissions granted for development in the Study Area, and beyond if their scale requires. Where large scale uses extend beyond the Study Area or exist outwith but in close proximity, these have also been identified and considered to ensure a robust approach.

5.2.2 Impact Assessment Methodology

5.2.2.1 There are no recognised procedures/guidelines for assessing potential land use impacts. Within this chapter, assessment has been made to determine whether potential impacts are 'significant' or 'not significant'

5.2.2.2 Sensitivity of identified receptors has been assessed using a standardised approach as described below. Professional judgement is applied in the consideration of what constitutes "vicinity". The distances will vary from project to project and the rationale is fully explained further in the ES where required.

Table 5.1 – Land Use Receptor Sensitivity

Receptor Sensitivity	Criteria
High	National and/or internationally important land uses on site or land in the vicinity
Medium	Regional and /or county level importance land uses on a site or on land in the vicinity
Low	Locally important land uses on site or on land in the vicinity and Land uses of no more than very local importance on site or in the vicinity

5.2.2.3 A second assessment then requires the magnitude of change to be determined. Criteria for this is described below.

Table 5.2 – Criteria for Assessing Magnitude of Change for Land Use Impacts

Magnitude of Change	Criteria
Major	An existing land use will be unable to continue as direct or indirect consequence of the proposals. Alternatively, a beneficial new land use is facilitated that may not otherwise have occurred.
Moderate	Existing land use can continue, but there will be a noticeable change in how the land use operates, due for example, to land take, changed profitability or enjoyment.

Magnitude of Change	Criteria
Slight	Small changes will occur that will not materially affect the continuation of an existing land use.
Negligible	No change is predicted to occur in existing land use.

5.2.2.4 Combining the magnitude of impact and receptor sensitivity, impact significance is determined using the matrix contained within section 2.7.

5.2.2.5 In determining the significance of the effect, if the significance of effect is moderate or above then the effect is considered to be significant.

5.2.2.6 The following sources of information have been used in this assessment:

- Aerial photography and maps from Google Maps and Streetview;
- Ordnance Survey (OS) Map Data;
- Herefordshire County Council Core Strategy Adopted Proposals Map;
- Herefordshire County Council Public Access Planning Portal; and,
- MAGIC website.

5.2.2.7 Before assessing the effect of the proposed development on land uses in the area, it is essential to have a clear understanding of what constitutes a “potential effect”. A potential effect on land uses depends on factors such as whether the existing land use can continue as a direct or indirect consequence of the proposals, or whether a noticeable change on how the land operated before and post construction occurs and whether a new land use is introduced.

5.2.2.8 The issues that are considered include whether the proposed development could lead to further restrictions on the future use of land and place restrictions on the structure of development permitted in terms of height, density and processes carried out. Potential

effects can be positive (beneficial), negative (adverse) or neutral, direct or indirect, permanent or temporary.

5.2.2.9 There are no known published standard criteria for determining the significance of effects on land use. In determining whether an effect on a receptor is significant, reference has been made to a wide range of criteria relating to the sensitivity of the area of interest. These criteria have been combined to determine effect significance, using the matrix set out within section 2.

5.3 Baseline Assessment

5.3.1 Current Land Use within Application Site

5.3.1.1 The site is currently used as arable land, within the ownership of the applicant.

5.3.2 Existing Land Uses Surrounding Site

5.3.2.1 The study area is dominated by land in agricultural use in all directions, which is the primary landuse within 1km of the site. This is interspersed with other various landuses The A417 is an arterial road which intersects the study area from North West to South-East and which provides the access point to the site. An area of ancient replanted woodland lies in close proximity to the North-East, on the opposite side of the A417. A further area of ancient woodland (Ash Coppice) lies approximately 270m to the South-West. There is a Grade II* listed building 580m to the North-East, five Grade II listed buildings approximately 580m to the West-South-West and West-North-West, three Grade II listed buildings approximately 820m to the West and a Grade II* listed building approximately 820m to West-North-West. There are isolated dwellings throughout the study area and the settlements of Newtown and Ocle Pychard lie just within the extent of the study area to the South-East and North-West respectively.

5.3.3 Future Baseline Land Use Conditions

5.3.3.1 No recent planning applications for major future development have been identified on the Herefordshire County Council website within the study area. There are a very small number of recent applications for very small scale residential development on the outskirts of Newtown, which are located just beyond the 1km extent of the study area. It is not possible to accurately determine potential future uses, but it is reasonable to assume that there will be no significantly different uses on the land in future years, given current landuses within a 1km radius of the site and since a large portion of the land is under the ownership/control of the applicant.

5.3.4 Receptor Sensitivity

5.3.4.1 The table below summaries sensitivity of existing land uses within and surrounding the site.

Table 5.3 – Land Use Receptor Sensitivity

Receptor	Sensitivity
Existing agricultural land on-site	Low
Agricultural land to South, East, North and West	Low
Ancient woodland areas	Medium
Listed buildings	High
Isolated settlements throughout 1km study area	Low
Developed residential areas of Newton and Ocle Pychard	Low

5.4 Construction Phase Impacts

5.4.1 The Proposed Development Site

5.4.1.1 None of the land uses in the surrounding area, as identified in the baseline, will be affected during the construction of the proposed development.

5.4.2 Surrounding Land Uses

5.4.2.1 Suitable mitigation has been incorporated into the scheme as detailed throughout this ES, to ensure that there will be no significant adverse environmental impacts on surrounding land uses outlined above during the construction phase.

5.4.3 Overall Construction Phase Impacts

5.4.3.1 Overall, construction phase land use impacts on surrounding land uses are not predicted to be significant. Construction works will be temporary and any potential impacts on surrounding land-use will be sufficiently mitigated to a negligible level, as demonstrated throughout this ES.

5.5 Operational Phase Impacts

5.5.1 The Proposed Development Site

5.5.1.1 Post construction, the proposals will include the operation of an AD plant with associated grain drying operation, which will significantly increase the sustainability and efficiency of local farming operations, whilst providing numerous other environmental benefits. Operation of the facility will be controlled and regulated by the EA through conditions within an EP, which will ensure that any potential impacts on air, land or water will be sufficiently controlled. Operational phase mitigation has been built into the scheme and is outlined within the various chapters in this ES. Additional vehicle numbers will not be significant, as detailed in Chapter 7. Agricultural land within the site is of relatively high value locally. However, the benefits of the scheme will far outweigh the loss of a small amount of arable land. However it is important to note that soils will not be removed from site and will be used in the site re-profiling works. Therefore, there will be no loss of the high quality soils which are currently present within the site.

5.5.2 Surrounding Land Uses

5.5.2.1 There will no direct land use changes outside the site as a consequence of the development. Potential impacts on air, land and water will not be significant, as demonstrated throughout this ES, since potential impacts will be fully controlled under the EP. Mitigation has been outlined within chapters 8 to 11 in this regard. Potential impacts on the setting, character and views at sensitive receptor locations will not be significant as demonstrated throughout this ES and will be mitigated by appropriate design and landscaping measures, as outlined within chapters 12 and 13. On the basis of the above, potential residual impacts on surrounding land uses as a result of land-take will be negligible in magnitude, neutral in significance.

5.5.3 Summary of Potential Impacts

5.5.3.1 Potential construction and operational phase land use impacts are summarised within the table below, along with a summary of mitigation and residual impacts. As is demonstrated, impacts will not be significant on surrounding landuses.

Table 5.4 - Summary of Land Use Impacts During Operational Phase

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
Existing site use	Reduction in available arable land	Neutral	None required – the benefits of the scheme will outweigh the small loss of arable land. Soils will not be exported from site and will be retained	Neutral
Ancient woodland areas	Impacts as a result of discharges from process and air emissions and associated nitrogen deposition	Moderate adverse, permanent, long term, reversible and local in nature	Emissions from the process will be fully controlled under the EP, as outlined within Chapters 8 to 11	Neutral

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
Surrounding agricultural land	Impacts on quality of land as a result of discharges from process	Minor to moderate adverse, permanent, long term, reversible and local in nature	Emissions from the process will be fully controlled under the EP, as outlined within chapter 8	Neutral
Listed buildings	Impact on setting of assets	Moderate adverse, direct, permanent, long term, reversible, local in nature	Appropriate design and landscaping measures integrated into scheme, as outlined within chapters 12 and 13	Neutral
Residential properties	Impact on amenity as a result of emissions from the process	Minor to moderate adverse, direct, permanent, long term, reversible, local in nature	Emissions from the process will be fully controlled under the EP, as outlined within chapters 10 and 11	Neutral

5.6 Conclusions

5.6.1 An assessment has been undertaken of the potential impacts on surrounding land use, both present and future uses.

5.6.2 A baseline assessment has been undertaken to assess landuses within a 1km radius of the development site and an assessment made of the potential for the proposed development to impact on the continuation of existing and future landuses.

5.6.3 Overall, construction phase land use impacts on surrounding land uses are not predicted to be significant. Construction works will be temporary and any potential impacts on surrounding land-use will be sufficiently mitigated to a negligible level, as demonstrated throughout this ES.

5.6.4 The proposals will not result in significant adverse impacts in terms of land-take of existing arable land on site, with the minor loss of arable land significantly outweighed by the benefits of the scheme. It has been concluded that with appropriate mitigation in place, operational phase impacts on surrounding landuses will not be significant.

6 Socio-Economic Assessment

6.1 Introduction

6.1.1 This chapter includes an assessment of the potential socio-economic impacts associated with the proposed development. In determining the current baseline position, reference has been made to the Nomis website[2], which contains official labour market statistics.

6.2 Assessment Methodology

6.2.1 Table 6.1 below outlines the criteria used for assessing magnitude of socio-economic impacts.

Table 6.1 - Criteria Used for Assessing Magnitude of Socio-Economic Impacts

Magnitude of Change	Criteria	
Major	Jobs & Employment	Significant number of Jobs created/lost on a local, regional and national scale
	Businesses	Significant impact on local, regional and national businesses
	Tourism & Recreation	Impact on tourism/recreational activities on a large extent/scale, including large number of people or activities
Moderate	Jobs & Employment	Significant number of jobs created/lost on a local and regional scale
	Businesses	Significant impact on local and regional businesses
	Tourism & Recreation	Extent of impacts on tourism/ recreational activities is on a smaller scale, but still affecting a large number of people or activities
Slight	Jobs & Employment	Significant number of Jobs created/lost on a local scale only
	Businesses	Significant impact on local businesses
	Tourism & Recreation	Extent of impacts on tourism/recreational activities is on a smaller scale, and a small number of people are affected
Negligible	Jobs & Employment	No discernible impacts from job creation/loss
	Businesses	No discernible impact on businesses

[2] www.nomisweb.co.uk

Magnitude of Change	Criteria	
	Tourism & Recreation	No discernible impacts on tourism/recreation

6.2.2 Table 6.2 below outlines the criteria used to determine receptor sensitivity.

Table 6.2 - Criteria for Assessing Socio-Economic Receptor Sensitivity

Receptor Sensitivity	Criteria	
High	Jobs & Employment	Low/limited availability of labour and skills, high unemployment levels
	Businesses	Large number of businesses likely to be affected
	Tourism & Recreation	Receptor or resource of international or national status with a large number of visitors
Medium	Jobs & Employment	Average availability of labour and skills, average unemployment levels
	Businesses	Medium number of businesses likely to be affected
	Tourism & Recreation	Receptor or resource of regional status with a medium number of visitors
Low	Jobs & Employment	High availability of labour and skills, low unemployment levels
	Businesses	Small number of businesses affected
	Tourism & Recreation	Receptor or resource of local status with a low number of visitors

6.3 Baseline Assessment

6.3.1 Employment across Herefordshire

6.3.1.1 Table 6.3 below contains details of the number of people currently economically active, employed and unemployed in Herefordshire with comparison to the West Midlands region and Great Britain as a whole, between January 2021 and December 2021.

Table 6.3 - Labour Supply Across Herefordshire, West Midlands Region and Great Britain Between January 2021 and December 2021

	Herefordshire (%)	West Midlands (%)	Great Britain (%)
Economically Active	81.4	77.6	78.4
In Employment	78.1	73.6	74.8
Unemployed	3.4	5.0	4.4

6.3.1.2 As is indicated by the tables above, Herefordshire has a higher percentage of people economically active and in employment compared to the West Midlands region and the nation as a whole. The percentage of people unemployed across Herefordshire is lower than that of the West Midlands region and nation as a whole.

6.3.2 Sensitive Receptors

6.3.2.1 Potential receptors in terms of socio-economic impacts include the local and regional population, local and regional businesses such as construction companies, raw material suppliers, haulage companies and shops along with recreational areas, such as the ancient woodland area to the North-East.

6.3.2.2 Levels of unemployment across Herefordshire are lower than the region and nation. Therefore, on balance, receptors are considered to be of low sensitivity in terms of job creation/employment opportunities. There is potential for a medium number of businesses to be directly impacted upon (positively and negatively), therefore sensitivity of other businesses is considered to be medium. Evaluation of the site and surrounding area indicates that there is limited potential for tourism activities in the immediate vicinity of the site, but some recreational potential, the latter in the form of the ancient replanted woodland area to the North-East, which is considered to be of medium sensitivity to socio-economic change.

6.4 Construction Phase Impacts

6.4.1 Potential socio-economic impacts during the construction phase include the following:

- Support of temporary jobs;
- Positive impacts on local and regional businesses; and,

- Socio-economic impacts on recreational activities in the vicinity of the site.

6.4.2 The construction phase is anticipated to be short term and temporary, anticipated to last for up to 18 months. However, this will introduce significant economic benefits as the construction phase will support a number of jobs. Preference will be given to sourcing labour locally, but it may be necessary to source workers from further afield, depending on the input required and availability of employees. Up to 30 jobs will be supported during construction works. The impact magnitude is predicted to be slight positive at receptors of low sensitivity, resulting in an overall impact significance which is minor beneficial, short term, temporary, reversible, local and regional in nature. There will be positive impacts on local and regional businesses as a result of the need for maintenance contractors and services, plant and machinery hire and raw materials suppliers. This is predicted to have a moderate positive impact on receptors of medium sensitivity, resulting in an overall impact significance which is moderate beneficial, direct, short term, temporary, reversible, local and regional in nature.

6.4.3 There is potential for impact on recreational areas to the North-East as a result of dust and noise associated with construction works, which could, if significant, have potential to impact on the enjoyment of visitors and subsequently reduce the number of visitors to the area, leading to adverse impacts. However, as is demonstrated by the assessments within the air quality and noise chapters of this ES, the proposals will not have any significant adverse impacts on amenity of the local area during construction works. a comprehensive construction method statement is included within Appendix XVII of this ES, which outlines the environmental controls that will be in place during construction works. As such, no significant adverse impacts on recreation/tourism activities are predicted during the construction phase.

6.5 Operational Phase Impacts

6.5.1 Potential socio-economic impacts during the operational phase include the following:

- Creation of jobs both directly and indirectly;
- Positive impacts on local and regional businesses;

- Socio-economic impacts on recreational activities in the vicinity of the site; and,
- Growth of existing successful local rural business.

6.5.2 There will be four direct jobs created as a result of the AD plant development. It is also anticipated that jobs will be created indirectly as a result of the proposals. Indirect employment is defined as temporary and permanent jobs created in businesses which supply products, materials and services. The number of indirect jobs created by the proposed development can be estimated using employment multipliers contained with former English Partnerships guidance[3]. Out of those presented, the most appropriate multipliers are considered to be those for general industrial developments, which are 1.29 and 1.44 for local and regional areas respectively. Using these multipliers, the number of indirect jobs created is as follows:

a) Indirect local jobs created = (4 x 1.29) – 4 = 1.16 (1)
b) Indirect regional jobs created = (4 x 1.44) – 4 = 1.76 (1)

6.5.3 The impact magnitude of job creation is predicted to be slight, positive at receptors of low sensitivity, resulting in an overall impact significance which is minor beneficial, direct/indirect, long term, local and regional, permanent and reversible in nature.

6.5.4 The creation of direct and indirect jobs will inevitably have a positive impact on local and regional business, through additional revenue being spent in local and regional shops. The AD plant operation will also generate positive impacts on the local and regional area through the need of maintenance contractors and services, plant and machinery hire and raw materials suppliers. Furthermore, the proposals will provide a more sustainable outlet for poultry manure from local farming operations in comparison to the direct spreading of manure on land, thereby providing socio-economic benefits to local businesses. The impact magnitude is predicted to be slight positive at receptors of medium sensitivity, resulting in an overall impact significance which is minor to moderate

3 Additionality Guide: A Standard Approach to Assessing the Additional Impact of Interventions, English Partnerships, 2008.

beneficial, direct/indirect, long term, local and regional, permanent and reversible in nature.

6.5.5 The potential for impact on recreational activities in the vicinity of the site could, if significant, arise due to additional visual impact or impact on amenity from dust and noise emissions, which could have potential to impact on the enjoyment of visitors and subsequently reduce the number of visitors to the area, leading to adverse socio-economic impacts. However, as is demonstrated by the assessments in Chapter 10, 11, 12 and 13, the proposals will not have any significant adverse visual/character impacts or significant adverse impacts on amenity within the local area. As such, no significant adverse impacts on recreation/tourism activities are predicted.

6.5.6 The proposals will result in the growth of an existing successful local rural business, providing further diversification of the business. The business has a proven track record through the operation of an AD plant elsewhere for a number of years. The impact magnitude is predicted to be slight positive at a receptor of low sensitivity, resulting in an overall impact significance which is minor beneficial, direct/indirect, long term, local, permanent and reversible in nature.

6.6 Mitigation

6.6.1 No mitigation is considered necessary during the construction or operational phase, over and above measures outlined within Chapters 10, 11, 12 and 13.

6.7 Residual Impacts

6.7.1 No significant adverse residual impacts are predicted during the construction or operational phase. Beneficial residual impacts are predicted during the construction and operational phase as a result of employment generation and positive impacts on local and regional businesses, as outlined and described above.

6.8 Cumulative Impacts

6.8.1 No significant cumulative impacts are predicted during the construction or operational phase.

6.9 Summary of Impacts

6.9.1 The tables below contain a summary of potential socio-economic impacts before and after mitigation for both the construction and operational phases of the development respectively.

Table 6.4 - Summary of Socio-Economic Impacts During the Construction Phase

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
Local and regional population	Creation of jobs in the local and regional area.	Minor beneficial, direct and indirect, temporary, short term, reversible, local and regional in nature	None required	Minor beneficial, direct and indirect, temporary, short term, reversible, local and regional in nature
Local and regional businesses	Requirement for raw materials, plant and machinery hire, contractors	Moderate beneficial, direct and indirect, temporary, short term, reversible, local and regional in nature	None required	Moderate beneficial, direct and indirect, temporary, short term, reversible, local and regional in nature
Adjacent recreational areas such as ancient woodlands	Impact on the amenity and enjoyment of recreational areas leading to reduction in number of visitors to area	Minor beneficial, direct and indirect, permanent, long term, reversible, local and regional in nature	Construction method statement included as part of this ES	Neutral

Table 6.5 - Summary of Socio-Economic Impacts During the Operational Phase

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
Local and regional population	Creation of jobs in the local and regional area	Minor beneficial, direct and indirect, permanent, long term, reversible, local and regional in nature	None required	Minor beneficial, direct and indirect, permanent, long term, reversible, local and regional in nature
Local and regional businesses	Increased revenue from money spent in local shops, requirement for provision of raw materials, and maintenance contractors	Moderate beneficial, direct and indirect, permanent, long term, reversible, local and regional in nature	None required	Moderate beneficial, direct and indirect, permanent, long term, reversible, local and regional in nature
Adjacent recreational areas such as ancient woodlands	Impact on the amenity and enjoyment of recreational areas leading to reduction in number of visitors to area	Neutral	Emissions from the process will be fully controlled under the EP and scheme has been designed so as to mitigate potential for landscape and visual impacts.	Neutral

6.10 Conclusions

6.10.1 A baseline assessment has been undertaken to determine the current socio-economic position across Herefordshire and the surrounding region. Statistics have shown that there are a lower percentage of people unemployed across Herefordshire in comparison to the region and the nation as a whole. Therefore, receptors are considered to be of low sensitivity to job/employment generation. There is considered to be a potential for a medium number of businesses to be impacted upon (positively and negatively), therefore sensitivity of other businesses is considered to be medium.

6.10.2 The construction phase is anticipated to be short term and temporary, lasting for up to 18 months. A minor beneficial impact is predicted in terms of temporary job creation and moderate beneficial impacts on local and regional businesses as a result of the requirement for plant and machinery hire, raw materials and contractor services.

6.10.3 The main socio-economic impacts associated with the operational phase have been predicted to be the following:

- Creation of jobs both directly and indirectly;
- Positive impacts on local and regional businesses;
- Socio-economic impacts on recreational activities in the vicinity of the site; and,
- Growth of existing successful local rural business.

6.10.4 It is estimated that 4 jobs will be directly created and up to 1 job created indirectly in the local and regional area, which is predicted to result in a minor beneficial impact.

6.10.5 A moderate beneficial impact is predicted on local and regional businesses as a result of requirement for plant/machinery hire, raw material provision and maintenance services.

6.10.6 No significant impacts are predicted on the enjoyment and use of recreational areas adjacent to the site, such as the ancient woodland areas.

6.10.7 A minor beneficial impact is predicted in terms of the growth and diversification of an existing local and successful rural business.

7 Traffic and Transport

7.1 Introduction

7.1.1 This Chapter of the ES has been prepared by SCP and addresses the likely significant effects of the Proposed Development, located at Whitwick Manor, Herefordshire.

7.1.2 It describes the methods used to assess the effects; the baseline conditions; the mitigation measures required to prevent, reduce or offset any substantial adverse effects; and the likely residual effects after these measures have been adopted.

7.1.3 This Chapter is supported by a Transport Statement (TS) which is submitted in Appendix IV.

7.2 Legislation

7.2.1 No legislation has been used in the assessments within this chapter.

7.3 Methodology and Scope

7.3.1 This chapter has been conducted in line with the above and the following:

- Design Manual for Roads and Bridges, Volume 11, Environmental Assessment (DMRB); and
- Guidelines for the Environmental Assessment of Road Traffic, Institute of Environment Assessment, 1993 (IEA).

7.3.2 To assess the likely significant effects of the Proposed Development and its traffic, the initial stages are:

- Qualify the existing characteristics (baseline);
- Identify the geographical boundaries of assessment (i.e. the study area); and
- Once this information is established, the predicted impacts are assessed, along with measures to mitigate any negative impact.

7.3.3 The submitted TS assesses the impact of the Proposed Development on the highway network during the typical weekday AM and PM peak periods.

7.3.4 IEA guidelines also state that the greatest environmental change will generally be when the development traffic is at the largest proportion of the total flow, which, may not be during the highway network peak hours. Therefore, this ES examines likely effects based on Annual Average Daily Traffic (AADT) flows.

Magnitude of Effect

7.3.5 To assess the overall significance of an effect it is necessary to establish the magnitude of the effect occurring i.e. the changes to the existing baseline conditions as a result of the Proposed Development, and the sensitivity or importance of the receiving environment or receptor.

7.3.6 The magnitude of potential effects (both beneficial and adverse) on environmental baseline conditions has been identified through the detailed consideration of the Proposed Development taking into account the following:

- Relevant legislation, policy or guidelines;
- The degree to which the environment is potentially affected for example, whether the quality is enhanced or impaired;
- The scale or degree of change from baseline conditions as a result of the Proposed Development;
- The duration of the effect for example, whether it is temporary or permanent and whether it is short, medium or long term; and,
- The reversibility of the effect.

7.3.7 The scale of effects is assessed for both the construction and operation phases using the criteria given in the table below which have been established with reference to the various guidance noted above and/or through professional experience and judgement.

Table 7.1 - Criteria Used for Assessing Magnitude of Impact

Level of Magnitude	Definition of Magnitude
Major	Substantial change from baseline conditions
Moderate	Moderate change from baseline conditions
Slight	Small discernible change from baseline conditions
Negligible	No discernible change from baseline conditions

7.3.8 This criteria refers to adverse effects only and where beneficial effects are identified, their magnitude is based on the corresponding positive effect for the same quantum.

Sensitivity of Receptors

7.3.9 Receptors will comprise drivers, pedestrians, cyclists and public transport users affected by increased traffic levels resulting from the Proposed Development.

7.3.10 The sensitivity of receptors, based on professional judgment and experience, is as follows in the table below

Table 7.2 - Criteria Used for Assessing Magnitude of Impact

Sensitivity of Receptor	Development Receptors
Very High	Receptor very highly sensitive to change. Receptor has very limited ability to absorb change without very significant change to receptor character or local environment. Receptors within this category are likely to be of international importance
High	Receptor highly sensitive to change. Receptor has limited ability to absorb change without significant change to receptor character or local environment. May include receptors of national/international importance
Moderate	Receptor with medium sensitivity to any change with a moderate capacity to absorb change without significantly altering character or local environment. May include assets of national/regional importance
Low	Receptor with low sensitivity to any change. Receptor can accommodate change to character or local environment. May include assets of local importance

Duration of Effect

7.3.11 The duration of effects has been assessed based on the following criteria in the table below.

Table 7.3 – Descriptors for Duration of Effect

Timescale	Definition
Short Term	0 to 5 years including the construction period and on completion
Medium Term	5 to 15 years including establishment of proposed landscaping
Long Term	15 years onwards for the life of the Proposed Development

Significance of Effect

7.3.1.1 Combining the magnitude of impact and receptor sensitivity, impact significance is determined using the matrix contained within section 2.7.

Cumulative Effects

7.3.12 No committed development traffic has been taken into account in either the baseline or proposed assessments, since there are no other major developments for which applications are in progress within the vicinity of the site.

Proposed Mitigation and Residual Effects

7.3.13 This section of the ES Chapter sets out the means by which any likely significant environmental impacts identified in the assessment of construction and operation phase impacts is to be mitigated. The purpose of the mitigation measure will be to prevent, reduce or offset any likely significant environmental effects.

7.3.14 Consideration is also given to the provision of any measures of environmental enhancement over and above required mitigation.

7.3.15 This final stage of assessment identifies any residual environmental effects and their significance taking account of the application of the mitigation measures outlined above based on the significance matrix.

Limitations and Assumptions

7.3.16 The assessments of effects are based on projections based on various sources of information, which are considered appropriate based on professional experience.

7.3.17 Given that the proposed development is not anticipated to have a significant impact on the local highway network, junction capacity modelling has not been undertaken and no results for delay are therefore provided.

7.4 Baseline Conditions

7.4.1 Existing and Predicted Baseline

7.4.1.1 A detailed description of the local highway network and existing infrastructure is provided within the submitted TS.

7.4.1.2 This includes an assessment of personal injury road traffic accident records for the most recent five-year period which concluded that the area in the vicinity of the site does not have any recurring highway safety problems that could be affected by the development proposals.

7.5 Assessment of Construction Phase Effects

7.5.1 Subject to the granting of permission the project is intended to commence construction in 2022.

7.5.2 The point of construction access from the adopted highway network will be via the existing access along the A417 and facilities within the site will be provided for construction workers including car parking, loading and unloading of plant and associated construction materials.

7.5.3 Wheel wash facilities will be provided at a position to be agreed with the Local Authority to reduce the incidence of transfer of mud or loose materials onto the public highway during the construction phase and general sweeping of the adjacent road system will be undertaken by mechanical road sweeper.

7.5.4 The construction phase will generate up to 5,368 HGV movements over an 18 month period on the surrounding road network. This equates to 9.8 movements per day. In addition, 20 car movements per day and 4 van movements per day are anticipated to be

generated. As a result, the development will generate more traffic during the operational phase than the construction phase.

7.5.5 A Construction Environment Management Plan will be prepared following any grant of planning permission and will define the routes for the larger construction delivery vehicles, however, the main routes will generally be via the most direct route to the wider classified road network, avoiding any prohibited routes as detailed in the submitted TS.

Assessment of Effects

7.5.6 The traffic flow increase as a result of the construction effect would not meet the levels of percentage increase requiring assessment in accordance with the Guidelines for the Environmental Assessment of Road Traffic and would be lower than during the operational phase. Therefore, the corresponding effect on the following would also be lower:

- Driver delay;
- Public transport users;
- Pedestrian delay;
- Pedestrian amenity;
- Fear and Intimidation;
- Severance; and,
- Accidents and road safety.

7.6 Assessment of Operational Phase Effects

7.6.1 Trip Generation

7.6.1.1 A detailed description of the daily traffic flows estimated to be generated by the Proposed Development is provided within the submitted TS. In summary, it is estimated that the Proposed Development will generate an increase of 12 two-way vehicles (including an increase of 6 two-way HGVs) during both the AM and PM peak hours. Over the course of the day the development will result in an increase of 100 two-way vehicles,

including a maximum of 80 HGVs. The increase in vehicle and HGV movements predicted has been used to assess the various transport effects.

7.6.2 Assessment of Effects

Cumulative Effects

7.6.2.1 No committed development traffic has been taken into account in either the baseline or proposed assessments.

Driver Delay

7.6.2.2 As detailed earlier, junction capacity modelling has not been undertaken given that proposed development will not have a significant impact on the local highway network and no results for delay are therefore provided.

7.6.2.3 Notwithstanding the above, the submitted TS concludes that the additional traffic generated by the development during the worst-case peak hour will result in a maximum of one additional vehicle movement every 5 minutes which will not have a material impact on the operation or delay on the local highway network.

7.6.2.4 The Proposed Development would therefore have a negligible magnitude of change on driver delay and the significance of impact would be neutral in EIA terms.

Public Transport Users

7.6.2.5 There are no public transport services within the vicinity of the site that staff or visitors are realistically likely to use. In addition, the volume of traffic would not have a material impact on the operation or delay on the local highway network.

7.6.2.6 The Proposed Development would therefore have a negligible magnitude of change on Public Transport Users and the significance of impact would be neutral in EIA terms.

Pedestrian Delay

7.6.2.7 There are no footways along the A417 or Public Rights of Way in the vicinity of the site. Having regard to this and given the low volume of traffic generated, the Proposed Development would have a negligible magnitude of change on Pedestrian Delay and the significance of impact would be neutral in EIA terms.

Pedestrian Amenity

7.6.2.8 Amenity is defined in the DMRB as the relative pleasantness of a journey for pedestrians and others. This is mainly influenced by the volume and type of traffic on an adjacent link. Other key contributory factors are the standard and width of footways/cycleways, the street furniture provided, planting and landscape etc.

7.6.2.9 There are no footways along the A417 or Public Rights of Way in the vicinity of the site. The sensitivity is therefore considered to be low. Having regard to this and given the low volume of traffic generated by the development, the Proposed Development would have a negligible magnitude of change on Pedestrian Amenity and the significance of impact would be neutral in EIA terms.

Fear and Intimidation

7.6.2.10 A further effect that traffic may have on pedestrians and cyclists is described as 'fear and intimidation'. This is influenced by the volume of traffic, HGV content and, in the case of pedestrians, the width of the footpath.

7.6.2.11 There are no pedestrian and cycle infrastructure facilities provided along the A417 in the vicinity of the site. The sensitivity is therefore considered to be low. Having regard to this and given the low volume of traffic generated by the development, the Proposed Development would have a negligible magnitude of change on Fear and Intimidation and the significance of impact would be neutral in EIA terms.

Severance

7.6.2.12 The concept of severance is a perceived division that occurs when a traffic link separates part of an existing community. This can occur when a road becomes too heavily trafficked, making crossing the road a problem, or when a new route physically divides existing land. It is particularly relevant to situations where access to an essential amenity is impaired.

7.6.2.13 The Guidelines for Environmental Assessment of Road Traffic note that the term severance is used to describe a complex series of factors. It goes on to state that:

"the measurement and prediction of severance is extremely difficult. The correlation between the extent of the severance and the physical barrier of a road is not clear and there are no predictive formulae which give simple relationships between traffic factors and levels of severance."

7.6.2.14 A number of factors are identified in the Guidelines for the Environmental Assessment of Road Traffic to assess new severance relating to new routes, including road width, traffic speeds, crossing facilities, and existing crossing provision. Three main indicators for the assessment of separation have been formulated from studies of changes in traffic flow on observed links and are discussed in the Guidelines for Environmental Assessment of Road Traffic. It should be noted that these are intended as guidelines only and are highly dependent upon ambient traffic levels. The following indicators are set out in the Guidelines:

- <30% flow increase – negligible separation effects;
- 30% flow increase – slight separation effects;
- 60% flow increase – moderate separation effects; and
- 90% flow increase – substantial separation effects.

7.6.2.15 The 2022 traffic flows including the addition of traffic generated by the operational phase of the Proposed Development (2022 Assessment) is detailed in the table below, together with the percentage increase in flows relative to the 2022 baseline traffic flows.

Table 7.4 – AADT Assessment

Road Name	2022 AADT Base	2022 AADT Assessment	Percentage Increase (%)
A417	4623	4723	2.2%

7.6.2.16 As shown in Table x above, the Proposed Development is estimated to have a 2.2% increase in traffic when compared to the baseline flows.

7.6.2.17 The Proposed Development would therefore have a negligible magnitude of change on severance and the significance of impact would be neutral in EIA terms.

Accidents and Road Safety

7.6.2.18 A detailed review of the accident records for the most recent five-year period available is included within the TS and does not identify any material concerns with regard to the Proposed Development given that one slight accident was recorded in the area in the vicinity of the site.

7.6.2.19 The Proposed Development would therefore have a negligible magnitude of change on accidents and road safety and the significance of impact would be neutral in EIA terms.

7.7 Mitigation

7.7.1 Construction Phase Mitigation

7.7.1.1 Effects on transport during the construction phase of the Development are below the level requiring assessment and would be lower than the effects of the operational phase.

7.7.1.2 A Construction Environment Management Plan will be prepared following any grant of planning permission to detail the proposed construction traffic routes.

7.7.1.3 During construction appropriate measures will be put in place to limit any secondary effects on transportation and will ensure that wheel-washing of construction vehicles and other appropriate cleaning is carried out prior to departing the site, and that all loads are properly secured.

7.7.1.4 A routing plan has been produced to inform drivers of the permitted and restricted routes, as shown on Figure 4.1 in the supporting TS. Information on permitted routes will be communicated to all construction contractors and displayed on-site, with drivers also being informed that they will face disciplinary action if caught contravening. It is also anticipated that the HGV routing plan will be conditioned as part of any planning permission.

7.7.2 Operational Phase Mitigation

7.7.2.1 Similar to the construction phase, Information on permitted routes will be communicated to all employed drivers who will also be informed that they will face disciplinary action if caught contravening.

7.7.2.2 With the exception of the above, there are no mitigation measures proposed as part of the development proposals. Therefore, there are no residual effects to assess.

7.8 Assessment Summary

7.8.1.1 The effects of the Proposed Development are detailed in the table below.

Table 7.5 – Summary of Impacts

	Sensitivity	Magnitude of Effect	Significance of Effect	Residual Effect
Driver Delay	Low	Negligible	Neutral	N/A
Public Transport Users	Low	Negligible	Neutral	N/A
Pedestrian Delay	Low	Negligible	Neutral	N/A
Pedestrian Amenity	Low	Negligible	Neutral	N/A
Fear and Intimidation	Moderate	Negligible	Neutral	N/A
Severance	Moderate	Negligible	Neutral	N/A
Accidents and Road Safety	Low	Negligible	Neutral	N/A

7.9 Conclusion

7.9.1 This ES Chapter assesses the likely effects of the Proposed Development on the environment with respect to transport.

7.9.2 Assessments of the effects were undertaken during both the construction and operational stages of the Proposed Development on the following:

- Driver delay;
- Public transport users;
- Pedestrian delay;
- Pedestrian amenity;
- Fear and intimidation;
- Severance; and,
- Accidents and road safety.

7.9.1.1 Effects on transport during the construction phase of the Development are below the level requiring assessment and would be lower than the effects of the operational phase.

7.9.1.2 A Construction Environment Management Plan will be prepared following any grant of planning permission to detail the proposed construction traffic routes which will be briefed-out to contractors and suppliers to instruct traffic associated with the construction of the Proposed Development to use the most appropriate routes.

7.9.1.3 Facilities within the site will be provided for construction workers including car parking, loading and unloading of plant and associated construction materials. A wheel wash area will be provided at a position to be agreed with the Local Authority to reduce the incidence of transfer of mud or loose materials onto the public highway.

7.9.1.4 The adverse residual effects on transport during the operational phase will be neutral.

8 Ecology

8.1 Overview

8.1.1 An Ecological Impact Assessment (EcIA) has been prepared by United Environmental Services Ltd. Reference should be made to Appendix V for the EcIA, which contains full details of surveys undertaken and assessment of potential impacts. The conclusions are presented below.

8.2 Conclusions

8.2.1 The land parcel has an area of approximately 19 hectares. The majority of the site comprises arable farmland, which is bordered by boundary hedgerows and scattered broadleaved trees. There is a small area of broadleaved woodland within the site boundary, and other small woodlands adjacent to the site boundaries. A single pond lies within the site boundary.

8.2.2 The EcIA has identified various impacts up to an international level due to the presence, or potential presence, of protected or priority species within the site boundary or the surrounding area and an internationally designated site within 10km of the site.

8.2.3 Mitigation and compensation measures are provided within section 7 of the EcIA in order to reduce the impacts to insignificant levels. Furthermore, recommendations for enhancements are provided, which could improve the habitats locally following the development, resulting in a moderate positive outcome. This is therefore compliant with Herefordshire Council's local planning policies.

8.2.4 Provided the measures within this report are followed, it is considered that the proposed development will be compliant with all relevant legislation and planning policy and that the aforementioned ecological receptors will not be significantly negatively impacted.

9 Lighting

9.1 Introduction

9.1.1 Reference should be made to Appendix XVIII for a Lighting Impact Assessment completed in support of the application.

9.2 Conclusions

9.2.1 A Lighting Impact Assessment has been undertaken, supported by background survey at the site. Based on the site visit, light survey and 'sky-brightness' mapping, the Proposed Development site and surrounding study area have been classified as falling within ILP Environmental Zone E2. By selecting the appropriate environmental zone, the area to be lit should fit in well with the local environment lighting and its wider surroundings.

9.2.2 The lighting assessment has found no significant effects in the context of the EIA Regulations during the construction or operational phase.

9.2.3 The following mitigation is recommended during the construction phase:

- Construction Lighting Management Plan to be incorporated into the Construction Environmental Management Plan (CEMP).

9.2.4 The following mitigation is recommended during the operational phase:

- Finalised scheme of lighting to be agreed with the Local Planning Authority.

10 Air Quality

10.1 Introduction

10.1.1 Air Quality Legislation and Guidance

10.1.1.1 The following legislation and guidance documents have been consulted during the completion of this Air Quality EIA:

- The Air Quality Standards Regulations 2010 (as amended);
- Environmental Protection Act 1990;
- The Environment Act 1995;
- The Environmental Permitting (England and Wales) Regulations 2016;
- European Union (Withdrawal) Act 2018; and,
- Local Air Quality Management Technical Guidance (16) (LAQM.TG[16]), DEFRA, 2016.

10.1.2 Planning Policy

10.1.2.1 The following planning policies are relevant to air quality:

- National Planning Policy Framework, July 2021;
- National Planning Policy for Waste, October 2014; and,
- Herefordshire Local Plan Core Strategy, Adopted October 2015.

10.1.2.2 Operations at the site will be regulated and controlled under the permitting regime. Paragraph 188 of the NPPF directs that the focus of planning decisions should be on whether proposed development is an acceptable use of land rather than the control of emissions, where these are subject to separate pollution control regimes and that planning decisions should assume that such regimes will operate effectively. As such, this means that controls which will be in place under the permit for emissions to air should not be duplicated as part of the planning process.

10.1.2.3 Similarly, paragraph 7 of NPPW directs that when determining waste planning applications, planning authorities should concern themselves with implementing the planning strategy in the Local Plan and not with the control of processes which are a matter for the pollution control authorities and that they should work on the assumption that the relevant pollution control regime will be properly applied and enforced. In this instance, operations at the site, including emissions to air, will be regulated under the provisions of an EP and there should be no duplication of this permitting control as part of the planning process.

10.1.2.4 Paragraph 185 of the NPPF states the following:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

10.1.2.5 Policy SS6 of the Herefordshire Local Plan Core Strategy states the following:

"Development proposals should conserve and enhance those environmental assets that contribute towards the county's distinctiveness, in particular its settlement pattern, landscape, biodiversity and heritage assets and especially those with specific environmental designations. In addition, proposals should maintain and improve the effectiveness of those ecosystems essential to the health and wellbeing of the county's residents and its economy. Development proposals should be shaped through an integrated approach to planning the following environmental components from the outset, and based upon sufficient information to determine the effect upon each where they are relevant:

…..local amenity, including light pollution, air quality and tranquillity…."

10.1.2.6 Policy RA6 of the Herefordshire Local Plan Core Strategy states:

"Planning applications which are submitted in order to diversify the rural economy will be permitted where they:

……do not cause unacceptable adverse impacts to the amenity of nearby residents by virtue of design and mass, noise, dust, lighting and smell….."

10.1.2.7 It is considered that compliance with the above national and local planning policies relating to air quality has been demonstrated throughout this chapter

10.1.3 Air Quality Standards, Limits and Objectives

10.1.3.1 The table below contains the Air Quality Limit Values (AQLVs) which are relevant to this assessment. These have been obtained from the Air Quality Standards Regulations 2010 (as amended).

Table 10.1 - Air Quality Limit Values

Pollutant	Measured As	Purpose	Air Quality Limit Values
Nitrogen dioxide (NO_2)	1-hour mean	Protection of human health	200μg.m^{-3} (not to be exceeded more than 18 times per calendar year)
	Annual mean	Protection of human health	40μg.m^{-3}
Particulate matter less than 10μm in aerodynamic diameter (PM_{10})	24-hour mean	Protection of human health	50μg.m^{-3} (not to be exceeded more than 35 times per calendar year)
	Annual mean	Protection of human health	40μg.m^{-3}
Particulate matter less than 2.5μm in aerodynamic diameter ($PM_{2.5}$)	Annual mean	Protection of human health	20μg.m^{-3}
Sulphur dioxide (SO_2)	1-hour mean	Protection of human health	350μg.m^{-3} (not to be exceeded more than 24 times per calendar year)

Pollutant	Measured As	Purpose	Air Quality Limit Values
	24-hour mean	Protection of human health	125µg.m^{-3} (not to be exceeded more than 3 times per calendar year)
Carbon monoxide (CO)	Maximum daily running 8-hour mean	Protection of human health	10mg.m^{-3}
Benzene	Annual mean	Protection of human health	5µg.m^{-3}

10.1.4 Environmental Assessment Levels

10.1.4.1 A list of short and long-term EALs relevant to this assessment are presented in the table below. These have been obtained from the government website[4].

Table 10.2 - Environmental Assessment Levels

Substance	Short Term 24-Hour Mean Limit (µg.m^{-3})
Benzene	30

10.1.5 Critical Levels for Protection of Vegetation and Ecosystems

10.1.5.1 The table below contains critical levels for the protection of vegetation at nature conservation sites, obtained from permitting risk assessment guidance on the government website.

Table 10.3 - Critical Levels for the Protection of Vegetation

Pollutant	Critical Levels	
	Concentration (µg.m^{-3})	Measured As
Nitrogen oxide (NO_x, expressed as NO_2	30	Annual mean
	75	Daily mean

[4] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Pollutant	Critical Levels	
	Concentration (µg.m^{-3})	Measured As
SO_2	20 (10µg.m^{-3} where lichens or bryophytes are present)	Annual mean

10.1.6 Critical Loads for Protection of Vegetation and Ecosystems

10.1.6.1 Critical loads are assigned for nitrogen and acid deposition at sensitive ecological sites, above which it is suggested harmful effects on vegetation may occur. Reference has been made to the APIS website to determine site specific critical loads. There are five ancient woodland areas and four Local Wildlife Sites (LWS) within 2km of the site. However, no site specific information is available on critical loads for local nature sites. Therefore, the table below contains worst case critical loads to ensure a precautionary assessment.

Table 10.4 - Site Specific Critical Loads for Nitrogen Deposition

Site	Worst Case Critical Load for Nitrogen Deposition (Kg N.ha^{-1}.Year^{-1})
River Wye Special Area of Conservation (SAC)	10-15
All ancient woodland areas and LWS within 2km	3

Table 10.5 - Site Specific Critical Loads for Acid Deposition

Site	Worst Case Critical Load for Acid Deposition (keq.ha^{-1}.Year^{-1})	
	Nitrogen	Sulphur
River Wye SAC	0.321	0.166
All ancient woodland areas within 2km	0.1	0.1

10.1.7 Environmental Regulation

10.1.7.1 An EP will be required to be in place for the site to operate, regulated by the EA. This means that potential impacts on air, land and water as a results of site operations will be fully regulated and controlled under the permitting regime. As such, operational phase

mitigation outlined within this chapter will need to be agreed with the EA as part of the permit application process. In accordance with the NPPF and NPPW, these controls and regulation should not be duplicated under the planning regime.

10.1.8 Dust

10.1.8.1 The Local Authority is obliged, where statutory complaint about dust nuisance is made, to take steps to investigate in accordance with Part III of the Environmental Protection Act (1990). Where assessment of 'nuisance' dust impacts is made within this assessment, consideration has been given to potential to cause statutory nuisance.

10.1.8.2 The term 'nuisance dust' is so defined as a result of the potential to lead to statutory nuisance complaints, if present in high enough concentration. Nuisance related dust includes coarser particulate matter >10µm in diameter, which will have the potential to travel varied distances from a source, dependent on particle size. Particles >30µm in diameter will largely deposit within 100m of a source, whilst intermediate sized particles (10-30µm) may travel up to 500m from a source. Although such dust has the potential to cause short and long term chronic health impacts, this is defined as nuisance dust since if the rate of soiling (deposition) becomes rapid enough, it may lead to nuisance complaints.

10.1.8.3 There are no UK or European standards for nuisance related dust. However, in the UK, a dust deposition rate of 200mg.m^{-2}.day^{-1} is generally used as the threshold above which complaints are possible. Literature suggests that significant impacts on vegetation are not likely to occur at deposition rates of less than 1000mg.m^{-2}.day^{-1}.[5]

[5] Interim Advice Note 61/05 – Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs (Supplement to DMRB 11.3.1).

10.1.8.4 Finer particulate matter (PM_{10}), which would be expected to make up the smallest proportion of particulate emissions from the proposed activities, will be deposited more slowly and may travel up to 1,000m from a source.

10.1.8.5 Dust may directly impact on plants through physically smothering leaves. If the level of dust deposition is high enough, it can lead to adverse impacts upon photosynthesis, respiration and transpiration. It has been reported in literature that most sensitive vegetation species are affected by dust deposition levels in excess of 1,000mg.m^{-2}.day^{-1} and that even the most sensitive vegetation species appear to be unaffected until dust deposition are at levels considerably greater than this[5].

10.2 Assessment Methodology

10.2.1 Construction Phase Dust Emissions

10.2.1.1 The estimation of potential dust impacts from construction works is subjective and the risk that an adverse impact will arise will depend on a number of factors such as handling methods, distance between site and sensitive receptors and also the weather conditions, such as wind speed and direction and rainfall.

10.2.1.2 In order to quantify potential dust impacts associated with construction works, reference has been made to guidance issued by the IAQM[6] on the Impacts of dust from demolition and construction.

10.2.1.3 The IAQM guidance advises a five step process to assessing potential construction phase dust impact as follows:

- STEP 1 – Screen the requirement for a more detailed assessment – no further assessment required if there are no receptors within a certain distance of the works;

[6] Guidance on the Assessment of Dust from Demolition and Construction, IAQM, 2014.

- STEP 2 – Assess the risk of dust impacts for four construction categories, including demolition, earthworks, construction and trackout;
- STEP 3 – determine site specific mitigation for each category in STEP 2;
- STEP 4 – Examine residual effects and determine whether or not these are significant; and,
- STEP 5 – Prepare the dust assessment report.

STEP 1 – Screening the Need for More Detailed Dust Assessment

10.2.1.4 IAQM guidance states that an assessment (of dust) will normally be required when there is:

- a 'human receptor' within:
  - 350 m of the boundary of the site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to -
  - 500 m from the site entrance(s); or,
- an 'ecological receptor' within:
  - 50 m of the boundary of the site; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

10.2.1.5 As there are dust sensitive receptors within 350m, an assessment of potential dust impacts has been undertaken following Steps 2, 3, 4 and 5 of the IAQM method, which are detailed below.

STEP 2 – Assessing Risk of Dust Impacts

10.2.1.6 The risk of dust arising is evaluated using four risk categories, negligible, low, medium and high risk. The risk category is determined based on the following two factors:

- The scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (STEP 2A); and

- The sensitivity of the area to dust impacts (STEP 2B), which is defined as low, medium or high sensitivity.

STEP 2A – Defining the Potential Dust Emission Magnitude

10.2.1.7 The following table outlines the generic criteria used to assess dust emission magnitude, based on the IAQM guidance.

Table 10.6 – Generic Criteria for Assessing Potential Dust Emission Magnitude

Dust Emission Magnitude	Criteria
Large	Dust – Earthworks Total site area >10,000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes Dust – Construction Total Building volume >100,000m^3, on site concrete batching, sandblasting Dust – Trackout >50 HDV (>3.5t) outward movements in any one day potentially dusty surface material (e.g. high clay content), unpaved road length >100m
Medium	Dust - Earthworks Total site area 2,500m^2 – 10,000m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes Dust – Construction Total building volume 25,000m^3 – 100,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching Dust - Trackout 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m

Dust Emission Magnitude	Criteria
Small	Dust - Earthworks Total site area <2,500m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months Dust – Construction Total building volume <25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber) Dust - Trackout <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

STEP 2B – Defining the Sensitivity of an Area

10.2.1.8 The IAQM guidance advises that the sensitivity of an area takes account of a number of factors as follows:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM_{10}, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

10.2.1.9 The table below outlines criteria used to assess sensitivity of individual receptors to dust soiling (nuisance) and health effects of PM_{10}, based on the IAQM guidance.

Table 10.7 – Receptor Sensitivity Criteria for Dust Emissions

Sensitivity of Receptor	Criteria
High	Nuisance related dust Indicative examples include dwellings, schools, museums and other culturally important collections, medium and long term car parks and car showrooms. Internationally designated European sites PM_{10} Arising from Dust from Construction Works Residential properties, hospitals, schools and residential care homes

Sensitivity of Receptor	Criteria
Medium	Nuisance related dust Indicative examples include parks and places of work. Nationally designated European sites. PM_{10} Arising from Dust from Construction Works Office and shop workers
Low	Nuisance related dust Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads. Ecological sites of local importance. PM_{10} Arising from Dust from Construction Works Public footpaths, playing fields, parks and shopping streets

10.2.1.10 The tables below show the matrices used to define the sensitivity of an area to dust impacts for nuisance and health related effects, which are based upon the IAQM guidance.

Table 10.8 – Criteria Used for Assessing Sensitivity of Area to Dust Soiling (Nuisance) Effects on People and Property

Sensitivity of Receptor	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 10.9 – Criteria Used for Assessing Sensitivity of Area to Human Health Impacts from PM_{10} Associated with Dust Arising from Construction Works

Sensitivity of Receptor	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32µg.m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32µg.m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28µg.m^{-3}	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low

Sensitivity of Receptor	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
	<24µg.m^{-3}	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

STEP 2C – Defining the Risk of Dust Impacts

10.2.1.11 In accordance with the IAQM guidance, the dust emission magnitude is combined with the defined sensitivity of an area to determine the risk of dust impacts with no mitigation applied. The IAQM guidance advises that for cases where a 'negligible' risk category is assigned, no mitigation measures beyond those required by legislation will be required. The method for assigning the level of risk for each construction activity is outlined in the tables below, based on the IAQM guidance.

Table 10.10 – Criteria Used for Assessing Risk of Dust Impacts from Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible Risk

Table 10.11 – Criteria Used for Assessing Risk of Dust Impacts from Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible Risk

Table 10.12 – Criteria Used for Assessing Risk of Dust Impacts from Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Medium	Medium Risk	Low Risk	Negligible Risk
Low	Low Risk	Low Risk	Negligible Risk

STEP 3 – Site Specific Mitigation

10.2.1.12 The dust risk categories determined in STEP 2C above should be used to define appropriate mitigation. The IAQM guidance outlines suitable mitigation measures for high, medium and low risk sites.

STEP 4 – Determining Significant Effects

10.2.1.13 Throughout this ES, potential significance of impacts have been assessed before and after mitigation to assess the effectiveness of mitigation. However, IAQM recommends that significance is only assigned to the effect after mitigation, stating that in the case of demolition/construction, it is assumed that mitigation (secured by planning conditions, legal requirements or required by regulations) will ensure that a potential significant adverse effect will not occur, so the residual effect will normally be 'not significant'. The same IAQM guidance also states that for almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation, experience showing that this is normally possible. Therefore, the residual effect will normally be 'not significant'. As such, the IAQM guidance does not provide a method for determining significance of pre-mitigation impacts, which have therefore not been considered in this assessment.

10.2.2 Vehicle Exhaust Emissions

10.2.2.1 The tables below outline the indicative criteria used to assess sensitivity of receptors to vehicle exhaust emissions and receptor sensitivity.

Table 10.13 – Criteria Used to Assess Magnitude of Impact from Vehicle Exhaust Emissions

Magnitude of Change	Criteria
Major	Change in ambient pollution concentration >10% of annual mean AQLV
Moderate	Change in ambient pollution concentration of 5-10% of annual mean AQLV
Slight	Change in ambient pollution concentration of 1-5% of annual mean AQLV
Negligible	Change in ambient pollution concentration <1% of annual mean AQLV

Table 10.14 – Criteria Used to Assess Sensitivity of Receptor to Vehicle Exhaust Emissions

Sensitivity of Receptor	Criteria
High	Background pollutant concentrations ≥75% of AQLV
Medium	Background pollutant concentrations ≥50%<75 % of AQLV
Low	Background pollutant concentrations <50% of AQLV

10.2.3 Odour, CHP, Flare and Backup Boiler Emissions

10.2.3.1 Given that emissions associated with the flare, backup boilers and CHP units and potential odour emissions arising from site operations will be controlled under an EP, the assessment methodology followed to assess such impacts has accorded with government permitting risk assessment guidance and established permit application procedures. In the case of odour, such issues have been addressed within a comprehensive Odour Management Plan (OMP). Details of assessment methodology are included within the reports contained within Appendix VII and XIII. Given that such controls should not be duplicated under the planning regime, this is the most appropriate approach to assessment of potential impacts in this regard.

10.3 Baseline Conditions

10.3.1 Review of Air Quality Across Herefordshire

10.3.1.1 Local Authorities (LAs) are required to undertake a review and assessment of air quality within their area of jurisdiction under Section 82 of part IV of the Environment Act (1995). For areas where AQLVs are not expected to be achieved, the LA is obligated to undertake detailed assessment, involving modelling of pollutant emissions. Subsequently, if AQLVs are not predicted to be met, the LA must declare an Air Quality Management Area (AQMA). The latest DEFRA technical guidance on Air Quality Management, Technical Guidance for Local Air Quality Management 2016 (LAQM.TG(16)), directs that an Annual Status report must be submitted by each LA by 30 June of each year.

10.3.1.2 The latest air quality progress report available on the HCC website is the 2020 ASR.[7] There are two AQMAs declared in Herefordshire at present. These are declared for NO_2 as follows:

- Hereford AQMA – The A49(T) corridor in Hereford, extending from Holmer Road in the North to Belmont Road in the South and extending East along New Market/Blue School Street and West along Eign Street as far as Barton Yard; and
- Bargates Leominster AQMA – An area encompassing the junction between the A44 Bargates and B4361 Dishley Street/Cursneh Road in Leominster.

10.3.1.3 The above AQMAs are all located several kilometres from the proposed site. As such, they have not been considered further in this assessment as they will not be impacted by the proposals given the distance from the site and it is not anticipated that any HGVs associated with the development will travel through these AQMAs.

[7] 2020 Air Quality ASR, HCC, April 2021.

10.3.2 Air Quality Monitoring Data

Continuous Monitoring Data

10.3.2.1 The Automatic Urban and Rural Network (AURN) is a network of air pollution monitoring stations across the UK, managed and co-ordinated by Bureau Veritas on behalf of DEFRA. The main purpose of the network is to enable the government to assess air quality at different locations to aid with the implementation of suitable policy measures for protection of human health.

10.3.2.2 The closest AURN monitoring station to the proposed site is Leominster. This is a suburban background monitoring location situated at least 17km from the site. With consideration to the proximity of this monitoring location to the proposed site and the nature of the location, which is situated close to an urban environment, it was not considered that it would provide a suitably representative source of background monitoring data for use in this assessment. Therefore, it was not considered further for this purpose.

10.3.2.3 HCC maintain a continuous monitoring location on Victoria Street, Hereford. However, this is a roadside monitoring location, located within a major urban environment, approximately 12km from the site. Given the distance from the site and nature of the monitoring location, it was not considered this would provide a suitable source of background data for use in this assessment. Therefore, it was not considered further for this purpose.

Diffusion Tubes

10.3.2.4 NO_2 diffusion tubes are deployed at numerous locations throughout the HCC area. However, these are all location several kilometres from the site and mostly comprise roadside/urban background locations. Given the distance from the site, it was not considered that these would provide a suitable source of background data for use in this assessment. Therefore, they were not considered further for this purpose.

Non-Automatic Hydrocarbon Network

10.3.2.5 The Non-Automatic Hydrocarbon Network includes sites which measure ambient benzene concentrations at various locations around the United Kingdom. The closest monitoring location to the proposed site is Newport, which is an urban background monitoring location, situated approximately 63km to the South-South-West of the site. Given the nature of this monitoring location and distance from the site, it was not considered that this would provide a suitable source of background data for use in this assessment. Therefore, it was not considered further for this purpose.

10.3.3 Background Pollutant Mapping Data

10.3.2 The DEFRA website contains background pollutant mapping data for NO_x, NO_2, PM_{10}, $PM_{2.5}$, SO_2 and benzene on a 1km by 1km grid square basis across the UK. This data is routinely used for assessing background pollutant concentrations where no suitably representative air pollution monitoring data exists. The archive is maintained by AEA on behalf of DEFRA. NO_x and NO_2 data is available for each grid square for the years 2018 to 2030. Background mapping of CO, SO_2 and benzene is only available for 2001. Future year predictions of CO and benzene have been calculated using the appropriate year adjustment factors contained on the DEFRA website. The annual mean concentration for SO_2 has been calculated as 75% of the 2001 mapped concentration, in accordance with previous LAQM guidance. The table below contains background pollutant concentrations for the grid square containing the site.

Table 10.15 - Background Pollutant Mapping Data for Grid Square 360500, 245500

Pollutant	2022 Annual Mean Pollutant Concentration ($\mu g.m^{-3}$) within Grid Square Containing Site
NO_x	5.38
NO_2	4.31
PM_{10}	12.72
$PM_{2.5}$	7.31

Pollutant	2022 Annual Mean Pollutant Concentration (µg.m^{-3}) within Grid Square Containing Site
CO	87.81
SO_2	1.06
Benzene	0.11

10.3.1 Summary of Background Data Used in Assessment

10.3.3 The table below summarises the background data used within this assessment. In lieu of any suitably representative monitoring data in the vicinity of the site, DEFRA mapped background data has been used to derive suitable background concentrations for use in the assessment.

Table 10.16 - Summary of Background Data Used in Assessment

Pollutant	Annual Mean Background Concentration (µg.m^{-3})	1-Hour Mean (µg.m^{-3})[(a)]	24-Hour Mean (µg.m^{-3})[(b)]	8-Hour Mean (µg.m^{-3})[(c)]	15-Minute Mean (µg.m^{-3})[(d)]	Source of Annual Mean Background Data
NOx	5.38	N/A	6.35	N/A	N/A	DEFRA Mapped Background Data
NO2	4.31	8.62	N/A	N/A	N/A	DEFRA Mapped Background Data
PM10	12.72	N/A	15.29	N/A	N/A	DEFRA Mapped Background Data
PM2.5	7.31	N/A	N/A	N/A	N/A	DEFRA Mapped Background Data
SO2	1.06	2.12	1.25	N/A	2.84	DEFRA Mapped Background Data
CO	87.81	175.62	N/A	122.93	N/A	DEFRA Mapped Background Data
Benzene	0.11	0.22	N/A	N/A	N/A	DEFRA Mapped Background Data

N.B (a) 1-hour mean concentration assume to be twice annual mean background concentration in accordance with relevant guidance
(b) 24-hour mean concentration provided by multiplying 1-hour mean concentration by factor of 0.59 in accordance with standard practice
(c) 8-hour mean concentration provided by multiplying 1-hour mean concentration by factor of 0.7 in accordance with standard practice
(d) 15-minute mean concentration provided by multiplying 1-hour mean concentration by factor of 1.34 in accordance with standard practice

10.3.1 Dust Sensitive Receptors

10.3.1.1 The tables below outline the sensitivity of areas to dust within each distance band from the dust sources assessed, which has been assessed in accordance with the methodology outlined in Section 10.2. The number of receptors within each sensitivity class and distance banding have been estimated, and the sensitivity of the area classified in accordance with the methodology outlined in Section 10.2.1. In accordance with the IAQM guidance, only the highest defined area sensitivity from each table has been considered further. In order to ensure a worst case assessment in the case of dust from construction works on site, distances have been measured from the proposed site boundary to ensure a worst case scenario.

Table 10.17 – Sensitivity of Area to Nuisance Related Dust from Construction Works on Site

Distance from Source (m)	Receptor Sensitivity	Number of Receptors Within Each Sensitivity Class Within Distance Band	Sensitivity of Area
<20	Low	>1	Low
	Medium	0	Not sensitive
	High	0	Not sensitive
<50	Low	>1	Low
	Medium	0	Not sensitive
	High	1	Low
<100	Low	>1	Low
	Medium	0	Not sensitive
	High	6	Low
<350	Low	>1	Low
	Medium	0	Not sensitive
	High	6	Low
OVERALL SENSITIVITY OF AREA			**LOW**

Table 10.18 – Sensitivity of Area to Nuisance Related Dust from Trackout

Distance from Source (m)	Receptor Sensitivity	Number of Receptors Within Each Sensitivity Class Within Distance Band	Sensitivity of Area
<20	Low	>1	Low

Distance from Source (m)	Receptor Sensitivity	Number of Receptors Within Each Sensitivity Class Within Distance Band	Sensitivity of Area
	Medium	>1	Medium
	High	0	Not sensitive
<50	Low	>1	Low
	Medium	>1	Medium
	High	0	Not sensitive
OVERALL SENSITIVITY OF AREA			MEDIUM

Table 10.19 – Sensitivity of Area to Ecological Impacts

Distance from Source (m)	Receptor Sensitivity	Number of Receptors Within Each Sensitivity Class Within Distance Band	Sensitivity of Area
<20	Low	1	Low
	Medium	0	Not sensitive
	High	0	Not sensitive
<50	Low	1	Low
	Medium	0	Not sensitive
	High	0	Not sensitive
OVERALL SENSITIVITY OF AREA			LOW

Table 10.20 – Sensitivity of Area to Health Related Impacts from PM_{10} Associated with Dust from Construction Works

Distance from Source (m)	Receptor Sensitivity	Number of Receptors Within Each Sensitivity Class Within Distance Band	Sensitivity of Area
<20	Low	>1	Low
	Medium	0	Not sensitive
	High	0	Not sensitive
<50	Low	>1	Low
	Medium	0	Not sensitive
	High	1	Low
<100	Low	>1	Low
	Medium	0	Not sensitive

Distance from Source (m)	Receptor Sensitivity	Number of Receptors Within Each Sensitivity Class Within Distance Band	Sensitivity of Area
	High	6	Low
<200	Low	>1	Low
	Medium	0	Not sensitive
	High	6	Low
<350	Low	>1	Low
	Medium	0	Not sensitive
	High	6	Low
OVERALL SENSITIVITY OF AREA			LOW

Table 10.21 – Sensitivity of Area to Health Related Impacts from PM_{10} Associated with Dust from Trackout

Distance from Source (m)	Receptor Sensitivity	Number of Receptors Within Each Sensitivity Class Within Distance Band	Sensitivity of Area
<20	Low	0	Not sensitive
	Medium	0	Not sensitive
	High	0	Not sensitive
<50	Low	0	Not sensitive
	Medium	0	Not sensitive
	High	0	Not sensitive
OVERALL SENSITIVITY OF AREA			NOT SENSITIVE

10.3.1.2 The table below contains a list of all identified vehicle exhaust emission sensitive receptors. The locations identified are those which are in closest proximity to vehicle routes to ensure a worst-case assessment. Reference should be made to Appendix XV Figure 1 for a graphical representation of these locations.

Table 10.22 – Identified Vehicle Exhaust Emission Sensitive Receptors

Receptor Identifier	Receptor description	NGR (m)		Sensitivity of Receptor
		X	Y	
V1	Property off A417	361095.6	245914.6	Low
V2	Property off A418	361122.3	245897.6	Low
V3	The Lodge	361228.3	245876.2	Low
V4	Orchard Cottage	360090.7	246708.6	Low

10.3.1.3 The table below contains a list of all identified receptors sensitive to emissions from the CHP units, backup boilers and flare. Reference should be made to Appendix XV Figure 2 for a graphical representation of these locations.

Table 10.23 – Receptors Sensitive to Emissions from CHP Units, Backup Boilers and Flare

Receptor Identifier	Receptor description	NGR (m)	
		X	Y
R1	Residential property at Whitwick Manor	360947.8	245714.7
R2	Residential property at Whitwick Manor	360963.4	245706.3
R3	Residential property at Whitwick Manor	360993.7	245703.4
R4	Residential property at Whitwick Manor	361082.1	245901
R5	Residential property at Whitwick Manor	361110	245886.8
R6	The Lodge	361225.9	245877.5
R7	Upper Mitchell's Cottages	361351.4	245702.3
R8	Lower Mitchell's Cottages	361387.3	245379.5
R9	Residential property off A417	361551.9	245140
R10	Residential property off A4103	361521.3	244939.5

Receptor Identifier	Receptor description	NGR (m)	
		X	Y
R11	The Conifers	361387.3	244887.8
R12	Residential property off A4103	361209	244827.7
R13	Wharf House	360762.1	244293.8
R14	Residential property at Boundary Land	359729.7	245608.4
R15	Residential property	359950.8	246023.4
R16	Residential property at Woods End	360519.7	246342.5
R17	Gardeners Cottage	361313.4	246558
R18	The Coach House	361475.9	246496.8
R19	Ancient Replanted Woodland/Local Wildlife Site	360778	246074
R20	Ash Coppice Ancient Woodland/Local Wildlife Site	360342	245320
R21	Ash Bed Ancient Woodland	359126	246318
R22	Long Coppice Ancient Woodland	359977	246888
R23	Local Wildlife Site	362202	246139
R24	Local Wildlife Site	359468	244190

10.4 Construction Phase Impacts

10.4.1 Potential air quality impacts during construction works includes the following:

- Wind blown dust during site excavation, preparation and construction works;
- Emissions from construction phase road traffic; and,
- Release of volatile organic compounds (VOCs) from stored liquids on site.

Dust

10.4.2 Emissions of dust may arise during the construction phase as a result of the following activities:

- Excavation and ground works;

- Building construction works;
- Storage of materials in external stockpiles; and,
- Delivery of materials to site.

10.4.3 Fugitive emissions of dust may occur from wind whipping of raw materials in open stockpiles, from dust raised from the ground by construction phase traffic, during unloading of raw materials from delivery trucks, during excavation of material to prepare site and during the construction of structures. The level of potential dust impact will depend on a number of factors including the type of activities, duration of activities, proximity to receptors and prevailing meteorological conditions. The potential for significant impacts from nuisance related dust would normally be expected to occur within 100m of a construction site. Beyond 200m, impacts would not normally be expected to be significant. The sensitivity of the surrounding area was outlined within section 10.2, in accordance with IAQM guidance. Using this same guidance, potential dust risk has been quantified in the table below. The dust emission magnitude for each activity has been determined in accordance with IAQM guidance. Given that the total site area exceeds 10,000m^2, a large dust emission magnitude has been predicted for earthworks. Given that the volume of the building(s)and structures to be constructed will be >100,000m^3, a large dust emission magnitude has been predicted for the construction activity. Given that up to 10 to 50 Heavy Duty Vehicles (HDVs) are anticipated to leave the site each day associated with construction works, a medium dust emission magnitude has been predicted for the trackout activity.

10.4.4 Based on the dust emission magnitude and sensitivity of receptors, potential unmitigated dust risk has been quantified in the table below. For all categories considered, the dust risk is predicted to be low, in accordance with the relevant guidance. Therefore, any potential unmitigated dust impacts are predicted to be minor at worst and can be adequately mitigated by the measures recommended in Section 10.6.

Table 10.24 – Potential Unmitigated Dust Emission Impact Magnitude and Overall Dust Risk at Sensitive Receptors

Activity	Dust Emission Magnitude	Dust Risk – Dust soiling (nuisance)	Dust Risk – Human Health	Ecological
Earthworks	Large	Low Risk	Low Risk	Negligible
Construction	Large	Low Risk	Low Risk	Negligible
Trackout	Medium	Low Risk	Low Risk	Low Risk

Vehicle Exhaust Emissions

10.4.5 The relevant guidance[8] indicates that detailed assessment of vehicle exhaust emissions should be undertaken if the following thresholds are exceeded:

- A change of Light Duty Vehicle (LDV) flow of:
  - more than 100 AADT within or adjacent to an Air Quality Management Area (AQMA); and/or
  - more than 500 AADT elsewhere; and/or,
- A change of Heavy Duty Vehicle (HDV) flows of:
  - more than 25 AADT within or adjacent to an AQMA; and/or
  - more than 100 AADT elsewhere

10.4.6 It is anticipated that up to 2684 HGVs will visit the site over the course of the construction programme over a period of 18 months. When averaged, this works out at 9.8 HGVs per day. In addition, it is anticipated that there will be up to 22 cars/small vans visiting the site each day, associated with construction phase works. The stated number of car and HGV movements associated with construction works are significantly less than the thresholds identified above. As such, a qualitative assessment of construction phase vehicle exhaust emissions has been undertaken.

[8] Land-Use Planning & Development Control: Planning for Air Quality, EPUK and IAQM, January 2017.

10.4.7 Impacts from vehicle exhaust emissions are predicted to be negligible in magnitude at receptors of low sensitivity, resulting in an overall impact significant which is neutral. This is a qualitative prediction which has been made based on the anticipated increase in pollution concentrations and existing background pollutant concentrations. Furthermore, the relevant guidance advises that if the thresholds identified in paragraph 10.4.5 are not exceeded, then the overall impact can be described as insignificant.

Release of Volatile Organic Compounds from Stored Liquids

10.4.8 Fugitive release of VOC compounds may occur during storage of liquids used in the construction process. Fugitive VOC release can occur due to leaks, spillages and container overloading. This can potentially lead to health impacts on the construction workforce and impacts on local air quality. This has potential to generate unmitigated impacts which are slight negative in magnitude at receptors of medium sensitivity, resulting in an unmitigated impact significance which is minor to moderate, adverse. However, a series of good practice measures are outlined later within this chapter. Provided these are implemented, it is considered that these should be sufficient to adequately control any potential impacts.

10.5 Operational Phase Impacts

10.5.1 Potential air quality impacts during operations includes the following:

- Odour from the operation;
- Vehicle exhaust emissions including PM_{10}, $PM_{2.5}$ and NO_2 associated with HGVs and cars visiting the site;
- Residual emissions from the stack(s) serving the CHP plant and backup boilers; and,
- Flare emissions.

Vehicle Exhaust Emissions

10.5.2 The change in AADT flow on the surrounding road network will 71.79 for HDVs and for 16 for LDVs. These volumes are significantly less than the thresholds identified within the

IAQM guidance, above which detailed assessment is required. As such, a qualitative assessment of operational phase vehicle exhaust emissions has been undertaken.

10.5.3 Impacts from vehicle exhaust emissions are predicted to be negligible in magnitude at receptors of low sensitivity, resulting in an overall impact significant which is neutral. This is a qualitative prediction which has been made based on the anticipated increase in pollution concentrations and existing background pollutant concentrations. Furthermore, the relevant guidance advises that if the thresholds identified in paragraph 10.4.5 are not exceeded, then the overall impact can be described as insignificant.

Odour

10.5.4 An EP will be required for operations at the site, controlling emissions to air, land and water, including odour. As such, odour controls will be agreed with the EA as part of the permitting process. In accordance with paragraph 188 of the NPPF and paragraph 7 of NPPW, such control should not be duplicated under the planning regime and the LPA must trust that the permitting regime will operate effectively. However, an OMP has been prepared for the site and is included within Appendix XIII. This has been drafted to meet permitting requirements and outlines the comprehensive mitigation measures which will be in place to control odour. This will need to be agreed with the EA as part of the permitting process and therefore has been provided for information purposes within this planning application. Provided the measures within the OMP are followed, potential impacts are not predicted to be significant in terms of odour.

CHP, Flare and Backup Boiler Emissions

10.5.5 Similarly to odour, emissions from the CHP plant, backup boilers and flare will be controlled under an EP, regulated by the EA and in accordance with the NPPF and NPPW, such controls should not be duplicated under the planning process. However, detailed assessment (modelling) of potential impacts as a result of such emissions has been undertaken. Reference should be made to Appendix VII for the assessment which contains full details of assessment methodology and results. This has demonstrated that

potential impacts will not be significant as a result of residual air emissions from the process.

10.6 Mitigation

10.6.1 Construction Phase Mitigation

10.6.1.1 The construction phase will be short term and temporary, anticipated to last for approximately 18 months. Therefore, the potential minor unmitigated impacts predicted in the previous section will not be long term. However, the following outlines a series of dust mitigation measures which are recommended during construction works. This is largely a set of good practice measures which are considered adequate to control potential dust impacts that may occur during construction works, in accordance with the relevant guidance:

- Name and contact details of person(s) accountable for air quality and dust issues should be displayed on the site boundary. This may be the environment manager/engineer or the site manager;
- A construction Dust Management Plan (DMP) will be created, including appropriate measures for control of dust from construction works;
- Contact details for the operator will be displayed at the site entrance;
- Any complaints related to dust will be logged and actions taken and if attributed to construction operations, appropriate measures will be taken to reduce the impacts and actions taken will be recorded. A record of complaints will be made available to the Local Authority on request;
- A record of any exceptional incidents that cause dust and/or air emissions, either on or offsite will be kept, and the action taken to resolve the situation maintained in the log book;
- Regular site inspections to monitor compliance with the DMP should be undertaken, inspection results recorded, and inspection log made available to the local authority when asked;

- The frequency of site inspections should be increased by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Avoid site runoff of water or mud;
- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- Avoid bonfires and burning of waste materials;
- Sheeting of vehicles transporting potentially dusty loads to and from site;
- Wetting of any materials stockpiles to prevent wind whipping of materials;
- Use of road sweeper, as necessary, to remove and prevent trackout of material onto the highway; and,
- Cleaning of any spillages using wet cleaning methods.

10.6.1.2 In order to minimise risk of VOC release from liquids used in construction process, the following guidelines should be followed during the construction phase of the farm:

- Pollution Prevention Guideline 2: Above Ground Oil Storage Tanks; and,
- Pollution Prevention Guideline 26: Storage and Handling of Drums and Bulk Containers.

10.6.1.3 Specifically, the following guidelines should be adhered to:

- The primary storage containers will be of sufficient strength and integrity to ensure they do not burst or leak;
- A secondary container should be used to contain any spillages that may occur from the primary container;
- Secondary containers should have sufficient capacity to store 25% of the total volume of liquids being stored, or 110% of the largest container, whichever is the greater;
- There should be no drainage outlets from storage containers;
- Containment facilities should be inspected regularly; and,
- Spill kits and suitable personal protective equipment should be made available on site.

10.6.2 Operational Phase Mitigation

10.6.2.1 The following operational phase mitigation measures are considered adequate to control potential air quality impacts during site operations.

Odour Control

10.6.2.2 An OMP will be implemented during the day to day operations at the site, which contains appropriate measures to control odour to acceptable levels surrounding the proposed AD plant. Reference should be made to Appendix XIII for a copy of the OMP which outlines the comprehensive measures that are proposed for odour control. As has been outlined above, odour will be controlled under the EP and in accordance with the NPPF and NPPW, this control should not be duplicated under the planning regime. As such, the measures within the OMP will need to be agreed with the EA as part of the permitting process.

Emissions Control for CHP Units, Backup Boilers and Flare

10.6.2.3 Elevated flues/stacks will be used to dilute and disperse residual emissions of pollutants arising from the process. The EP will contain a series of emission limits for the CHP and flare, which the operator will be required to comply with. Compliance will need to be

demonstrated by periodic monitoring. These controls will be regulated and enforced by the EA as part of the permitting process, which should not be duplicated under the planning regime. The modelling report in Appendix VII has demonstrated that with the above controls in place, residual impacts from point source emissions will not be significant.

10.7 Residual Impacts

10.7.1 Construction Phase

10.7.1.1 Provided the mitigation measures identified in the previous section are followed/implemented, all potential impacts arising from construction works are predicted to be negligible in magnitude, neutral in significance. Despite the increase in vehicle movements on the surrounding highway network, residual impacts from vehicle exhaust emissions have been assessed to be neutral in significance at all identified receptors. The dust mitigation measures outlined within the previous section are considered sufficient to control potential dust impacts to an acceptable level.

10.7.2 Operational Phase

10.7.2.1 Provided the mitigation measures identified in the previous section are followed/implemented, all potential adverse operational phase air quality impacts are predicted to be negligible in magnitude, neutral in significance. Despite the increase in vehicle movements on the surrounding highway network, residual impacts from vehicle exhaust emissions have been assessed to be neutral in significance at all identified receptors. Potential emissions from site operations will be controlled under the EP. As such, confidence is high that sufficient controls will be in place to control potential impacts to an acceptable level.

10.8 Cumulative Impacts

10.8.1 The site is relatively isolated. There are no other significant developments in close proximity to the proposed site and a search on the HCC website also shows no other

major applications having been submitted for proposals in the vicinity of the site within the last five years. As such, there is no potential for cumulative air quality impacts during the construction or operational phase of the development.

10.9 Summary of Impacts

10.9.1 The tables below contain a summary of potential air quality impacts before and after mitigation for both the construction and operational phases of the development respectively.

Table 10.25 - Summary of Impacts for the Construction Phase

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
Dust sensitive receptors	Dust from earthworks Dust from construction Dust from trackout	N/A	• Name and contact details of person(s) accountable for air quality and dust issues will be displayed on the site boundary. This may be the environment manager/engineer or the site manager; • A construction Dust Management Plan (DMP) will be created, including appropriate measures for control of dust from construction works; • Contact details for the operator will be displayed at the site entrance; • Any complaints related to dust will be logged and actions taken and if attributed to construction operations, appropriate measures will be taken to reduce the impacts and actions taken will be recorded. Complaints will be made available to the Local Authority on request; • A record of any exceptional incidents that cause dust and/or air emissions, either on- or offsite will be kept, and the action taken to resolve the situation in the log book; • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked; • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions;	Neutral

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
			• Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site; • Avoid site runoff of water or mud; • Ensure all vehicles switch off engines when stationary - no idling vehicles; • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems; • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate; • Use enclosed chutes and conveyors and covered skips; • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; • Avoid bonfires and burning of waste materials; • Sheeting of vehicles transporting potentially dusty loads to and from site; • Wetting of any materials stockpiles to prevent wind whipping of materials; • Use of road sweeper, as necessary, to remove and prevent trackout of material onto the highway; and, • Cleaning of any spillages using wet cleaning methods.	

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
V1 to V4	Vehicle exhaust emissions – impact on local air quality	Neutral	None required	Neutral
Construction workforce, local air quality	VOCs from liquids used in construction works	Minor to moderate adverse, short term, direct, temporary, reversible and local in nature	• All liquids to be stored and handled in accordance with Pollution Prevention Guidelines 2 and 26, as applicable	Neutral

Table 10.26 - Summary of Impacts for the Operational Phase

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
V1 to V4	Vehicle exhaust emissions – impact on local air quality	Neutral	None required	Neutral
Odour Sensitive receptors	Statutory nuisance	N/A	• Odour controlled through condition within EP, regulated by the EA. • OMP to be implemented during day to day operations at the site	Neutral
Residual emissions from CHP Plant, backup boiler and flare	Impacts on local air quality	N/A	• Elevated flues for dilution and dispersion of residual emissions • Emission limits to be in place within EP • Periodic monitoring of emissions to demonstrate compliance with limits • Air emissions controlled through condition within EP, regulated by EA	Neutral

10.10 Conclusions

10.10.1 An assessment has been undertaken of baseline air quality within the vicinity of the proposed site. The site is not located within an AQMA, and local monitoring data indicates that levels of NO_2 and PM_{10} are significantly below annual mean AQLVs in the vicinity of the site.

10.10.2 The potential air quality impacts during the construction phase includes dust from construction works on site, including earthworks and construction activities, dust raised by vehicles travelling to and from site (trackout), VOCs from stored liquids used in the construction process and exhaust emissions from HGVs transporting materials to site. Impacts from construction phase vehicle exhaust emissions have been assessed to be insignificant. Provided relevant Pollution Prevention Guidelines are implemented, impacts from VOCs are not predicted to be significant. A series of good practice dust mitigation measures have been outlined which are predicted to control any minor dust impacts to a negligible level.

10.10.3 The potential air quality impacts during the operational phase includes:

- Odour from the operations;
- Emissions from CHP units, backup boiler and flare; and,
- Vehicle exhaust emissions including PM_{10} and NO_2 associated with HGVs and cars visiting the site.

10.10.4 Given the number of additional vehicle movements, impacts from vehicle exhaust emissions are not predicted to be significant. A detailed OMP will be implemented during operations which will ensure odour is controlled to an acceptable level. Detailed modelling of potential emissions from the flare, backup boilers and CHP units has demonstrated that resulting pollutant concentrations will not generate significant impacts. Emissions from site operations, including odour, will be controlled and regulated under an EP. As such, confidence is high that sufficient mitigation will be in place to control any potential air quality impacts to a negligible level.

11 Noise and Vibration

11.1 Introduction

11.1.1 Overview

11.1.1.1 This chapter contains an assessment of potential noise and vibration impacts during the construction and operational phase of the development. In the case of the operational phase, impacts have been fully quantified in accordance with a BS4142 assessment within Appendix VIII.

11.1.2 Planning Policy and Legislation Relating to Noise

11.1.2.1 A discussion of relevant legislation and planning policy relating to noise is included within the assessment in Appendix VIII.

11.2 Assessment Methodology

11.2.1 Construction Phase Assessment Methodology

11.2.1.1 Assessment of potential construction phase noise impacts has been undertaken on a qualitative basis. Construction phase noise impacts will only be temporary. Potential construction phase impacts have been qualitatively assessed based on the anticipated construction activities with reference to BS 5228 guidance and good practice mitigation.

11.2.2 Operational Phase Assessment Methodology

11.2.2.1 Potential operational phase noise impacts from on-site noise sources have been quantified within a BS4142 assessment. Reference should be made to Appendix VIII for a copy of this assessment, outlining methodology and results.

11.2.3 Magnitude of Impact and Receptor Sensitivity

11.2.3.1 The table below contains the indicative criteria used to determine magnitude of noise impacts. Further discussion on how noise impacts have been quantified during the operational phase is included within Appendix VIII.

Table 11.1 - Indicative Criteria Used for Assessing Magnitude of Noise Impacts

Impact Magnitude	Criteria/Change in Ambient Noise Level
Substantial	Substantial risk of statutory nuisance
Moderate	Moderate risk of statutory nuisance
Slight	Slight risk of statutory nuisance
Negligible	Negligible risk of statutory nuisance

11.2.3.2 Table 11.2 contains the criteria uses to assess sensitivity of noise sensitive receptors.

Table 11.2 - Indicative Criteria for Assessing Sensitivity of Noise Receptors

Sensitivity of Receptor	Criteria
High	Residential properties, hospitals, retirement homes, nursing homes at night time
Medium	Residential properties, hospitals, retirement homes, nursing homes during day time
Low	Offices, shops, outdoor recreational areas, leisure centres, places of worship

11.3 Baseline Assessment

11.3.1 Background Noise Levels

11.3.1.1 Existing noise levels within the vicinity of the site at sensitive receptor locations have been quantified within the BS4142 assessment within Appendix VIII.

11.3.2 Noise Sensitive Receptors

11.3.2.1 The table below contains a list of identified noise sensitive receptors. These are representative of worst case exposure locations. Receptor locations are illustrated within Appendix XV.

Table 11.3 – Noise Sensitive Receptors

Receptor Identifier	Receptor description	NGR (m)		Sensitivity of Receptor
		X	Y	
N1	Residential property at Whitwick Manor	361081.9	245901.6	High
N2	Residential property at Whitwick Manor	360946	245711.3	High
N3	Residential property at Boundary Land	359729.7	245608.4	High
N4	Residential property	359950.8	246023.4	High

11.4 Construction Phase Impacts

11.4.1 Potential noise impacts associated with the construction phase includes:

- HGVs used for the delivery of construction materials to site; and,
- Noise from construction works on site.

11.4.2 The construction phase will be short term and temporary, anticipated to last for up to 18 months, however the bulk of the physical construction activities will be completed within 12 months. Therefore, such sources will not generate significant levels of noise over a prolonged period of time.

11.4.3 There is potential for noise to be generated by plant and machinery used on site during site preparation and construction works. Site preparation works and preparation of foundations are anticipated to be the major source of noise during construction works. To a lesser degree, there is potential for noise impacts from the erection of the structures and vehicle movements on the surrounding road network. However, vehicle movements generated during the construction phase will not be significant, anticipated to average out at 14.71 HGV movements per day over the course of construction works.

11.4.4 Given the short term and temporary nature of construction works, impacts from construction phase are not predicted to be significant over a long period of time. Without mitigation, unmitigated construction phase noise impacts are predicted to be slight negative in magnitude at sensitive receptors of high sensitivity, resulting in an overall

impact significance which is moderate adverse and direct, short term, temporary, reversible and local in nature. A series of good practice noise mitigation measures are included with this chapter, which are considered adequate to control any potential noise impacts during construction works.

11.5 Operational Phase Impacts

11.5.1 Potential noise impacts associated with the operation of the site are as follows:

- Noise from HGVs on-site; and,
- Noise from operation of plant and machinery.

11.5.2 Potential impacts as a result of the above noise sources have been fully quantified within the BS4142 noise assessment within Appendix VIII. This has demonstrated that the proposals will not generate any significant noise impacts as a result of in-built mitigation. As such, noise impacts are predicted to be negligible in magnitude, neutral in significance. However, a Noise Management Plan (NMP) has been prepared which will ensure that measures are in place to minimise noise. Similarly to other potential emissions from site, noise will be regulated and controlled by the EA in accordance with an EP and such controls should not be duplicated under the planning regime, in accordance with national planning policy. As such, operational phase mitigation will need to be agreed with the EA at the permitting stage. The measures provided in the NMP are therefore indicative at this stage and subject to approval by the EA.

11.6 Mitigation

11.6.1 Construction Phase Mitigation

11.6.1.1 The contractor will be instructed to have regard to guidance in BS5228 and use best practicable measures to minimise noise impacts during construction works. The following outlines relevant mitigation measures from the guidance:

- Restricting construction works to daytime hours only;

- Minimising drop heights during unloading of materials;
- Careful placement of materials;
- Avoiding unnecessary revving of engines and switching of engines when plant and machinery not in use;
- Siting any stationary plant and equipment used in construction works as far away from sensitive receptors as practicably possible;
- Use of plant and machinery in accordance with manufacture specifications and ensure plant and machinery is appropriately maintained; and,
- Starting up plant and machinery sequentially rather than simultaneously.

11.6.2 Operational Phase Mitigation

11.6.2.1 Operational phase mitigation is outlined within the BS4142 noise assessment within Appendix VIII. A number of measures have been built into the design of the plant. No additional mitigation has been determined to be necessary over and above site design measures. However, a NMP has been prepared to ensure that potential for noise from site operations is minimised as far as is possible.

11.7 Residual Impacts

11.7.1 Provided the mitigation measures outlined above are followed/implemented on-site, residual impacts during the construction and operational phase are predicted to be negligible in magnitude, neutral in significance.

11.8 Cumulative Impacts

11.8.1 No other major developments have been identified in the vicinity of the site and therefore no significant cumulative impacts are predicted during the construction or operational phase.

11.9 Summary of Impacts

11.9.1 The tables below summarise potential noise impacts during the construction and operational phase.

Table 11.4 - Summary of Impacts During Construction Phase

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
N1 to N4	Noise from construction activities creating nuisance at closest sensitive receptors	Moderate adverse, short term, direct, temporary, reversible and local in nature	• Restricting construction works to daytime hours only; • Minimising drop heights during unloading of materials; • Careful placement of materials; • Avoiding unnecessary revving of engines and switching of engines when plant and machinery not in use; • Siting any stationary plant and equipment used in construction works as far away from sensitive receptors as practicably possible; • Use of plant and machinery in accordance with manufacture specifications and ensure plant and machinery is appropriately maintained; and, • Starting up plant and machinery sequentially rather than simultaneously.	Neutral

Table 11.5 - Summary of Impacts During Operational Phase

Receptor Identifier/ Description	Impact Description	Impact Significance (Without Additional Mitigation in Place)	Mitigation Summary	Residual Impact Significance (With Mitigation in Place)
N1 to N4	Noise from construction activities creating nuisance at closest sensitive receptors	Neutral, with in-built mitigation measures	No additional mitigation required over and above design measures. However, NMP prepared for operation to ensure noise is minimised as far as is possible	Neutral

11.10 Conclusions

11.10.1 A baseline assessment has been undertaken to assess existing levels of noise and receptors sensitive to noise surrounding the site.

11.10.2 During construction works, there is potential for noise impacts as a result of site preparation works, construction of the buildings and structures and from HGVs visiting the site. However, provided the following good practice mitigation measures are followed, residual construction phase noise impacts are predicted to be negligible in magnitude, neutral in significance.

- Restriction of construction works to daytime hours only;
- Minimising drop heights during unloading of materials;
- Careful placement of materials;
- Avoiding unnecessary revving of engines and switching off engines when plant and machinery not in use;
- Siting any stationary plant and equipment used in construction works as far away from sensitive receptors as practicably possible;
- Use of plant and machinery in accordance with manufacturer specifications and ensure plant and machinery is appropriately maintained; and,
- Starting up plant and machinery sequentially rather than simultaneously.

11.10.3 During the operational phase, there is potential for noise impacts as a result of HGVs used for the delivery and export of materials and from operation of the process itself. However, such impacts have been quantified within a BS4142 noise assessment, which has demonstrated that resulting noise levels will not be significant, as a result of mitigation built into the scheme. Therefore, impacts are predicted to be negligible in magnitude, neutral in significance. However, a NMP has been prepared for the operation to ensure that potential for noise is minimised as far as is possible.

11.10.4 No significant cumulative noise impacts are predicted.

12 Archaeology and Cultural Heritage

12.1 Introduction

12.1.1 An Archaeological and Cultural Heritage Impact Assessment has been undertaken by Map Archaeological Practice. Reference should be made to Appendix VI for the assessment which contains full details of methodology and results. The conclusions are presented below.

12.2 Conclusions

12.2.1 The report has considered the effect of the proposed anaerobic digestor plant on archaeological and built heritage resources (referred to as “heritage assets” as defined in the National Planning Policy Framework) within and surrounding the site on land at Whitwick Manor, Herefordshire.

12.2.2 At present it is not possible to fully assess the archaeological potential of the site although it is considered that features relating to former agricultural regimes, such as field boundaries may be present, furthermore Historic England record the presence of an undated enclosure within the site boundary. It is recommended that a programme of Geophysical Survey be undertaken in the first instance, to allow the Archaeological Advisor of Herefordshire Council, to make a reasoned decision regarding the need for further archaeological work in advance of development.

12.2.3 Given the landscape in which the site is located, it is believed that the proposed development is located, any development is likely to have a negligible impact on the setting and significance of recorded designated and non-designated heritage assets.

13 Landscape

13.1 Introduction

13.1.1 A Landscape and Visual Impact Assessment (LVIA) has been undertaken by Amalgam Landscape. Reference should be made to Appendix X for the LVIA which contains full details of methodology and results. The conclusions are presented below.

13.2 Conclusions

13.2.1 The proposed development is situated within regular flat to gently sloping fields, currently in agricultural use. It is immediately to the south and south-west of the A417 and to the west of the complex of buildings and residential properties associated with Whitwick Manor.

13.2.2 The site is not recognised for its value through any landscape relevant designations. There are however landscape relevant designations within the study area including the Cowarne Court Unregistered Park and Garden, immediately to the north to the A417. The centre of Ocle Pychard to the north-west is recognised as a Conservation Area and there are also scattered Scheduled Monuments and Listed Buildings in the study area.

13.2.3 The proposed development will have the potential to directly and indirectly affect landscape relevant designations, landscape character and visual amenity receptors and their views.

13.2.4 Through sensitive design and siting advice during the earliest stages of the assessment process and the proposed extensive landscape mitigation measures, focussed within and on the boundaries, this will ensure that any potential effects will be kept to a minimum.

13.2.5 The development design and layout will respect the wider character and features of the landscape, will restrict its visual profile in the immediate and wider landscape and will help to reduce the proposed development's visibility and wider effects on landscape character. The influence of the proposed development on the wider landscape character

and views will also be restricted not only by the existing vegetation immediately surrounding the proposed development, but also development and mature vegetation in the wider landscape.

13.2.6 Although the proposed development will be selectively initially perceived, largely only in close proximity, the growth of the proposed landscape mitigation measures will restrict this influence over time.

13.2.7 In summary, the proposed development will introduce additional built elements, within an agricultural landscape. The proposed development will be selectively initially perceived, largely only in close proximity. The growth and establishment of the extensive proposed landscape mitigation measures will ensure that the proposed development will not dominate or largely influence the landscape, be out of character with the surroundings or dominate any key views. The growth of the proposed landscape mitigation measures will also provide benefits to landscape character, landscape pattern and nature conservation and biodiversity.

14 Arboricultural Impact Assessment

14.1 Introduction

14.1.1 This chapter presents an assessment of the likely significant effects of the proposed development on tree and hedgerow features at the site.

14.2 Legislation, Planning Policy and Guidance

14.2.1 Key legislation, planning policy and guidance relevant to trees and hedgerows at this site are:

- National Planning Policy Framework July 2021;
- Hereford Core Strategy, notably policies LD1, LD2 and LD3;
- The Environment Act 2021;
- Natural Environment and Rural Communities Act 2006;
- Hedgerow Regulations 1997; and,
- The England Trees Action Plan 2021-2024.

14.2.2 Of particular relevance are:

- Policy LD1 provides guidance on trees which states that development proposals should maintain and extend tree cover where important to amenity, through the retention of important trees, appropriate replacement of trees lost through development and new planting to support green infrastructure;
- Policy LD2 states that development proposals should conserve, restore and enhance the biodiversity and geodiversity assets of Herefordshire; and
- Policy LD3 seeks to ensure that development proposals should protect, manage and plan for the preservation of existing and delivery of new green infrastructure, and should achieve the following objectives:
    1. identification and retention of existing green infrastructure corridors and linkages; including the protection of valued landscapes, trees, hedgerows, woodlands, water courses and adjoining flood plain;

2. provision of on-site green infrastructure; in particular proposals would be supported where this enhances the network; and
3. integration with, and connection to, the surrounding green infrastructure network.

14.3 Assessment Methodology

14.3.1 The tree and hedgerow survey and assessment were conducted in accordance with British Standard BS5837:2012 'Trees in relation to design demolition and construction Recommendations'[9]. The survey and assessment area is based on the proposed permanent development area and temporary working area and includes trees and hedgerows within a 15m buffer of the extent of development.

14.3.2 Under BS 5837:2012 trees and groups are objectively assigned a quality category designed to quantify their value. The table below presents a summary of the categories presented in the British Standard. The full table has been reproduced below

[9] British Standards Institution (2012) BS5837:2012 Trees in relation to design, demolition and construction. Recommendations. London, BSI Standards Limited

Table 1 **Cascade chart for tree quality assessment**

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall dedine • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see* ***4.5.7.***			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, induding conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

14.3.3 The survey method was undertaken as follows:

- A topographical survey was not available at the time of survey. Tree and hedgerow locations were referenced using Bluesky aerial imagery prior to field survey and located using Garmin etrex touch 35 GPS equipment on site to within 1m accuracy;
- The trees were plotted as individuals, groups and woodland as appropriate and hedgerows were plotted to the canopy extents;
- All trees over 75mm stem diameter at 1.5m above highest adjacent ground level within the survey area were surveyed;
- Crown spreads were measured to four cardinal points with a Disto laser distance measure and measurements noted to one decimal place;
- Height measurements were taken using clinometers and tree diameter measurements taken using a calibrated specialist diameter tape. Where this was not possible, heights and diameter measurements were estimated;
- Planting beyond the survey area is also indicated on the Tree Constraints Plan for context. Where access to determine exact location was impeded, the locations were estimated; and,

- Hedgerows were noted according to species, age, condition, height and width. The Hedgerow Survey Handbook[10] method was not adopted for the hedgerow assessment, as the only hedgerows surveyed were single species hawthorn and the hedgerow could not be considered species rich under the regulations.

14.3.4 The baseline assessment includes a schedule of all trees located within, or in close proximity to, the proposed development site and temporary working area noting:

- Tree reference number and whether an individual tree, a group, a woodland or a hedgerow;
- species type stating full common and latin name where identifiable;
- height in metres;
- stem diameter at-breast-height (dbh) in millimetres;
- crown spread to four cardinal points in metres;
- height of crown clearance in millimetres;
- maturity – young, semi-mature; middle age; mature, over mature;
- condition – good, fair, poor, veteran;
- comments on physiological and structural form, condition, health and significant defects;
- tree quality category as detailed in Table 2.0;
- radius of the root protection area (RPA);
- management recommendations; and,
- estimated remaining contribution in years – less than 10, 10-20, 20-40 and over 40.

14.3.5 Magnitude and impact and receptor sensitivity has been assessed based on the criteria in the tables below.

[10] DEFRA 2007 The Hedgerow Survey Handbook Second Edition. London.

Table 14.1 – Magnitude of Change Criteria

Magnitude of Change	Criteria
Major	Major change from baseline condition – complete removal of tree, group or complete or partial removal of woodland, or hedgerow removal greater than 30m in length
Moderate	Moderate change from baseline condition – extensive pruning affecting more than 30% of the crown including removal of branches over 100mm diameter, partial removal of group or intrusive works affecting up to 20% of the RPA of a tree or partial removal of a hedgerow of less than 30m
Slight	Slight change from baseline condition – pruning of branches less than 100mm diameter and affecting less than 30% of the crown or works within the RPA that can be satisfactorily undertaken with appropriate ground protection or pruning of a hedgerow to reduce width and height but not affecting roots.
Negligible	Negligible change from baseline condition – pruning of branches less than 25mm diameter and affecting less than 10% of the crown and no intrusive works affecting the RPA or pruning the face of a height but not affecting overall width and height.

Table 14.2 – Receptor Sensitivity Criteria

Receptor Sensitivity	Criteria
Very high	Receptor is a category A (1, 2, 3) tree, group or woodland or species rich hedgerow of good condition over 30years old and very highly sensitive to change. Category A tree, group or woodland or species rich important hedgerow has very limited ability to absorb change without very significant change to intrinsic landscape, arboricultural, cultural or conservation qualities.

Receptor Sensitivity	Criteria
High	Receptor is a category B (1, 2, 3) tree, group or woodland or species rich hedgerow of good to moderate condition over 30years old and highly sensitive to change. Category A tree, group or woodland or species rich hedgerow has limited ability to absorb change without significant change to landscape, arboricultural, cultural or conservation qualities.
Medium	Receptor is a category C (1, 2) tree, group or woodland or species poor hedgerow of moderate or good condition and at least 30years old with moderate sensitivity to any change and moderate capacity to absorb change without significantly altering landscape, arboricultural, cultural or conservation qualities.
Low	Receptor is a category C3 or U tree, group or woodland or species poor hedgerow of poor condition or species poor under 10years old with low sensitivity to any change and with the capacity to accommodate change to landscape, arboricultural, cultural or conservation qualities.

14.4 Baseline Assessment

14.4.1 This section details the tree and hedgerow baseline for the assessment area and identifies receptors where there is potential for significant effects to arise. Baseline data were collected from a variety of sources in compiling this assessment including the field survey conducted in February 2022.

14.4.2 The assessment was undertaken with reference to the sources detailed in the table below.

Table 14.3 – Data Sources

Data Source	Reference
MAGIC website. This data source was investigated to confirm absence or presence of sensitive national designations and woodland in the vicinity of the permanent development area and temporary working area.	https://magic.defra.gov.uk/MagicMap.aspx
Hereford council website and administrative map page. This data source was investigated to confirm absence or presence of Tree Preservation Orders (TPO) and Conservation Areas (CA) in the vicinity of the permanent development area and temporary working area.	https://www.herefordshire.gov.uk
Hereford Core Strategy. This data source was reviewed for local planning policy relating to arboriculture and hedgerows, notably Policy LD1 – Landscape and townscape, LD2 – Biodiversity and geodiversity and Policy LD3 – Green infrastructure.	https://www.herefordshire.gov.uk
Woodland Trust website – Ancient Tree Inventory	https://ati.woodlandtrust.org.uk/
Bluesky aerial photography	Imagery from April 2021

Tree Protection Status

14.4.3 An examination of Hereford council administrative map on 12.3.2022, confirmed that there are no TPO or conservation areas present at the site. However, the development site boundary is some 700m to the east of Ocle Pychard Conservation Area.

Woodland, Veteran and Ancient Tree Status

14.4.4 No formal or informal records of veteran or ancient trees at the site were identified in the desk study and no woodland or tree group surveyed lies within an area of ancient woodland. An examination of the MAGIC website confirms that:

- Cowarne Wood 7m to the north of the development site adjacent to the A417, is ancient replanted woodland, covering 10.2 hectares (ha) and is noted in the priority habitat inventory as deciduous woodland; and,
- Some 280m to the south west of the site boundary lies Ash Coppice, 5.6Ha of ancient and semi-natural woodland, also deciduous.

14.4.5 Woodland priority habitat is not considered in the assessment methodology for trees and hedgerows to avoid overlaps with the Ecology Chapter.

Features Assessed

14.4.6 The proposed development site is located on agricultural land at Whitwick Manor, Yarkhill, Hereford. The land is a private estate with established planted tree groups, hedgerows, coppice, woodland and individual trees.

14.4.7 The trees assessed include native and non-native species of deciduous and evergreen oak and maple, willow, ash, hawthorn, silver birch, field maple, sycamore, lime, horse chestnut, poplar, alder, Western red cedar, cherry, beech, larch, hazel and Scot's pine.

14.4.8 A total of 53 individual trees, 14 groups of trees, one woodland and 13 hedgerows were recorded in the assessment. The majority of trees, groups, woodland and hedgerow features are to boundaries with roads, tracks and fields and in relation to topographical and hydrological features of ponds, ditches and water courses.

14.4.9 There is a varied age class from young to over-mature, with some trees approaching early veteran status. The condition of trees at the time of survey was fair to good, with few trees noted as poor or unsuitable for retention.

14.4.10 The wider tree population includes ancient replanted woodland to the north at Cowarne Wood, ancient semi-natural woodland to the south at Ash Coppice, mature hedgerow trees and hedgerows, scattered field trees, small copses, shelterbelts, plantations and woodland.

14.4.11 The tree and hedgerow survey findings are included in the data sheets of the Tree Constraints report 118-R-100_P01 and illustrated in the Tree Constraints Plans 118-T-100 to 106. The assessment of tree impacts is illustrated in the Arboricultural Impact Assessment drawings 118-T-200 to 206 and referenced in the Arboricultural Impact Assessment and Method Statement 118-R-200. Reference should be made to Appendix 12 for this document.

14.5 Assessment of Likely Significant Effects

14.5.1 Overview

14.5.1.1 The following section summarises the effects of the proposed development on trees and hedgerows. The proposed works has the potential to generate effects on these receptors identified in the baseline. The significance of effects is assessed by considering the sensitivity of receptors in relation to the predicted magnitude of effect after taking into consideration the mitigation measures embedded within the project design, as well as good practice mitigation. The assessment considers the potentially significant tree and hedgerow effects likely to result from the following development phases:

- Enabling Works Phase;
- Construction Phase; and,
- Operation Phase.

14.5.2 Enabling Works Phase Predicted Impacts

14.5.2.1 The enabling works activities described below are considered relevant to the assessment of tree and hedgerow effects:

- Clearance of vegetation within the development envelope and at the access point with the A417;
- Removal of stumps and roots in the vicinity of trees to be removed;
- Removal of existing boundary features such as fences;
- Stripping and storage of existing topsoil and subsoil; and,

- Localised ground re-profiling and stone laying to temporary compound areas.

Embedded Mitigation

14.5.2.2 The following embedded mitigation measures to address the potential tree and hedgerow effects have been incorporated into design. These are taken into account in the assessment of the tree and hedgerow effects during the enabling works phase. The embedded mitigation is detailed in the Arboricultural Impact Assessment and Method Statement Report 118-R-200 and illustrated on the Tree Retention, Removal and Protection Plans 118-T-300 to 306.

14.5.2.3 Existing trees and hedgerows would be retained and protected where practicable;

- Works in relation to trees and hedgerows would be supervised by an arboricultural consultant in accordance with the arboricultural method statement;
- Existing boundary features such as fences would be removed using methods that minimize disturbance to existing trees and hedgerows;
- Tree and hedgerow protection methods would be installed as one of the first activities in the enabling works and prior to commencement of construction with fencing installed to form the construction exclusion zone (CEZ);
- Soil storage mounds would be sited outside of the CEZ and in the working area; and,
- Where branches extend into the working area, tree pruning would be undertaken in advance of construction to minimize risk of damage to trees.

Tree and Hedgerow Effects

14.5.2.4 Groups G1 and G2, incorporating trees T1-T9 inclusive, would be directly affected by the enabling works. This would include pruning of branches overhanging the access that may impede access for construction or result in damage to branches. Installation of ground protection to the RPA of trees T1-T9 inclusive would also be undertaken prior to installation of the access road. There would be a discernible change to T1-T9 inclusive during the enabling works but an imperceptible change overall to G1 and G2 as a result of the tree pruning works. These medium sensitivity receptors would therefore

experience a slight magnitude of effect, resulting in a minor to moderate adverse significance of effect.

14.5.2.5 Hedgerows H1 and H2, would be directly affected by the enabling works. This would include partial removal of H1 and H2 at the access on the A417 to widen the gateway and access track for construction and to form sightlines, totaling 125m of hedgerow removal. There would be a noticeable change to H1 and H2 during the enabling works. These medium sensitivity receptors would therefore experience a moderate magnitude of effect, resulting in a moderate adverse significance of effect.

14.5.2.6 Tree T11 would be directly affected by the enabling works. This would include installation of a 3D cellular confinement system along the line of an existing hard surfaced access route within the RPA of T11. The cellular confinement system would not discernibly change the appearance of T11 and is not expected to affect the RPA of the tree. This high sensitivity receptor would therefore experience a negligible magnitude of effect, resulting in a neutral significance of effect.

14.5.2.7 Hedgerow H4 would be directly affected by the enabling works. This would include removal of 10m of hedgerow to form the working width for installation of new pipework. There would be a noticeable change to H4 during the enabling works as a result of the hedgerow removal works. This medium sensitivity receptor would therefore experience a moderate magnitude of effect, resulting in a moderate adverse significance of effect. The table below summarises potential impacts from enabling works.

Table 14.4 – Summary of Enabling Works Phase Tree and Hedgerow Effects

Tree / Hedgerow Feature	Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect (Post Embedded Mitigation)
G1 and G2 – incorporating T1-T9 inclusive	High	Pruning of nine trees to edge of groups; Ground protection within the RPA	Short-term / permanent / reversible	Slight	Minor to Moderate Effect
H1 and H2	Medium	Removal of hedgerow either side of access	Short-term / temporary / reversible	Moderate	Moderate Effect
T11	Very High	Ground protection within the RPA, no discernible change to the tree	Long-term / permanent / reversible	Negligible	Neutral Effect
H4	Medium	Removal of hedgerow for pipeline	Short-term / temporary / reversible	Moderate	Moderate Effect
All other impacts on trees and hedgerows have been avoided by design, can be satisfactorily protected in accordance with BS5837:2012 and are not affected by the enabling works					Neutral Effect

14.5.3 Construction Works Phase Predicted Impacts

14.5.3.1 The operation of construction plant on site can lead to crown, stem and root damage on trees to be retained if tree protection fencing and ground protection is not correctly installed and maintained and construction plant is able to access the CEZ and affect the RPA.

14.5.3.2 The construction works activities, following initial enabling works, are considered relevant to the assessment of tree and hedgerow effects:

- Installation of temporary and permanent drainage, fencing and services;
- Construction of earthworks and landform changes;

- Reinstatement of temporary compounds, laydown areas and temporary access and other disturbed areas following completion of the construction activities;
- Topsoiling and seeding of reinstated areas, including the return of disturbed land to agricultural land use where possible; and,
- Landscape reinstatement and enhancement works.

Embedded Mitigation

14.5.3.3 The following embedded mitigation measures to address the potential tree and hedgerow effects have been incorporated into design. These are taken into account in the assessment of the tree and hedgerow effects during the construction phase. The embedded mitigation is detailed in the Arboricultural Impact Assessment and Method Statement Report 118-R-200 and illustrated in Tree Retention, Removal and Protection Plans 118-T-300 to 306.

- Existing trees and hedgerows would be retained and protected where practicable;
- The tree and hedgerow fence and ground protection would be maintained in accordance with the arboricultural method statement;
- All construction works would not encroach into the CEZ and would not affect the RPA;
- Tree and hedgerow protection methods would be installed as one of the first activities in the enabling works and prior to commencement of construction with fencing installed to form the construction exclusion zone (CEZ);
- Soil storage mounds would be sited outside of the CEZ and in the working area;
- The tree and hedgerow fence protection would be removed in a timely fashion at reinstatement after completion of topsoiling reinstatement; and,
- New planting would not occur within the RPA of trees to be retained.

14.5.3.4 An arboricultural method statement details the tree removal and protection methods to be adhered to during the enabling works and maintained thereafter for the duration of construction through to reinstatement.

Tree and Hedgerow effects

14.5.3.5 Adherence to the arboricultural method statement would ensure protection of trees and hedgerows to be retained during construction and reinstatement. There would be no effect on trees and hedgerows during the construction phase with tree and hedgerow removals and pruning works having been completed in the enabling works phase.

Table 14.5 – Summary of Construction Phase Tree and Hedgerow Effects

Tree / Hedgerow Feature	Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect (Post Embedded Mitigation)
G1 and G2 – incorporating T1-T9 inclusive	High	No change	No effect	Negligible	Neutral Effect
H1 and H2	Medium	No change	No effect	Negligible	Neutral Effect
T11	Very High	No change	No effect	Negligible	Neutral Effect
H4	Medium	No change	No effect	Negligible	Neutral Effect
All other impacts on trees and hedgerows have been avoided by design, can be satisfactorily protected in accordance with BS5837:2012 and are not affected by the construction works					Neutral Effect

14.6 Operational Phase Predicted Impacts

14.6.1.1 The operational activities described below are considered relevant to the assessment of tree and hedgerow effects:

- Operational access to the plant;
- Maintenance of easements; and,

- Access, operation and maintenance of the plant.

Embedded Mitigation

14.6.1.2 The following embedded mitigation measures to address the potential tree and hedgerow effects have been incorporated into design. These are taken into account in the assessment of the tree and hedgerow effects during the operational phase.

- The replacement hedgerow planting at the site entrance (H1 and H2) would be undertaken to comply with highways visibility splay requirements, such that annual hedgerow growth does not impede visibility;
- Annual hedgerow cutting to control height and width, would be undertaken to ensure that visibility splays and sightlines are safely maintained;
- The replacement hedgerow at H4 would be planted along the original line and the hedgerow would be maintained annually to control height and width;
- No trees to be retained are within the operational area of the plant, to avoid conflict with access and maintenance during the operational phase; and,
- No tree species would be planted within the easement width for buried services or within 10m of new plant and equipment to avoid future conflict with tree root growth.

Table 14.6 – Summary of Operational Phase Tree and Hedgerow Effects

Tree / Hedgerow Feature	Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect (Post Embedded Mitigation)
G1 and G2 – incorporating T1-T9 inclusive	High	No change	No effect	Negligible	Neutral Effect
H1 and H2	Medium	No change	No effect	Negligible	Neutral Effect

Tree / Hedgerow Feature	Sensitivity	Effect	Nature of Effect	Magnitude	Significance of Effect (Post Embedded Mitigation)
T11	Very High	No change	No effect	Negligible	Neutral Effect
H4	Medium	No change	No effect	Negligible	Neutral Effect
All other impacts on trees and hedgerows have been avoided by design, would have been satisfactorily protected in accordance with BS5837:2012 and are not affected by the operational phase of the works					Neutral Effect

14.7 Outline of Proposed Mitigation and Residual Impacts

14.7.1 Mitigation is most effective if considered as an integral part of the AD Plan design in order to avoid, reduce or offset any adverse effects on trees and hedgerows. Tree removal has been avoided as a result of the design process and the length of hedgerow removal has been minimized to what is required to safely undertake the works.

14.7.2 Aspects of the iterative design process that have resulted in minimal impact on trees and hedgerows as a result of development include:

- Installing a permanent 3D cellular confinement system as ground protection to the new access road construction to ensure retention of trees in groups G1 and G2 and protection of the RPA;
- Siting passing places for the permanent vehicular access route outside of the RPA and within existing field areas rather than affecting tree groups;
- Locating the route of the gas pipeline outside of existing tree groups and crossing the hedgerow at a right angle and not oblique to minimize the length of hedgerow removal; and,
- Designing the site layout to ensure there is a suitable buffer between operational plant and equipment and trees for future tree crown and root growth.

14.7.3 Adherence to the arboricultural method statement would further ensure that impacts on trees and hedgerows can be minimized. This is detailed in the Arboricultural Impact Assessment and Method Statement Report 118-R-200 and illustrated in 118-T-300 to 306 Tree Retention, Removal and Protection Plans in Appendix XII. The mitigation measures would ensure that there is minimal disturbance to trees and hedgerows during the construction and operational phases of the proposed development and that trees and hedgerows can be adequately protected and retained.

14.7.4 The embedded mitigation and good practice measures described above would be expected to off-set tree and hedgerow effects. The hedgerows to be removed would be replaced with new hedgerow planting on completion of construction to mitigate for temporary hedgerow loss. It is anticipated that the new hedgerow would establish and mature over five to seven years to form a dense line of planting, restoring boundary features and connecting with existing hedgerows.

14.8 Cumulative Impacts

14.8.1 Land to the west, south and east of the proposed AD Plant falls within the same landownership. No additional development is currently planned in the vicinity of the site by the current landowner. Based on professional judgement, it was concluded that there are no proposed third party developments or land allocations in local development plan documents which could potentially give rise to likely significant cumulative effects. No cumulative assessment was therefore undertaken in connection with the landscape and visual topic.

14.9 Summary of Impacts

14.9.1 The proposed AD Plant would have permanent and temporary direct effects on trees, groups and hedgerows at the site primarily during the enabling phase of the works. Direct effects on these features during the enabling works cannot be avoided, as tree pruning and hedgerow removal would be required to create visibility splays for safe access and for laying of the new gas pipeline. However, the effects of hedgerow removal would be mitigated on completion of construction by the planting of new hedgerow.

14.10 Conclusions

14.10.1 The impacts on trees and groups at the site may potentially have a moderate adverse effect, however the scale of the losses and impact is negligible in relation to the overall area and numbers of trees, groups, woodland and hedgerows to be retained and protected.

14.10.2 Losses of vegetation would be mitigated by replacement hedgerow planting and tree and hedgerow cover at the site would be increased as shown in the landscape proposals within Chapter 13. The long-term viability of the tree stock and hedgerows would be secured through implementation of the landscape and habitat management plan.

15 Geology, Hydrogeology and Hydrology

15.1 Introduction

15.1.1 Reference should be made to Appendix IX for Hydrogeological Impact Assessment and Appendix XVI for Flood Risk Assessment. The conclusions are contained below.

15.2 Conclusions

15.2.1 An assessment of the potential geological, hydrogeological and hydrological impacts has been undertaken. The assessment includes a description of the baseline geological, hydrogeological and hydrological conditions at the site including a site walkover survey and a water features survey.

15.2.2 The impacts due to the proposed development in respect of coal mining and non-coal mining, land stability, geodiversity, soils and agricultural classification, human health due to ground conditions at the site, hydrogeology and hydrology have been assessed. The cumulative impacts of the proposed development taking into account the wider area surrounding the site are assessed also.

15.2.3 It is concluded that the potential impacts due to coal mining and non-coal mining on the proposed developments are negligible and that the potential impacts elsewhere as a result of the proposed development due to coal mining are negligible. It is concluded consequently that the proposed development will not increase any cumulative impact in respect of the risk posed due to coal mining as a result of the development of the wider area.

15.2.4 It is concluded that the potential impacts due to land stability on the site and elsewhere as a result of the proposed development are negligible and that the proposed development will not increase any cumulative impact elsewhere due to land stability as a result of the development of the wider area.

15.2.5 It is concluded that the potential for the proposed operations to have an adverse effect on any geological SSSI or to compromise the favourable condition or the favourable conservation status of a LGS further than 1km from the site is negligible. It is concluded that the potential for the proposed operations at the site to result in a cumulative impact on a geological SSSI or LGS taking into account the current land use surrounding the site is negligible also.

15.2.6 It is concluded that the proposals will have a negligible impact on the quantity and quality of agricultural soil resources available and will not affect adversely the overall agricultural land classification of the site and surrounding area. There will therefore be no increase in cumulative impacts across the wider area as a result of the development due to changing agricultural practices elsewhere.

15.2.7 It is concluded that there is no source pathway linkage at the site between any potentially contaminative material and human health receptors. It is concluded that the proposed operations at the site will have a negligible impact on human health following the proposed development works. It is concluded that the proposed development will not increase any cumulative impact on human health receptors at the site or the area surrounding Whitwick Manor.

15.2.8 It is concluded that the proposed development will have a negligible hydrogeological impact on groundwater levels or quality in the Raglan Mudstone Formation. It is concluded that the proposed development will not increase any cumulative impact on groundwater levels or quality in the Raglan Mudstone Formation as a result of the agricultural use of the wider area of the site.

15.2.9 It is concluded that there will be a negligible impact on surface water levels in the catchment of the Withington Marsh Brook and the wider catchment of the River Wye. It is concluded that there will be an overall positive or beneficial impact on water quality in the Withington Marsh Brook and catchment of the River Wye through the reduction of nutrient inputs following the completion of the development. It is concluded that the proposed development will not increase any cumulative impact on surface water levels

or quality in the Withington Marsh Brook or wider River Wye catchments as a result of the agricultural use of the wider area of the site.

15.2.10 It is concluded that during the construction phase the development will have a negligible impact on coal mining and non-coal mining, land stability, geodiversity, human health due to ground conditions at the site, groundwater levels, groundwater quality, surface water levels and surface water quality.

15.2.11 It is concluded that the proposed development has been assessed consistent with the requirements of the Environmental Impact Assessment Regulations pertaining to geological, hydrogeological and hydrological impacts hence assessment or mitigation measures further to those set out in this report are not necessary.

16 Accident and Major Hazardous Incidents

16.1 Introduction

16.1.1 Risks from accidents and major hazardous incidents will be controlled under the EP as well as other relevant Health and Safety regulations, including Dangerous Substances and Explosive Atmospheres Regulations 2002 and such controls should not be duplicated as part of the planning process, in accordance with national planning policy. However, this section provides a summary of the controls that will be required to be in place to minimise risk to environment from accidents and major hazardous incidents.

16.2 Accident Mitigation

16.2.1 As part of compliance with the relevant European Union Best Available Techniques (BAT) Conclusion for Waste Treatment, the operator will be required to submit and Accident Management Plan (AMP) to the EA for approval as part of the EP application process. This must cover the following:

- Protection measures – incudes measures such as:
  - protection of the plant against malevolent acts;
  - fire and explosion protection system, containing equipment for prevention, detection, and extinction
  - accessibility and operability of relevant control equipment in emergency situations
- Management of incidental/accidental emissions; and,
- Incident/accident registration and assessment system – including techniques such as:
  - a log/diary to record all accidents/incidents, changes to procedures and the findings if inspections
  - procedures to identify, respond to and learn from such incidents and accidents

16.2.2 The operator will be required to undertake DSEAR and HAZOP risk assessments as part of the detailed design and build phases.

16.2.3 Given the above, confidence is high that risks from accidents and incidents will be adequately controlled

16.3 Residual Impacts

16.3.1 Given the controls that are required to be in place under the EP, residual impacts from accidents and major hazardous incidents are not predicted to be significant.

17 Cumulative Impacts

17.1 Introduction

17.1.1 The EIA regulations require that as part of the EIA process, and wherever possible, projects should assess the potential for any beneficial or adverse impacts on the wider environment as a result of cumulative effects with other projects/developments. The EIA regulations do not contain any guidance for assessment of cumulative impacts. European Commission (EC) guidance[11] describes cumulative impacts as incremental changes caused by other past, present or reasonably foreseeable actions together with the project.

17.2 Assessment Methodology

17.2.1 The three main types of potential cumulative impact associated are as follows, adapted from definitions in the EC guidance:

i) Incremental impacts from a number of separate developments, e.g. combined noise, dust, odour, landscape and visual effects etc from multiple developments;
ii) Combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor; and,
iii) Several developments with insignificant impacts individually, but which together may have a cumulative impact.

17.2.2 This cumulative impact assessment has been undertaken on a qualitative basis using professional judgement, also drawing upon the findings/conclusions of the various technical assessments.

[11] Guidelines for the Assessment of Indirect and Cumulative Impacts as Well as Impact Interventions, European Commission, 1999.

17.3 Assessment of Potential Cumulative Impacts

Identified Third Party Projects with Potential to Contribute to Cumulative Impacts

17.3.1 A search has been undertaken on the HCC planning website to identify major projects in the vicinity of the proposed site which may have potential to contribute to cumulative impacts with the proposed development. This search was extended up to 2km from the site. No other consents or applications for major developments were identified. As such, it is concluded that potential for cumulative impacts with other developments is not significant.

Potential Cumulative Impacts as a Result of Potential Interaction of Impacts from Proposed Development

17.3.2 Potential cumulative impacts may arise as a result of a combination of individual impacts from the same development. However, the various reports included within this ES have demonstrated that with mitigation in place, residual adverse impacts will not be significant and no significant cumulative impacts have identified within any of the reports included within this ES. As such, it is considered that potential for cumulative impacts from the development itself is insignificant.

ES Appendix I

EIA Screening and Scoping Opinion

ES Appendix II

Site Location Plan

ES Appendix III

Site Layout Plans

ES Appendix IV

Transport Statement

ES Appendix V

Ecological Impact Assessment

ES Appendix VI

Archaeology and Cultural Heritage Impact Assessment

ES Appendix VII

Emissions Modelling Assessment

ES Appendix VIII

Noise and Vibration Impact Assessment and Noise Management Plan

ES Appendix IX

Hydrogeological and Geological Impact Assessment

ES Appendix X

Landscape and Visual Impact Assessment

ES Appendix XI

Construction Method Statement

ES Appendix XII

Arboricultural Impact Assessment

ES Appendix XIII

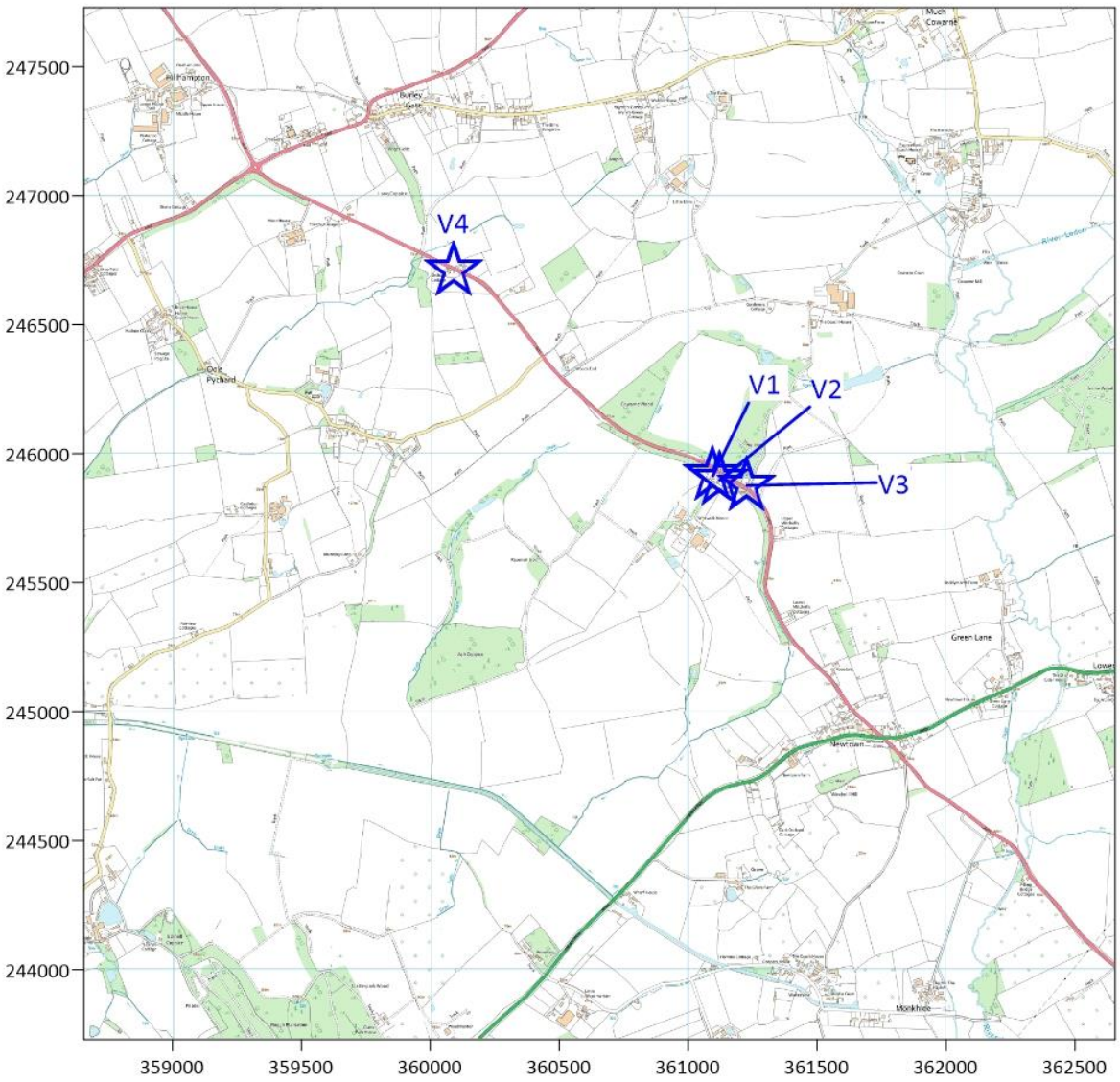
Odour Management Plan

ES Appendix XIV

Alternative Sites Assessment

ES Appendix XV

Receptor Plans

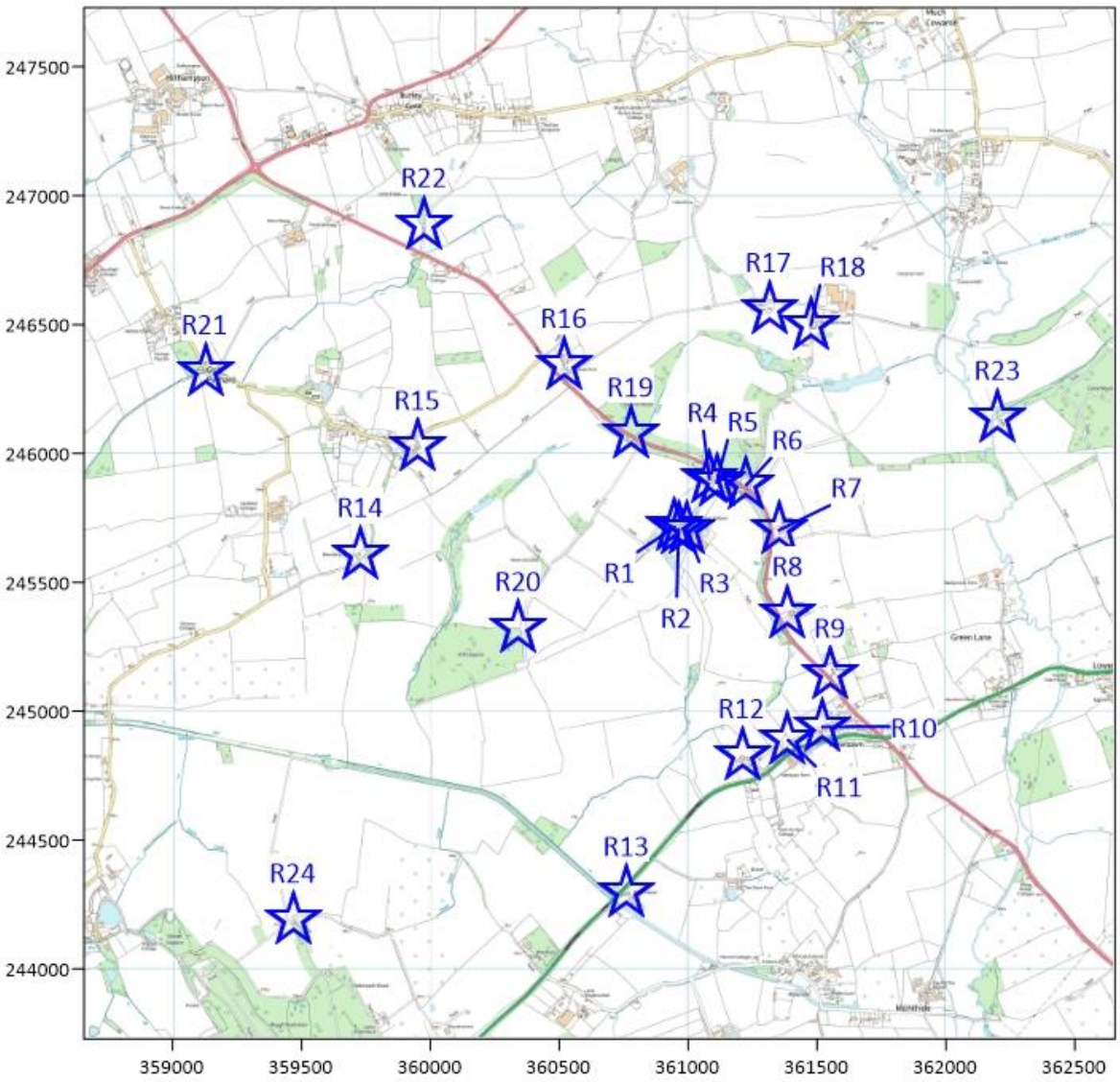


Appendix XV Figure 1 - Vehicle Exhaust Emissions Sensitive Receptors

☆ Receptor Location

V1 Receptor Identifier

Oaktree Environmental Ltd
Lime House
2 Road Two
Winsford
Cheshire
CW7 3QZ

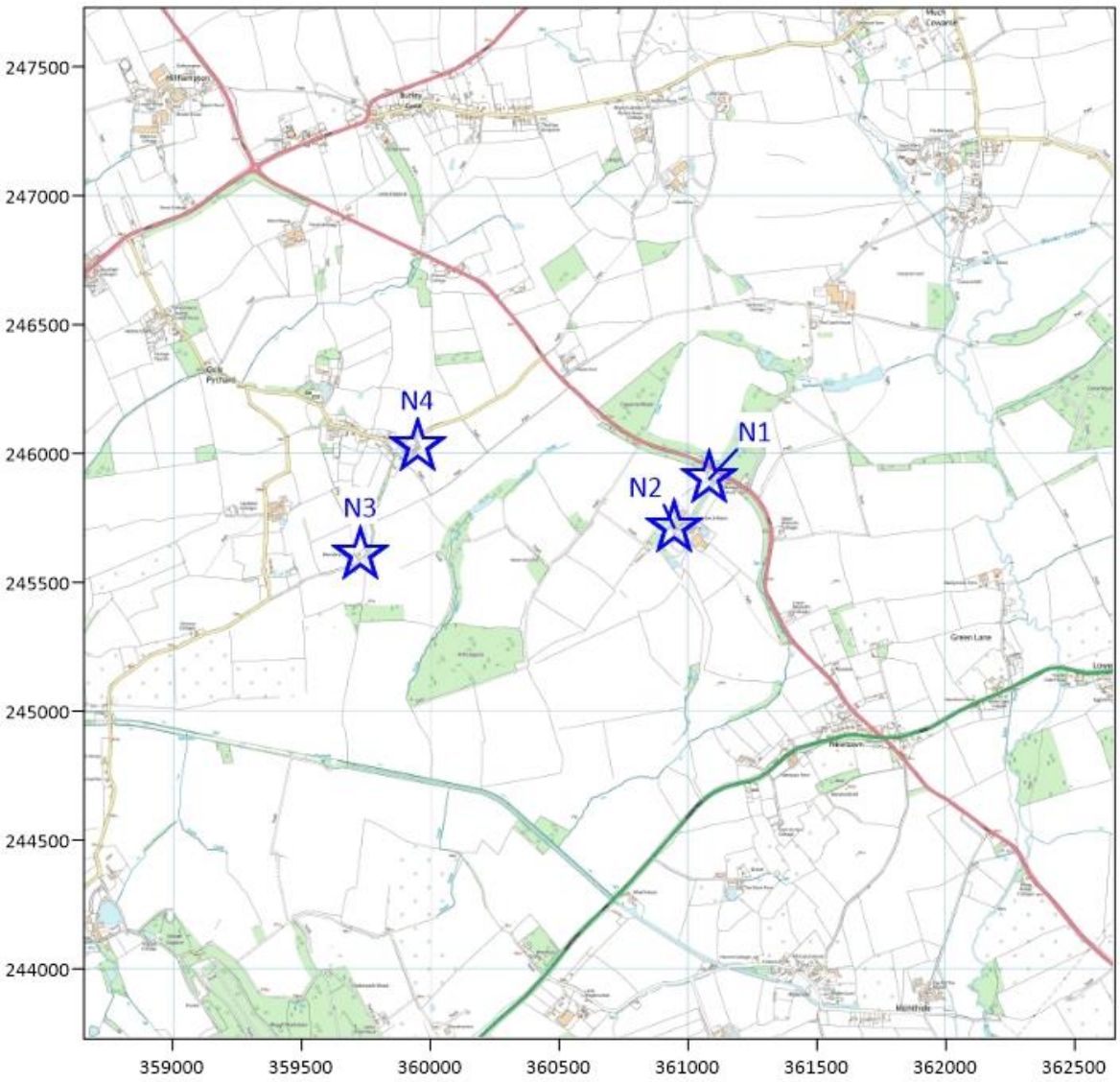


Appendix XV Figure 2 - Receptors Sensitive to Emissions from CHP Units, Backup Boiler and Flare

☆ Receptor Location

R1 Receptor Identifier

Oaktree Environmental Ltd
Lime House
2 Road Two
Winsford
Cheshire
CW7 3QZ



Appendix XV Figure 3 - Noise Sensitive Receptors

☆ Receptor Location

N1 Receptor Identifier

Oaktree Environmental Ltd
Lime House
2 Road Two
Winsford
Cheshire
CW7 3QZ

ES Appendix XVI

Flood Risk Assessment and Drainage Strategy

ES Appendix XVII

Mass Flow Diagrams

ES Appendix XVIII

Lighting Impact Assessment

ES Appendix XVIX

Reed Bed Design Details