HEOLDDU SOLAR FARM ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT

Request for Scoping Direction under Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017

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Damian Barry		13 February 2025

Prepared by:

RPS

Emily Avery
Principal Planning & EIA Consultant

Prepared for:

Heolddu Solar Park Limited

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1 INTRODUCTION

1.1 Introduction

1.1.1 This Scoping Report has been prepared by RPS on behalf of Heolddu Solar Park Limited (the Applicant) in relation to the proposed Heolddu Solar Farm located near Ferryside, Carmarthenshire, hereafter referred to as the 'Proposed Development'. A Proposed Site Location Plan is at Appendix 1.1.

1.1.2 The Applicant proposes to submit an application for development consent to Planning and Environment Decisions Wales (PEDW). The application will be accompanied by an Environmental Statement (ES) prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, as amended (the EIA Regulations), and other required documents.

1.1.3 This Scoping Report sets out the proposed content, methodologies and key issues to be included within the Environmental Impact Assessment (EIA) process and the resulting ES to be submitted with the application. The purpose of this document is to obtain a Scoping Direction from PEDW (on behalf of the Welsh Ministers) and, in doing so, this Scoping Report provides information for statutory consultees and the Welsh Ministers to agree the scope of the ES and what the Applicant intends to assess within the ES.

1.2 The applicant

1.2.1 Heolddu Solar Park Limited (the Applicant) is a registered company of Qualitas Energy ('QE'). QE has been leading the drive of renewable energy, energy transition, and sustainable infrastructure development in Europe for over 18 years. QE consists of a team of over 690 professionals who work together, sharing objectives and a commitment to sustainability. In total, 1.1 million homes have been supplied with clean energy through QE electricity generation, and it has 18GW in its energy asset portfolio in operation and development.

1.2.2 QE is a leading fund manager focused on renewable energy, energy transition and sustainable energy infrastructure. Its mission is to drive the change towards a decarbonized economy through focusing its investments into energy transition and sustainability-related assets. Since its inception in 2007, QE has invested c. EUR 12 billion and managed 5 different funds. QE's team delivers cross all the relevant aspects of the value chain including, development, construction, financing, operations, and energy management.

1.2.3 To-date, QE has an operational output of 585 MW of solar with a further 6.1 GW in development. With offices in London, Bristol and Edinburgh as well as over 20 staff in the UK, QE is committed to accelerating the energy transition in the United Kingdom. As well as solar, QE is committed to delivering wind energy infrastructure and renewable natural gas with two renewable biomethane gas generating facilities and one gas injection hub under construction in England. With a pipeline of renewable biomethane gas projects, QE is expected to become the leading biomethane and green CO2 producer in the UK.

1.3 Statutory framework and purpose of the environmental statement

Statutory Framework

1.3.1 The indicative scale and size of the Proposed Development being greater than 10MW means the future application will be classed as a Development of National Significance (DNS) to be determined by the Welsh Ministers and submitted to PEDW who appoint an Inspector to examine the application and determine the planning merits, national priorities and the benefits the Proposed Development is likely to bring if approved.

1.3.2 As stated in PEDW's DNS Procedural Guidance document (2024), the statutory basis for the DNS process is provided by the Planning (Wales) Act 2015, which amends the Town and County Planning

Act 1990 ('the Act'), and the Developments of National Significance (Wales) Regulations 2016 (as amended) and subsequent Regulations. The purpose of the DNS process is to ensure timely decisions are made on those planning applications that are of the greatest significance to Wales, because of their potential benefits and impacts.

1.3.3 As per the statutory requirements set out in the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, referred to herein as the 'EIA Regulations', if significant environmental effects are likely to arise from implementation of a proposed development, then an EIA is required to be submitted along with the application. The Project falls under Section (3) 'Energy Industry' (a) 'Industrial installations for the production of electricity, steam and hot water (of paragraph 2 of Schedule 2. As the Proposed Development exceeds the area threshold of 0.5 ha listed within Column 2 of Schedule 2, paragraph (3) (a) and based on current available information, the Applicant has elected to carry out an EIA and an ES will be submitted to accompany the planning application.

Purpose of EIA

1.3.4 EIA is the process of identifying and assessing the significance of effects likely to arise from a proposed development. This requires consideration of the likely changes to the environment, where these arise as a consequence of a proposed development, through comparison with the existing and likely future baseline conditions in the absence of that proposed development.

Purpose of scoping

1.3.5 The process of identifying the matters to consider within an ES (establishing the scope of the assessment) is known as scoping. Scoping is not a mandatory requirement under the EIA Regulations. However, it is recognised that through the scoping exercise, the key environmental matters are identified at an early stage, which permits subsequent work to concentrate on those environmental topics for which significant effects may arise as a result of a proposed development.

Purpose of this scoping report

1.3.6 This document sets out details of the Proposed Development, the proposed EIA methodology and the proposed scope of technical assessments. It invites comments from PEDW and its consultees regarding the scope of works. The intention of this scoping exercise is to gain agreement from all key parties regarding the proposed methodology and scope of assessment.

1.3.7 This Scoping Report has been informed by the following:

- Desk-top studies, site visits and surveys.
- Review of relevant websites, such as those provided by statutory consultees.
- Local planning policy, Planning Policy Wales and Technical Advice Notes.
- The EIA Regulations and EIA good practice guidance.
- Experience of other similar developments.

Public consultation

1.3.8 An important part of the Applicant's planning process is engaging with local communities to provide information on the Proposed Development and gather local feedback to improve the proposals. The Applicant is committed to building a relationship with the community near the Heolddu Solar Farm Site and more broadly across Wales. To ensure that this happens there will be extensive consultation on the Proposed Development.

1.3.9 The enclosed Consultation Plan at Appendix 1.2 confirms the proposed key project milestones which include:

- Late 2024 / early 2025 – pre-application engagement and EIA Scoping Request.
- Early 2025 – informal consultation including project website launch, stakeholder outreach, consultation leaflet and consultation event, community benefit workshop and media relations.
- Mid 2025 – Statutory Pre-Application Consultation including formal notification of full draft DNS planning application hosted on project website, consultation event, community benefit workshop and further media relations.
- Late 2025 – application submission. Concurrent stakeholder meetings, including community benefit organisations.

1.3.10 The ES will include a summary of the pre-application public consultation carried out.

2 THE SITE AND THE PROPOSED DEVELOPMENT

2.1 The Site and its surroundings

2.1.1 The Application Site (the "Site") extends to 90.5 hectares (ha) and is located wholly within the administrative boundary of Carmarthenshire County Council. The Site is set within a rural, farmed landscape 1km to the east of Ferryside. Kidwelly is 4km to the south. Smaller settlements within a 5km radius of the Site include the villages of Llandyfaelog, Broadway, Llansaint, Saint Ishmael and Broadlay.

2.1.2 The Site comprises:

- Solar Area West
- Solar Area East
- Underground cable route connecting the two Areas
- Offsite parcels for ecology mitigation and/or enhancement if required.

2.1.3 Solar Area West extends to 55 hectares and is south-westerly facing, whilst Solar Area East extends to 25 hectares and is south-easterly facing (see Figure 2.1) – these are the areas proposed for the solar farm itself. Additionally, off-site mitigation and enhancement land comprises a 3-hectare parcel located to the north of Carmarthen Road (north of Solar Area East) and a 7-hectare parcel located immediately south of Carmarthen Road (north of Solar Area West). The underground cable route covers 0.5 hectares.

2.1.4 Solar Area West consists of fifteen fields (1-15), mainly flat and separated from each other by mature hedgerows which also form the Site boundaries. There is a small woodland within the fields. The land is well screened from the surrounding landscape and views by existing mature boundary vegetation. 57% of this land has been consented for solar development in 2015: the Bryncoch Solar Farm planning permission (W/32171) (see Figure 2.1 below for spatial extent of the permission). This lapsed due to grid connection issues but is considered still relevant in terms of the acceptability in principle of the location in environmental and planning terms.

2.1.5 Solar Area East consists of eleven fields (16-26) some of which, due to the surrounding topography and their hillside location, are more visible in the landscape than Solar Area West.

Figure 2.1: Consented Bryncoch Solar Farm shown in yellow and overlap fields as hatched.

2.1.6 Six residential properties are located within 300m of Solar Area West and Solar Area East, the nearest being Maes Mawr Farm, which is immediately north of Solar Area West. Pembrey Airport is located 5km to the south of the Site.

2.1.7 Figure 2.2 and Figure 2.3 below provide views from within Solar Area West. Figure 2.4 and Figure 2.5 provide views from within Solar Area East.

Figure 2.2: View from centre of Solar Area West looking east (Field 8)

Figure 2.3: View from centre of Solar Area West looking north (Field 7)

Figure 2.4: View from south of Solar Area East looking north (Field 19)

Figure 2.5: View from the south of Solar Area East looking north (Field 17 and Field 19 beyond first field)

2.1.8 In terms of site access, both Solar Area East and Solar Area West have access gates between field boundaries, allowing easy internal access and both are accessed from Carmarthen Road off the A484. Solar Area West can be accessed via a gate in the field boundary located on a junction 3km along Carmarthen Road from Ferryside. An additional access to Solar Area West can be achieved immediately west of the crossroads along the northern boundary. Solar Area East can be accessed via a gate in the field boundary located 1.5km along Carmarthen Road from the A484 to Llandyfaelog. It is anticipated that both accesses from the road may require small sections of hedgerow removal to ensure that appropriate sightlines can be achieved. Hedgerow loss required to accommodate the Proposed Development will be kept to a minimum with all internal trees and hedgerows retained. Where any removal is required, replacement planting will be secured through a Landscape Strategy to be secured by planning condition.

2.1.9 There is a single Public Right of Way (PRoW) crossing the centre of Solar Area West, running broadly in an east-west direction, along the existing field boundary (62/12/1). It is anticipated that this will be accommodated within the Proposed Development layout, and it is not intended that a permanent diversion or stopping up will be necessary. Controls will be in place during construction to manage the continued use of this route which will be secured in a Construction Environmental Management Plan (CEMP) or similar management plan. Opportunities for enhancement of this section of the PRoW will also be explored.

2.1.10 Please see Appendix 1.1 which show the Site's location and red line boundary.

2.2 Project description

2.2.1. The Applicant proposes to develop a solar photovoltaic electricity generating station (or 'solar farm') with an installed generation capacity of circa 40 MW and associated ancillary development, including a 132kV substation, with landscape and environmental enhancements.

2.2.2. The project description is as follows:

Proposed development of a solar farm, including associated ancillary infrastructure and development, temporary laydown areas and landscape and environmental enhancements on land at Maes Mawr and Treforris Fawr Farm, Ferryside, Carmarthenshire.

2.2.3. The main components of the Proposed Development are:

- Solar panels and frames.
- Central Inverters.
- Transformers.

- Cabling.
- Substations with communications tower.
- Internal access roads.
- Fencing.
- Landscape and wildlife enhancements.

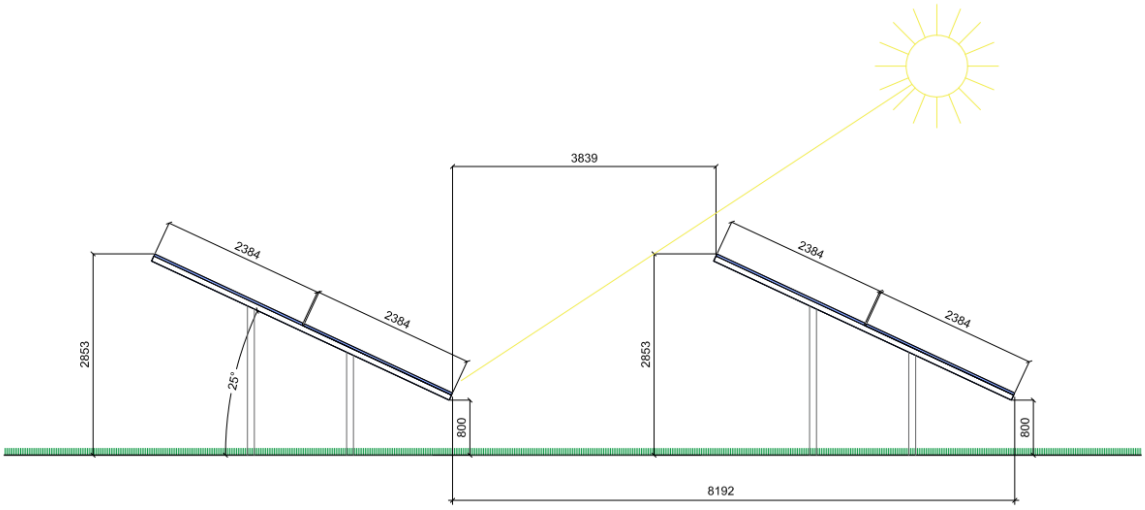
2.2.4. It is anticipated that the Point of Connection (PoC) will be at the existing 132kV pylon located in the north-east of Solar Area East (Field 21). Underground cables will be laid between Solar Area West and Solar Area East to connect Solar Area West to the PoC. It is anticipated that the cable route will be laid via surface dug trenches and backfilled along the public highway as shown in Appendix 1.1.

2.2.5. It is estimated that annually, the electricity generated would be enough to power approximately 10,770 homes[1], resulting in an approximate saving of 9,961 tonnes of CO_2[2]. This would be enough to power almost all the homes in Kidwelly and St Ishmael, Trimsaran, St Clears and Carmarthen put together. It should be noted that the figures stated may change once more detailed assessment has been undertaken.

2.2.6. During construction and decommissioning temporary site compounds will be required to host staff facilities, take deliveries of components and store plant and equipment securely while not in use. These compounds will be sited within the Solar Area East and Solar Area West – no additional land is necessary to accommodate site compounds.

2.2.7. Solar panels, also known as photovoltaics (PV), are made up of cells, which convert the light energy from daylight into electrical energy. The solar panels will 'over sail' the land which they occupy, arranged in series of squares up to a height of 1 m for east/west panels and a series of rows, typically tilted southwards at an angle of 10-25 degrees. The PV panels will be traditional static south facing fixed tilt structures hosting panels up to 2.85m tall. The panels have an anti-reflective coating to ensure maximum absorption of solar radiation and reduction of reflections. An indicative solar panel cross section is shown at Figure 2.6 below.

Figure 2.6 Indicative Solar Panel Cross Section



[1] Year one output has been calculated by multiplying the proposed development's generation capacity (40 MW), by total hours in a year (8,766 accounting for leap years), then applying a capacity factor for solar PV schemes operating in the UK on an unchanged configuration basis (11.06% (average of 2012-2023 data)) (DESNZ, 2024). Year one output was then divided by 3,600 kWh, (annual electricity consumption for an average UK household) (DESNZ, 2023), providing an estimated number of homes powered per annum.

[2] This saving is calculated by multiplying estimated total output in year 1 (38,769 MWh), by the UK's current grid average factor, inclusive of Well-to-tank (WTT), and WTT transmission and distribution (T&D) (DESNZ, 2024).

2.2.8. Solar panels will be mounted upon support frame uprights which will then be pile (push) driven into the ground. Some limited excavation will be required for the substation platform as well as for the central inverters and transformers' foundations.

2.2.9. The majority of the cabling associated with the Proposed Development will be laid underground via surface dug trenches of approximately 1 m deep and 50cm wide and backfilled.

2.2.10. At this stage the technical requirements are being clarified and assessed but the proposal is likely to include a 132 kV DNO substation, which would comprise an open compound with support stanchions and cabling. The substation's main structural elements can be painted in a warm, muted mid-tone neutral shade and its perimeter landscaped (if appropriate) to ensure it is visually recessive within the landscape. The substation design will be confirmed by the Distribution Network Operator (DNO) and will comprise the DNO substation and a further Customer Substation. The substations will sit within a circa 22m wide and x 67 m long area which will include hardstanding for the placement of the electrical components and a 15m high communications tower. It will be enclosed within a 3 m tall security fence, painted in a shade of moss green and composed of an open steel mesh panel. Approx. 3.5 m high control room buildings will also be located in the substation compound area.

2.2.11. The solar panels will be designed to accommodate grazing beneath and between the rows of panels, providing an efficient dual use of land for renewable energy generation and agriculture. The solar farm will be enclosed by 2 m tall post and wire 'deer' fencing with 3 m tall security cameras in selected locations for security purposes.

2.2.12. Temporary construction compounds will be accommodated on-site with one temporary construction compound located in each of Solar Area West and Solar Area East. The construction period for the Proposed Development remains to be confirmed but will be between 8 to 12 months.

2.2.13. The Proposed Development would be a temporary and reversible use, unlike housing for example, with all above ground infrastructure removed from Site at the end of the installation's operational life (approximately 40 years). The methods used in construction (limited concrete) mean that remediation works following the removal of the panels and associated infrastructure are relatively minor and will return the Site to its previous agricultural use.

2.2.14. An Indicative Proposed Concept Layout Plan has been prepared and will be subject to technical assessment to inform the evolution of the design to arrive at a final Proposed Layout Plan. The Indicative Proposed Concept Layout Plan is included at Appendix 2.1.

3 GENERAL APPROACH TO EIA

3.1 Information required

3.1.1. Although there is no statutory provision as to the form of an ES, it must contain the information specified in Regulation 17(3), including any relevant information specified in Schedule 4 of the EIA Regulations, as set out below:

1. A description of the development including in particular:

    a. A description of the location of the development;

    b. A description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;

    c. A description of the main characteristics and the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the minerals and natural resources (including water, land, soil and biodiversity) used;

    d. An estimate, by type and quantity, of expected residues and emissions (such as water, air, soils and sub soil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases;

2. A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen opinion, including a comparison of the environmental effects;

3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge;

4. A description of the factors specified in regulation 4(2) likely to be significantly affected by the development; population, human health, biodiversity (for example fauna and flora), land, (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaption), material assets, cultural heritage, including archaeological aspects, and landscape;

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

    a. The construction and existence of the development, including, where relevant, demolition works;

    b. The use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

    c. The emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;

    d. The risks to human health, cultural heritage or the environment (for example due to accidents or disasters);

e. The cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;

f. The impact of the project on climate (for example the nature and magnitude if greenhouse gas emissions) and the vulnerability of the project to climate change;

g. The technologies and the substances used.

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

1. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.

2. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.

3. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU(c) of the European Parliament and of the Council or Council Directive 2009/71/Euratom(d) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

4. A non-technical summary of the information provided under paragraphs 1 to 8.

5. A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.

3.1.3. The information supplied in the ES will provide a clear understanding of the likely significant effects of the project upon the environment. The following sections outline the overall approach to EIA in order to meet these legal requirements.

3.2 Structure of the Environmental Statement (ES)

3.2.1 The ES will be structured logically, enabling all relevant environmental information to be found quickly and easily. The ES will describe the EIA process and its findings, and will include the following sections:

- Non-Technical Summary (as a stand-alone document)
- Written Statement
- Figures
- Appendices

3.3 EIA Methodology

Relevant EIA guidance

3.3.1 The EIA process will take into account relevant government or institute guidance, including:

- Welsh Office Circular 11/99: Environmental Impact Assessment.
- Highways Agency et al. (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08.
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment.
- Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report.
- Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment: Guide to Shaping Quality Development.
- Institute of Environmental Management and Assessment (2015b) Climate Change Resilience and Adaptation.
- Institute of Environmental Management and Assessment (2016) Environmental Impact Assessment: Guide to Delivering Quality Development.
- Institute of Environmental Management and Assessment (2017) Environmental Impact Assessment: Assessing Greenhouse Gas Emissions and Evaluating their Significance.
- Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach.

3.3.2 Other topic-specific specialist methodologies and good practice guidelines will be drawn upon as necessary and have been stated in topic sections.

Key elements of the general approach

3.3.3 The assessment of each environmental topic will form a separate chapter of the ES. For each environmental topic, the following will be addressed:

- Methodology and assessment criteria.
- Description of the environmental baseline (existing conditions).
- Identification of likely effects.
- Evaluation and assessment of the significance of identified effects, taking into account any measures designed to reduce or avoid environmental effects which form part of the project and to which the developer is committed.
- Identification of any further mitigation measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the project).

Methodology and assessment criteria

3.3.4 Each topic chapter will provide details of the methodology for baseline data collection and the approach to the assessment of effects. Details of the proposed approach for each topic chapter are provided in Sections 5 - 7 of this Scoping Report. Each identified environmental topic will be considered by a specialist in that area. The identification and evaluation of effects will consider relevant topic-specific guidance where available.

Description of the environmental baseline

3.3.5 The existing and likely future environmental conditions in the absence of the project are known as 'baseline conditions'. Each topic-based chapter will include a description of the current (baseline) environmental conditions. The baseline conditions at the Site and within the study area form the basis of the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.

3.3.6 The baseline for the assessment of environmental effects will primarily be drawn from existing conditions during the main period of the EIA work. Consideration will also be given to any likely changes between the time of survey and the future baseline for the construction and operation of the project. In some cases, these changes may include the construction or operation of other planned developments in the area. Where such developments are built and operational at the time of writing and data collection, these will be considered to form part of the baseline environment. Where sufficient and robust information is available, such as expected traffic growth figures, other future developments will be considered as part of the future baseline conditions. In all other cases, planned future developments will be considered within the assessment of cumulative effects.

3.3.7 The consideration of future baseline conditions will also take into account the likely effects of climate change, as far as these are known at the time of writing. This will be based on information available from the UK Climate Projections project (UKCP18), which provides information on plausible changes in climate for the UK (Environment Agency and Met Office, 2018) and on published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016).

Assessment of effects

3.3.8 The EIA Regulations require the identification of the likely significant environmental effects of the project. Each topic chapter will take into account both the sensitivity of receptors affected and the magnitude of the likely impact in determining the significance of the effect.

Sensitivity and importance of receptors

3.3.9 Receptors are defined as the physical resource or user group that would be affected by a proposed development. The baseline studies will identify potential environmental receptors for each topic and will evaluate their sensitivity to the proposed development. The sensitivity or importance of a receptor may depend, for example, on its frequency or extent of occurrence at an international, national, regional or local level.

Magnitude of impact

3.3.10 Impacts are defined as the physical changes to the environment attributable to the project. For each topic, the likely environmental impacts will be identified. The magnitude of the impact will be described using defined criteria within each topic chapter.

3.3.11 The categorisation of the impact magnitude may take into account the following four factors:

- Extent
- Duration
- Frequency
- Reversibility

3.3.12 Impacts will be defined as either adverse or beneficial. Depending on discipline, they may also be described as:

- Direct: Arise from activities associated with the project. These tend to be either spatially or temporally concurrent.

- Indirect: Impacts on the environment which are not a direct result of the project, often produced away from the project site or as a result of a complex pathway.

3.3.13 Impacts will be divided into those occurring during the construction phase and those occurring during operation. Where appropriate, some chapters may refer to these as temporary and permanent impacts.

Significance of effects

3.3.14 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'), which is determined by correlating the magnitude of the impact to the sensitivity of the receptor or resource.

3.3.15 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national value, or a large impact on a resource of local value. In broad terms, therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity or importance of the receptor.

3.3.16 Levels of significance that will be used in the assessment include, in descending order:

- Substantial
- Major
- Moderate
- Minor
- Neutral

3.3.17 Where an effect is described as 'neutral' this means that there is either no effect or that the significance of any effect is considered to be negligible. All other levels of significance will apply to both adverse and beneficial effects. These significance levels will be defined separately for each topic within the methodology sections. In all cases, the judgement made as to significance will be that of the author of the relevant chapter with reference to appropriate standards/guidelines where relevant.

Cumulative effects

3.3.18 The cumulative effects of the proposed development in conjunction with other proposed schemes will be considered. The cumulative effects assessment will consider any developments that are formally in the planning system at the time of submission. Developments that are built and operational at the time of assessment will be considered as part of the baseline.

3.3.19 It is proposed that the ES will consider the following cumulative schemes:

Table 3.1: Identified Cumulative Schemes

Project	Status
DNS CAS-03094-T7D9G0 – Green GEN Towy Teifi Grid Connection Distance: approximately 40km north	EIA Scoping Direction issued by PEDW.
DNS CAS-02917-K8D5Z2 – Bryn Cadwgan Energy Park Distance: approximately 45km north-east	EIA Scoping Direction issued by PEDW.
DNS/3227364 – Tycroes Solar Farm Distance: approximately 18km east	Consented but unimplemented.

DNS/3213164 – Llangennech Solar Farm Distance: approximately 15km south-east	Consented but unimplemented.
S/36948 – Pentre Awel Wellbeing and Life Sciences Village Distance: approximately 15km south-east	Phase 1 under construction
Nantycaws Circular Economy Park Distance: approximately 9.5km north-east	Pre-Application Stage
Carmarthen West Strategic Site Distance: approximately 10km north-east	Part-implemented adopted LDP allocations and draft RLDP allocation.
Towy-Usk connection route Distance: approximately 3km north-east	Pre-Application Stage
PL/08221 – Proposed replacement dwelling and extension of domestic curtilage, Golygfa, Kidwelly, SA17 5AR. Distance: approximately 270m east of Solar Area West (immediately south of proposed cable route).	Consented but unimplemented.

3.3.20 The Applicant submitted a pre-application advice request to Carmarthenshire County Council in December 2024 which included the list of cumulative developments above to be agreed. Accordingly, the cumulative schemes to be considered in the ES will be agreed with Carmarthenshire County Council prior to this list being finalised.

Mitigation measures

3.3.21 The EIA Regulations require that where significant effects are identified 'a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce or, if possible, offset likely significant adverse effects on the environment' should be included in the ES.

3.3.22 The development of mitigation measures is part of an iterative EIA process. Therefore, measures will be developed throughout the EIA process in response to the findings of initial assessments. The project that forms the subject of the planning application will include a range of measures designed to reduce or prevent significant adverse environmental effects arising, where practicable. In some cases, these measures may result in enhancement of environmental conditions. The assessment of effects will therefore take into account all measures that form part of the project and to which the Applicant are committed.

3.3.23 The topic chapters will therefore take into account all measures that form part of the Proposed Development, including:

- Measures included as part of the project design (sometimes referred to as primary mitigation).
- Measures to be adopted during construction to avoid and minimise environmental effects, such as pollution control measures. These measures would be implemented through the Code of Construction Practice.
- Measures required as a result of legislative requirements.

3.3.24 Where required, further mitigation measures will be identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any residual adverse effects on the environment.

3.3.25 In some cases, monitoring measures may be appropriate, for example, to ensure that proposed planting becomes established. Where appropriate, monitoring measures will be set out.

Summary tables

3.3.26 Tables will be used to summarise the effects of the project for each environmental topic.

4 SCOPE OF ASSESSMENT

4.1 Work undertaken to date

4.1.1 The Site selection and layout design exercises have been informed by a combination of desk-based assessment to identify any opportunities or constraints together with the findings of survey work undertaken to-date. Environmental constraints have been given particular regard and prioritised wherever practicable when selecting the Site for development. Where environmental constraints remain, the design of the development itself within the Site will respond to these constraints in order to minimise impacts as far as possible. The following studies have been undertaken or are currently ongoing in relation to the proposed development.

4.1.2 Topographical surveys of the Site were completed in November 2024 and have informed the Proposed Concept Layout Plan.

4.1.3 Surveys are underway to confirm the Agricultural Land Classification (ALC) value of the Site and the extent of any BMV. The methodology for the ALC survey has been verified by the Welsh Government Land Quality Advice Service. The outcome of the survey will inform the design of the Proposed Development.

4.1.4 An early Zone of Theoretical Visibility (ZTV) was prepared based upon a maximum capacity layout to inform the selection of candidate viewpoint locations and to identify the areas of the Site that are most visible in order to inform the early design of the Proposed Development.

4.1.5 A Written Scheme of Investigation for Geophysical Survey was approved by the archaeological advisor at Heneb Development Management – Dyfed Region on 8 November 2024. The geophysical survey was completed in November 2024 and will be shared with Heneb in order to confirm any requirements for further evaluation.

4.1.6 A Phase 1 Ecological Walkover Survey was undertaken in December 2024 which will inform the required scope of the Phase 2 surveys to be undertaken in 2025. The Phase 1 Survey will be updated during the optimal survey window in 2025 to validate the December 2024 findings and will be presented in a Preliminary Ecological Appraisal (PEA) report. Wintering bird surveys commenced in November 2024 and will continue until early March 2025.

4.1.7 A Noise Impact Assessment is currently under preparation. Early findings emerging from the baseline noise monitoring are being considered in order to ensure the selection of appropriate equipment, as well as to inform the spatial arrangement of infrastructure on the Site. A decision has been made by the design team to reject string inverters and opt for a centralised inverter solution. This choice reduces noise impacts through increasing the distances between the inverters and the limited number of nearby noise sensitive receptors and significantly reducing the overall number of inverters in the scheme. Initial high-level modelling has been undertaken that has informed the choice of the centralised inverter technology.

4.1.8 Early transport appraisal exercises have been undertaken to identify the most appropriate access points to each parcel, and to model the visibility splays for construction and maintenance vehicles accessing the Site. An early review of construction compound options has also been undertaken.

4.1.9 A walkover and arboricultural appraisal (BS5837:2012 standard) was completed in December 2024. Appendix 4.4 presents the Tree Survey Report which has been prepared to inform feasibility and design options. A full Arboricultural Impact Assessment will be undertaken as a stand-alone assessment to accompany the planning application.

4.2 Topics scoped out of assessment

4.2.1 Taking into account the findings of the above studies, together with our knowledge of the Site and surrounding area, it is proposed that the following topics are not included in the scope of the ES:

- Planning policy context.
- Population.
- Human Health.
- Transport.
- Land (for example land take).
- Air.
- Material Assets.
- Risk of Major Accidents.
- Ground Conditions.
- Noise and Vibration.
- Hydrology, Hydrogeology and Flood Risk.
- Historic Environment.
- Glint and Glare.
- Residential Visual Amenity.
- Climate Change.

Planning policy context

4.2.2 The ES will provide an overview of relevant legislative and planning policy context within each topic chapter. The assessment will have regard to national and local policy documents, where relevant. However, it is not proposed to include a separate chapter on Planning Policy Context in the ES. The draft guidance on EIA from the Department for Communities and Local Government 'EIA: A Guide to Good Practice and Procedures' (DCLG 2006) (paragraph 155) states that there is no requirement to provide chapters on planning and sustainability in Environmental Statements. A separate Planning Statement will be submitted with the planning application and the environmental topic chapters within the ES will each set out the policy context relevant to that topic.

4.2.3 Planning policy therefore is proposed to be scoped out of the ES.

Population and Human Health

4.2.4 The construction phase will have a temporary effect on employment provision through the creation of construction jobs. This is unlikely, however, to result in a significant change in population as workers are unlikely to relocate to an area on a permanent basis. Therefore, a minor beneficial effect is therefore anticipated for a temporary period. This would not be significant in EIA terms.

4.2.5 The direct human health effects of the Proposed Development are limited, the Proposed Development will displace primary fossil fuel derived electricity, and the consequent Greenhouse Gases and other pollutants released during fossil fuel combustion and would result in a beneficial effect on human health. This would not be significant in EIA terms.

4.2.6 Population and human health are therefore proposed to be scoped out of the ES.

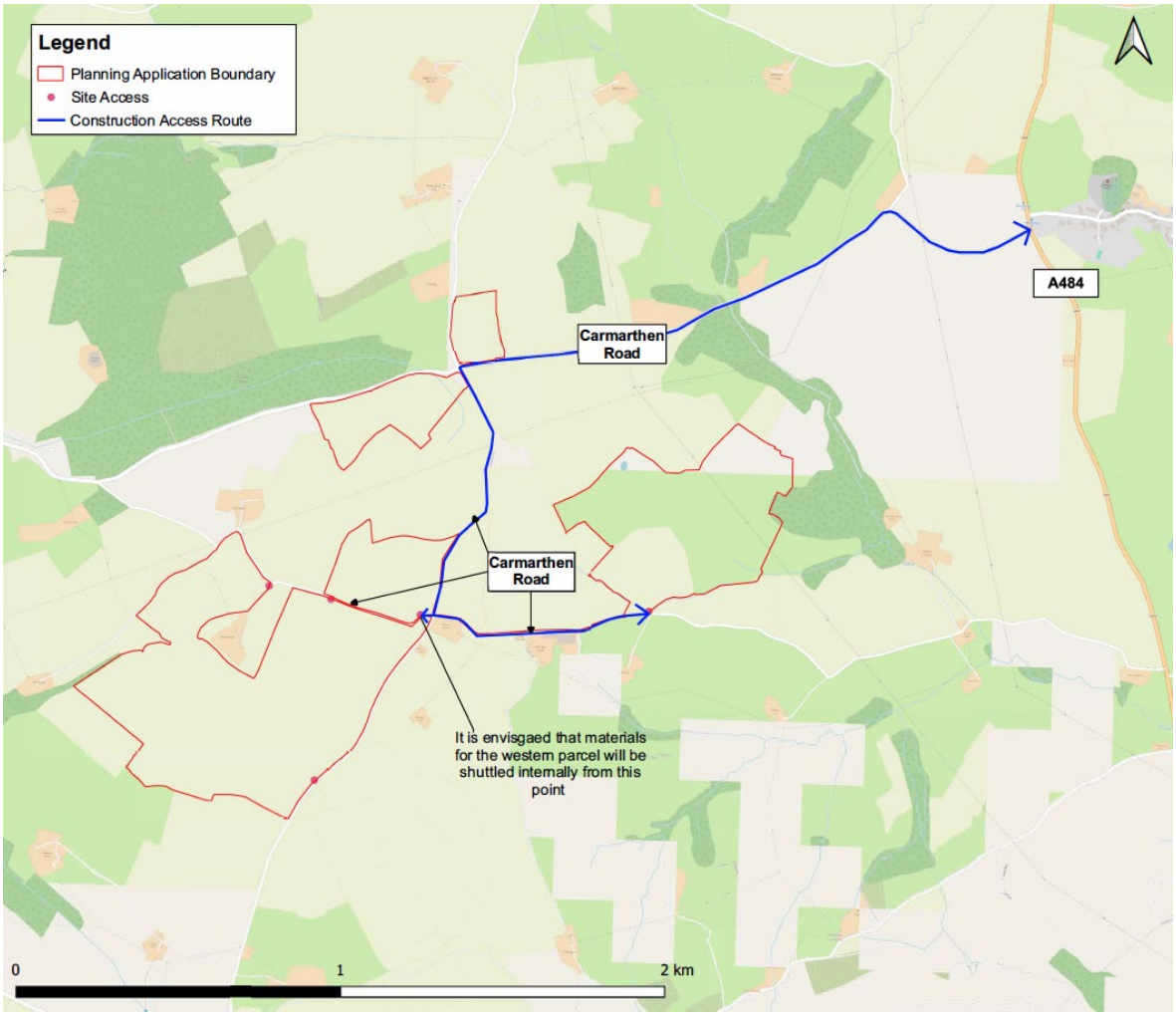
Transport

4.2.7 Appropriate construction traffic management and mitigation measures will be set out and secured within an Outline Construction Traffic Management Plan (CTMP) which will be prepared to accompany the planning application (and secured by planning condition). The construction period is to be confirmed but is estimated to take between 8 to 12 months. It is expected that construction hours will be between 07:30 and 18:00 hours Monday to Friday and 08:00 and 13:00 hours on Saturday.

4.2.8 Over the duration of the 8-to-12-month construction period, there will be an average of eight HGV deliveries (16 two-way movements) per day. Even at the most intense period of construction it is expected that there will be no more than 15 HGV deliveries (30 two-way movements) per day. Even if such numbers of daily movements were to be generated, these would be balanced by other days on which fewer HGV movements than the daily average would be generated.

4.2.9 The construction period is temporary, and the Site is not located in a specifically sensitive area. It is therefore considered the impact of construction traffic on the surrounding population and highway network would not be significant. It is envisaged that the main construction route will be from the northeast via the A484 and Carmarthen Road, as shown on Figure 4.1. Carmarthen Road provides access to a small number of residential properties, farms and agricultural fields, thus there are already large vehicles routeing along it. The residential properties are typically set back from the highway with screening formed by the hedgerow which typically lines both sides of the carriageway. It is considered that there are no sensitive receptors along Carmarthen Road and the access route.

Figure 4.1: Construction Access Route



4.2.10 An investigation of Personal Injury Accident data on the main construction route has been undertaken using Crashmap. Personal Injury accidents for the latest available five-year period (January 2019 to December 2023) have been assessed for the main construction route.

4.2.11 The data shows that there were two slight injury accidents recorded during this period, with both injury accidents occurring at the A484 / Carmarthen Road junction in 2021 and 2022.

4.2.12 Having analysed the Personal Injury Accident data, there are no clusters which would highlight any potential deficiency in the design of the highway network. It is therefore considered that the adjoining highway network currently operates with no significant highway safety issues which could be exacerbated by the Proposed Development.

4.2.13 Once operational, the solar farm will be operated remotely and only require between 3-5 visits per month for maintenance, monitoring and cleaning of the panels and Site.

4.2.14 The suggested changes in traffic flows (during operation) in the vicinity of the Site represent a negligible change in traffic flows, similarly the Site is not located in a specifically sensitive location. On this basis, these predicted increases are well below the 'Guidelines for the Environmental Assessment of Road Traffic' which suggest two broad rules that can be used as a screening process to identify the appropriate extent of the assessment area. These are:

- Rule 1 – Include highway links where traffic flows would increase by more than 30% (or the number of new HGVs would increase by more than 30%); and
- Rule 2 – Include any other specifically sensitive areas where traffic flows would increase by 10% or more.

4.2.15 Therefore, the operational traffic generated by the Proposed Development would have a negligible influence on the surrounding population and highway network.

4.2.16 It is therefore considered that transport, both construction and operational can be scoped out of the ES and adequately addressed through the submission of separate standalone technical reports, such as an Access Strategy and Transport Assessment, which will accompany the planning application. The Access Strategy and Transport Assessment will assess the highway geometries and layouts of the access route along with its existing traffic volumes and road safety records and will determine any traffic management and mitigation measures that may be required such that the construction vehicles would not result in any material impacts upon road users, the operation of the highway and highway safety. A detailed CTMP detailing the delivery routes, construction routes, construction compounds and any associated parking or management of construction traffic will also be prepared prior to the construction of the Proposed Development (and secured by planning condition). It is also proposed that details of the operational traffic movements and any onsite parking and turning spaces will be provided as part of the planning application.

Land (for example land take)

4.2.17 The Site comprises pastoral agricultural land which will be developed for the production of renewable energy. The Site will be designed to be capable of enabling sheep grazing during its operational life, and therefore it is anticipated that energy and agriculture will remain in a co-use across the Site. The Proposed Development is temporary and reversable, and the Site will be restored following decommissioning.

4.2.18 Solar farms have been found to boost the diversity and abundance of certain plants, invertebrates and birds, compared to that on farmland, if solar panels are integrated with vegetation. Careful management of grazing regimes and planting proposals, together with a reduction in the use of

pesticides and fertilisers has been shown to improve the quality of land over the lifetime of solar farm developments.

4.2.19 Overall, the land will not be irreversibly developed and will remain in agricultural use as grazing of sheep will be possible whilst the solar arrays are in place and as such no likely significant lasting adverse effects on the quality of the land is expected.

4.2.20 Land is therefore proposed to be scoped out of the ES.

Air

4.2.21 At this stage, the operation of the Proposed Development is not anticipated to result in any direct emissions to air (e.g. as a result of emissions from combustion plant or other combustion sources) and thus local air quality impacts associated with the Proposed Development are not anticipated.

4.2.22 The number of HGV movements during the construction of the Proposed Development will not exceed the traffic criteria detailed in the Institute of Air Quality Management (IAQM) (UK) Planning Guidance. As such the change in the volume of traffic on the surrounding road network will not have any significant effect on air quality as experienced by the nearest receptors located in the vicinity of the Site. Additionally, a CTMP will demonstrate that construction materials can be transported by environmentally friendly means; identify construction deliveries that could be reduced, re-timed or consolidated, particularly during peak periods; and encourage use of modern, low emission vehicles. Good practice dust control measures as recommended by the IAQM will be implemented through a CEMP which will accompany the planning application.

4.2.23 As described above, the increase in local traffic volumes once the Proposed Development is operational will be minimal. Therefore, the effects from operational traffic-related air pollutants are anticipated to be not significant.

4.2.24 Air is therefore proposed to be scoped out of the ES on the basis that all potential impacts and effects will be temporary in nature and will be fully addressed through the implementation of appropriate management plans.

Material assets

4.2.25 The EIA Regulations refer to 'material assets', including architectural and archaeological heritage. The phrase 'material assets' has a broad scope, which may include assets of human or natural origin, valued for socio-economic or heritage reasons.

4.2.26 Material assets are in practice considered across a range of topic areas within an ES, in particular the cultural heritage desk-based assessment. This topic is proposed to be considered as part of a standalone assessment and therefore, no separate consideration of material assets is considered necessary.

4.2.27 Material assets is therefore proposed to be scoped out of the ES.

Risk of major accidents and disasters

4.2.28 Solar photovoltaic technology is a benign form of electricity generation with very low risk of accident or disaster and will not have a significant environmental effect in this regard. The solar farm will be

enclosed by appropriately designed security fencing and monitored by CCTV, which will lower the risk of unauthorised access and accidents.

4.2.29 Each topic chapter will include a consideration of the impact of major accidents and disasters on that topic.

4.2.30 Risk of major accidents and disasters is therefore proposed to be scoped out of the ES.

Ground conditions

4.2.31 BGS records indicate that Solar Area West is located on outcropping bedrock of the Milford Haven Group typically comprising hard red marls and red/green sandstones. Solar Area East is located primarily on the bedrock of the Milford Haven Group again comprising hard red marls and red/green sandstones with localised cover of Glacial Till in the south.

4.2.32 A review of the Carmarthenshire County Council Local Plan 2006 – 2021 shows that the Site is not within a Mineral Safeguarding Area (MSA) and therefore it is concluded that there is no further requirement for minerals assessment. The Mining Remediation Authority does not indicate the Site to be within a Development High-Risk Area or Coal Mining Reporting Area and therefore, no further assessment is required on these aspects either.

4.2.33 The Applicant proposes to undertake a Geoenvironmental Desktop Study (GDTS) which will be included as a technical appendix to the ES. The GDTS will consider the baseline environment of the Site in relation to ground conditions and will provide an assessment of issues relating to soils and groundwater, contamination and geology. Groundwater (and surface water) will be considered within the context of potential pollution issues and the potential impact of the Proposed Development on existing groundwater (and surface water) abstractions within the study area. Geology will be assessed in terms of potential impact on identified mineral safeguarding areas and designated geological conservation sites listed by the Joint Nature Conservation Committee (JNCC) in the Geological Conservation Review (GCR).

4.2.34 Recommendations set out in the GDTS to prevent any adverse impacts arising as a result of the Proposed Development on the Site and the surrounding area will be incorporated into management plans as appropriate which will be secured as part of the planning permission if granted.

4.2.35 It is therefore proposed that ground conditions is scoped out of the ES.

Noise and vibration

Baseline Environment

4.2.36 The existing noise environment at the nearest noise-sensitive receptors is very quiet, and governed by natural sources, such as birdsong and wind-induced vegetation movement, with some contributions arising from road traffic on the local and regional road network.

4.2.37 A baseline noise survey at the Site has revealed that typical L_{A90} background sound levels across the site range from 26 to 28 dB during the day and 20 to 24 dB, during the night-time/early morning period. These figures have been derived from a modal distribution analysis of 15-minute logs measured continuously between 7 November 2024 and 12 November 2024.

Temporary Effects during Construction

4.2.38 The Proposed Development will result in noise and vibration generation during the construction stage.

4.2.39 The Site and its environs are rural and sparsely populated; however, there are three identified residential properties located within 30 metres of the Site boundary including a bungalow which is subject to planning permission for a proposed two-storey replacement property (PL/08221). These properties are anticipated to represent the key acoustic constraints to the Proposed Development

and as such, the eventual layout will not introduce significant plant and consequent construction concentrations in these areas.

4.2.40 It is envisaged that noise and vibration generated during the construction stage will be limited to the daytime working hours stated within a CEMP that will accompany the Application (and be secured by planning condition). With reference to British Standard (BS) 5228 Part 1, it is expected that a daytime construction noise limit of 65 dB LAeq,10hour would apply at the nearest human receptors. Due to the nature of the emerging design, low intensity of construction activity associated with solar farm construction and separation distances involved, it is highly unlikely that this limit would be exceeded by construction noise from the works. On this basis, no significant effects are expected to arise at noise sensitive receptors during the construction phase and this noise aspect can be scoped out.

4.2.41 It is anticipated that construction hours would be limited to 0730 to 1800hrs Monday to Friday; 0800 to 1300 on Saturdays; with no working on Sundays or bank holidays. Any working outside of these times would be subject to written, prior approval from the LPA. With respect to the minimisation of acoustic disruption arising from construction activity, the following controls would be employed:

- Effective co-ordination and time management of construction operations to avoid noise and vibration nuisance to surrounding uses.
- Early and helpful communications with the surrounding receptors and Parish Council, who will be contacted 4 weeks in advance of the construction phase, to assist reducing potential for and in managing any complaints arising during the demolition and construction works of.
- Undertaking of all works in accordance with Best Practice Measures (BPM) as stipulated in the Control of Pollution Act 1974.

4.2.42 Typically, adopting Best Practicable Means (BPM) would reduce overall construction noise levels by approximately 5 dB.

4.2.43 Whilst traffic movements during the construction are expected to be very low in the context of the existing traffic baseline, management of deliveries and removal of material off-site will still be as follows:

- Ensuring that construction traffic is parked off the public highway.
- No idling engines, when vehicles are awaiting loading/unloading.
- Controlling the discharge of trucks from Site to avoid congestion.
- Implementing traffic management systems at the entrance to the Site at all times to control the traffic into the Site.

4.2.44 Should any non-routine activities be identified that would make it impracticable to work to the target criterion, provisions would be set out in advance and with the agreement of the LPA, to reduce and control the effect

Effects during Operation

1.2 The Proposed Development will generate noise from the inverter and transformer stations during its operation; however, the design being developed is responding to the acoustic constraints of the area to ensure that separation distances to any inverter stations are maximised, with plant selection being made on an acoustically appropriate basis, to ensure that acoustic amenity is adequately protected. The scheme design is running in tandem with the scoping process and has already resulted in a move away from string inverter technology to a centralised inverter strategy, which minimises the number of noise sources and has enabled their appropriate placement, alongside a selection of acoustically appropriate candidate plant, based on known, existing technology and mitigation packages. It is important to note that currently available candidate plant data is used, as the sector will evolve and provide new, quieter technologies as the planning and implementation process progresses.

2.2 Initial predictions have shown that this approach will ensure that noise impacts will be low, with rating noise levels being maintained at a level of no greater than the prevailing background sound level, when assessed in accordance with the BS4142:2014+A1:2019 methodology, with the highest predicted specific noise level at any receptor being 20 dB, reducing to 11 dB at greater separation distances.

3.2 Consequently, the Proposed Development can and will be specified to avoid any significant adverse effects with regards to noise during operation, with preliminary predictions identifying no greater than a Low Impact in BS4142-terms at any identified receptor.

Conclusions

4.2.45 Subject to the control measures to be committed to in the CEMP, and acoustic specifications incorporated into the design, which can all be secured via appropriate planning controls, no significant effects due to noise or vibration are anticipated at any noise-sensitive receptors as a result of the Proposed Development.

4.2.46 It is therefore considered that noise and vibration can be scoped out of the ES.

Hydrology, Hydrogeology and Flood Risk

Baseline Environment

4.2.47 The Site lies wholly within Flood Zone A according to the Natural Resources Wales (NRW) Development Advice Map meaning that the Site is not at risk of flooding from rivers or the sea. The emerging NRW Flood Map for Planning also identifies the Site as being located within Flood Zone 1 and represents the most up-to-date source of flood risk information. There are small areas of surface water flooding identified within the Site associated with small watercourses.

4.2.48 OS mapping shows the presence of an unnamed ordinary watercourse through the southern section of the Solar Area East. The watercourse outfalls into the Nant Morlais approximately 380m east of the Site. The Nant Morlais then flows southeast for 1.2km before joining the Gwendraeth Fach which continues south/southwest for approximately 7km where it becomes the Gwendraeth Fawr and discharges into Carmarthen Bay (SPA). Due to environmental conditions and the distance between the Proposed Development and designated site, the SPA is assessed to be located outside the Proposed Development's zone of hydraulic influence. Therefore, hydrological impacts from the Proposed Development to the designated site will be undiscernible.

4.2.49 Another unnamed ordinary watercourse is present through the western section of the Solar Area West. The watercourse flows in a westerly direction before joining another unnamed watercourse and flowing north for approximately 1km where it joins a tributary of the River Towy. This tributary flows in a westerly direction before reaching the River Towy where it flows south and eventually discharges into Carmarthen Bay (SPA) some 6.5km downstream of the Site.

4.2.50 Superficial deposits of Devensian Till are found in the Solar Area East near the unnamed watercourse. These deposits are classified as Secondary (undifferentiated) aquifers, these formations have varying characteristics in different locations.

4.2.51 Bedrock deposits beneath these superficial deposits and underlying the solar area west are Argillaceous rocks and sandstone belonging to the Milford Haven Group. The bedrock is classified as a Secondary A aquifer, these formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.

Assessment Methodology

4.2.52 A Flood Consequences Assessment (FCA) will be prepared and included as a technical appendix to the ES to provide an assessment of the impact of the Proposed Development on flood risk and

hydrology receptors, taking into account the impacts of climate change on peak river flows and peak rainfall intensity.

4.2.53 A Conceptual Drainage Design will also be prepared which will incorporate sustainable drainage features and pay careful consideration to the areas of surface water flooding. The drainage strategy will ensure surface water runoff arising from new impermeable areas is attenuated and discharged at the greenfield runoff rate to prevent an increase in flood risk downstream. This will allow drainage features and setbacks to be incorporated into the design of the Proposed Development.

4.2.54 The Geoenvironmental Desktop Study (DTS) will also further inform the baseline environment in regards to hydrogeology. Recommendations set out in the DTS to prevent any adverse impacts arising as a result of the Proposed Development on the Site and the surrounding area will be incorporated into management plans as appropriate which will be secured as part of the ES.

4.2.55 Consultation with CCC and NRW is to be undertaken as part of the preparation of the FCA and Conceptual Drainage design to obtain Site specific flood risk and water quality information to inform the design and mitigation at the Site. During this consultation, any relevant permits will be obtained, including Sustainable Urban Drainage Systems (SuDS) Approval Body (SAB) approval of the drainage concept and any relevant consents such as land drainage if required.

Construction phase embedded mitigation

4.2.56 Construction phase mitigation would be implemented through the CEMP. To prevent impacts to hydrology, hydrogeology and flood risk receptors during the construction phase, all construction work would be undertaken in accordance with the CEMP and good practice documentation such as:

- Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532; 2001).
- CIRIA – SuDS Manual (C753; 2015a).
- CIRIA (C741; 2015b) Environmental good practice on site guide.
- Prevent surface water being affected during earthwork operations. No discharge to surface watercourses would occur without permission from NRW (SuDS Manual).
- Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual).
- Regular cleaning of roads of any construction waste and dirt to be carried out (SuDS Manual).
- A construction method statement to be submitted for approval by the responsible planning authority (SuDS Manual).

Operational phase embedded mitigation

4.2.57 The operational phase mitigation will also be undertaken in accordance with relevant local and national policy and will be subject to the approval of relevant bodies.

4.2.58 The Conceptual Drainage Strategy will be subject to approval from CCC and will detail measures in relation to flood risk and pollution prevention during operation. Appropriate levels of pollution treatment of flows prior to discharge to prevent pollution to hydrology and hydrogeology receptors and the restriction of surface water flows from the Site to the greenfield runoff rate to prevent an increase in flood risk as a result of development. The drainage strategy will also include an outline SuDS maintenance plan to ensure routine inspection, management and maintenance of the Proposed Development's SuDS features to ensure optimum performance and prevent risk of failure arising from poor maintenance.

Summary

4.2.59 Through the incorporation of the mitigation measures discussed above and production of supporting documents, it is considered the development will have minimal impact on hydrology, hydrogeology and flood risk and can therefore be scoped out of the ES.

Cultural Heritage

Introduction

4.2.60 Cultural Heritage encompasses buried archaeological remains; historic buildings, structures and monuments; and historic landscapes. The reasons why the cultural heritage topic is proposed to be scoped out of the EIA are presented, and the suggested approach for addressing the cultural heritage constraints, through appropriate assessment and investigation, is detailed.

Baseline Conditions

Baseline sources

4.2.61 Initial desk-based research has been undertaken. This exercise reviewed information from a number of heritage databases and reports encompassing the Site and the surrounding area, comprising:

- the Cadw list of designated historic assets.
- Heneb: Dyfed Historic Environment Record (HER) data, obtained in November 2024.
- Carmarthenshire Conservation Areas.
- Historic maps (including Tithe and Ordnance Survey).
- The Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) data.
- The Cultural Heritage Desk-Based Assessment (CgMs 2015) for previously consented solar farm at Bryncoch (planning application ref. W/32171) which included part of the Site area[3].

4.2.62 For the purposes of this chapter, a 1km 'study area' around the Site was utilised for the assessment of potential impacts upon buried archaeological remains and the historic landscape. A 5km 'settings study area' was used to consider the cultural heritage resource which may be affected as a result of change within the setting of historic assets.

4.2.63 This section is supported by the following appendices:

- a gazetteer of historic assets, presented in Appendix 4.1.
- Figures 4.1 and 4.2, included in Appendix 4.2.
- Geophysical Survey Written Scheme of Investigation (Appendix 4.3).

Built heritage

4.2.64 There are no built heritage, designated or not designated, historic assets within the Site (Appendix 4.2, Fig. 4.1).

- Within the settings study area the following designated historic assets (built heritage) can be found (Appendix 4.1):
  - 71 Listed Buildings, including three Grade I, seven Grade II* and 61 Grade II Listed Buildings. These historic assets represent predominantly domestic structures, but also

[3] https://planning-carmarthenshire.msappproxy.net/PublicAccess_Live/Document/ViewDocument?id=8CA3B2630B7B11E5B0A8001CC0FE604C

include religious buildings, defensive features (i.e. Llansteffan and Kidwelly castles) and features associated with industry and transport.

- Three Conservation Areas: Llansteffan, Kidwelly and Llansaint.
- Llechdwnni, Grade II Registered Park and Garden.

4.2.65 Only one built heritage designated historic asset is situated within 1km of the Site, the Grade II Listed 'Iscoed', a large late Georgian country house situated with views overlooking Carmarthen Bay, located approximately 700m to the north of the Site (Appendix 4.2, Fig. 4.1: C).

Archaeology

4.2.66 There are no designated historic assets of archaeological interest (Scheduled Monuments) within the Site (Appendix 4.2, Fig. 4.1).

4.2.67 Within the settings study area, 24 Scheduled Monuments are located, comprising prehistoric barrows, standing stones and burial chambers, medieval remains (largely associated with castles) and post-medieval features associated with agricultural or industrial activity (Appendix 4.1).

4.2.68 Of these, two Scheduled Monuments are located within the 1km study area, including the Round Barrow 330m SW of Mynydd-Uchaf, approximately 110m south-east of the Site (Appendix 4.2, Fig. 4.1: A), and Is-Coed Standing Stone, approximately 710m to the north-west (Appendix 4.2, Fig. 4.1: B).

4.2.69 The initial research has highlighted the potential for as yet unrecorded buried archaeological remains within the Site and in its wider environs. It should be noted however that no intrusive archaeological investigations have been previously carried out within the study area, with only previous desk-based assessments recorded by the HER (Appendix 4.2, Fig. 4.2: P1-P2).

4.2.70 While no prehistoric remains are recorded on the HER as surviving within the Site, 20 sites associated with Bronze Age funerary or ritual activity are recorded within the study area, represented by standing stones and round barrows (Appendix 4.2, Fig. 4.2: 1-3; Appendix 4.1). It should be noted however that the majority of these sites have been identified on the basis of place-name evidence rather than recorded archaeological remains. However, due to the presence of abovementioned Scheduled barrow 110m south-east of the Site (Appendix 4.2, Fig. 4.1: A, Fig. 4.2: 1), there is potential for Bronze Age activity within this landscape.

4.2.71 The only other asset of prehistoric date within the study area is a putative Iron Age hillfort approximately 200m to the north (Appendix 4.2, Fig. 4.2: 8) although the HER provides only an approximate location and records the earthwork enclosure as destroyed. There are no other Iron Age remains within the surrounding area, and the potential for as yet unrecorded similar remains within the Site is considered to be low.

4.2.72 There are no Roman period remains recorded in the HER within the study area, and the potential for surviving and as yet unrecorded remains within the Site is considered to be low.

4.2.73 The evidence for medieval activity within the study area is sparse and limited to place-name evidence likely indicative of agricultural land use in the medieval period, rather than settlement.

4.2.74 The majority of the sites recorded on the HER and lying within the study area relate to post-medieval and later activity (Appendix 4.2, Fig. 4.2; Appendix 4.1). This includes post-medieval farmsteads and cottages, as well as infrastructure (roads, milestones, bridges), quarries and agricultural remains. Within the Site, this is represented by place-name evidence, including for a potential former dwelling (which, however, is not depicted on tithe or Ordnance Survey maps) and a quarry (within the laydown area; Appendix 4.2, Fig. 4.2: 4). Several farmsteads and a cottage are recorded adjacent to and near to the Site boundaries (Appendix 4.2, Fig. 4.2: 5-7), but the review of historic tithe and Ordnance Survey maps indicates that the Site comprised enclosed agricultural fields. As such, there is considered to be a high potential for the presence of agricultural remains within the

Site associated with post-medieval and later activity, such as the infilled ditches of former field boundaries.

Historic Landscape

4.2.75 Two areas of Registered Historic Landscape (RHL) lie within the 1km study area (Appendix 4.2, Fig. 4.1):

- Tywi Valley RHL, which encompasses the western part of the Site.
- Taf and Tywi Estuary RHL extends to c. 740m to the south-west of the Site.

4.2.76 Heneb: Dyfed Archaeology (formerly Dyfed Archaeological Trust) has examined the historic character of RHL areas and Historic Landscape Characterisation of the RHL is available online and via HER.

4.2.77 The Site falls outside any of the mapped character areas of Tywi Valley, with the nearest recorded area, Croesyceilog – Cwmffrwd, located approximately 290m to the south of the main Site area (and adjacent to the north-west to the Option Solar Area West). This is characterised by enclosed medium-sized fields of improved pasture, with scattered farmsteads, and linear settlement along main roads, outside Carmarthen to the north.

4.2.78 Although the Site is over 700m north of the defined Taf and Tywi Estuary RHL, the historic landscape characterisation includes the southernmost part of the Site within the Allt Hilltop character area. This character area is defined by enclosed fairly large fields, bounded by banks and hedges, perhaps originating in the 16th century, with a settlement pattern of dispersed farms, but with evidence for archaeological features in the form of round barrows and possible standing stones.

Assessment Methodology

Consultation

4.2.79 A Written Scheme of Investigation for Geophysical Survey (Terradat 2024; Appendix 4.3) was approved by the archaeological advisor at Heneb Development Management – Dyfed Region on 8 November 2024. The geophysical survey was completed in November 2024 and a report discussing the results will be available in due course.

4.2.80 No further consultations with the archaeological advisors at Heneb Development Management – Dyfed Region or Cadw have been undertaken to date. A Written Scheme of Investigation for a Historic Environment Desk-Based Assessment will be submitted to the archaeological advisors for approval. Further consultations will take place during the course of the ongoing survey work, to confirm the scope of work necessary to inform the assessment as well as any required additional surveys and mitigation.

Historic Environment Desk-Based Assessment

4.2.81 A detailed historic environment desk-based assessment, discussing the historic assets which may be affected by the Proposed Development, will be prepared. The assessment will be prepared in line with the current legislative and planning policy context, and with reference to relevant guidance including Conservation Principles (Cadw 2011), Setting of Historic Assets in Wales (Cadw 2017a), Heritage Impact Assessment in Wales (Cadw 2017b), Principles of Cultural Heritage Impact Assessment in the UK (IEMA, IHBC, CIfA 2021), and Standard and guidance for historic environment desk-based assessment (Chartered Institute for Archaeologists 2020).

4.2.82 It will be informed by archaeological and historical information from publicly accessible sources, including:

- Cadw, for statutory designated historic assets (including Listed Buildings, Scheduled Monuments, Registered Parks and Gardens, Registered Historic Landscapes, Battlefields and World Heritage Sites).

- Heneb HER (Dyfed), for details of recorded historic assets, previous archaeological works, findspots, and historic landscape characterisation data.
- Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) for further details of recorded assets and previous archaeological works.
- Historic maps and other documentary sources relevant to understanding historic land use and development.
- the BGS Online record of geological information.
- Lidar imagery of the Site.
- Relevant grey literature reports.
- Welsh Government Historic Aerial Photography, for historic aerial photography collections (sent digitally).
- A site and study area walkover.
- Carmarthenshire Conservation Areas and other relevant online sources.

4.2.83 This assessment will investigate the potential extent and the historic value of buried archaeological remains within the Site which may be affected by the Proposed Development and will present the results of the examination of further data including aerial photographic records, historic mapping, Lidar imagery and the results of the geophysical survey.

4.2.84 The assessment will incorporate a detailed built heritage and historic landscape assessment. This will comprise a 'settings assessment' of the key designated (and any non-designated) historic assets in proximity of the Site. This will also comprise an assessment of the historic landscape character of the Site and assess impacts on the Registered Historic Landscapes. The results of the assessment will inform the need for, and scope of, any mitigation measures. At current stage, it is not proposed that ASIDOHL 2 Assessment (Cadw et al. 2007) will be undertaken, as the Site is not within the key areas of the Tywi Valley RHL, and only forms a small part of the wider character area that has been identified as forming part of the Taf and Tywi Estuary landscape (though outside its Registered Historic Landscape boundary). Rather, the effects of change within and in the setting of the RHL will be covered within the desk-based assessment.

4.2.85 The baseline assessment work described above will culminate in an understanding of the historic values of any assets within the Site and environs. An understanding of the proposed development (the impact of change to the baseline environment) alongside the understanding of significance and importance will allow for an impact assessment to be undertaken. This will include a discussion on any potential cumulative impacts but it should be noted that significant effects in this respect are not anticipated, based on review of the proposed development and the cumulative developments, as listed above.

Geophysical survey

4.2.86 To further clarify the archaeological potential within the Site, a geophysical survey was completed within the Site in November 2024, in line with the approved WSI (Terradat 2024, Appendix 4.3). The report will be provided in due course, which will inform the desk-based assessment and further consultations. The magnetic gradiometer is the primary survey method, and the key objective of the geophysical survey is to locate and describe any detectable archaeological features present. The survey will provide context and insight as a standalone document and facilitate the subsequent fieldwork phase by indicating the detected features' location, character, extent, and potential significance.

Further investigations

4.2.87 The results of the desk-based assessment and the geophysical survey will then inform the need for and scope of any additional investigations which may be required to ensure the potential archaeological remains are investigated and recorded at an appropriate stage in the development process, in line with the requirements of the national and local planning policies requiring the

protection of archaeological remains. Further investigations will also be deployed as required, and the need for and scope of any such surveys will be discussed through consultation with the archaeological advisor at Heneb Development Management – Dyfed Region.

Not Significant Effects

Buried archaeological remains

4.2.88 Known and potential buried archaeological remains are anticipated to be present within the Site. However, the minimal nature of ground disturbing activities associated with the construction and decommissioning of the Proposed Development means that significant effects on the archaeological interest (significance) of any potentially surviving remains is highly unlikely.

4.2.89 The below ground impacts associated within the Proposed Development are generally limited and would derive from ground disturbance associated with the excavation of cable trenches, limited foundations for equipment, substation, as well as groundworks for access tracks and construction compound. The impacts from piling for the installation of the solar arrays would be more limited still, the size and frequency of the driven piles and cable runs for the solar arrays being so slight that even if their location were to coincide exactly with buried remains there would be no or negligible material loss of archaeological interest.

4.2.90 Furthermore, mitigation through detailed design (avoidance) can allow for any especially sensitive buried archaeological remains (such as human remains) to be safeguarded completely from any disturbance. Other complimentary techniques involve ballast footings (such as concrete shoes) to avoid piling completely.

4.2.91 The potential extent and heritage significance of buried archaeological remains is being investigated by additional desk-based research and the results of the geophysical survey. These will inform the need for inform the need for any further surveys (such as trial trenching) so that any sensitive remains can be safeguarded.

4.2.92 Therefore, while all investigations and assessments will follow industry good practice and professional guidelines and reports on this work will form part of the application for development consent, the assessment of buried archaeological remains can be scoped out of the EIA, as significant effects are very unlikely.

Built heritage, Scheduled Monuments and historic landscape

4.2.93 The potential effects upon the designated historic assets during the construction and decommissioning phases of the Proposed Development would derive from the presence of machinery, fencing, construction compounds, as well as increased noise and traffic. Construction operations are temporary by nature, and the impacts associated with these works would be temporary and limited and would not cause significant effects to those designated historic assets.

4.2.94 The change of character and land-use of agricultural land parcels within the setting of designated historic assets (historic buildings, structures and monuments, gardens and Registered Historic Landscapes) during the operation phase of the development is also not sufficient to cause significant effects to their historic values.

4.2.95 Based on the initial assessment of maps and aerial imagery, topography, intervening vegetation, Zone of Theoretical Visibility (ZTV; as prepared for the Landscape and Visual Impact Assessment; Chapter 5), and character of the designated historic assets, it is recognised that the vast majority of the assets within the setting study area do not share any intervisibility or historical relationship with the Site and would in no way be affected by the Proposed Development. Whilst there may be some distant visibility of the Proposed Development from a number of assets in the wider landscape, beyond 1km of the Site, it is recognised that beyond a certain distance, solar PV arrays lose definition and assume a ‘washed-over’ appearance, and are perceived as blocks of faded colour within an established agricultural landscape. As such, it can be stated with confidence that assets beyond this distance would not be adversely affected. The detailed assessment of this matter will be explored through further assessment, site visits and information available through further LVIA.

Consultation with the advisors at Cadw and Heneb Development Management – Dyfed Region will be carried out to inform the selection of designated historic assets for detailed assessment.

4.2.96 The Proposed Development would change the character of land parcels lying within the setting of a number of designated historic assets. However, the fundamental agrarian nature of the setting of these designated historic assets would be unchanged, and the historic field boundaries within the Site would be retained. For the vast majority of designated historic assets, it is views towards them that are the critical components of their experience, especially views from up close. The form of the Proposed Development and its distance from the majority of the historic assets means that no important views of them would be lost or obscured. As such, key experiences of the buildings and monuments will be unaltered.

4.2.97 The historic landscape character of the majority of Site has not been recognised as of particular importance. The Site falls within the wider surroundings of the mapped character areas of the Tywi Valley RHL, the key components of which would be unlikely to be affected due to distance. The southernmost part of the Site extends into the Allt Hilltop character area of the Raf and Tywi Estuary RHL, however the Site forms only a small part of the wider area, and the identified characteristics, such as the field pattern and field boundaries, would be retained.

4.2.98 Therefore, any impacts on the historic landscape, Scheduled Monuments and built heritage are unlikely to result in a significant adverse effect in EIA terms, and this element of the topic can be scoped out of the EIA. As per the assessment of buried archaeological remains, the assessment of impacts on 'setting matters' and the historic landscape will follow industry good practice and professional guidelines and reports on this work will form part of the application for development consent, with options to incorporate appropriate mitigation through design measures for any sensitive assets.

Summary

4.2.99 Based on the assessment presented above, it is highly likely that the Proposed Development can be accommodated without significant environmental effects on the cultural heritage resource, based on the assumption that the methodology described above is followed, and provided appropriate and proportionate mitigation measures are implemented alongside good design. At this stage it is wholly reasonable to assume that this will be possible. In addition, it should be noted that no significant effects have been identified in the course of the planning application for the Bryncoch Solar Farm (ref. W/32171), which has an overlap with a large part of the western part of the Site, with planning consent granted (including a condition for archaeological recording).

4.2.100 As such, significant effects related to designated and non-designated historic assets are considered to be unlikely and, in accordance with the EIA Regulations, it is appropriate to scope the cultural heritage resource topic out of the EIA.

4.2.101 However, and for the avoidance of any doubt, the desk-based assessment report, incorporating impact assessment, results of the geophysical survey, as well as the results of any additional surveys which may be required, will be submitted to support the planning application.

Glint and Glare

4.2.102 It is proposed to scope glint and glare out of the ES as a chapter with a standalone glint and glare assessment to be undertaken and included as an appendix to the Landscape and Visual chapter.

Introduction

4.2.103 This section of the Scoping Report sets out the approach to the assessment of possible effects of glint and glare from the Proposed Development upon road safety, residential amenity, and aviation

activity. It is proposed to scope glint and glare out of the ES as a chapter with a standalone glint and glare assessment to be undertaken[4] and included as an appendix to the landscape chapter.

4.2.104 A glint and glare report was produced[5] for the previously consented Bryncoch Solar Park development. This concluded that the impact of glint and glare to Ferryside and other surrounding areas is likely to be negligible.

4.2.105 Solar PV panels are specifically designed to absorb light rather than reflect it. Light reflecting from solar PV panels results in the loss of energy output. Solar PV panels are dark in colour due to their anti-reflective coatings and are manufactured with low-iron, ultra-clear glass with specialised coatings and textures to enable maximum absorption. The combination of these factors significantly increases the electrical energy production of the panels and significantly reduces reflected rays at the same time.

Potential effects

4.2.106 Potential effects at the identified receptors include:

- Glint – a momentary flash of bright light typically received by moving receptors or from moving reflectors.
- Glare – a continuous source of bright light typically received by static receptors or from large reflective surfaces.

4.2.107 The impact significance will be determined considering the visibility of the solar reflection including the level of screening (existing or proposed), the sensitivity of the receptor, location of origin of the solar glare, time and duration of any reflection, location of the Sun at the time a solar reflection is possible, and solar reflection intensity (aviation only).

Legislation and policy

4.2.108 There are no specific government guidelines setting out a particular methodological approach to delivering a glint and glare assessment.

4.2.109 The glint and glare assessment will be carried out in accordance with the principles contained within the following appropriate policy and legislation:

- National Policy Statement for Renewable Energy Infrastructure (EN-3, January 2024).
- Planning Policy Wales (February 2024).
- Guidance for Renewable and Low Carbon Energy (specifically regarding the consideration of solar farms, paragraph 013), 14 August 2023.
- UK Solar PV Strategy.
- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
- The Overarching National Policy Statement for Energy (EN-1, January 2024).

Guidance

4.2.110 Guidelines exist in the UK (produced by the Civil Aviation Authority) and in the USA (produced by the Federal Aviation Administration) with respect to solar developments and aviation activity. The UK CAA guidance is relatively high-level and does not prescribe a formal methodology. Pager Power (the consultant) has however produced guidance for glint and glare and solar photovoltaic

[4] By Pager Power.

[5] By Green Energy UK Direct Ltd.

developments, which was published in early 2017, with the fourth edition published in 2022. This methodology defines a comprehensive process for determining the impact upon road safety, residential amenity and aviation activity.

4.2.111 Pager Power's approach is to undertake geometric reflection calculations and, where a solar reflection is predicted, consider the screening (existing and/or proposed) between the receptor and the reflecting solar panels. The scenario in which a solar reflection can occur for all receptors is then identified and discussed, and a comparison is made against the available solar panel reflection studies to determine the overall impact.

4.2.112 The available studies have measured the intensity of reflections from solar panels with respect to other naturally occurring and manmade surfaces. The results show that the reflections produced are of intensity similar to or less than those produced from still water and significantly less than reflections from glass and steel

Study area and baseline context

Study area – roads and dwellings

4.2.113 There is no formal guidance with regard to the maximum distance at which glint and glare should be assessed. From a technical perspective, there is no maximum distance for potential reflections. The significance of a reflection, however, decreases with distance because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases. Terrain and shielding by vegetation are also more likely to obstruct an observer's view at longer distances.

4.2.114 The above parameters and extensive experience over a significant number of glint and glare assessments undertaken show that consideration of receptors within 1km of panel areas is appropriate for glint and glare effects on roads and dwellings. The panels are fixed south facing and solar reflections at ground level towards the north at this latitude are highly unlikely. It is likely that the roads and dwellings to the north of the Site will not be materially impacted and therefore, they will not be considered within the assessment.

4.2.115 Potential receptors are identified based on mapping and aerial photography of the region. The initial judgement is made based on a high-level consideration of aerial photography and mapping i.e. receptors are excluded if it is clear from the outset that no visibility would be possible. A more detailed assessment is made if the modelling reveals a reflection would be geometrically possible.

Study area – aviation

4.2.116 Glint and glare analysis is often undertaken for solar developments that are near large aerodromes. The most common concerns are:

1. Potential reflections towards an Air Traffic Control (ATC) tower.
2. Potential reflections towards approaching pilots of powered aircraft for the final two miles of the approach.

4.2.117 With regard to Point 2, these reflections are typically evaluated in the context of:

- Whether they are in a pilot's primary horizontal field of view (50° either side of the direction of travel).
- The intensity of the solar reflection.

4.2.118 There is no formal distance within which aviation effects must be modelled. However, in practice, concerns are most often raised for developments within 10km of a licensed airport. Requests for modelling at ranges of 10-20km are far less common. Assessment of aviation effects for

developments over 20km away is a very unusual requirement. Therefore, any airfields or airports within 10 km of the solar panel boundary will be considered.

4.2.119 Pembrey West Wales Airport is an unlicensed airport located approximately 5.5km from the Proposed Development with a single runway (04/22). It is understood that there is an ATC Tower present at this airport, located approximately 0.34km north-east of runway threshold 04. The runway approach paths and the ATC Tower will be considered within the glint and glare assessment at a high-level without technical modelling due to the distance from the Proposed Development.

Summary of baseline context

4.2.120 The baseline context is presented with respect to possible glint and glare effects only. The Proposed Development is rurally located with:

- National, regional, and local roads located within 1km of the Site area.
- A number of dwellings located within 1km of the Site area.
- One unlicensed aerodrome (Pembrey West Wales Airport) located within 10km of the Site area.

Outline Scope of Assessment

4.2.121 A 'Solar Photovoltaic Glint and Glare Assessment' will emprise a technical appendix to the ES chapter, considering the effect of the solar panel areas upon receptors identified in this document. The assessment will include the detailed modelling of the solar panels relative to surrounding roads and dwellings with potential views of the Site, and the high-level assessment of approach paths and the ATC Tower at Pembrey West Wales Airport (without technical modelling).

Assessment Methodology

4.2.122 The glint and glare assessment methodology has been derived from the information provided to Pager Power through consultation with stakeholders, assessment experience, and by reviewing the available guidance and studies. The methodology for ground-level and aviation glint and glare assessments is as follows:

- Identify the key receptors in the area surrounding the Proposed Development.
- Consider direct solar reflections from the Proposed Development towards the identified receptors by undertaking geometric calculations.
- Consider the visibility of the panels from the receptor's location. If the solar photovoltaic (PV) panels are not visible from the receptor then no reflection can occur.
- Based on the results of the geometric calculations, determine whether a reflection can occur, and if so, at what time it will occur.
- Consider both the solar reflection from the Proposed Development and the location of the direct sunlight with respect to the receptor's position.
- Consider the solar reflection with respect to the published studies and guidance - including intensity calculations where appropriate for aviation receptors.
- Determine whether a significant detrimental impact is expected in line with Pager Power's standard process and recommended methodology.

Conclusion

4.2.123 A desktop review of the available imagery and site plans has been completed.

4.2.124 Any predicted impacts towards the ground-based infrastructure (roads and dwellings) can likely be solved with relatively simple mitigation strategies – the most common being the provision of

screening (e.g. hedgerow planting) at the panel boundaries to obstruct views of potentially reflecting panels. Where views of reflecting panels are obstructed, no effects can be experienced. Other solutions such as layout modification can be considered but are rarely required in practice for glint and glare effects on ground-based receptors from fixed solar panels.

4.2.125 The runway approach paths and the ATC Tower at Pembrey West Wales Airport will be considered within the glint and glare assessment at a high-level without technical modelling. This is considered to be appropriate given the type of aerodrome (unlicensed general aviation) and the distance to the Proposed Development (greater than 5km). Based on the above, it proposed that an assessment of the impact of glint and glare on identified receptors will be included as a technical appendix to the ES chapter.

Residential Visual Amenity Assessment (RVAA)

4.2.126 We do not propose to undertake a Residential Visual Amenity Assessment (RVAA) or an assessment of likely night-time effects. Notwithstanding this, the LVIA will include a number of Representative Viewpoints located on public rights of way (PRoW) which are in proximity to and representative of available views from a number of residential properties (refer to Table 5.2 below). These Representative Viewpoints will be assessed as part of the LVIA.

4.2.127 Figure 5302-RPS-XX-XX-DR-L-9003-ZTV and Residential Receptors, Appendix 5.1, gives an indication of residential properties within a 1 km radius of the Proposed Development and that fall within the ZTV (figure 5302-RPS-XX-XX-DR-L-9001, appendix 5.1) that may be affected.

4.2.128 The Landscape Institute has provided guidance on residential visual amenity in Landscape Institute Technical Guidance Note 2/19 Residential Visual Amenity Assessment (LI TGN 2/19).

4.2.129 Views of the Proposed Development would neither overwhelm existing properties within the study area, nor render these properties so “unattractive a place to live that planning permission should be refused” (Inspector Kingaby, Burnthouse Farm Wind Farm, APP/D0515/A/10/2123739, Inspector’s Report, paragraph 119) (also at paragraph A1.6 of LI TGN 2/19). Inspector Kingaby noted that “There needs to be a degree of harm over and above identified substantial effect to take a case into the category of refusal in the public interest. Changing the outlook from a property is not sufficient” (Inspector’s Report, paragraph 120) (also at paragraph A1.7, LI TGN 2/19). The Inspector, in the Langham Wind Farm decision, noted that “The planning system controls development in the public interest, and not in the private interest. The preservation of open views is a private interest” (Langham Wind Farm Appeal Decision APP/D2510/A/10/2130539) (also at LI TGN 2/19, paragraph A1.11).

4.2.130 The closest residential properties within the ZTV of the Proposed Development are situated along the C2075 and C2074, between approximately 20 m and 362 m to the Site. These include Golygfa Bungalow (which is subject to planning permission PL/08221), Pen-Yr-heol, Nonarn House, Maes-Yr-Awel and Glastir. These properties, for the most part, have an aspect facing away from the Proposed Development and / or have substantial garden vegetation that would limit views. Where there are properties with open aspects that face the Site, including Maes-Yr-Awel, on-site mitigation will be proposed to help mitigate potential views. Further to the south on higher ground, residential properties with open elevated views towards the Site include Parcgwyn. Whilst the property faces the Site, located at some 1 km to the south, it is the Applicant’s position that the residential property falls beyond the anticipated buffer zone where significant effects would occur. Views of the Proposed Development from Parcgwyn are therefore not anticipated to be significant in EIA terms and therefore not resulting in the need for an RVAA.

4.2.131 **Table 4.1** below give details of residential receptors that fall within the 1 km RVAA study area and ZTV for the Proposed Development.

4.2.132 Landscape Institute TGN 02/2019: Residential Visual Amenity Assessment (RVAA) does not explicitly give a defined study area suitable for an RVAA. Based on the low-level nature of the Proposed Development, the limited number of residential properties in proximity to the Site with potential views of the Proposed Development an based on RVAA studies done previously for

comparable schemes, at this stage it is considered that a study area of 1 km from the outer edge of the Site, in all directions, would be appropriate.

Table 4.1: Residential Receptors

Property Reference	Approximate Distance to Proposed Development	Primary Direction of View	View towards Proposed Development (Y/N)	Comments
P1 (Golygfa Bungalow)	300 m (at its' nearest point)	North	N	Single storey property subject to planning application for redevelopment. Primary view is north and not towards Proposed Development. Limited side elevation windows.
P2 (Nonam House)	40 m	Northwest	Y	Single storey property. Primary view towards Proposed Development. Tall evergreen hedgerow to property boundary screens possible views.
P3 (Unknown)	40 m	Northwest	Y	Single storey property in proximity to Proposed Development. Primary view towards Proposed Development, open with limited screening vegetation. Additional on-site mitigation to the eastern boundary adjacent to the road and property may be required. This would be in the form of hedgerow and tree planting, managed to a suitable height to mitigate potential views. Mitigation would be designed as part of an ongoing iterative design process in the form of a landscape strategy plan. The mitigation and management of this would be secured through condition in the form of a detailed planting scheme and Landscape and Ecology Management Plan (LEMP).
P4 (Bryncoch)	90 m	Northeast	N	Single storey property. Primary view is northeast and not towards Proposed Development. Limited side elevation windows towards site. Vegetation to property boundaries further limit potential views.
P5 (Caeglas)	820 m	North	N	Two storey property. Primary view to the north away from

				Proposed Development. Limited side elevation windows allowing views to site. Mature hedgerow to property boundary further limits potential views, particularly from ground floor. No further on-site mitigation would be required, as the property is of a sufficient distance from the Proposed Development so that significant effects in EIA terms are unlikely. Additionally, the properties' primary view is away from the Proposed Development, with limited side elevation views.
P6 (Rosyscoch)	1 km	East	N	Single storey property. Primary view to the east away from Proposed Development. Mature vegetation to property boundary would further limit views.
P7 (Bryn Eryl Farm)	900 m	South	N	Single storey property. Primary view from property is south, away from the Proposed Development. Farm out buildings to the north of the property would prevent rear elevation views to the Proposed Development.
P8 (Bryn Eryl)	930 m	Northeast	Y	Two storey properties. Primary views northeast towards Proposed Development. Limited vegetation to property boundaries, although mature hedgerow to edge of Portway would limit ground floor views. No further on-site mitigation would be required, as the property is of a sufficient distance from the Proposed Development so that significant effects in EIA terms are unlikely.
P9 (Greenfield)	750 m	East	N	Single storey property. Primary view is to the east away from the Proposed Development. Limited side elevation windows with views towards the site.
P10 (No.4 at edge of Broadway)	1 km	Northeast	N	Single storey properties to the northern edge of Broadway. Primary views from properties varies, but predominantly away from Proposed Development. Mature hedgerow vegetation to

				edge of Portway would further limit views.
P11 (Pen Hill)	990 m	Northwest	N	Two storey property. Primary view to the northwest away from Proposed Development. Surrounding farm building would prevent views to the Proposed Development.
P12 (Parcgwyn)	900 m – 1 km	North	Y	Two storey property. Primary view from property, on elevated ground to the south, is towards Proposed Development. Vegetation to property boundary would limit views from ground floor. No further on-site mitigation would be required, as the property is of a sufficient distance from the Proposed Development so that significant effects in EIA terms are unlikely.
P13 (Maesmawr Farm house)	< 50 m (at its nearest point)	Southeast	Y	Single storey property, on raised ground. Surrounded by large scale farm buildings to the north and west, screening views. Substantial vegetation to the south along watercourse largely screens views to the south. Rear garden vegetation partially screens views to the southeast in direction of primary views towards Proposed Development. Further on-site mitigation to be considered including buffer to solar panels and further planting along boundary nearest property.

4.2.133 A landscape strategy plan would be completed as part of the wider planning application. This will detail intended on-site mitigation, such as the removal of panels within the properties' eye line and on-site planting, considered and implemented as part of the ongoing iterative design process to mitigate effects on Parcgwyn and other residential properties within the wider landscape with views to the Proposed Development.

4.2.134 Due to the low nature of the Proposed Development, the presence of substantial screening vegetation, as well as distance (and intervening screening between dwellings and the Proposed Development) it is anticipated that there would be no residential properties which have the potential to experience a degree of harm of substantial. It is therefore considered that an RVAA would not be required. Consequently, individual residential properties would not be considered as part of the LVIA, or within an RVAA. Representative Viewpoints included within the LVIA have been selected, where publicly accessible locations are available, to include views that are representative of views from a number of residential properties. These Representative Viewpoints would be assessed as part of the LVIA.

4.2.135 It is therefore considered that a RVAA can be scoped out of the EIA.

Climate Change

4.2.136 The ES will identify how the Proposed Development is likely to affect the ability of the natural environment (including habitats, species and soils) to adapt to climate change as well as its ability to contribute towards climate change adaptation. This will include impacts on the vulnerability or resilience of a receptor as well as impacts on how the environment can accommodate change. This will be considered within each topic chapter of the ES and in supporting assessments for topics proposed to be scoped out of the EIA such as hydrology.

4.2.137 The ES will detail embedded mitigation together with additional mitigation and enhancement measures that will be adopted to address the impacts of the Proposed Development on climate change and to reduce the effects of climate change on the Proposed Development.

4.2.138 It is therefore considered that climate change can be scoped out of the ES as a standalone chapter with appropriate assessment to be incorporated within topic chapters.

4.3 Content of the Environmental Statement

4.3.1. The scope of the EIA takes into account the preliminary environmental information pertinent to the Site and as a result, the issues set out below are considered appropriate for assessment in an ES. It is considered that the Proposed Development may have the potential to give rise to significant environmental effects in these areas:

- Landscape and Visual
- Biodiversity
- Soils

Table 4.2: Structure of the ES

Structure of ES	
Non-Technical Summary	Summary of the ES using non-technical terminology
Volume 1: Text	
	Glossary
Chapter 1	Introduction
Chapter 2	Project Description
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Landscape and Visual
Chapter 6	Biodiversity
Chapter 7	Soils
Volume 2: Figures	
Including all figures and drawings to accompany the text.	
Volume 3: Appendices	
Including specialist reports forming technical appendices to the main text.	

4.3.2. The following sections provide details for each of the chapters that are proposed to be included in the ES.

5 TECHNICAL ASSESSMENTS

5.1 Chapter 1: Introduction

5.1.1 This chapter will provide the introduction to the ES, including details of the application, need for EIA and the structure of the ES.

5.2 Chapter 2: Proposed Development Description

5.2.1 The ES will include a description of the Proposed Development, which will form the basis of the assessment of effects. The EIA Regulations require an ES to include:

'A description of the development comprising information on the site, design and size and other relevant features of the development.'

5.2.2 This Proposed Development description chapter will include details of the Site, together with a description of the key components of the Proposed Development. The description will include the following information, as far as practicable at the time of writing:

- Construction phase - a description of the key works, activities and processes that would be required during the construction phase.
- Operational phase - a description of the completed development and its use.
- Decommissioning phase - a description of the key works, activities and processes that would be required during the decommissioning phase.

5.2.3 Where options remain at the time of the assessment (with regard to construction techniques, for example), the ES will provide a clear explanation of the assumptions made. Where appropriate, the realistic worst case scenario will be assessed.

5.2.4 Where mitigation measures have been identified and developed through the EIA process and have been incorporated as part of the Proposed Development, details of these measures will be set out within the Proposed Development description chapter.

5.3 Chapter 3: Need and Alternatives Considered

5.3.1 This chapter will briefly set out the need for the Proposed Development. In addition, the EIA Regulations require the alternatives considered by the applicant to be set out in the ES:

'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.'

5.3.2 This chapter will summarise the reasons for the selection of the Site and provide an outline of the alternatives considered during the EIA process, including a description of the alternative design and layout options that have been considered.

5.4 Chapter 4: Environmental Assessment Methodology

5.4.1 Details of the overall approach to EIA will be set out in this chapter, together with details of the scoping process, consultation undertaken and the overall approach to the assessment of significance. Topic specific methodologies, such as survey methods, will be provided in each topic chapter.

5.5 Chapter 5: Landscape and Visual Impact Assessment (LVIA)

General

5.5.1 Landscape and / or Visual effects, associated with the Proposed Development, are an important environmental issue. As such, a Landscape and Visual Impact Assessment (LVIA) would form an important part of the wider Environmental Impact Assessment (EIA) process for the project.

5.5.2 Chapter 5: Landscape and Visual Impact Assessment (LVIA), of the Environmental Statement (ES), would consider the potential effects of the Proposed Development upon the physical landscape elements and features, landscape character, views and visual amenity within a 5km radius study area, as measured in all directions from the edge of the Site (red line) boundary.

5.5.3 The LVIA would be undertaken with reference to best practice guidance, as detailed within 'Assessment of Effects' section below (paragraph 1.31) and would be completed by a suitably qualified and experienced Chartered Landscape Architect (CMLI).

5.5.4 A Glint and Glare Assessment, would also be completed as part of the LVIA. It would be a standalone assessment but included within the Appendices of the LVIA and referred to within the assessment of effects section of the LVIA chapter as appropriate.

Public Consultation

5.5.5 An important part of the applicant's planning process is engaging with local communities to provide information on the project and gather local feedback. Details regarding this public consultation process, of which the LVIA and related issues will be an important part, can be found above at Section 1 of this scoping report document. Specific engagement with the relevant statutory consultees will be undertaken in respect of landscape effects and will be used to inform the design of the proposed development and the LVIA.

Planning History

5.5.6 A review of the published Landscape and Visual Impact Assessment, in relation to the consented Bryncoch Farm development, has been carried out. It is noted that here are two no. Fields (14 and 15) of the Proposed Development, were part of the consented Bryncoch scheme. As such, there is a precedence for development of the nature proposed with the Application Site and wider landscape. This and other aspects will be considered as part of the LVIA for the Proposed Development.

Baseline Information

5.5.7 The following provides a summary of the baseline data collated, and work undertaken to inform the landscape and visual element of the EIA Scoping Report and the forthcoming LVIA. Information is illustrated on figures, including Landscape Planning Designations (ref. 5302-RPS-XX-XX-DR-L-9002) and the Zone of Theoretical Visibility (ZTV) (ref. 5302-RPS-XX-XX-DR-L-9001) (Appendix 5.1):

- Preliminary review of legislative and planning policy context insofar as it relates to landscape and visual matters and / or solar farm developments.
- Review of Landscape Planning Designations.
- Preliminary review of National, Regional and Local Landscape character assessments, as appropriate and / or where available.
- Preparation of preliminary proposed ZTV with barriers and bare earth, including Candidate Viewpoint locations.
- A preliminary, desk based, landscape and visual appraisal of the Proposed Development was completed by RPS Group in January 2025 and included a site visit to complete Representative Viewpoints and to inform the layout. The following section summarises the

existing baseline conditions and sensitive landscape and visual receptors that are likely to be affected by the Proposed Development

Landscape Planning Designations

5.5.8 The Proposed Development is not located within a National Park or National Landscape (Area of Outstanding Natural Beauty), i.e. an area of national importance for its scenic quality. Nor is the Proposed Development located within a locally designated Special Landscape Area (SLA). The nearest being part of the Carmarthenshire Bay and Estuary SLA, approximately 500m to the southwest at its nearest point, and Carmarthenshire Limestone Ridge SLA, approximately 2.8 km to the southeast at its nearest point. There would therefore be an indirect perceptual effect upon these SLAs as a result of the Proposed Development. It is noted however, that the Proposed Developments westernmost option would be located within an Historic Landscape (Tywi Valley); a designation designed for decision makers and landscape managers to help ensure that the historic character of the landscape is sustained (refer to Figure 5302-RPS-XX-XX-DR-L-9002-Designation, Appendix 5.1).

5.5.9 Within the wider 5km study area, there are a number of other landscape planning designations that would be indirectly impacted by the Proposed Development. These include:

- Listed Buildings.
- Conservation Areas (CA); the nearest being the Llansaint CA, located approximately 1.7 km to the west of the Application Site (at its nearest point).
- Scheduled Monuments; the nearest being Round Barrow 330m SW of Mynydd-Uchaf, approximately 110m south-east of the Site (at its nearest point).
- Registered Common Land.
- Significant Views.
- Historic Parks and Gardens; the nearest being Llechdwnni, approximately 2.4 km to the east of the Application Site (at its nearest point).

5.5.10 There are a substantial number of individual trees, hedgerows and blocks of woodland across the Site, or immediately adjacent to it. A number of the woodland blocks, to the north and east, and within the wider 5 km study area, are designated as Ancient Woodland.

National and Local Landscape Character

5.5.11 The relevant published landscape character assessments have been reviewed. Within the LVIA Chapter, particular attention would be paid to the key landscape characteristics of the relevant LANDMAP aspect areas of the Site and the surrounding areas.

5.5.12 National Landscape Character Areas (NLCAs) are countrywide and form the broad scale landscape character assessment of Wales. The Site and much of the 5 km study area falls within NLCA 33: Gwendraeth Vales. Other NLCAs which fall within the 5 km study area include NLCA45: Aberoedd Taf, Tywi a Gwendraeth and NLCA44: Broydd Taf a Chleddau.

5.5.13 LANDMAP is an “all-Wales Geographical Information System (GIS) based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent dataset” (CCW (now NRW), 2011). It is administered by Natural Resources Wales (NRW) and comprises five spatially related datasets or aspect layers as follows:

- Geological Landscape: “considers the physical, primarily geological, influences that have shaped the contemporary landscape and identifies those landscape qualities which are linked to the control or influence exerted by bedrock, surface processes, landforms and hydrology”.
- Landscape Habitats: “Focuses on recording habitat features, characteristics and their spatial relationships within the context of the wider landscape”.

- Visual and Sensory: “Maps landscape characteristics and qualities as perceived through our senses, primarily visually. The physical attributes of landform and land cover, their visible patterns and their interrelationship”.
- Historic Landscape: “Landscape characteristics that depend on key historic land uses, patterns and features. Identifies only those classes of historic land uses, patterns and features that are prominent and contribute to the overall historic character of the present landscape.”.
- Cultural Landscape: “Describes the links between landscape and people, from the way in which cultural, or human activity shapes the landscape, to the way in which culture shapes the way we respond to landscape. Focus is on mapping the landscape where it has been, or is being, shaped by a particular cultural activity or process, or where it has been directly represented, depicted or described in art, literature or folklore.”

5.5.14 The Visual and Sensory Dataset (accessed January 2025) locates the Site entirely within Aspect Area ‘CRMRTVS936: Llansaint Coastal Hills’. The area is described as:

“Rolling hills overlooking the coast and the Tywi estuary. Dominated by improved agricultural land, some arable (maize). Strong field boundaries, relatively few trees compared to other parts of the county creating a feeling of exposure, some trees are wind sculpted. Scattered rural farms and fairly busy country roads. Llansaint is an unusual settlement being old in origin and hilltop. It has a strong sense of place. The red soils are another feature that make this area distinct. Pylons cross a section of the area.”

5.5.15 Overall, Aspect Area ‘CRMRTVS936: Llansaint Coastal Hills’, is evaluated as High.

Visual Resources

Zone of theoretical visibility

5.5.16 In order to further determine the geographical extent of potential visibility, a preliminary computer-generated Zone of Theoretical Visibility (ZTV) was generated (ref. 5302-RPS-XX-XX-DR-L-9001, Appendix 5.1). The ZTV broadly defines the study area for both the landscape character and visual assessment. A 5km radius study area is proposed for this assessment due to the overall size and height of the Proposed Development, a maximum of 3 m above existing ground level (EGL) for the substation control room and 2.85 m above EGL for the solar arrays. It is anticipated that any potentially significant landscape and / or visual effects would lie within this radius. Following field survey and analysis of existing barriers, the study area radius may be reviewed.

5.5.17 Currently, the Proposed Development would consist of static south facing photovoltaic solar panels (PVs) at a finished height of 2.85 m above existing ground level (EGL), 132kV substation, DNO and customer controls rooms at 3 m EGL and other built elements such as security fencing and CCTV. The preliminary ZTV was completed to show this, with the origin points at 3m above EGL. The ZTV was compiled assuming observer height as 1.7 m at eye level and takes into account the screening effects of local settlements at 9m and existing areas of substantial vegetation (woodland) at a height of 11m. Twenty three (23) origin points, from within the Application Site, have been used to establish the likely area from where views to the Proposed Development may be available. These origin points are located within the centre of each of the agricultural fields within the Application Site which would contain solar panels.

5.5.18 OS Terrain 5 data has been used to generate the ground model for the ZTV.

View Ranges

5.5.19 For the purposes of the LVIA Chapter, views would be classified according to three distance ‘ranges’ as set out in Table 5.1 below.

Table 5.1: View Ranges

Range	Distance Threshold	Reasoning Description
Close	Less than 1 km	At close range the project could appear as a 'prominent' feature and visual receptors could experience high to medium/low magnitude of change when compared to existing views.
Medium	Between 1 km and 3 km	In medium range views the project could appear as 'present' features and visual receptors could experience medium/low to negligible magnitude of change compared to the existing situation.
Long	More than 3 km	In long range views the project would read as part of the landscape and visual receptors would tend to experience a low to negligible or lower magnitude of change compared to the existing situation.

Representative Viewpoints

5.5.20 A number of Representative Viewpoints have been proposed, which are considered representative of key sensitive visual receptors within the 5 km study area. An assessment of potential effects upon views from each viewpoint, as a result of the Proposed Development, would be completed (ref. 5302-RPS-XX-XX-DR-L-9001, Appendix 5.1). These Representative Viewpoints have been further refined following field work and will be assessed as part of the LVIA Chapter.

5.5.21 All Representative Viewpoints are situated in publicly accessible locations falling within the ZTV, at a range of distances and orientation to the Proposed Development. They include a range of receptors of varying sensitivity. Photographs have been taken from each of the chosen Representative Viewpoints and will be illustrated in accordance with the Landscape Institute Technical Guidance Note 06/19, Visual Representation of Development Proposals (Landscape Institute, September 2019). Any additional photographs, requested as part of the scoping exercise, would be included as necessary.

5.5.22 Photographs have been taken during winter, January 2025, when vegetation was devoid of its leaf cover to show the worst-case scenario. Any assessment of effects upon summer views would be necessarily made using professional judgement. Table 5.2 below describes the location of the Representative Viewpoints for this assessment.

Table 5.2: Representative Viewpoints

No. / Name	Sensitivity	View Location Description
Viewpoint 1: Local road (C2075)	Medium (road users)	Close distance view from the local road to the immediate south of the eastern part of the Application Site.
Viewpoint 2: PRoW 62/13/1	High (PRoW users)	Close distance view from Public Right of Way (62/13/1) to the south and east of the Application Site.
Viewpoint 3: Local road (C2074)	Medium (road users)	Close distance view from the local road at the southeast corner of the western part of the Application Site.
Viewpoint 4: Local road (U2216) near Maesmawr Farm	Medium (road users)	Close distance view from the local road to the immediate north of the western part of the Application Site, near to Maesmawr Farm.
Viewpoint 5: Local road (C2074)	Medium (road users)	Medium distance view from the local road to the north of the Application Site, near Nantygoitre Isaf.
Viewpoint 6: Local road (C2057)	Medium (road users)	Medium distance view from the local road to the northeast of the Application Site, near Ffynnon-Wen.

Viewpoint 7: PRoW (29/31/1 – 29/32/1)	High (PRoW users)	Medium distance view from Public Right of Way (29/31/1 – 29/32/1) to the east of the Application Site.
Viewpoint 8: PRoW (62/54/2)	High (PRoW users)	Medium distance view from Public Right of Way (62/54/2, Cilffordd Byway) to the south of the Application Site.
Viewpoint 9: PRoW (62/54/2)	High (PRoW users)	Medium distance view from Public Right of Way (62/54/2, Cilffordd Byway) to the south of the Application Site.
Viewpoint 10: PRoW (62/15/2)	High (PRoW users)	Medium distance view from Public Right of Way (62/15/2) to the south of the Application Site.
Viewpoint 11: Local road (Port Way)	Medium (road users)	Medium distance view from the local road to the southwest of the Application Site, near Manor Farm.
Viewpoint 12: PRoW (Wales Coast Path)	High (PRoW users)	Long distance view from Public Right of Way (part of the Wales Coast Path) to the west of the Application Site, near Llansteffan.
Viewpoint 13: Unclassified Road near Llechdwnni)	Medium (road users)	Medium distance view from the local road to the west of the Application Site, near Llechdwnni.
Viewpoint 14: PRoW (62/13/1)	High (PRoW users)	Close distance view from Public Right of Way (62/13/1) to the south and east of the Application Site. Representative of views from nearby residential property (Parcgwyn).
Viewpoint 15: PRoW (62/38/1)	High (PRoW users)	Medium distance view from Public Right of Way (62/38/1) to the south the Application Site. Representative of views from nearby residential properties to northern edge of Llansaint.

Further visual assessment

5.5.23 To further inform the potential adverse visual effects as a result of the Proposed Development, a detailed consideration of publicly available views would be caried out. Within 1km of the Proposed Development, an assessment of likely effects upon views for occupants of businesses/ places of work and, in particular, users of public rights of way, not covered by the Representative Viewpoints, would be completed. In some cases, given access restrictions, the baseline view and / or summary of effects upon these receptors would necessarily be estimated. However, an overview assessment of the likely effects of the operational phase of the Proposed Development upon views for these visual receptors would be given. This would include an overall assessment of the sequential effects upon views for users of the PRoWs and roads within the local vicinity of the Application Site.

Proposed approach

Baseline studies

5.5.24 Baseline information on the landscape will be gathered through a combination of desk studies, consultation and field surveys. Documents used in the assessment may include aerial photographs, Ordnance Survey (OS) maps and published landscape character assessments.

5.5.25 Further to the Baseline Information described above, the baseline assessment within the final LVIA Chapter will also include an assessment of the effects of the Proposed Development upon the landscape character of the Application Site itself and its immediate surrounds. It will also include an assessment of the existing landscape character within the wider study area in terms of its value and its sensitivity to the Proposed Development. The studies will identify the landscape resources and character of the surrounding area and examine how the Proposed Development will affect individual landscape features, elements, and characteristics of the wider landscape.

5.5.26 Field work has been undertaken to gain a better understanding of the landscape of the Application Site and surrounding area, to determine its character and condition and to identify visual receptors

and the extent of available views. Field work will help to establish those landscape resources which combine to give the area its distinct sense of place. Further consultation would be sought from key statutory organisations/consultees where applicable.

Assessment of effects

5.5.27 The Landscape and Visual Impact Assessment (LVIA), undertaken as part of the Landscape and Visual Resources chapter, will identify and assess the likely significant effects that would arise as a result of the Proposed Development on the landscape (its fabric, character and elements) and upon views as experienced by receptors (people). The full methodology for the LVIA can be viewed within Appendix 5.2 of this ES Scoping Report. Please note this is written in the present tense as it will be included within the LVIA Chapter.

5.5.28 The LVIA will be based on the current published guidelines for landscape and visual assessment provided in:

- Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA) (Landscape Institute and Institute of Environmental Management & Assessment, 2013).
- An Approach to Landscape Character Assessment, Natural England (2014).
- Planning Policy Wales LANDMAP Guidance Note 1: LANDMAP and Special Landscape Areas (2016).
- Planning Policy Wales LANDMAP Guidance Note 3: (2013).
- Technical Guidance Note 06/19, Visual Representation of Development Proposals (Landscape Institute, September 2019).

5.5.29 The sensitivity of landscape and visual receptors within the 5 km study area would be assessed (through the identification of the landscape resource's susceptibility to the Proposed Development/susceptibility of the visual receptor to change and value of the landscape resource/view), together with the predicted magnitude of impact on that receptor (through identification of the Proposed Development's size/scale, geographical extent and the duration and reversibility of effect). When combining sensitivity with magnitude of impact, a judgement will be made as to the significance of effect upon the landscape resource and/or view during the construction phase, the operational and maintenance phase, as well as the decommissioning phase of the Proposed Development.

5.5.30 Where appropriate, mitigation measures will be identified to avoid, where possible, or reduce any potential landscape and / or visual effects as a result of the Proposed Development.

5.5.31 The LVIA Chapter would include an assessment of cumulative effects of the Proposed Development in association with other proposed solar parks within the study area.

5.5.32 The LVIA ES chapter would include an assessment of effects of the Proposed Development (as detailed above) during its construction, operation and decommission phases. For the assessment of the operational phase, the LVIA would include an assessment of its likely effects during daytime only, at winter year 1, when all construction and mitigation planting is assumed complete, and during summer year 15 once all mitigation planting is assumed to have reached its design and screening function. Field work would be completed during summer 2025 and therefore the assessment of effects at winter would be completed using professional judgement.

5.6 Chapter 6: Biodiversity

Introduction

5.6.1 An Ecological Impact Assessment (EcIA) will assess likely impacts and effects on biodiversity as part of the Biodiversity chapter. This section of the scoping report provides a summary of the

ecological baseline at the current stage and addresses the proposed methodology to assess impacts and effects.

5.6.2 It should be noted that further ecological surveys and assessments (with the exception of wintering bird surveys) have yet to be commenced. This is primarily a result of the seasonal restrictions associated with ecological surveys and assessments. Ecological surveys and assessments will be commenced at the earliest opportunities, ensuring that survey methodology meets best practice guidance.

Assessment Methodology

5.6.3 The approach to the ecology impact assessment will follow the EcIA methodology detailed in the Guidelines for Ecological Impact Assessment in the UK and Ireland by the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2018).

Legislation and Policy

5.6.4 Relevant legislation and policies will be taken into account as part of the EcIA, including the:

- Environment (Wales) Act 2016
- Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019
- Countryside and Rights of Way Act 2000
- Wildlife and Countryside Act 1981 (as amended)
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- Hedgerow Regulations 1997
- Protection of Badgers Act 1992
- Future Wales: the national plan 2040
- Planning Policy Wales (Edition 12, February 2024)
- Technical Advice Note (TAN) 5: Nature conservation and planning
- Natural Resources Policy
- Carmarthenshire Local Biodiversity Action Plan

Baseline Information

Designated Sites and Ancient Woodland

5.6.5 One Internationally designated site and two nationally designated sites were identified within 2km of the Site, these include: Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd Special Area of Conservation (SAC), Afon Tywi Site of Special Scientific Interest (SSSI) and Gwel y Coed (SSSI). Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd (SAC) and Afron Tywi (SSSI) are both located approximately 1.4km to the west of the Site. Gwel y Coed (SSSI) is located 1.4km to the south. Bae Caerfyrddin/ Carmarthen Bay Special Protection Area (SPA) and Bury Inlet SPA were both located more than 5 km from the Site.

5.6.6 Whilst there are no Sites of Importance for Nature Conservation (SINCs) located within 2km of the Site, an area of Buglife's 'B-line' sites is located 0.2 km to the west.

5.6.7 The desk study identified multiple Ancient Woodland Sites within 2km of the Site. The closest parcel of ancient woodland was located immediately west of the Site boundary. Development will be excluded from areas of Ancient Woodland.

Habitats

5.6.8 A habitat walkover of the Site was undertaken in December 2024 to ascertain the broad habitat composition and assess the Site's suitability to support protected and/or notable species. A Habitat Plan is included at Appendix 5.3.

5.6.9 The Site comprised primarily grazing pasture/improved grassland, which was identified as the most abundant habitat recorded across the Site. Improved grasslands were dominated by perennial rye-grass *Loleum perenne,* with Yorkshire fog *Holcus lanatus* and cock's-foot *Dactylis glomerata* comprising frequently encountered species. Sward height was varied as a result of influence from domesticated animal rotation. Solar Area West and Solar Area East were homogenous in terms of species composition, though select areas in the Solar Area East comprised scattered patches of rush *Juncus* sp*.* At the time of survey, the northern eastern fields in Solar Area East were inundated.

5.6.10 Species-poor and defunct hedgerows bordered most of the fields within Solar Area West and Solar Area East. Drainage ditches were also identified. A slow flowing ditch was identified in Solar Area West bordering the central field south of Maesmawr, extending to the west of the farmyard and along the north western perimeter. In Solar Area East, a ditch was identified in the south east, along the Site boundary. Mature broadleaved trees made up a relatively small proportion of all habitats, with scattered oak *Quercus* sp. recorded in the south east of Solar Area East, which formed a wooded corridor connecting into a broadleaved woodland outside of the Site, to the east.

5.6.11 The habitat survey is to be updated in late spring to ensure diversity and condition information is collected during the optimal time for undertaking habitat surveys. The updated habitat information will form part of a factual Preliminary Ecological Appraisal report, which will support the EcIA. This will include Option 1 and Option 2 areas.

Protected and/or Notable Species

5.6.12 Records of several species groups such as bats, otter, badger, birds, reptiles and amphibians were identified as part of a records search obtained from West Wales Biodiversity Information Service (WWBIC). Additionally, invasive non-native species records were also identified. None of the records returned from WWBIC fell within the site. The nearest record was of a European hedgehog *Erinaceus* europaeus, located approximately 100 m to the east of Area A.

5.6.13 The site supports several habitat types that could support protected and notable species. Grasslands could be used by breeding and wintering birds, mammals listed on Section 7 of the Environment (Wales) Act 2016 and badger, with hedgerows and trees offering opportunities for commuting and foraging bats. Broadleaved trees in the south east (within Area B) could support potential roost features (PRF) for roosting bats. Based on OS mapping a pond is located within the site, in the north east, though at the time of the habitat survey the fields in the north east were inundated which had covered the pond's location. An assessment of the on-site pond's suitability for great crested newt *Triturus cristatus* including other waterbodies within a 500 m buffer (or appropriate search area excluding amphibian dispersal barriers) would be undertaken alongside other ecological surveys and assessments.

5.6.14 Two wintering bird surveys have been undertaken at the Site, one in November 2024 and one in December 2024. Redwing *Turdus iliacus* and starling *Sturnus vulgaris* were the most abundant species recorded during the surveys, with the November 2024 visit recording flocks of more than 100 birds (of both species) in the north of Solar Area West and south of Solar Area East. Redwing and starling were also the most abundant species recorded across the site in December 2024, though their numbers had reduced by 50%. From vantage points of neighbouring fields, it appears that the wintering thrush and starling population use a variety of different fields across the local area interchangeably to forage, which is the typical behaviour of these species in winter. Other Schedule 1 species, and species listed on the Birds of Conservation Concern (BoCC) Wales lists were recorded during the surveys. These include red kite *Milvus milvus*, fieldfare *Turdus pilaris*, snipe *Scolopax rusticola,* meadow pipit *Anthus pratensis* and stock dove *Columba oenas*. A full

interpretation of the abundance and distribution of the wintering bird assemblage will be undertaken following survey completion in early March 2025.

5.6.15 Further ecological surveys will be undertaken in 2025 based on the results of the habitat survey. The surveys would be undertaken to ensure the ecological baseline is sufficiently studied and to support the EcIA.

Scope of the Assessment

5.6.16 The Biodiversity chapter will determine the 'importance' of ecological features including key sites, habitats and species that are considered to be of conservation interest and could be affected by the development proposals. The evaluation will specifically refer to:

- Statutory and non-statutory designated Sites for nature conservation;
- Habitats of Principal Importance (Priority Habitats) in Wales;
- Species of Principal Importance (Priority Species) in Wales; and
- Carmarthenshire Biodiversity Action Plan (BAP), red listed, rare or legally protected species.

5.6.17 The importance will be qualified in a geographic context, as set out below:

- International (Europe)
- National (United Kingdom, specifically Wales)
- Regional (South West Wales)
- County (Carmarthenshire)
- Local
- Negligible/Site (specifically, the Proposed Development footprint)

5.6.18 The approach will identify, qualify and, where possible, quantify the sensitivity, value and magnitude of all ecological receptors which cannot be scoped out of this assessment.

5.6.19 In assigning a value to a site, habitat or species (population or assemblage), their distribution and status (informed by survey data and available historical records) will be considered. Rarity will be considered due to its relationship with threat and vulnerability, and the need to conserve representative areas of habitats and genetic diversity of populations and species.

5.6.20 The valuation of sites will also take full account of existing value systems such as site designations.

5.6.21 Criteria for the valuation of habitats and plant communities will include Annex III of the Habitats Directive, guidelines for the selection of biological SSSIs / criteria used by local planning authorities and Wildlife Trusts guidance for the selection of local sites. Legal protection status, will also be considered.

5.6.22 Other habitat or plant community criteria considered will include size (extent), diversity, naturalness, rarity, fragility, typicalness, historic records, importance to the ecological functioning of a site, ecological value to species of conservation concern, condition and potential importance.

5.6.23 Species populations will be valued on the basis of their size, recognised status (e.g. inclusion in lists of species of conservation concern or BAP status) and legal protection status. Other species related

factors that will be considered include the species' distribution and rarity, any population trends, the size of the population that would be affected, and geographic scale of the impact.

5.6.24 Legal protection afforded to species will be taken into account in the development of mitigation measures. For European protected species, measures will ensure that the species will remain at a favourable conservation status in their natural range.

5.6.25 Finally, existing and future predicted baseline conditions will be considered, including predicted changes resulting from climate change.

Magnitude of Impact

5.6.26 The likely impacts of the proposals will be assessed in terms of the:

- type – positive or negative impact on an important ecological feature;
- magnitude - size or intensity;
- extent or spatial scope;
- likely duration;
- reversibility – naturally or through mitigation action; and
- timing and frequency in relation to ecological changes.

5.6.27 Where likely adverse impacts are identified, mitigation or compensation measures will be incorporated into the proposal where practicable.

Significance of Effect

5.6.28 As per Section 3.1 of this scoping report, the significance and scale of the effects will be assessed and classified as:

- Substantial: likely to be significant at a national, UK, European / international scale.
- Major: likely to be significant at a regional scale.
- Moderate: likely to be significant at a County scale
- Minor: likely to be significant at a Local scale.

5.6.29 Effects of 'moderate' or greater significance are considered to be significant in terms of the EIA Regulations. Effects that are too low to be considered in the assessment will be those that are assessed as 'slight' or neutral. Beneficial effects will be considered in the assessment.

Duration

5.6.30 Time frames referred to in the EcIA would be:

- short-term - one to three years;
- medium-term - four to nine years; and
- long-term - greater than nine years.

Assessment of Effects

Construction Impacts

5.6.31 In the absence of mitigation, the following impacts and their resultant effects would be assessed, or scoped out where not relevant:

- Impacts (direct and indirect) on designated sites, leading to loss, alteration and/or degradation
- Impacts (direct and indirect) on terrestrial habitats including grassland, arable, woodland and trees, hedgerows and scrub, leading to loss, alteration and/or degradation.
- Impacts (direct and indirect) on aquatic habitat such as waterbodies and watercourses (where present), including potential changes in water quality, leading to their alteration or degradation
- Impacts (direct and indirect) on protected and notable species of flora and fauna (following further ecological surveys and assessment), leading to disturbance/displacement, mortality and/or injury

5.6.32 As part of the EcIA, the significance of effects would be assessed considering embedded mitigation, such as a CEMP.

Operational Impacts

5.6.33 In the absence of mitigation, the following impacts and their resultant effects would be assessed or scoped out where not relevant:

- Impacts (direct and indirect) on habitats, leading to alteration and/or degradation
- Impacts (direct and indirect) on protected and notable species of flora and fauna, leading to disturbance/displacement

5.6.34 Effects during the decommissioning stage are considered to be similar or no worse than during construction.

Notes and Limitations of the Assessment

5.6.35 Limitations will be avoided as far as practicable possible, however, should any limitations arise as part the assessment, such as through ecological surveys, these will be reported and assessed in relation to their effectiveness and presented in the ES.

Habitats Regulations Assessment

5.6.36 Considering the distance between the Proposed Development Site and the closest internationally designated site (Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd Special Area of Conservation SAC), and the lack of discernible impact pathways, it is considered that there would be no likely significant effects on SACs from the proposal. Additionally, likely significant effects on qualifying features of the Bae Caerfyrddin/ Carmarthen Bay SPA and Bury Inlet SPA are not anticipated given the lack of functionally linked land within the Site. As a result, no Habitats Regulations Assessment (HRA) would be undertaken. This was also the position taken as part of the assessment for the Bryncoch Solar development.

Biodiversity Strategy

5.6.37 A biodiversity strategy would be developed in consultation with specialist consultees where appropriate and possible, and other technical specialists (including landscape architects, hydrologists and soils specialists where appropriate). The aim of the biodiversity strategy would be to avoid, minimise and mitigate any significant impact on biodiversity. A core part of the biodiversity strategy would be to maintain and enhance ecosystem resilience as part of the Proposed Development design, alongside building in measures to safeguard and maximise green infrastructure, ultimately delivering a net benefit for biodiversity. The Welsh Government's step-wise

approach and Natural Resources Wales' DECCA[6] framework will be integral to the Proposed Development's biodiversity design.

5.6.38 The biodiversity strategy will be taken into account in the final conclusions of the EcIA and reported in the Biodiversity chapter. The assessment of residual impacts will be made, based on the implementation of additional mitigation measures.

Cumulative Assessment

5.6.39 The cumulative ecological effects resulting from the combination of effects from the Proposed Development and other proposed developments in the area will be assessed. The cumulative effects will be considered together to ensure that an overarching assessment of impacts will be considered.

[6] Diversity, Extent, Condition, Connectivity and Adaptability

5.7 Chapter 7: Soils

Introduction

5.7.1 This section of the Scoping Report considers the assessment of the potential effects of the Proposed Development on soils, including on the Agricultural Land Classification as a measure of agricultural land quality. This section considers the potential effects on the soil and land quality as a physical resource, and on its potential use as an economic resource. The section considers the physical effects that construction works, and decommissioning works, could have on the soils.

Potential Effects

5.7.2 Potential effects on soils include:

- loss of land as a resource for biomass production, using the Agricultural Land Classification (ALC) classification system;
- loss or damage to soils as a physical resource.

Legislation and Policy

5.7.3 Relevant policy includes:

- Future Wales 2040 (2021), especially Policy 18;
- Planning Policy Wales (2024) especially paragraphs 3.58 and 3.59;
- Technical Advice Note TAN 6 (2010).

Guidance

5.7.4 Guidance that will inform the environmental assessment process, and assessment of the impacts and mitigation, includes:

- Institute of Environmental Management and Assessment Guide “A New Perspective on Land and Soils in Environmental Impact Assessment” (2022);
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, Defra (2009);
- Good Practice Guide for Handling Soils in Mineral Workings, The Institute of Quarrying (2021), supplementary notes and worksheets.

Study Area and Baseline Context

5.7.5 The Study Area is all land within the Site, including land previously consented under the Bryncoch Solar Farm consent.

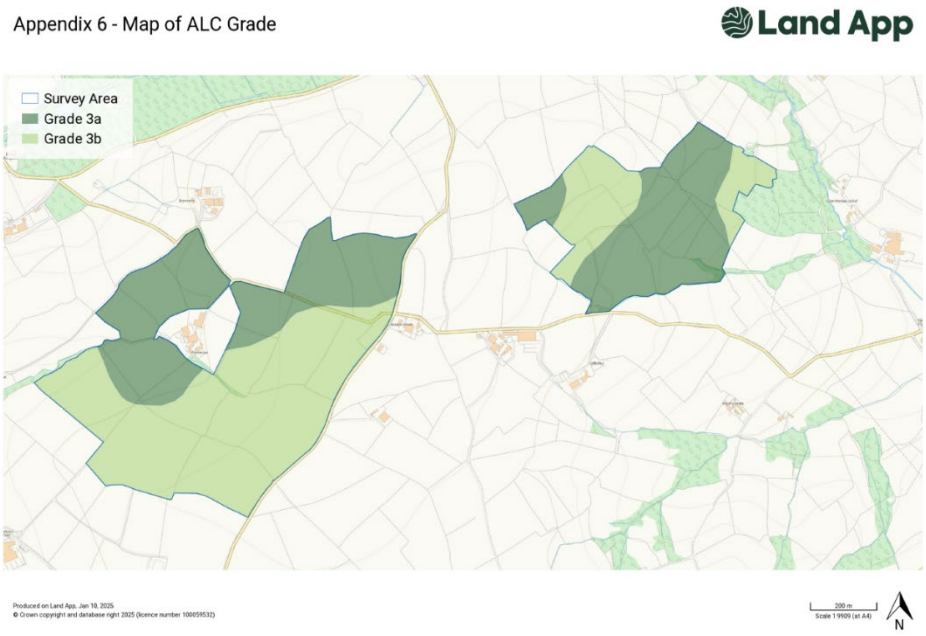
5.7.6 Agricultural land quality is measured under a system of Agricultural Land Classification (ALC), with the current methodology set by MAFF in October 1988. This divides land into five grades, from

Grade 1 “excellent” to Grade 5 “very poor”, with Grade 3 divided into Subgrades 3a “good” and 3b “moderate” quality.

5.7.7 The site is shown on the predictive ALC by the Welsh Government, version 2, as mostly falling into ALC subgrade 3a, with an area of subgrade 3b.

5.7.8 A detailed ALC survey has been carried out by Amet Property Ltd. They have identified that part of the site falls within Subgrade 3a and the majority falls within Subgrade 3b. The distribution is shown on an extract from the ALC plan below.

Figure 7.1: Distribution of ALC



5.7.9 Approximately 10 ha of subgrade 3a land has previously been granted consent for solar farm use under the Bryncoch Solar Farm consent.

5.7.10 The ALC results for the whole site, are shown below.

Table 7.1: ALC Results of the Whole Site

ALC Grade	Area (ha)	Area (%)
Subgrade 3a good	38.7	48
Subgrade 3b moderate	42.2	52
Total	80.9	100

Assessment Methodology

5.7.11 The soils and land quality assessment has been derived from historic practice, recently encapsulated in the IEMA Guide. The IEMA Guide methodology has been adjusted for this

assessment to place all BMV land in the high category, rather than the very high category leaving the high category unpopulated as per IEMA.

5.7.12 The assessment of magnitude will be as set out in Table 7.2.

Table 7.2: Assessment Magnitude

Magnitude of Effect	Effects on Agricultural Land (soils)
Major	The Development would directly lead to the loss (including permanent sealing or land quality downgrading) of one or more soil functions or soil volumes over an area of over 20 hectares ('ha') of soil-related features; or potential for improvement in one or more soil functions over an area of more than 20 ha.
Moderate	The Development would directly lead to the loss (including permanent sealing or land quality downgrading) of one or more soil functions or soil volumes over an area of between 5 ha and 20 ha of soil-related features; or potential for improvement in one or more soil functions over an area of between 5 ha and 20 ha.
Minor	The Development would directly lead to loss (including permanent sealing or land quality downgrading) of one or more soil functions or soil volumes over an area of less than 5 ha of soil-related functions; or potential for improvement in one or more soil functions over an area of less than 5 ha.
Negligible	No discernible loss or reduction or improvement of soil functions or volumes.

5.7.13 The matrix for assessing sensitivity will be as set out in Table 7.3.

Table 7.3: Matrix for Assessing Sensitivity

Sensitivity	ALC/biomass production*	Sensitivity of topsoil and subsoil**
High	Land of ALC Grades 1, 2 and 3a	High clay soils where the field capacity days ('FCD')*** is >150, or medium textured soils where the FCD is >225
Medium	Land of ALC Subgrade 3b	High clay soils where the FCD is <150, or medium textured soils where the FCD is <225
Low	Land of ALC Grades 4 and 5	Soils with a high sand fraction where the FCD is <225
Negligible	Land of ALC Grades 4 and 5 with only indirect links	-

* IEMA Guidance Table 2
** IEMA Guidance Table 4. For the full list. refer to the IEMA Guidance Table 4
*** Field Capacity Days i.e. days when the soil is replete with water

5.7.14 These impacts will lead to a significance threshold determination as set out in Table 7.4.

Table 7.4: Significance Threshold Determination

Sensitivity	Magnitude			
	Major	Moderate	Minor	Negligible
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Assessment of Likely Effects

5.7.15 Parts of the site are of ALC subgrade 3a, and accordingly of high sensitivity. The quantum of BMV within the site exceeds 20 ha, although some of this has previously been consented.

5.7.16 The installation of solar PV arrays does not generally adversely affect agricultural land quality, as the piles are driven in and have a very limited impact on the soil resource. There will be a requirement for some access tracks and bases for small items of fixed infrastructure, but collectively

these are likely to involve relatively small areas of BMV. By design, so far as possible, these areas of disturbance will be placed on land of moderate quality (subgrade 3b).

5.7.17 Overall, the impact on BMV land quality is expected to be minor, i.e. less than 5 ha, to include any tracks or infrastructure that cannot be located on subgrade 3b. The effect of a minor adverse impact (< 5 ha) on a resource of high sensitivity (BMV) would be a minor adverse effect, which would be temporary and reversible.

5.7.18 The Proposed Development has the potential to involve more than 20 ha, hence a large magnitude impact. The Field Capacity Days in this area are 260, and therefore in excess of 225 (reference Table 7.3). The soils were identified in the ALC as medium clay loam and heavy clay loam, and accordingly all soils are considered to be of high sensitivity (i.e. low resilience to structural damage). Without careful mitigation, which can be embedded in the construction process, there is the potential for a major adverse effect on soils. With suitable mitigation, however, especially from the limitations of construction works to only those periods when soils are suitably dry, this impact can be mitigated to a minor adverse effect.

Conclusions

5.7.19 There is the potential for major adverse effects on agricultural land and soils. However, by design and mitigation these effects can be reduced to minor adverse and temporary effects.

6 REFERENCES

Cadw, Welsh Assembly Government and Countryside Council for Wales 2007 Guide to Good Practice on Using the Register of Landscape of Historic Interest in Wales in the Planning and Development Process. Revised (2nd) Edition Including Revisions to the Assessment Process (ASIDOHL2)

Cadw 2011 Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment in Wales

Cadw 2017a Setting of Historic Assets in Wales

Cadw 2017b Heritage Impact Assessment in Wales

CgMs 2015 Cultural Heritage Desk-Based Assessment: Proposed Solar Farm, Bryncoch, Ferryside, Carmarthenshire

Chartered Institute for Archaeologists, 2020, Standard and guidance for historic environment desk based assessment

Hedgerows Regulations 1997 (Act of the National Assembly for Wales)

Historic Environment (Wales) Act 2023 (Act of the National Assembly for Wales)

IEA (2021), Environmental life cycle assessment of electricity from PV systems: Fact sheet. Available at: https://iea-pvps.org/wp-content/uploads/2021/11/IEA-PVPS-Task12-LCA-PV-electricity-_-Fact-Sheet.pdf

IEMA, IHBC, CIfA 2021: Principles of Cultural Heritage Impact Assessment in the UK

Welsh Government 2017 Technical Advice Note (TAN) 24: The Historic Environment

Welsh Government, 2024, Planning Policy Wales Edition 12

Appendix 1.1

Proposed Site Location Plan

A1

Revisions:

Revision	Date	Revision Notes	Drawn	Inspected
01	17.12.24	First Issue	JM	ID
02	19.12.24	Amendments to Red Line Boundary	JM	ID
03	10.01.25	Field 29 Added	JC	ID

LEGEND:

PLANNING APPLICATION BOUNDARY

1 FERRYSIDE SITE LOCATION PLAN

Scale: 1:5000@A1

50 100 150 200 250 300 350 400 450 500m

SCALE 1:5000

N

Project:

Heolldu Solar Farm

MaesMawr and Treforris Fawr Farm, Ferryside, Camarthenshire, SA17 5YD

Client:

Qualitas energy

Drawn by:

CADmando 2D, 3D CAD & BIM SERVICES

CADmando Design & Draughting Solutions Ltd
Unit B2, The Courtyard, Severn Drive, Tewkesbury Business Park, GL20 8GD

Tel: +44 (0) 1684 850019
Mob: +44 (0) 7814436910

Status:

PLANNING

Drawing Title:

Site Location Plan

Drawn:	Checked:	First Issued:
JM	ID	17.12.2024

Project Code:	Drawing Number:
QU003-	**SP-01**

Sheet Size:	Scale:	Revision:
A1	**1:5000**	**03**

A1

Revisions:

Revision	Date	Revision Notes	Drawn	Inspected
01	31.01.25	First Issue	JM	ID

LEGEND:

PLANNING APPLICATION BOUNDARY

1 FERRYSIDE SITE LOCATION PLAN

Scale: 1:7500@A1

0 150 300 450 600 750m

SCALE 1:7500

Project:

Heolldu Solar Farm

MaesMawr and Treforris Fawr Farm, Ferryside, Camarthenshire, SA17 5YD

Client:

Qualitas energy

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Tel: +44 (0) 1684 850019
Mob: +44 (0) 7814436910

Status:

PLANNING

Drawing Title:

Site Location Plan

Drawn:	Checked:	First Issued:
JM	ID	31.01.2025

Project Code:	Drawing Number:
QU003-	SP-02

Sheet Size:	Scale:	Revision:
A1	1:7500	01

Appendix 1.2

Consultation Plan

ENERGY AND INFRASTRUCTURE
COMMUNICATIONS SPECIALISTS

THIRTY 4/7

Heolddu Solar Farm
Qualitas Energy
Consultation Plan (Pre-SCI)

December
2024

INTRODUCTION

This document is an outline plan of how Qualitas Energy proposes to consult relevant consultees and rights owners regarding its Heolddu Solar Farm proposals.

This Consultation Plan is intended to provide an overview of Qualitas Energy's consultation approach to engagement as a part of the pre-application stage of the Development of National Significance (DNS) process for the new Heolddu Solar Farm.

The site is located within the administrative boundaries of Carmarthenshire County Council (CCC). The site is comprised of two parcels of land, the area around the site is rural and sparsely populated, with the settlements of Ferryside to the west, Llandyfaelog to the east and Kidwelly to the south east. The two parcels of land straddle a four-way junction to the west of the A484.

This document can be refined based on feedback received through initial discussions with stakeholders, including, but not limited to the local authorities, Planning and Environment Decisions Wales (PEDW) as well as local political and community representatives as appropriate.

1. PROJECT BACKGROUND

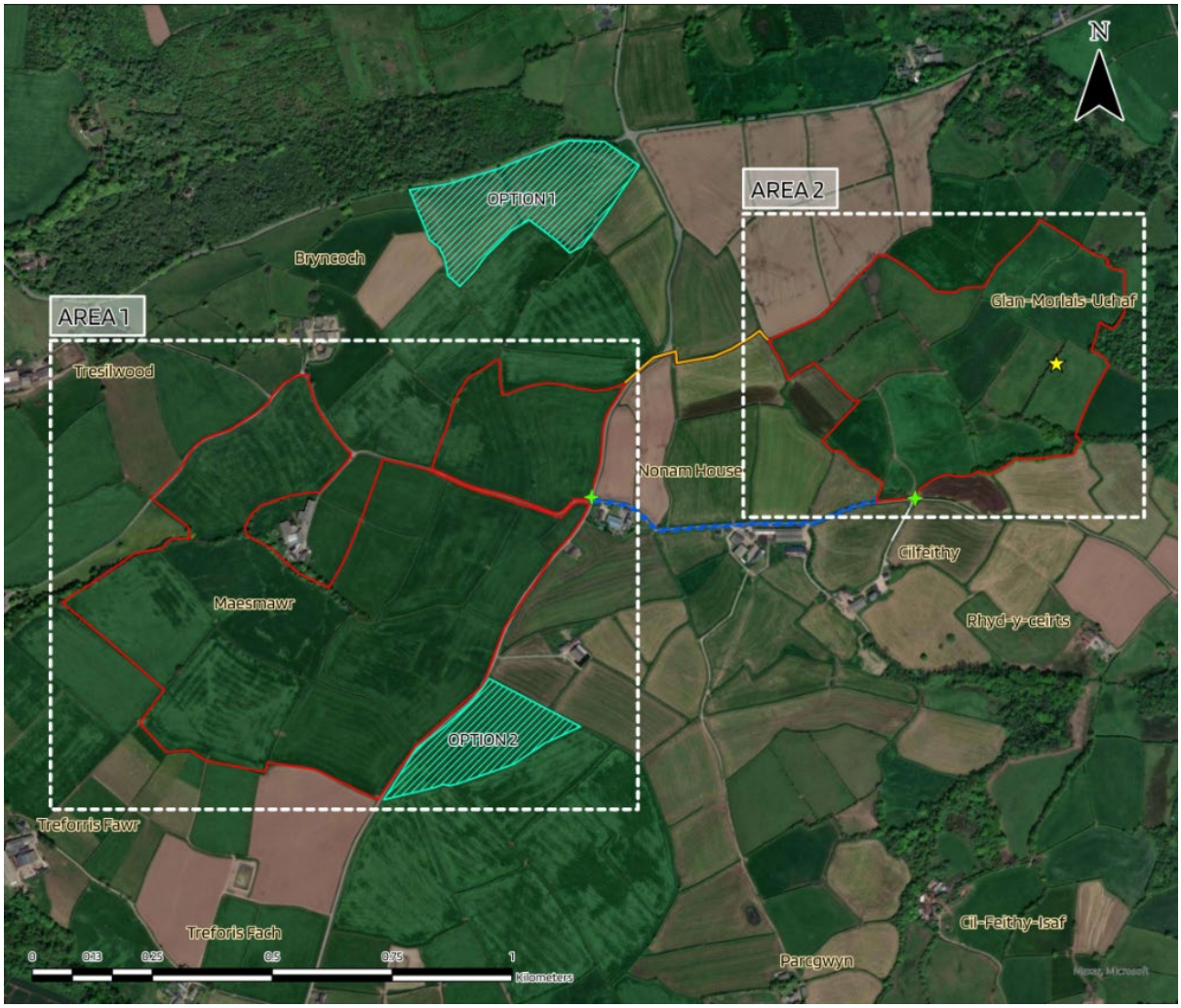
Qualitas Energy is seeking to develop a solar farm, with a generating capacity of up to c. 40MW, currently known as the Heolddu Solar Farm. Whilst the design of the solar farm is likely to evolve during the course of the pre-application process, at this initial stage the project is currently envisaged as comprising:

- Area 1 and Area 2 comprised of solar panels
- Point of connection to the grid located on Area 2 utilising an existing or modified/replaced tower
- Grid connection cable laid underground.
- A temporary laydown area to separate to Areas 1 and 2, to assist in the management and delivery of equipment and materials during construction.

2. SITE PLAN

The proposed site area spans across two parcels of land entirely within the boundaries of CCC, with the proposed grid connection remaining within the site boundary. The settlements of Ferryside and Llandyfaelog are the closest to the site, though it is worth noting that the local area is largely rural and relatively sparsely populated.

Politically, the site is situated across both the Kidwelly and St Ishmael and Llangyndeyrn wards of Carmarthenshire County Council.



As this project will deliver up to 40MW of renewable energy it will qualify as a Development of National Significance (DNS) under the Planning (Wales) Act 2015. Qualitas Energy will apply to the Planning and Environment Decisions Wales (PEDW), which will examine the proposals and make a recommendation to Welsh Ministers on whether or not to grant planning permission.

3. STATUTORY REQUIREMENTS, GUIDANCE AND BEST PRACTICE

Consultation will be undertaken in line with best practice and will extend beyond the statutory minimum requirements.

Key statutory requirements for pre-application consultation associated with the Heolddu Solar Farm stem from provisions of the Planning (Wales) Act 2015 and the Developments of National Significance (Procedure) (Wales) Order 2016.

Statutory requirements therefore include:

- Notification of Welsh Ministers and the Local Planning Authority of the proposed application
- Publicising and consulting on the proposed application for a period of six weeks.
- Following notification (and acceptance by PEDW), applicants are obliged to undertake the following as a minimum:

- Consult specific community consultees, specialist consultees and any relevant persons,
- Serve written notice on owners or occupiers of land adjoining the site; and
- Place a notice in a local newspaper

It is PEDW's expectation that most projects exceed the minimum requirements set out in the Order.

The Welsh Government's Pre-application Community Consultation: Best Practice Guidance for Developers (2017) provides extended guidance on consultation that not only meets legal and procedural requirements but delivers various benefits such as building trust and shaping the project in the light of community interests and concerns.

Qualitas Energy will comply with or exceed all of these requirements, in line with best practice guidance.

4. GDPR

Qualitas Energy takes data security very seriously and has ensured that its arrangements, and those of its sub-contractors, for data handling comply in full with the General Data Protection Regulation (GDPR).

Information that will be collected in relation to the consultation process for the project will be securely, clearly and logically stored and reviewed to ensure it is up to date and that any details not required for the purpose of the pre-application consultation process are deleted.

5. PROJECT MILESTONES

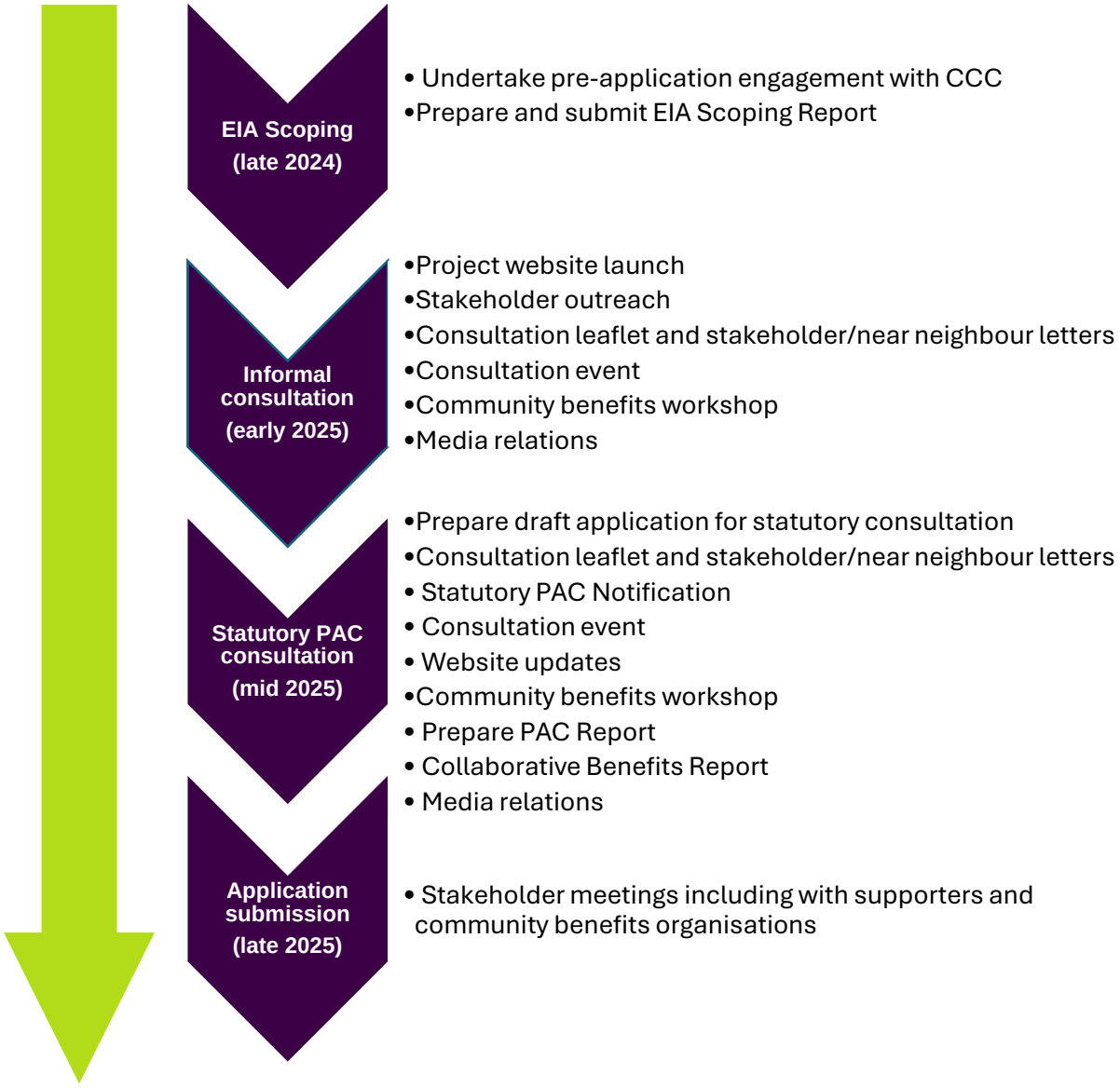
Qualitas Energy will carry out ongoing engagement with local stakeholders, community and specialist consultees during the whole process.

Key project milestones are laid out in more detail below, however it should be noted that the current programme builds in two phases of consultation with the local community, key stakeholders and other consultees.

This will be split across an informal phase of engagement followed by the statutory pre-application consultation period, which will align with the requirements set out in legislation.

A more detailed schedule of deliverables will be provided following agreement with the wider project team to supplement the indicative timeline outlined below.

Key project milestones



6. SCOPE OF CONSULTATION

Qualitas Energy will consult with communities, groups and individuals that live, work or use the area or may be potentially affected by the proposed development.

As noted in Developments of National Significance: A guide for Local Communities, the best opportunity to influence a significant project such as this is at an early stage. Qualitas Energy therefore intends to involve stakeholders, consultees and local communities in the development of these proposals from an early stage and will continue to engage with interested parties throughout the pre-application process and beyond.

Consultation with statutory consultees and technical stakeholders will be handled via the EIA process, which will run parallel to consultation with local communities. This document confirms the approach taken to consultation with the following:

- Identified stakeholders

- Local residents living in proximity to the proposed development
- Wider population with an interest in the proposals

Given the nature of the proposals and the site location, Qualitas Energy will engage with close neighbours, businesses, landowners and the communities surrounding the site in the first instance. Where appropriate, interested parties, groups and individuals from any identified surrounding areas will also be informed about the proposals. Qualitas Energy is keen to ensure that engagement is as inclusive and accessible as possible, and will therefore be keen to work with the local stakeholders to ensure that their knowledge of local groups is harnessed and applied as part of the consultation.

Engagement with these groups will incorporate a range of direct engagement methods, such as letters and newsletters, to ensure that local communities and community representatives are informed about, and have adequate opportunity to engage with, the consultation process.

Additional groups and individuals will be identified through the informal consultation stages.

Ensuring that local communities are consulted meaningfully on Heolddu Solar Farm, that they do not feel that they are being 'over consulted' or become confused about what they are being consulted upon, will be important. Measures to avoid consultation fatigue within the local area will be incorporated into the consultation programme and the project team will seek, wherever possible, to clearly indicate the stage of the pre-application process and the role which feedback garnered will have on the project's design.

7. COMMUNICATIONS AND CONSULTATION TOOLS

Qualitas Energy is committed to ensuring that the consultation and engagement process is accessible, inclusive and generates a wide range of feedback and views from stakeholders and residents. In order to achieve this, Qualitas Energy will utilise a range of tools to communicate and seek feedback from the local communities in the areas around the proposed site.

These are set out in the table below.

Zone	Parameters of Zone	How they will be informed	Key communication and Engagement Tools
Consultation Zone (CZ) (Those communities most directly affected by the proposals in terms of potential visibility. Including all properties/ businesses. ***A proposed 'consultation zone' will be agreed with the project team in liaison.***	Communities/ residents situated close to the site, including Ferryside, Llandyfaelog.	The core of the consultation will be focused within this zone, with local residents directly receiving information on the consultation.	- Direct mail/leaflets - Public drop-in session - Media coverage - Website - Email updates - Feedback capture forms - Feedback via Freepost/Freephone/Email
Wider Area (Individuals and communities outside of the CZ with a potential interest in the proposals)	Not defined	Those communities outside the CZ and the wider population in general would be consulted through advertising, proactive media relations, online and via the project website and wider stakeholder engagement.	- Media coverage - Website - Email updates - Feedback via Freepost/Freephone/Email

8. FEEDBACK MECHANISMS

Qualitas Energy will provide a range of feedback mechanisms bilingually to ensure that all those interested in participating in the consultation are able to respond with their views and comments. These include:

- **Feedback Forms** - provided and returnable free of charge in hard copy via post, online via the project website, or at public exhibitions
- **Freepost** – written feedback can be provided utilising the Project Freepost address FREEPOST TC CONSULTATION (no further address or stamp required)
- **Freephone** – opportunities to speak with the project team and seek further information or provide verbal feedback can be achieved via the Project Freephone number 0800 6990081 during normal office hours (Monday to Friday 9am to 5pm excluding public holidays)

- **Email** - written feedback can be provided utilising the project email address, em**ail address to be confirmed.**
- **Project website** – An online feedback form will be set up and hosted on the project website, **website address to be confirmed,** during both phases of consultation.

9. WELSH LANGUAGE

Given the location of the solar farm and the understanding of local demographic data it is expected that there will be a high number of local residents that speak Welsh as their first or second language.

In order to ensure that residents feel consulted in their first language, and line with guidance from PEDW, Qualitas Energy will prepare its public facing consultation materials in both Welsh and English. This will include any consultation leaflets, display materials, the project website, feedback and comment forms and consultation information documents and advertisements.

The facility to provide written feedback in Welsh will be accommodated, and, wherever possible during consultation activities, a Welsh speaker will be available to discuss the project with interested parties.

10. HARD TO REACH/SELDOM HEARD ENGAGEMENT

Throughout the pre-application process Qualitas Energy will actively seek opportunities to engage with seldom heard or hard to reach groups in the local area. Early engagement with key stakeholders, including at a local authority level, relevant ward members and Community Councils will be vital in helping to identify additional relevant local groups, and highlighting where any areas of the local community may not be engaging with the consultation process.

Recent developments in the use of online and digital consultation and engagement techniques have resulted in a reported rise in levels of engagement and range of participants in pre-application consultation processes.

Digital engagement therefore will play a central role in the consultation approach for this project with the intention of broadening the range of respondents and increasing participation of traditionally hard to reach groups.

As has been set out above however, we will also use a variety of direct engagement and physical consultation tools that work for different groups and individuals which, where possible, go beyond digital engagement using more traditional methods of communication taking into consideration issues such as lack of digital skills, internet access, and/or access to technology.

APPENDIX A: STAKEHOLDER LIST

As required in the Developments of National Significance (Procedure)(Wales) Order 2016; Articles 7, 8 and 9:

Community Consultees:

- Each Councillor representing each electoral ward in Carmarthenshire County Council in which the site is situated
- The Town/Community Council(s) in which the site is situated.

Specialist Consultees:

- The Welsh Ministers
- Natural Resources Wales
- CADW
- CCC Highways Authority
- The railway network operator (if required)
- Welsh Water/Dŵr Cymru
- The Coal Authority
- The Health and Safety Executive
- The Office for Nuclear Regulation (if required)
- The Control of Major Accident Hazards (COMAH) competent authority, and any person associated with any land associated with a hazardous installation (to be confirmed)
- The Theatres Trust
- The Sports Council for Wales
- The Canal and Rivers Trust
- Any further additional consultees as requested/required by PEDW and/or the host local authorities

In addition to the statutory consultees as required, the following stakeholders have been identified initially and will be invited to participate in the consultation. This list will be expanded through the process further to additional suggestions from the local authorities and relevant stakeholders.

Carmarthenshire County Council

- Leader of the Council
- Relevant Cabinet members
- CCC Chief Executive
- Director of Place and Infrastructure and Head of Place & Sustainability

Members of the Senedd:

- Constituency MS, Carmarthen East and Dinefwr
- Regional Members for Mid and West Wales

Members of Parliament:

- Constituency MP, Llanelli

Town/Community Councils

- St Ishmael Community Council
- Llandyfaelog Community Council
- Kidwelly Community Council

Environment Groups

- RSPB
- Carmarthenshire Young Farmers
- Climate Cymru
- Friends of the Earth
- Other relevant environmental stakeholders

Business Groups

- Ferryside Social Enterprise Groups
- Nearby businesses within the CZ

Community Groups (including resident associations, recreation and leisure groups)

- Calon y Fferi (Ferryside Community Centre)
- Ferryside Village Forum
- Ferryside Rugby Club
- Ferryside Men's Shed
- Llandyfaelog Community Hall

**please note, further community groups will be identified and engaged following meetings with strategic and local stakeholders at CCBC and DCC.*

Education

- All schools within CZ

Appendix 2.1

Indicative Proposed Concept Layout Plan

A1

Revisions:

Revision	Date	Revision Notes	Drawn	Inspected
01	26.11.24	First Issue	JM	ID
02	17.12.24	Layout and Red Line Bondary Revised	JM	ID
03	19.12.24	Layout and Red Line Bondary Revised	JM	ID
04	07.01.25	Layout Updated in Line With Comments	JM	ID
05	10.01.25	Field 29 Added	JC	ID

LEGEND:

- PLANNING APPLICATION BOUNDARY
- DNO ACCESS
- CONSTRUCTION AND OPERATION ACCESS
- SITE ACCESS
- PERIMETER FENCELINE
- FOOTPATH
- PROPOSED SWALES
- PROPOSED O/H CABLE ROUTE

SOLAR SITE INFRASTRUCTURE:

- PV FULL TABLE
- PV HALF TABLE
- PV QUARTER TABLE
- CCTV CAMERA
- SECURITY GATE
- SPARE PARTS CONTAINER
- COMMS TOWER
- 132kV SUBSTATION
- DNO CONTROL ROOM
- CUSTOMER CONTROL ROOM
- PCSK INVERTER
- TWIN SKID (TX)
- POINT OF CONNECTION

SERVICES:

- HV 132kV / ELE — 132kV O/H CABLE ROUTE — ELE / HV 132kV

VEGETATION:

- EXISTING VEGETATION
- REMOVED VEGETATION

Design Parameters	
Constraint	Offset Taken (Metres)
Hedgerows	10
Established Woodland	20
PROW	8
Water Course	8

Project:

Heolldu Solar Farm

MaesMawr and Treforris Fawr Farm, Ferryside, Camarthenshire, SA17 5YD

Client:

Qualitas energy

Drawn by:

CADmando
2D , 3D CAD & BIM SERVICES

CADmando Design & Draughting Solutions Ltd
Unit B2, The Courtyard, Severn Drive, Tewkesbury Business Park, GL20 8GD

Tel: +44 (0) 1684 850019
Mob: +44 (0) 7814436910

Status:

PLANNING

Drawing Title:

Site Layout Plan (Overall - Central Inverter)

Drawn:	Checked:	First Issued:
JM	ID	26.11.2024

Project Code:	Drawing Number:
QU003-	PL-01

Sheet Size:	Scale:	Revision:
A1	1:3500	05

1 FERRYSIDE SITE LAYOUT PLAN (OVERALL - CENTRAL INVERTER)

Scale: 1:3500@A1

0 70 140 210 280 350m

SCALE 1:3500

Appendix 4.1

Gazetteer of historic assets

Designated historic assets

Ref.	Name	Designation	Easting	Northing	NHLE Ref.
A	Round Barrow 330m SW of Mynydd-Uchaf	Scheduled Monument	239164	209964	CM190
B	Is-Coed Standing Stone	Scheduled Monument	238084	211185	CM199
C	Iscoed	Grade II Listed Building	238350	211322	9732
D	Llansaint	Conservation Area	238491	208078	-
	Church of All Saints	Grade II Listed Building	238459	208050	9414
E	Llansteffan	Conservation Area	210623	235169	210623
	Llansteffan Castle	Scheduled Monument	235112	210132	CM004
	Llansteffan Castle	Grade I Listed Building	235141	210148	9405
	Y Plas	Grade II* Listed Building	234921	210466	9385
	Church of St Ystyffan	Grade II* Listed Building	235009	210708	9404
	Vale View	Grade II* Listed Building	234936	210704	9406
	Coach House and Stable Range at Y Plas	Grade II* Listed Building	234879	210432	27075
	Telephone call-box outside the Old Pound.	Grade II Listed Building	235026	210756	9751
	Telephone call-box	Grade II Listed Building	235343	210532	9752
	Cyncoed, including area railings.	Grade II Listed Building	235057	210664	27063
	Osbourne House, including area railings.	Grade II Listed Building	235058	210659	27064
	Plas-y-Coed	Grade II Listed Building	235018	210650	27065
	Park Villa	Grade II Listed Building	235016	210664	27066
	Railings and area walls at Plas-y-Coed and Park Villa.	Grade II Listed Building	235039	210660	27067
	Nolands, including forecourt railings.	Grade II Listed Building	235127	210840	27068
	Albion House, including forecourt railings	Grade II Listed Building	235110	210816	27069

Ref.	Name	Designation	Easting	Northing	NHLE Ref.
	The Sticks Hotel	Grade II Listed Building	235030	210774	27070
	Ffynnon Fair	Grade II Listed Building	234953	210734	27071
	Ffynnon Fair House	Grade II Listed Building	234940	210745	27072
	The Stores	Grade II Listed Building	235057	210771	27073
	Cartref	Grade II Listed Building	235061	210775	27074
	Wall and gatepiers to stable court at Y Plas	Grade II Listed Building	234900	210427	27076
	Milestone	Grade II Listed Building	235182	210938	27077
	Well Cottage with forecourt railings and gate	Grade II Listed Building	235097	211155	27078
	St Anthony's Well	Grade II Listed Building	234596	209930	27079
	Fron Ucha Burial Chamber	Scheduled Monument	234551	210747	CM058
-	Kidwelly	Conservation Area	240899	206952	-
	Kidwelly Medieval Town (Part of)	Scheduled Monument	240829	207047	CM209
	Kidwelly Town Gate & Defences	Scheduled Monument	240817	206928	CM183
	Kidwelly Castle	Scheduled Monument	240915	207096	CM002
	Kidwelly Castle	Grade I Listed Building	240897	207049	11876
	Church of Saint Mary	Grade I Listed Building	240842	206750	11878
	The Town Gate	Grade II* Listed Building	240724	206941	11877
	Kidwelly Town Hall	Grade II Listed Building	240805	206691	11880
	Kidwelly Bridge/Pont Cydweli	Grade II Listed Building	240689	206855	20184
	Morfa House	Grade II Listed Building	240703	206792	20185
	Capel Sul	Grade II Listed Building	240691	206812	20186

Ref.	Name	Designation	Easting	Northing	NHLE Ref.
	The Old Moat House	Grade II Listed Building	240826	207004	20187
	Castle School and School house	Grade II Listed Building	240759	206969	20188
	No 6,,Castle Street,Kidwelly/Cydweli,Kidwelly,,SA17 5AX	Grade II Listed Building	240784	206975	20189
	Ruined Warehouse By Kidwelly Bridge	Grade II Listed Building	240694	206883	20190
	Wall along S side of churchyard	Grade II Listed Building	240847	206724	20191
	Castle Mill	Grade II Listed Building	240787	206877	20192
-	Group of Standing Stones NE of Llechdwnni	Scheduled Monument	243204	210119	CM060
-	Hot & Cold Rolling Mills, Kidwelly Tinplate Works	Scheduled Monument	242173	207942	CM254
-	Castell y Domen, Gwempa	Scheduled Monument	243689	212580	CM240
-	Coleman Dovecot	Scheduled Monument	239640	207188	CM152
-	Limekilns at Penymynydd, Pedair Heol	Scheduled Monument	243966	209483	CM277
-	St Ishmael's Scar Beach Defence Gun House	Scheduled Monument	236198	208211	CM383
-	Kidwelly Old Tinplate Works and Dam	Scheduled Monument	242055	207783	CM291
-	Rhyd-Lydan Cromlech	Scheduled Monument	237914	215989	CM056
-	Maen Melyn Standing Stone	Scheduled Monument	234709	212800	CM063
-	Maen Llwyd Standing Stone	Scheduled Monument	236025	213548	CM064
-	Pen Celli Standing Stone	Scheduled Monument	243940	213803	CM122
-	Standing Stone NNW of Clomendy	Scheduled Monument	238696	214861	CM184
-	Meini Llwydion Burial Chamber	Scheduled Monument	237725	215345	CM057
-	Standing Stone NE of Halfway House	Scheduled Monument	245205	212097	CM191
-	Pen-Lan-Uchaf Standing Stone	Scheduled Monument	241214	208338	CM197

Ref.	Name	Designation	Easting	Northing	NHLE Ref.
-	Is-Coed-Uchaf Standing Stone	Scheduled Monument	238652	212355	CM198
-	Gwempa Standing Stone	Scheduled Monument	244510	211127	CM316
-	Dovecote NW of Coleman Farm	Grade II* Listed Building	239641	207187	11879
-	Cold-roll Engine-house at former Kidwelly Tinplate Works	Grade II* Listed Build	242191	207937	20197
-	Church of St Ishmael	Grade II Listed Building	236219	208401	9411
-	Remains of monastic grange at Penallt Farm	Grade II Listed Building	238794	207023	9412
-	Robert's Rest	Grade II Listed Building	236669	210225	9413
-	Fern Hill	Grade II Listed Building	237303	215693	9718
-	Stable and coach-house at Fern Hill	Grade II Listed Building	237286	215677	9719
-	The Masons Arms	Grade II Listed Building	240816	207213	11882
-	Old house at Llechdwnni	Grade II Listed Building	242873	210063	14553
-	The War Memorial and railings	Grade II Listed Building	240700	206971	20193
-	Cae Newydd Railway Bridge	Grade II Listed Building	240693	205913	20194
-	Boxing Room at former Kidwelly Tinplate Works	Grade II Listed Building	242098	207810	20195
-	Assorting Room at former Kidwelly Tinplate Works	Grade II Listed Building	242107	207851	20196
-	Chimney at former Kidwelly Tinplate Works	Grade II Listed Building	242176	207931	20198
-	Lime-kiln facing W, on ridge E of Capel Horeb	Grade II Listed Building	243084	208481	20199
-	Lime-kiln facing S, on ridge E of Capel Horeb	Grade II Listed Building	243111	208537	20200
-	Kidwelly Quay	Grade II Listed Building	239730	206399	20201
-	Upland	Grade II Listed Building	240300	213617	21456
-	Former stables at Upland	Grade II Listed Building	240331	213621	21457

Ref.	Name	Designation	Easting	Northing	NHLE Ref.
-	Salem Baptist Chapel	Grade II Listed Building	236756	210527	22272
-	Bethania Welsh Presbyterian Church	Grade II Listed Building	236803	210579	22273
-	Llwyn-du	Grade II Listed Building	237781	215131	24449
-	Coach-house at Llwyn-du	Grade II Listed Building	237794	215110	24450
-	Stable court at Llwyn-du	Grade II Listed Building	237782	215093	24451
-	Laques	Grade II Listed Building	233629	210260	27080
-	Lord's Park	Grade II Listed Building	233793	209723	27081
-	Church of St Thomas	Grade II Listed Building	236684	210382	82094
-	Lime kilns at Penymynydd	Grade II Listed Building	243965	209488	82286
-	Pont Antwn	Grade II Listed Building	244052	213055	82287
-	Church of St Maelog	Grade II Listed Building	241491	211877	82398
-	Glanrhydw	Grade II Listed Building	243338	213358	82399
-	Pont Rhydyronnen	Grade II Listed Building	242023	211288	82400
-	Ferryside Signal Box	Grade II Listed Building	236581	210385	87670
-	Llechdwnni	Grade II Registered Park & Garden	242809	210092	-
-	Tywi Valley	Registered Historic Landscape	242581	220346	HLW (D) 5
-	Taf and Tywi Estuary	Registered Historic Landscape	235837	206452	HLW (D) 9

Previous Investigations

Ref.	Name	Year	Easting	Northing	*HE Ref.* HER Ref.
P1	Penhill Farm, Ferryside: DBA		239280	209403	130552
P2	Trefforis Fawr, Ferryside, Carmarthenshire: HEA		238548	210092	112106

Archaeological Remains

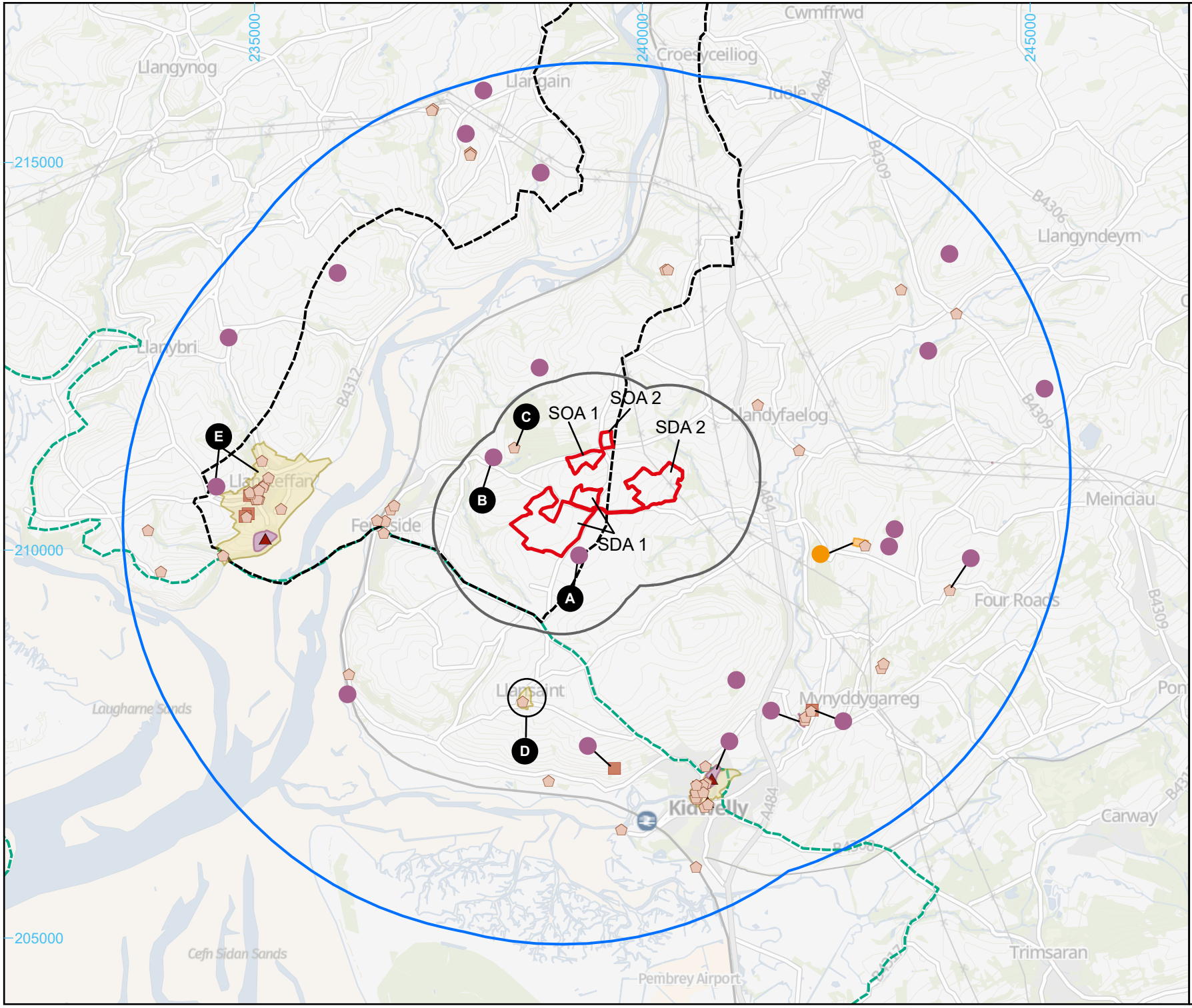
Ref.	Name	Description / Period	Easting	Northing	HER Ref.
1	Ferryside (Scheduled Monument A)	Bronze Age Barrow	209970	209970	2112
2	Park Crig Bach	Site of Bronze Age Barrow	210100	210100	11218
3	Park Main Dan Udlan	Site of Standing Stone	210500	210500	11216
4	Cae Quarry	Modern Quarry	211200	211200	23408
5	Bryncoch Bach;bryncoch Cottage	Modern	211290	211290	23409
6	Maesmawr	Modern Farmstead	210430	210430	23401
7	Pen Y Back Issa;pen Y Back Fach	Modern Farmstead	211036	211036	23028
8	Iscoed a small, oval, single-banked hill-slope enclosure, no trace of earthwork survives (destroyed)	Iron Age	239000	211400	2204
-	Broadway	Bronze Age Barrow	209065	209065	130780
-	Llain Garn	Bronze Age Barrow	209400	209400	11224
-	Llandyfeilog	Bronze Age Barrow	211828	211828	2202
-	Park Pen Y Crug	Site of Bronze Age Barrow	212100	212100	11307
-	-	Site of Bronze Age Barrow	211006	211006	119988
-	Maen Llwyd	Standing Stone	211185	211185	2201
-	Cae Main	Site of Standing Stone	211000	211000	11213
-	Cae Main	Site of Standing Stone	209450	209450	11221
-	Cefn Maen	Site of Standing Stone	209800	209800	11222
-	Llain Fain	Site of Standing Stone	209400	209400	11223
-	Llandyfeilog	Site of Standing Stone	211290	211290	2203
-	Park Maen	Site of Standing Stone	211286	211286	11284
-	Park Maen Mawr	Site of Standing Stone	209850	209850	11220
-	Park Main	Site of Standing Stone	211400	211400	11285

Ref.	Name	Description / Period	Easting	Northing	HER Ref.
-	Park Main Bach	Site of Standing Stone	210000	210000	11219
-	Park Y Maen	Site of Standing Stone	210800	210800	11214
-		Modern Quarry	209450	209450	56459
-	Blaen-y-cwm	Modern Farmstead	212167	212167	23024
-	Ty-newydd	Modern Farmstead	211893	211893	114261
-	Nantygoitre;nantygoitre Isaf	Modern Farmstead	211962	211962	23035
-	Nant-y-goetre-uchaf	Modern Farmstead	212204	212204	113603
-	Iscoed Farm;iscoed Home Farm;iscoed (old)	Modern Farmstead	211828	211828	21793
-	Treforris Bach	Modern Farmstead	209531	209531	23413
-	Tir Bach	Modern Farmstead	209414	209414	23412
-	Pen-hill	Modern Farmstead	208914	208914	113608
-	Parc-gwyn	Modern Farmstead	209501	209501	113610
-	Wern	Modern Farmstead	210336	210336	25682
-	Tresilwood	Modern Farmstead	210803	210803	21799
-	Trecor	Modern Farmstead	210509	210509	21787
-	Tre-forris-fawr	Modern Farmstead	209829	209829	112988
-	Rhyd-y-ceirts	Modern Farmstead	210252	210252	113607
-	Penrheol	Modern Farmstead	210511	210511	23404
-	Pen Back;pen Y Back Fawr;pen Y Back	Modern Farmstead	211337	211337	23029
-	Panteg	Modern Farmstead	211612	211612	23034
-	Mynydd Uchaf	Modern Farmstead	210226	210226	23402
-	Lletty-pen-hen	Modern Farmstead	210221	210221	23609
-	Kilgadarn Fawr;cilgadan Fawr;cilgadan	Modern Farmstead	211462	211462	23027

Ref.	Name	Description / Period	Easting	Northing	HER Ref.
-	Is-coed	Modern Farmstead	211315	211315	112989
-	Glan-morlais-uchaf	Modern Farmstead	210930	210930	113605
-	Bryncoch	Modern Farmstead	210877	210877	21800
-	Cwmbychan	Modern Farmstead	210325	210325	21797
-	Coed Y Brain	Modern Farmstead	210721	210721	23030
-	Cilfeithi;cilvithe Tommy	Modern Farmstead	210436	210436	23407
-	Cil-feithy-isaf	Modern Farmstead	209686	209686	113611
-	Cil-feithy-ganol	Modern Farmstead	210360	210360	113606
-	Cil-gadan-fach	Modern Farmstead	211832	211832	113604
-	Hawker Hurricane Ii Z2689	WWII	211000	211000	105321
-	Toll Road 124	Toll road from Ferryside to Kidwelly	-	-	109110
-	Toll Road 105	Toll road from the River Tywi at Carmarthen to Kidwelly	-	-	109091

Appendix 4.2

Figures 4.1 and 4.2



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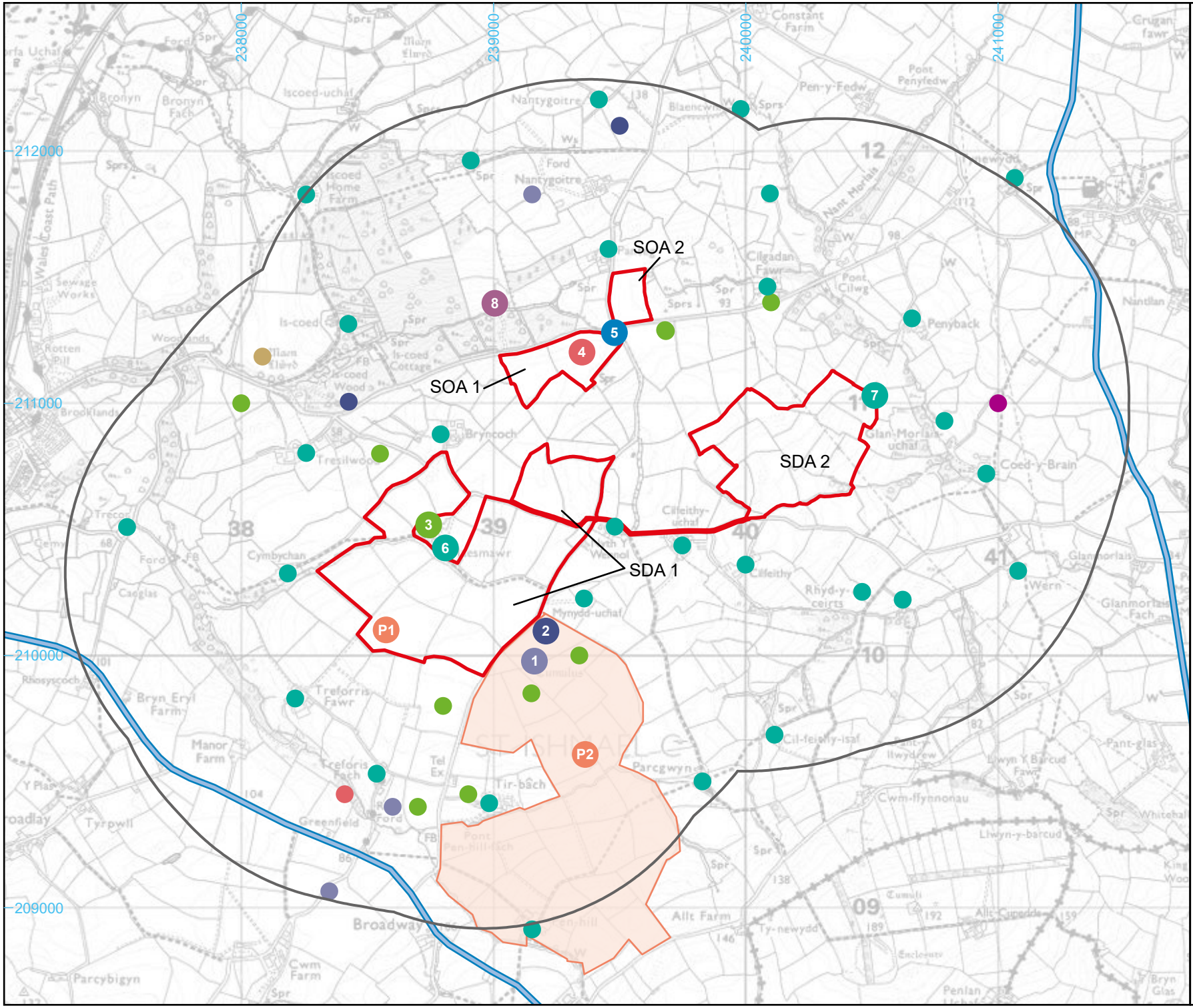
Includes CADW HER data

Cotswold Archaeology
Andover 01264 347630
Cirencester 01285 771022
Milton Keynes 01908 564660
Suffolk 01449 900120
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE
Heolddu Solar Farm, Carmarthenshire

FIGURE TITLE
Designated Historic Assets

DRAWN BY	FC	PROJECT NO.	CR1831	FIGURE NO.
CHECKED BY	JS	DATE	23/12/2024	x.1
APPROVED BY	JS	SCALE @ A4	1:65,000	



Cotswold Archaeology

Andover 01264 347630
Cirencester 01285 771022
Milton Keynes 01908 564660
Suffolk 01449 900120
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE
Heolddu Solar Farm, Carmarthenshire

FIGURE TITLE
Previous Investigations and Archaeological Remains

DRAWN BY	FC	PROJECT NO.	CR1831
CHECKED BY	JS	DATE	23/12/2024
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FIGURE NO. 3

Appendix 4.3

Geophysical Survey Written Scheme of Investigation

WRITTEN SCHEME OF INVESTIGATION FOR GEOPHYSICAL SURVEY

Location

HEOLDDU SOLAR FARM, FERRYSIDE

Unit 1
Link Trade Park
Penarth Road
Cardiff
CF11 8TQ
United Kingdom

Tel: +44 (0) 2920 700127
Web: www.terradat.co.uk

TERRA DAT
down to earth geophysics

Job reference: 9205
Date: November 2024
Version: 1

WRITTEN SCHEME OF INVESTIGATION FOR GEOPHYSICAL SURVEY

Location

HEOLDDU SOLAR FARM, FERRYSIDE

Author	**Christian Bird**
Reviewer	**Dr Jonathan Thomas**
Job Reference	**9205**
Date	**05/11/2024**

Contents

1. Non-technical summary

This written scheme of investigation (WSI) details the methodology for a geophysical survey programme at the proposed Heolddu Solar Farm.

This WSI has been prepared by Christian Brid (TerraDat (UK) Ltd) to define the scope of works and their methodology. This WSI is to be approved by Heneb Development Management before the survey is undertaken in its capacity as archaeological advisor to the local planning authority.

Towed magnetic gradiometry is proposed as the primary survey method; experience of similar sites suggests that an average of 20 ha acquisition (per team) a day should be possible.

All work will conform to the Chartered Institute for Archaeologists Standard and Guidance for Geophysical Survey (CIfA December 2014) and will be undertaken by suitably qualified staff to the highest professional standards.

A report containing all relevant information will be produced upon completion of the survey. The geophysical survey will comply with guidelines outlined by English Heritage (now Historic England) (David *et al.* 2008), the Chartered Institute for Archaeologists (CIfA 2014) and Europae Archaeologiae Consilium (EAC) (Schmidt *et al.* 2016).

2. Introduction and project background

This written scheme of investigation (WSI) details the methodology for a geophysical survey programme at the proposed Heolddu Solar Farm near Ferryside, Carmarthenshire.

The Site comprises three clusters of fields near Ferryside, Carmarthenshire. The western measures 54.5 ha, and the eastern 24.2 ha and a small area in the north measures 7ha. The total survey area measures ~85.7 ha. Plate 1 shows the location of the survey area, and Plate two the arrangement of the two clusters.

All work will conform to the Chartered Institute for Archaeologists Standard and Guidance for Geophysical Survey (CIfA December 2014) and be undertaken by suitably qualified staff to the highest professional standards.

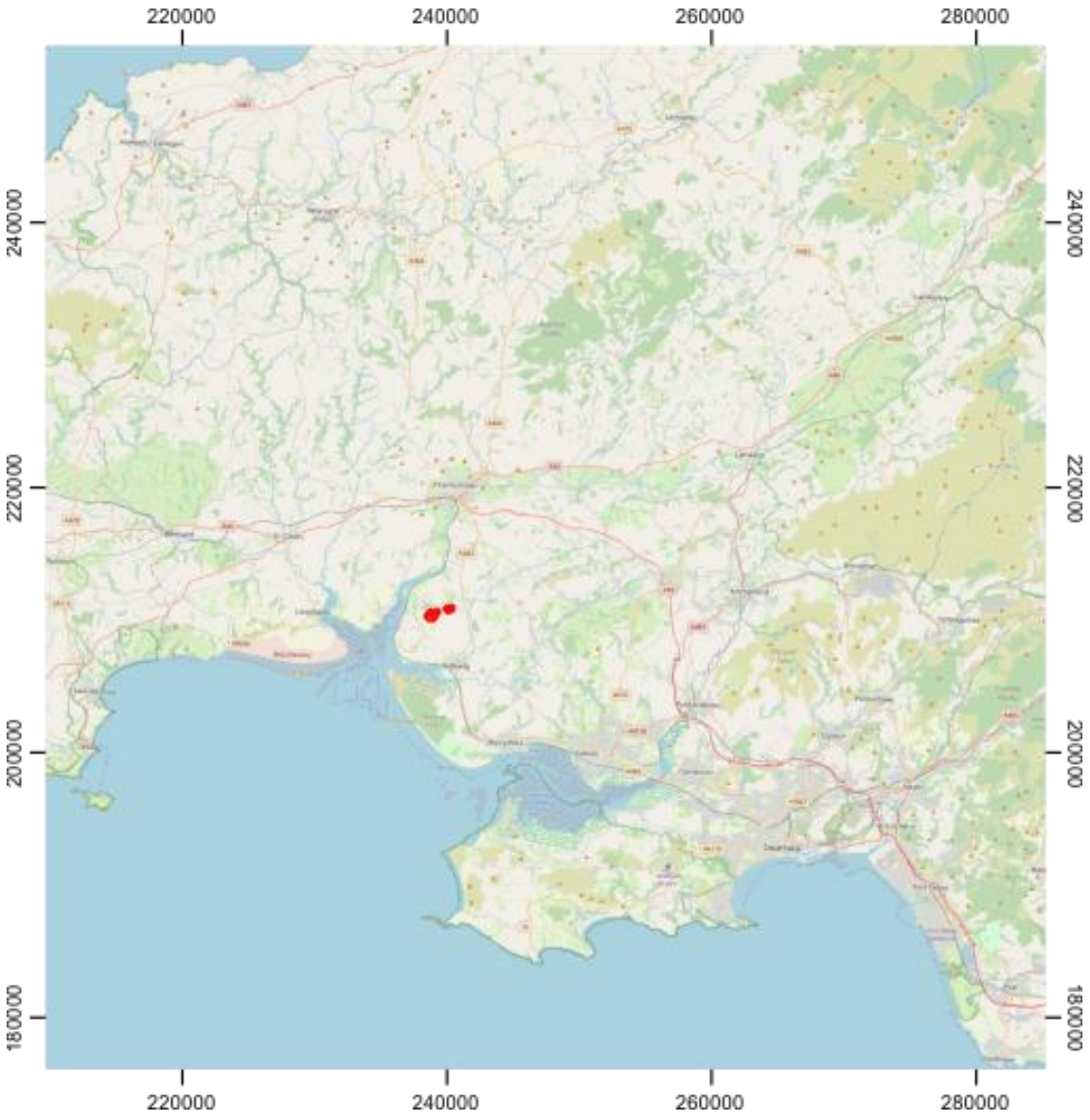


Plate 1 *– Location of the survey area.*

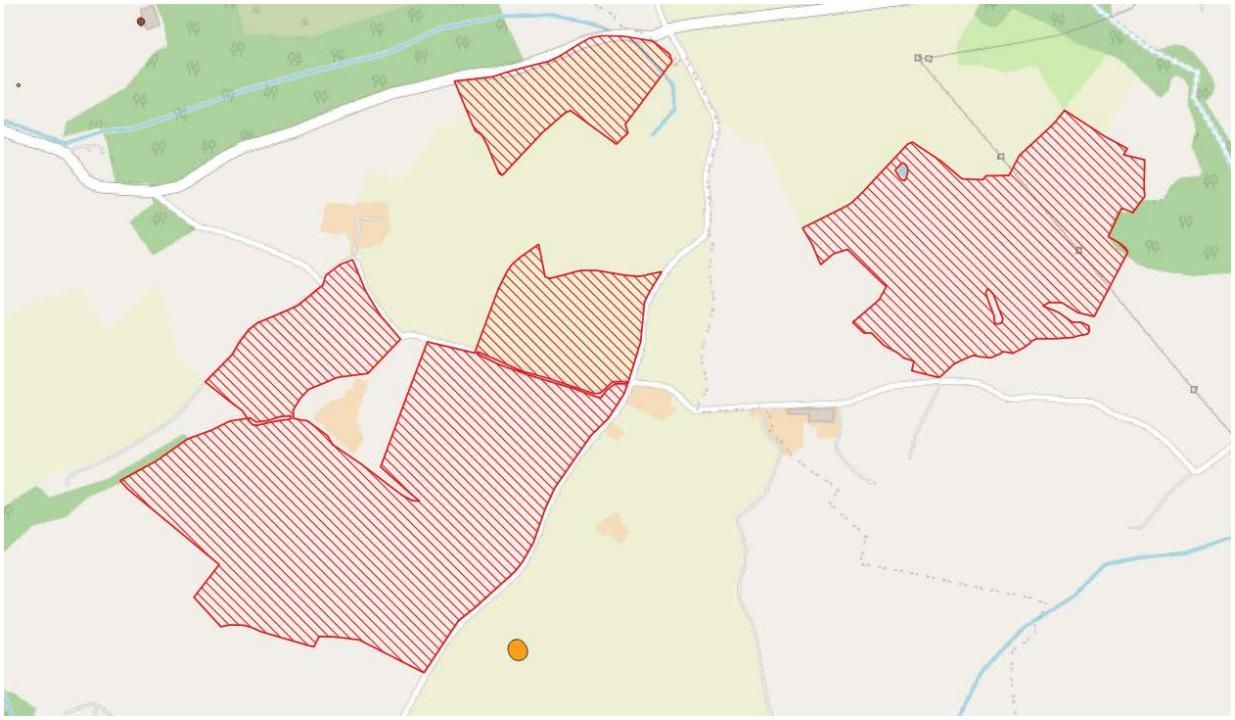


Plate 2 *– Arrangement of the survey areas.*

3. Site Description

The Site occupies a position on the eastern slopes of the Tywi Valley, characterised by gently undulating hills and small valleys typical of this part of Carmarthenshire. The land lies at approximately 115m AOD, forming part of a landscape of medium to large-sized irregular fields primarily used for improved pasture and livestock grazing. These fields are bounded by well-established hedgerows, frequently incorporating mature trees, which follow boundaries documented since at least the 1840 tithe survey. Plate 3 shows details of the survey area.

Plate 3 *– Detail of the survey areas*

3.1 Solid Geology

The bedrock geology underlying the Site comprises rocks of the Milford Haven Group, dating to the Devonian-Silurian period (approximately 419-393 million years ago). This Group consists predominantly of argillaceous rocks - mudstones and siltstones - with interbedded sequences of subordinate sandstone and conglomerate. Plate 4 shows the solid geology of the local area.

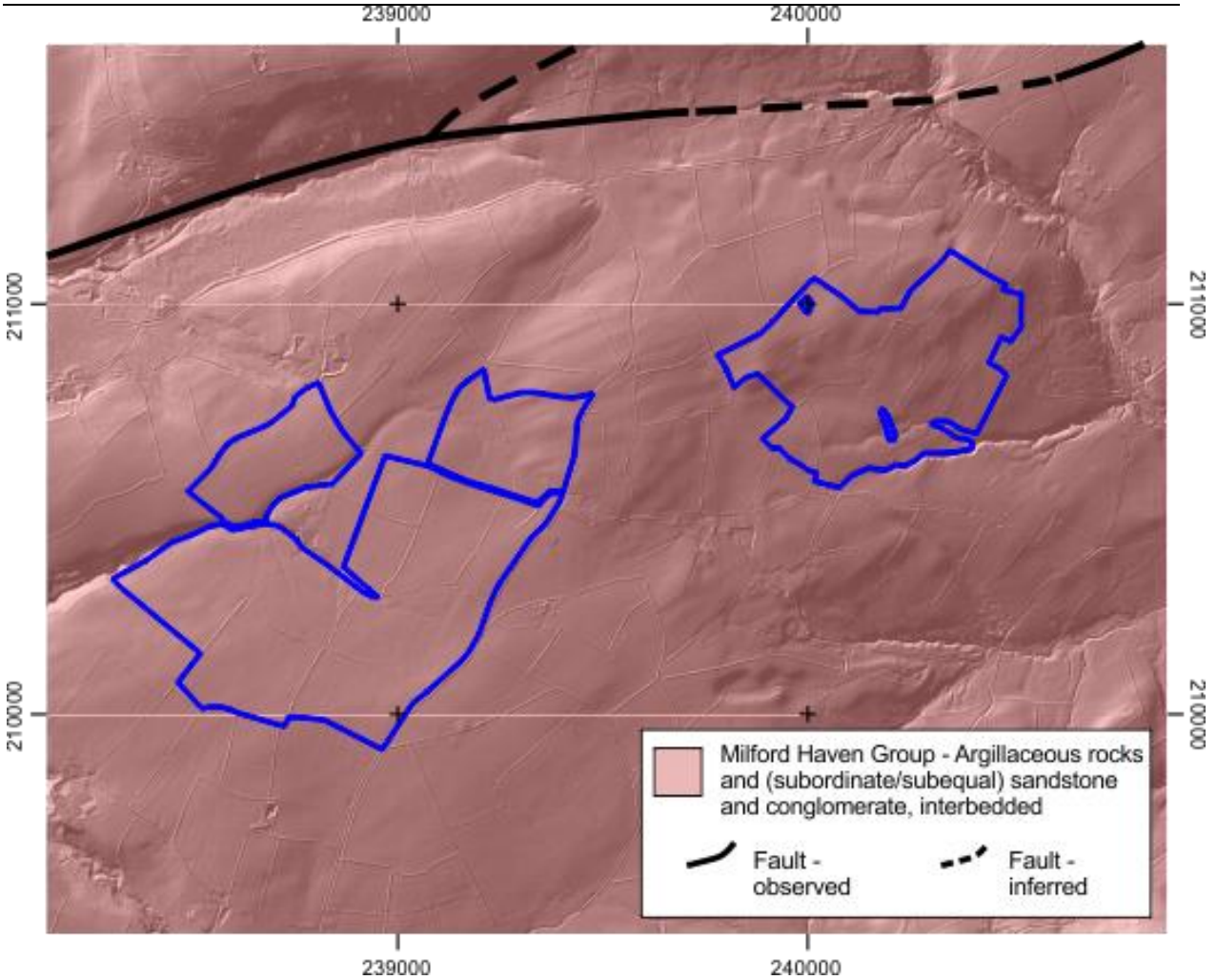


Plate 4 *– Solid geology of the Site and surrounding area (BGS 2024)*

3.2 Superficial Geology

The British Geological Survey mapping indicates no significant recorded superficial deposits at the Site. However, Till is recorded infilling the shallow valley in the extreme south of the eastern survey area (Plate 4)

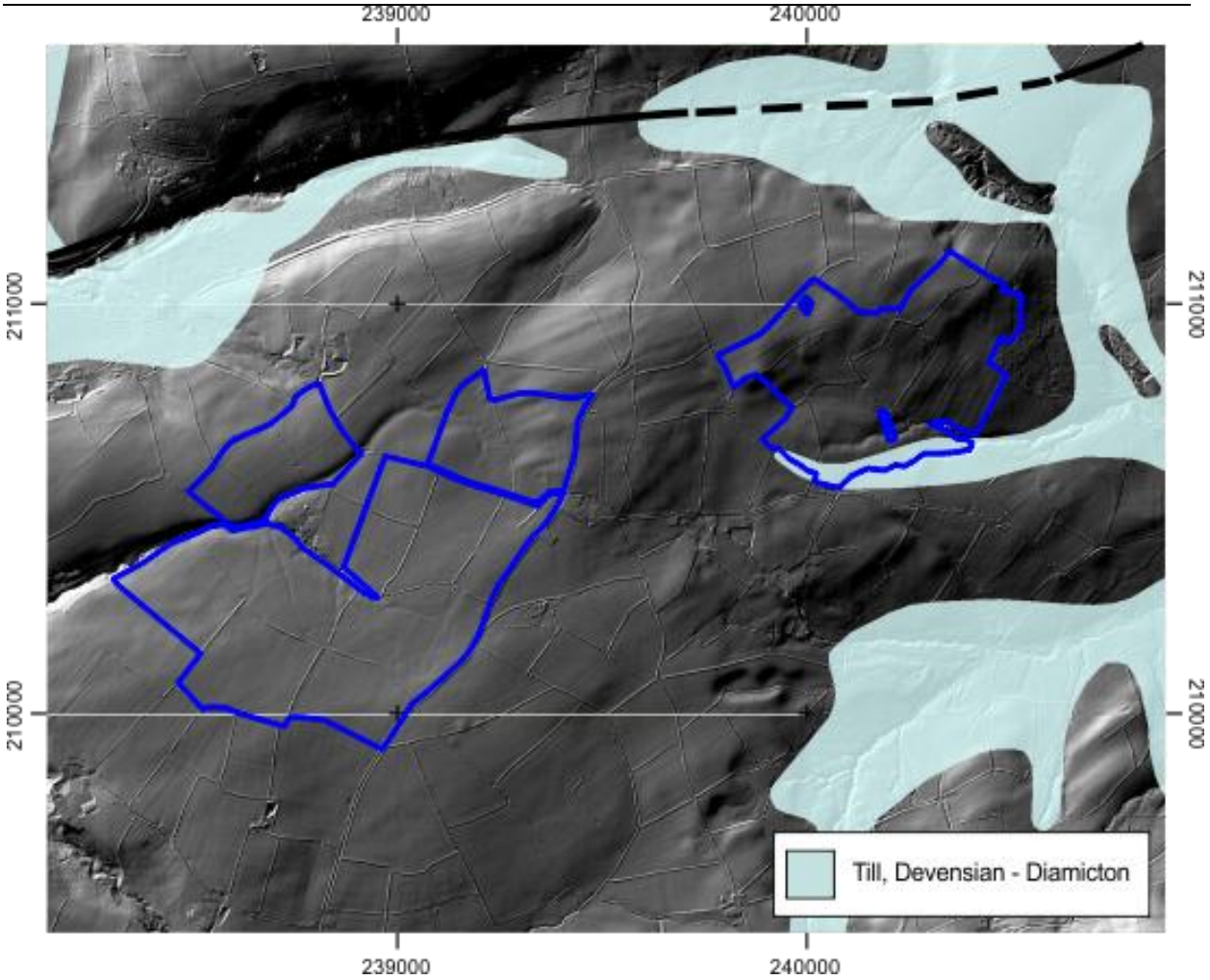


Plate 4 *– Superficial (drift) geology of the Site and surrounding area (BGS 2024)*

3.3 Soils

The soils at the Site are classified within the LandIS system as "freely draining slightly acid loamy soils" (Soilscape 6).

3.4 Effect of Geology on Geophysics

The geological characteristics of the Site suggest favourable conditions for a magnetic gradiometry survey. The bedrock geology of the Milford Haven Group, comprising predominantly argillaceous rocks with subordinate sandstone and conglomerate beds, typically exhibits low magnetic susceptibility values, providing a relatively magnetically 'quiet' background against which archaeological features should be readily detectable. The minor superficial deposits are advantageous, as there are few glacial or alluvial deposits to mask or interfere with archaeological responses. The freely draining, slightly acid, loamy soils (Soilscape 6) would typically develop strong magnetic enhancement through pedogenic processes, particularly in areas of sustained agricultural activity, creating good magnetic contrast for any cut features filled with this material. Features such as ditches, pits, and postholes should be readily

detectable, especially if they cut into the less magnetic bedrock. However, some factors should be considered: possible geological variations in the sandstone and conglomerate beds might create background magnetic 'noise', and enhanced magnetic responses from long-term agricultural activity could potentially mask subtle archaeological features.

4. Archaeological background

4.1 Archaeology

The Site, situated on the eastern slopes of the Tywi Valley in Carmarthenshire (238849, 210362), demonstrates moderate archaeological potential. The location occupies a favourable topographic position on gently sloping ground (c.115m AOD) overlooking the Tywi Valley.

The immediate landscape context suggests particular potential for Bronze Age activity, evidenced by the scheduled Pen-yr-Heol round barrow (SAM CM190) approximately 300m south (Plate 6). This forms part of a broader pattern of Bronze Age monuments recorded in the Dyfed HER, including several standing stones and barrows, suggesting an extensively utilised prehistoric landscape. The concentration of Bronze Age funerary and ceremonial monuments indicates settled agricultural communities in the vicinity, raising the possibility of associated settlement evidence or field systems.

Analysis of available LiDAR data (DTM composite from Scottish Remote Sensing Portal) reveals subtle earthwork features that may represent remnant field boundaries or agricultural features, though these require ground-truthing.

The Roman period presents low archaeological potential, with no recorded evidence within 2km, and the Site lies well beyond the immediate hinterland of Moridunum (Carmarthen). Similarly, early medieval activity is poorly attested in the immediate area, though the Site falls within the early medieval kingdom of Seisyllwg, later Deheubarth.

Medieval potential is assessed as low-moderate, primarily relating to agricultural activities. While no settlement evidence is recorded, documented ecclesiastical landholdings in the vicinity suggest organised agrarian exploitation. The western survey area lies within the Tywi Valley Registered Landscape of Historic Interest, and the eastern survey area is just outside.

Cartographic regression from the 1840 tithe map through successive OS editions demonstrates consistent agricultural use with remarkable stability in field boundaries, suggesting minimal post-medieval ground disturbance.

The geomorphological setting suggests good potential for preserving cut features, with the absence of superficial deposits indicating relatively shallow stratigraphic sequences typical of the region. However, given the documented agricultural history, sustained plough damage should be anticipated.

While no archaeological investigations are recorded at the Site, investigations at comparable topographic positions in the region have revealed Bronze Age funerary/ritual features and medieval agricultural remains. The most significant archaeological potential relates to prehistoric activity, particularly Bronze Age, which would likely be of regional significance.

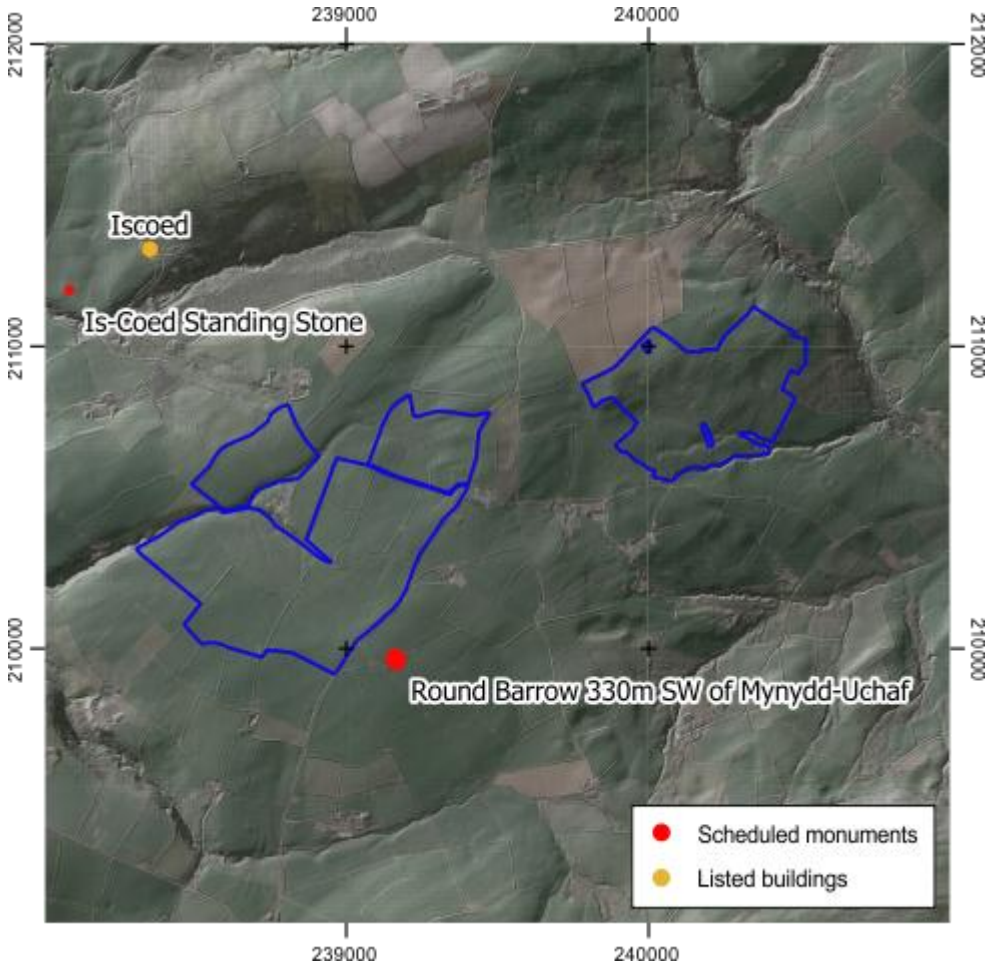


Plate 6 *– Scheduled monuments and listed buildings close to Ferryside*

5. Aims and Objectives

This WSI sets out a program of geophysical survey to meet the standard required by The Chartered Institute for Archaeologist's Standard and Guidance for archaeological geophysical survey (2014).

The primary objective of the geophysical survey will be to locate and describe any detectable archaeological features present. The survey will provide context and insight as a standalone document and facilitate the subsequent fieldwork phase by indicating the detected features' location, character, extent, and potential significance.

A report will be produced with sufficient detail to allow the archaeological resource to be better understood and to improve the outcome of the subsequent watching brief.

6. Methodology

6.1 Overview

Magnetic gradiometry (measurement of the vertical gradient of the Earth's magnetic field, using two sensors, one positioned above the other typically at 1.0m separation) developed from magnetometry (measurement of the Earth's magnetic field strength, using a single sensor) to free magnetic surveys from the constraint of requiring base-station measurements to compensate for diurnal variation in field strength.

The identified magnetic anomalies (i.e. areas with a magnetic gradient that deviates from that of the typical site background) may be due to the influence of one of three main magnetic properties: ***ferromagnetism*** (that exhibited by a magnetic object of ferrous metal), ***remanent magnetism*** (a permanent sympathetic magnetic field acquired during the cooling of a hot object, commonly seen in both fixed archaeological features such as hearths, as well as portable materials, such as ceramic building material [CBM]) and most importantly of all, ***magnetic susceptibility*** ([MS], a measure of the temporary sympathetic magnetic field generated by a body in an ambient field). Typically, weathering elevates the magnetic susceptibility, so soils have a higher MS than their parent rock. Anthropogenic processes (particularly heating) may also enhance MS. Thus, the fills of archaeological cut features typically show a higher magnetic susceptibility than the substrate into which they are cut (and thus appear as positive anomalies). There are exceptions to this sense of susceptibility contrast – for instance, where a cut feature is filled by stone with low magnetic susceptibility. For structures built of stone, there is typically

a stronger contrast between the lower MS stonework and higher MS occupation deposits (meaning that stone walls, drains, etc., usually show negative magnetic anomalies).

Ferrous materials usually strongly influence the magnetic gradient but to a limited spatial extent. These anomalies typically show strong negative and positive components (so a small iron object appears as a black/white dot on the plots). Accumulations of iron objects may generate a speckled appearance – typical, for instance, of the sites of former wire fences. The remanent magnetic fields of CBM may also produce speckled textures – brick rubble will appear similar to a spread of ferrous debris but with lower magnitude 'spikes'.

6.2 Technique

The survey will use an implementation of magnetic gradiometry employing an array of multiple gradiometers deployed on a lightweight non-magnetic cart. Cart-based systems have four great advantages over manually-deployed instruments:

- Firstly the cart enables the use of up to 5 (for the *Sensys Magneto MXPDA*) or 8 (for the *Sensys Magneto MXV3*) sensors at 0.5m spacing – producing double the traverse density compared with a standard manual instrument (e.g. the Bartington Grad601);
- the cart imposes a rigid alignment on the multiple sensors, which, together with the recording of location by GPS, eliminates the slight 'between traverse' locational errors in manually-acquired data, across an effective swath width of 2m and 3.5m for the MPXDA and MXV3 respectively;
- the use of GPS for data location means there is no requirement for gridding fields as with conventional instruments, saving a considerable investment in field time;
- the sensors employed by these systems operate at up to 200Hz (although typically only up to 100Hz in the configuration to be used here), which permits data acquisition with the larger cart system to be at rates compatible with its towing by ATV of speeds of up to 15km/h.

The approach to be adopted for this survey is to employ the vehicle-towed MXV3 for all the larger fields and to use the smaller manually-pushed cart (MPXDA) for smaller fields where the vehicle towed system would not be sufficiently manoeuvrable (generally for those areas <2Ha)

The resultant data lie on 0.5m-spaced traverses, with sub-100mm spacing between readings along the traverses.

6.3 Data Processing

The gradiometry data are acquired using *SENSYS* proprietary software *MONMX*, which produces a data file for each acquired survey line. These files are compiled in *DLMGPS*, which locates each gradiometry data point using the GPS data; coordinates are calculated based on the location of each sensor within the array, thus creating a single swathe of gradiometry data up to 3.5m wide. The software applies a constant median filter to normalise the data within each swathe; the data are then exported as raw ASCII files. The plug-in software *Geoserver* is used to transform the coordinates from lat, long (WGS84) to national grid coordinates (OSGB36).

The ASCII files output from *DLMGPS* are further processed using TerraDat proprietary software *MagMerge* (Plate 7) to remove any poor-quality data (sensor drop-outs/data spikes etc/overlapping data.) and apply 50Hz and rolling median filters. The 50Hz filter removes artefacts principally associated with electrical power lines, while the median filter equalises the background data across the swathes within a dataset, removing any apparent striping between them. Plate 8 shows an example of raw data alongside filtered data. Table 1 details the processing steps that are applied to the ASCII data;

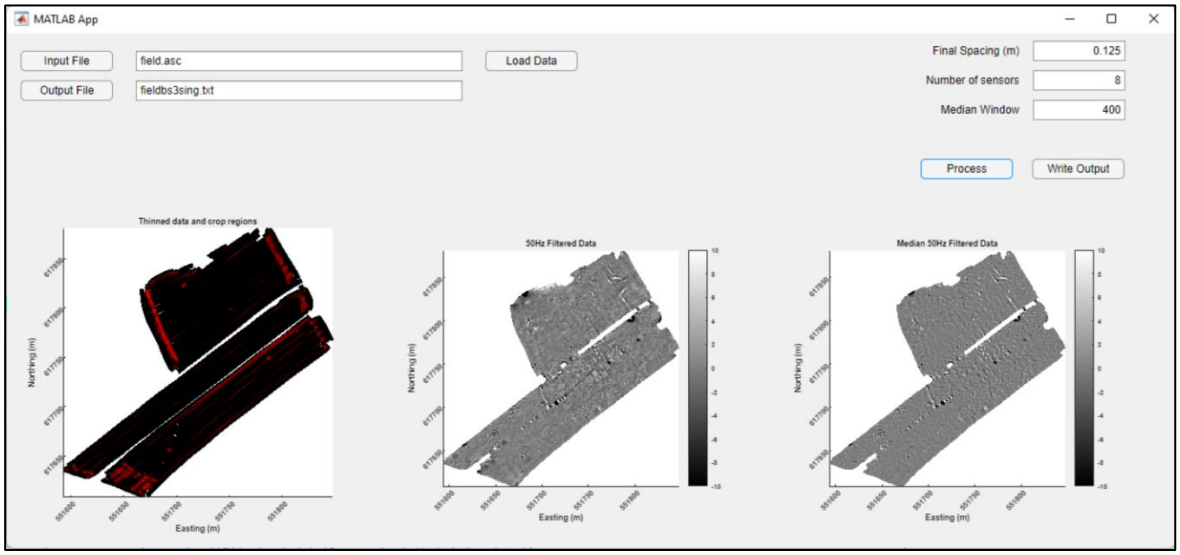


Plate 7: *TerraDat proprietary software MagMerge*

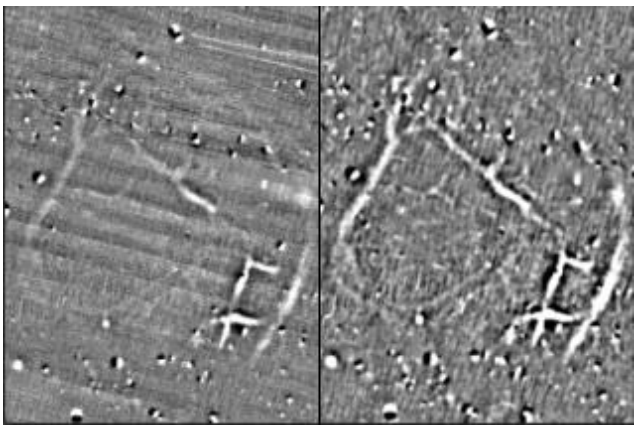


Plate 8: *Raw data (left) and filtered data (right)*

Processing Step	Description
Raw data input	Raw data (.asc) file is imported, and X,Y,Z,gradient,Time_stamp,sensor columns are retained. All other columns are removed.
Truncate Time_Stamp	Alphanumeric Time_stamp variable is truncated to the last digits (e.g. L1_20221007-095821_GZ.prm becomes 95821) to create unique IDs for each line.
Create line_number	Variable 'line_number' (i.e. 1 to #lines) is created by identifying all unique 'Time_stamp' values.
Rolling median	The median filter is calculated per line, per sensor, on values within -/+20nT and removed from the gradient to create a new 'GM' column. The rolling median filter has a window length of 400 data points centred on the input value. Therefore, the first and last 200 data points do not have sufficient information to calculate the median. In these cases, the first value calculated is applied back to the start of the line, and the last value calculated is filled forward to the end of the line. In practical terms, the median window length is equivalent to 10m of data acquisition.
Filter 50Hz Noise	50Hz noise from electrical utilities is removed through wavelet analysis, signal decomposition, and a 50Hz Bandstop filter. Both methods yield similar results. Multiple combinations of Median and 50Hz filters are created (i.e. G50, G50M, G50BS and G50BSM) for comparison.
Calculate Mean Spacing	Mean along-track spacing is calculated.
Thin data	Data are thinned to specified output resolution using the calculated mean spacing
Crop overlapping data	Calculate bounding polygons around each line of data. Remove data located within reverse-ordered overlapping polygons.
Display Data	Plot thinned data and cropped areas, plot 50Hz filtered data, plot median filtered data.
Write output file	Write output file containing thinned data with X,Y,Z, gradient,Time_stamp,sensor,Gm,G50,G50M,linenum,G50BS,G50BSM.
Write output GPS	Write output X,Y,Z gps file using centre (actual GPS) data.

***Table 1**: Processing steps applied to the raw magnetic gradiometry data.*

The magnetic gradiometry data is output as raw and filtered 'XYZ' files in .CSV format. The height data from the GPS is also output as an approximately 3m x 0.125m resolution DTM of the Site. These files are gridded in Oasis Montaj, using minimum curvature gridding and a grid cell size of 0.125m. Once the data is gridded and an appropriate colour scale applied, the data is exported as high-resolution GeoTiff images (900 DPI) before being imported into the open-source GIS software qGIS. Features of interest are then digitised to produce summary archaeological interpretation plans. These are integrated with the DTM to allow consideration of any identified archaeological features within the Site's topography. Final figures are created in CorelDraw and .SHP files are exported to be sent with the report.

6.4 Constraints

The main limitation of magnetic surveys is that the nearby presence of metallic (ferrous) features/debris can mask the more subtle response from the target features. Magnetic solar storms may cause occasional fluctuations in readings. The size and depth of the target feature will affect its detectability. Constraints on data acquisition include excess vegetation, extremely soft or rough ground and the presence of obstacles (particularly where made of steel (e.g. electric fences and animal feeding troughs).

7. Post-fieldwork programme

7.1 Site archive: Geophysical Survey

An ordered and integrated project archive will be prepared in accordance with guidelines set out by Schmidt (2011) and in the EAC Guidelines for the Use of Geophysics in Archaeology (Schmidt et al., 2015).

7.2 Reports and archive deposition

7.2.1 Report to client

Copies of all reports associated with the geophysical survey will be submitted to the CA and Heneb Development Management for approval upon completion. Digital copies will be provided in pdf format if required.

The client report will contain, as a minimum, the following elements:

- Concise, non-technical summary of the results
- Introductory statements and project background
- Aims and purposes of the survey
- Methodology, including a description of and reasoning behind the geophysical survey technique
- Detailed plans of the site and survey results. All processing techniques used will be accompanied by a full justification statement.
- Written description
- Written interpretation of results along with illustrated interpreted site plan
- Statement of local and regional context
- Conclusions as appropriate
- Index to and location of the digital archive
- Bibliography

7.2.2 Deposition

Final versions of the approved report will be deposited with the relevant Welsh Historic Environment Record (HER). Material deposited will be prepared and deposited per guidance for the Submission of Data to the Welsh Historic Environment Records (WAT 2018). A digital archive will be submitted to the RCAHMW in accordance with their guidelines.

7.2.3 Notification of important remains

Where it is considered that remains have been revealed that may satisfy the criteria for statutory protection, Terradat will submit a preliminary notification of the remains to Cadw.

8. Resources and timetable

8.1 Standards

Terradat (UK.) Ltd works to the standards and guidance provided by the Chartered Institute for Archaeologists.

8.2 Staff

The project will be undertaken by suitably qualified and experienced Terradat staff. Overall management of the project will be undertaken by Christian Bird (07966 934350). Interpretation and quality control will be by Dr Tim Young (GeoArch).

8.3 Survey approach and timetable

It is anticipated that the ultimate client land agent will have contacted landowners and tenant farmers before the survey, and an assumption of unrestricted access has been made for planning; however, it is anticipated that daily access will be arranged in coordination with the contract manager and the tenant farmers.

The timetable is provisional but realistic and based on an average daily coverage rate for similar regional-scale surveys conducted by TerraDat elsewhere. It is anticipated that the survey will be conducted in September 2024. Two teams will be deployed, and the survey will take three weeks.

9. Environmental Protection

Geophysical surveys, by their very nature, are non-invasive and involve minimal disturbance to the ground and environment. Usually, our work has a lower impact than routine agricultural activities. The sections below represent our company's environmental policy.

- **Marking out survey grids or profiles**: No marking out will be required.

- **Vehicular access:** the main form of access in the survey area will be by van or 4X4 vehicle. The Sensys Magneto MXV3 will be towed by a lightweight ATV (Honda Fourtrax Quad Bike or equivalent). The survey team will avoid, wherever possible, any activity where ground damage may be caused.

- **Chemical use:** No hazardous chemicals or substances are anticipated for use in this project.

- **Noise:** No excessive amounts of machinery noise arise from our activities.

- **Site tidiness:** Any litter, survey consumables or packaging materials will be removed from the Site and properly disposed of by TerraDat.

- **Groundwater hazards:** None of the proposed activities will cause any chemical or erosional contamination of waterways, streams or groundwater.

10 Plant and Equipment

Transit-type vans and 4x4 vehicles will transport the survey crew and survey equipment to the Site.

The geophysical survey equipment will comprise a SENSYS Magneto MXV3 8-Channel magnetometer system towed behind a lightweight ATV (John Deere Gator/quad bike)

The *Sensys Magneto MXV3,* comprises eight fluxgate gradiometer probes installed at 0.5m sensor separation on the trailer (Plate 5). A network-corrected RTK GPS provides real-time GPS positioning. This system allows for acquiring 0.5m horizontal resolution gradiometry data within a 3.5m wide swathe. The trailer is towed across the survey area behind an ATV (Plate 9) at speeds of ~15 km/h.

Plate 9 *– John Deer Gator and Sensys Magneto MXV3*

11 Health and Safety

TerraDat staff should refer to the TerraDat Health and Safety Manual. TerraDat has attained OHSAS 18001 status.

12 Quality Control

TerraDat has attained BS EN ISO 9001:2010 and ISO 14001:2004. The proposed quality management arrangements for this project are contained in the Quality Manual issued by the TerraDat Directors (a copy of which can be sent if requested). Throughout the duration of the project, daily records will be maintained for quality audit purposes in order to ensure that the arrangements are effective and appropriate for the work being carried out. All work carried out and issued by TerraDat is in accordance with BS 5930: 2015 (site investigation).

13 References

British Geological Survey 2024. www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html (accessed 24/0724)

Chartered Institute for Archaeologists. 2014. *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives.*

Chartered Institute for Archaeologists. 2015. *Standards and Guidance for Geophysical Surveys*.

DAVID A, LINFORD, N. and LINFORD, P. 2008. *Geophysical Survey in Archaeological Field Evaluation.* English Heritage.

Sanigar J. 2024. *Priosect Mean Hir, Anglesey. Historic Desk-based assessment.* Cotswold Archaeology

Schmidt A. 2011. *Geophysical Data in Archaeology: A Guide to Good Practice*. Archaeology Data Service and Digital Antiquity.

Schmidt A. et al. 2015. EAC Guidelines for the Use of Geophysics in Archaeology, Questions to ask and points to consider 2015. *EAC Guidelines* 2

The Welsh Archaeological Trusts (WAT), 2018. *Guidance for the Submission of Data to the Welsh Historic Environment Records.*

Appendix 4.4

Tree Survey Report

ARBORICULTURAL SURVEY REPORT

Heolddu Solar Scheme,
Ferryside

February 2025

Barton Hyett Associates
Arboricultural Consultants

Summary table		
Site Name:	Heolddu Solar Scheme	
Project reference:	6507	
Site Address:	St. Ishmael, Carmarthenshire, Wales	
Nearest Postcode:	SA17 5YE	
Central Grid reference:	SN 38813 10177	
Local Planning Authority:	Carmarthenshire County Council	
Relevant planning policies:	N/A	
Statutory Controls:	**Tree Preservation Order**	**Conservation Area**
	None	No
Ancient trees/ woodlands?	None on site: ASNW to west of site which abuts 'Area 1'; RAW site to north west of 'Option 1'	
Soil Type: (Source: BGS online soils map © NERC 2025)	**Superficial/Drift**	**Bedrock**
	Freely draining slightly acid loamy soils	Milford Haven Group - Argillaceous rocks and sandstone and conglomerate, interbedded
Topographical Survey:	Drawing No: 7168, entitled: '*Land at Ferryside, Carmarthenshire*', dated: Nov 2024 (sheets 1 - 4)	
Notes:	Site is split over Area 1 (west) & Area 2 (east)	
Report author:	David Holmes *FdSc, MArborA*	
Checked by:	Richard Hyett *MSc, BSc (Hons), MICFor, MArborA*	
Date of issue:	06/02/2025	

Barton Hyett
Arboricultural Consultants

REPORT CONTENTS:

Arboricultural Association
Professional Member
PR01027

Institute of Chartered Foresters
registered

THIS REPORT HAS BEEN PREPARED TO PROVIDE ADVICE AND GUIDANCE ON THE POTENTIAL FOR DEVELOPMENT OF LAND IN RELATION TO TREES. IT IS THEREFORE INTENDED FOR 'INTERNAL USE' ONLY BY THE NAMED CLIENT AND DESIGN TEAM. IT MAY NOT THEREFORE BE SUITABLE FOR SUBMISSION TO A PLANNING AUTHORITY WITH A PLANNING APPLICATION.

1. INSTRUCTION

1.1. I am David Holmes, an Arboriculturist with 16 years of experience and a Professional member of the Arboricultural Association.

1.2. Barton Hyett Associates Ltd has been instructed by Qualitas Energy to survey trees located at Heolddu, near Ferryside in Carmarthenshire ('the site') in accordance with the recommendations of British Standard 5837:2012 '*Trees in relation to design, demolition and construction - recommendations*'.

1.3. The scope of the instruction was to inspect trees relevant to a planning application for a solar farm at the site and provide written advice on how they inform feasibility and design options. **This report is intended for use by the applicant and design team only and is not for submission to the Local Planning Authority (LPA)**.

2. SITE DESCRIPTION

2.1. The site consists of two distinct areas, 'Area 1' to the west and 'Area 2' to the east. Each area is made up of several adjoining fields divided by a mixture of hedgerows, fences and ditches with access points between them. Two cable routes and two optional areas were also subject to survey, the optional fields are labelled 'Option 1' and 'Option 2', respectively located to the north and to the south of Area 1.

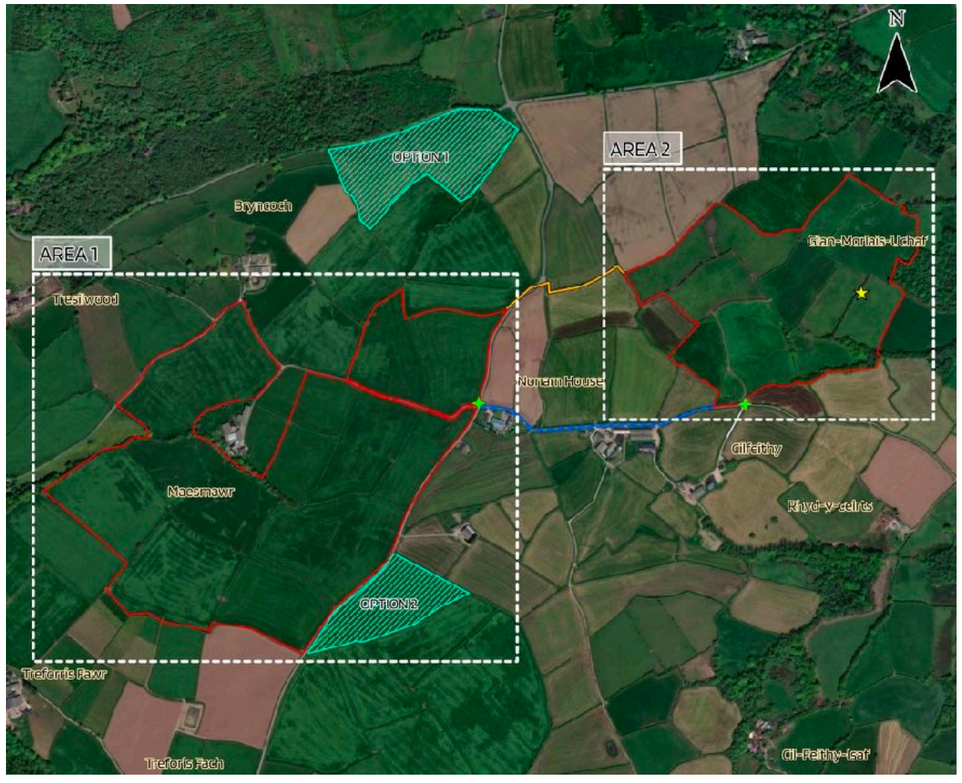


Figure 1: aerial image (Google Maps 2025) showing the approximate site areas in red with the two optional areas shown in green (cable routes shown in orange & blue)

2.2. The site is located approximately 9.5km to the south of Carmarthen town centre. The surrounding area is agricultural land with occasional small wooded areas and copses with small villages, outlying rural dwellings and farmsteads.

2.3. Access to the areas is primarily via field gates which open onto unnamed side roads. Area 1 can be accessed from the farmyard at Maesmawr. Area 2 is accessed by field gates located approximately 200m east of Cilfeithy Farm. The site undulates throughout with average mean heights above sea level varying between the west and east respectively by 106m - 118m.

3. TREE SURVEY FINDINGS

3.1. The survey recorded 206 arboricultural features. These are summarised in terms of quality in accordance with the recommendations of BS 5837:2012 in Table 1 and shown in more detail on the Tree Survey and Constraints Plan (**Section 2**) and within the Tree Survey Schedule (**Section 3**).

Table 1: arboricultural features by type and quality category.

	Total	A - High quality trees whose retention is most desirable.	B - Moderate quality trees whose retention is desirable.	C - Low quality trees which could be retained but should not significantly constrain the proposal.	U - Very poor quality trees that should be removed unless they have high conservation value.
Trees	**36**	-	20	16	-
Groups	**29**	-	26	3	-
Hedgerows	**141**	-	117	24	-
Total	**206**	**0**	**163**	**43**	**0**

3.2. The recorded Out Of Scope (OOS) trees and features refer to either dead-standing or failed trees not included on the topographical survey; demarcation of boundary; a topographical feature; a stump; spoil heap or brash pile; ruderal species or minor shrubs; where trees are inaccessible or located off-site and unlikely to be affected by the development or, it was found that the trees are undersized according to BS 5837:2012, which stipulates a minimum recordable diameter of 75mm.

3.3. Japanese Knotweed (JKW) was found to be established in a disused gateway at the location recorded as 'OOS 21'. This is an invasive species and specialist advice should be sought as to how this is best considered.

4. KEY ARBORICULTURAL FEATURES

4.1. There are no high-quality category A, Veteran or Ancient trees recorded on this site. None of the trees recorded on site are protected by a Tree Preservation Order (TPO) nor is the site located within a Conservation Area (C/A). There is no Ancient Semi Natural Woodland (ASNW) associated with the site.

4.2. To the immediate west of T20 and G9 is an ASNW plot. After studying the polygons hosted online by Natural Resources Wales (NRW), it was apparent that T20 and G9 are not included within the ASNW plot. To the northwest of the field labelled 'Option 1', is a plot designated by NRW as Restored Ancient Woodland (RAW). The RAW is on the opposite side of the road and the features recorded close to this boundary (T28, G17 and H105) are not within the RAW plot.

4.3. The twin-stemmed Turkey oak T18 was found to be a good example of the species with few minor defects and good vigour noted throughout the crown.

4.4. Two low-quality ash were recorded on site, the first being T9 which is in decline with multiple wound sites and is located to the west of a field gateway with extensive water logging to the localised root plate. The second ash is T21, a twin-stemmed dead-standing tree with several failed limbs. At present, these trees offer good habitat value, with small to moderate-sized deadwood, partly decayed wound sites, etc., in the upper crowns and this influenced the C3 categorisation.

4.5. In the northwest corner of the field labelled as 'Option 1', T28 is standing adjacent to the highway and the crown of this tree is showing approximately 50% crown dieback.

4.6. It is recommended that T28 is felled to ground level. The two ash T9 and T21 should be reduced and retained as habitat monoliths at an approximate height of 5 - 6m. Standing deadwood is recognised as the least common form of deadwood and has a high habitat value associated with it. Managing the ash in this manner will reduce risk to site users and allow the trees to be of value to wildlife. These recommendations should be carried out regardless of whether the proposed development goes ahead or not.

4.7. The majority of the hedgerows around the site were found to be moderate-quality. Across the site, all the hedgerows are predominantly thorn with a significant amount of hazel recorded.

5. CONSTRAINTS AND OPPORTUNITIES

5.1. Due to the previous usage of the site, the majority of the recorded arboricultural resources are located alongside, or close to, the site boundaries. Several internal longstanding gateways provide good connectivity between the fields. Retaining the majority of the boundary features should be possible.

5.2. When scoping the site to assign a 'developable area', the ASNW to the far west of the site does not represent a constraint. This plot is located in the far corner of the site and the other trees and RPAs on that boundary would limit development.

5.3. Detrimental impacts from development might include, but are not limited to, damage to roots and understorey, damage to or compaction of soil around tree roots, and changes to the water table or drainage within the surrounding soil.

5.4. There is a good opportunity to improve long-term tree cover through appropriate new tree and woodland planting or supplementary planting to improve low and moderate-quality hedgerows. Laying older hedgerows is an option to bring them back into good management. Suitable planting alongside existing features, new boundary or infrastructure features (e.g., attenuation ponds) and establishing new wildlife corridors linking existing features would help improve biodiversity and connectivity.

5.5. Please see **Section 5** for further advice and guidance on designing new developments near trees.

6. CONCLUSION AND RECOMMENDATIONS

6.1. The information contained within this report should be used in the preparation of design proposals for the site, in order to minimise negative arboricultural impacts.

6.2. The site includes moderate and low-quality arboricultural features (category B and C). It will be important for the category B trees to be carefully considered in the preparation of design proposals for future usage of the land in order to minimise negative arboricultural impacts.

6.3. It would be preferable to avoid removing category C trees by diverting or realigning apparatus outside the Root Protection Areas (RPAs). However, this may not always be feasible or proportionate.

6.4. The RPAs of recorded arboricultural features should be considered sacrosanct and proposed development (e.g. infrastructure for the short to long-term construction) should be planned to avoid these areas wherever possible.

6.5. The developable area of the site is focused within the interior of existing agricultural fields and is therefore relatively free from arboricultural constraints. On this basis, developing the site as a solar farm is feasible from an arboricultural perspective.

6.6. There is ample opportunity across the site to establish new trees and hedgerows or enhance existing hedgerows and the long-standing points of access should continue to be used. Inspiration for the species choice should be drawn from the trees and hedgerows recorded around the site.

6.7. I would be pleased to provide comments and advice on the emerging design proposals before drafts are prepared.

David Holmes *FdSc, MArborA*
Arboriculturist

IMAGES FROM THE TREE SURVEY

TAKEN ON: 02-05/12/2024

PROJECT NO: 6507

SURVEYORS: DH (1 - 3) & OK (4 - 6)

Barton Hyett
Arboricultural Consultants

IMAGE 1: A view looking north along H90 with H91 visible in the distance

IMAGE 2: A view looking eats at the boundary group G15 which acts as a shelter-belt to the farmyard

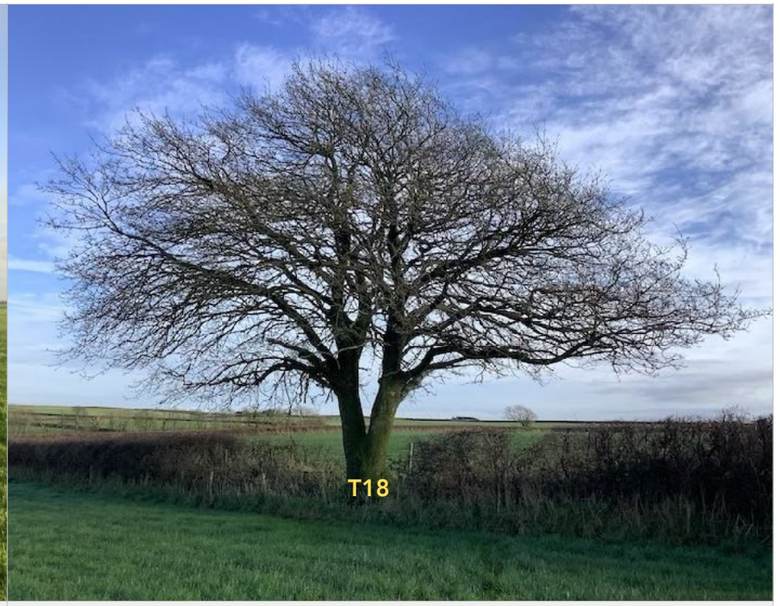


IMAGE 3: A view looking east at T18, a twin-stemmed Turkey oak within the hedgerows H71 & H72

IMAGE 4: A view looking north at T9, a low-quality ash which has a good habitat potential

IMAGE 5: A view looking north at G2, collection of mature oak with a established understorey

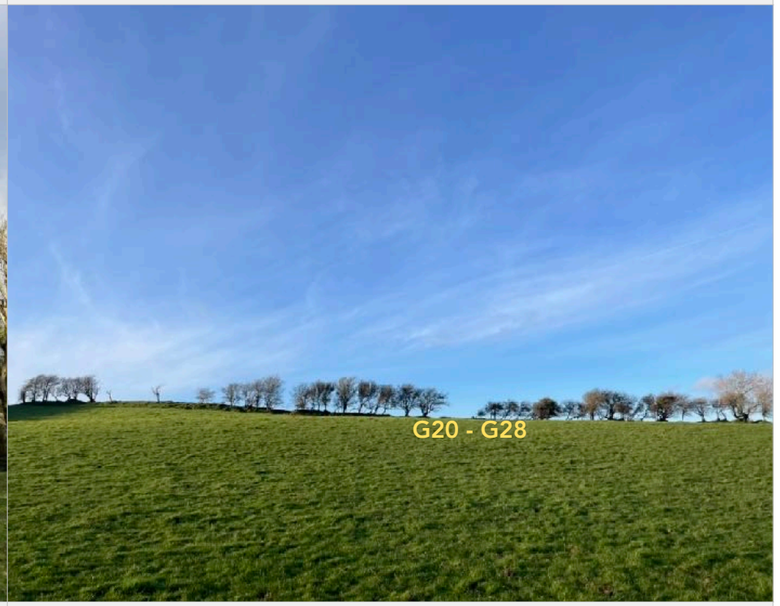


IMAGE 6: A view looking north at the boundary groups G20 - G28

SECTION 1

239000 239250 239500 239750

211250 211000 210750

Section 2

KEY

- Category A Tree - High quality (Retention highly desirable)
- Category A - Hedgerow, Group, Woodland - High quality (Retention highly desirable)
- Category B Tree - Moderate quality (Retention desirable)
- Category B - Hedgerow, Group, Woodland - Moderate quality (Retention desirable)
- Category C Tree - Low quality (May be retained but should not constrain development)
- Category C - Hedgerow, Group, Woodland - Low quality (May be retained but should not constrain development)
- Category U Tree - Very low quality (Mostly unsuitable for retention)
- Category U - Hedgerow, Group, Woodland - Very low quality (Mostly unsuitable for retention)
- Root Protection Area (RPA) - Layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and soil volume to maintain the tree's viability
- **Shrub mass/offsite tree/out of scope (OOS)**
- ★ **Tree/Group/Hedgerow not on topographical survey. Location given is an estimate**
- Target Note

Label	Description
OOS 1	Post and wire fence line dominated by bramble.
OOS 2	Off site group adjacent to boundary. Dilapidated farm building heavily clad in ivy. Roofing areas likely to be O/S site.
OOS 3	Standing dead ash. NOT ON TOPO
OOS 4	Standing dead ash. TREE NOT PLOTTED ON TOPO
OOS 5	Off-site semi mature broadleaf woodland; avg. dia. 350mm & max. height 12m
OOS 6	Standing dead ash. TREE NOT PLOTTED ON TOPO
OOS 7	Brambles
OOS 8	Patch of gorse & bramble
OOS 9	Patch of gorse & bramble
OOS 10	Patch of bramble
OOS 11	Patch of gorse & bramble
OOS 12	Standing dead oak. Height- 2m.
OOS 13	Large scrub group dominated by gorse and bramble.
OOS 14	Norway spruce, approx dia. 350mm & height 10m
OOS 15	Brambles brushed by flail
OOS 16	Hedge banking colonised by small brambles, dogrose, gorse & ash
OOS 17	Small thorn & brambles, brushed & maintained as hedge
OOS 18	Brambles, brushed by flail
OOS 19	Brambles & bracken
OOS 20	Small self seeded willow, thorn & brambles growing on N back of ditch, partly brushed by flail
OOS 21	JKW established atop spoil heap
OOS 22	Standing dead.
OOS 23	Standing dead.
OOS 24	Treeless Embankment
OOS 25	Gorse and bramble
OOS 26	Hedge made up of gorse
OOS 27	Hedge made up of gorse

Target Notes

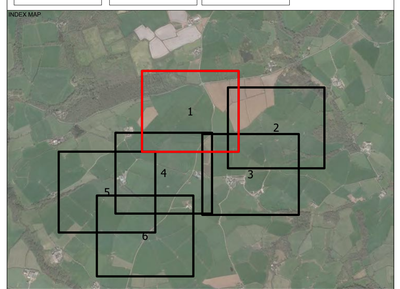
Label	Description
TN 1	Disused gateway; approach blocked by moderate sized deadwood
TN 2	Milk kit-stand, c. 1950s
TN 3	Disused gateway; heavily colonised by brambles

Tree Canopy Area	
Category	**Total SQM**
B	2304.8
C	1217.4

Tree Group Canopy Area	
Category	**Total SQM**
B	19817
C	494.9

Hedgerow Canopy Area	
Category	**Total SQM**
B	30452
C	3802.2

INDEX MAP



Note: The original of this drawing was produced in colour – a monochrome copy should not be relied upon. This drawing should be interpreted with reference to the accompanying tree schedule and written advice

N
GRID NORTH

0 20 40 80 Meters

PROJECT TITLE

Heolddu Solar (6507)

DRAWING TITLE

Tree Survey Plan

SCALE			DRAWING NUMBER	
Scale: 1:1,250 @ A1			**BHA_6507_01**	
DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
AT	**IH**	**-**	**1 of 6**	**14/12/2024**

COORDINATE SYSTEM / DATUM

British National Grid / Newlyn Datum (AOD)

CLIENT

Qualitas Energy

Barton Hyett Associates
Arboricultural Consultants

Tel: 01386 576161
Address: Office 5E, Deer Park Business Centre,
Eckington, Pershore, Worcestershire, WR10 3DN

DRAWING PRODUCED BY

SUMMIT GEO

enquiries@barton-hyett.co.uk

239750 240000 240250 240500

211250 211000 210750

Section 2

KEY

- Category A Tree - High quality (Retention highly desirable)
- Category A - Hedgerow, Group, Woodland - High quality (Retention highly desirable)
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- Category B - Hedgerow, Group, Woodland - Moderate quality (Retention desirable)
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C	1217.4

Tree Group Canopy Area

Category	Total SQM
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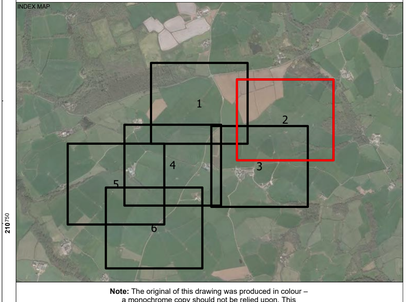
C	494.9

Hedgerow Canopy Area

Category	Total SQM
B	30452
C	3802.2

INDEX MAP



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0 20 40 80 Meters

PROJECT TITLE

Heolddu Solar (6507)

DRAWING TITLE

Tree Survey Plan

SCALE			DRAWING NUMBER
Scale: 1:1,250 @ A1			**BHA_6507_01**
DRAWN BY	APPROVED BY	REVISION	SHEET / DATE
AT	**IH**	-	**2 of 6** / **14/12/2024**

COORDINATE SYSTEM / DATUM: **British National Grid / Newlyn Datum (AOD)**

CLIENT: **Qualitas Energy**

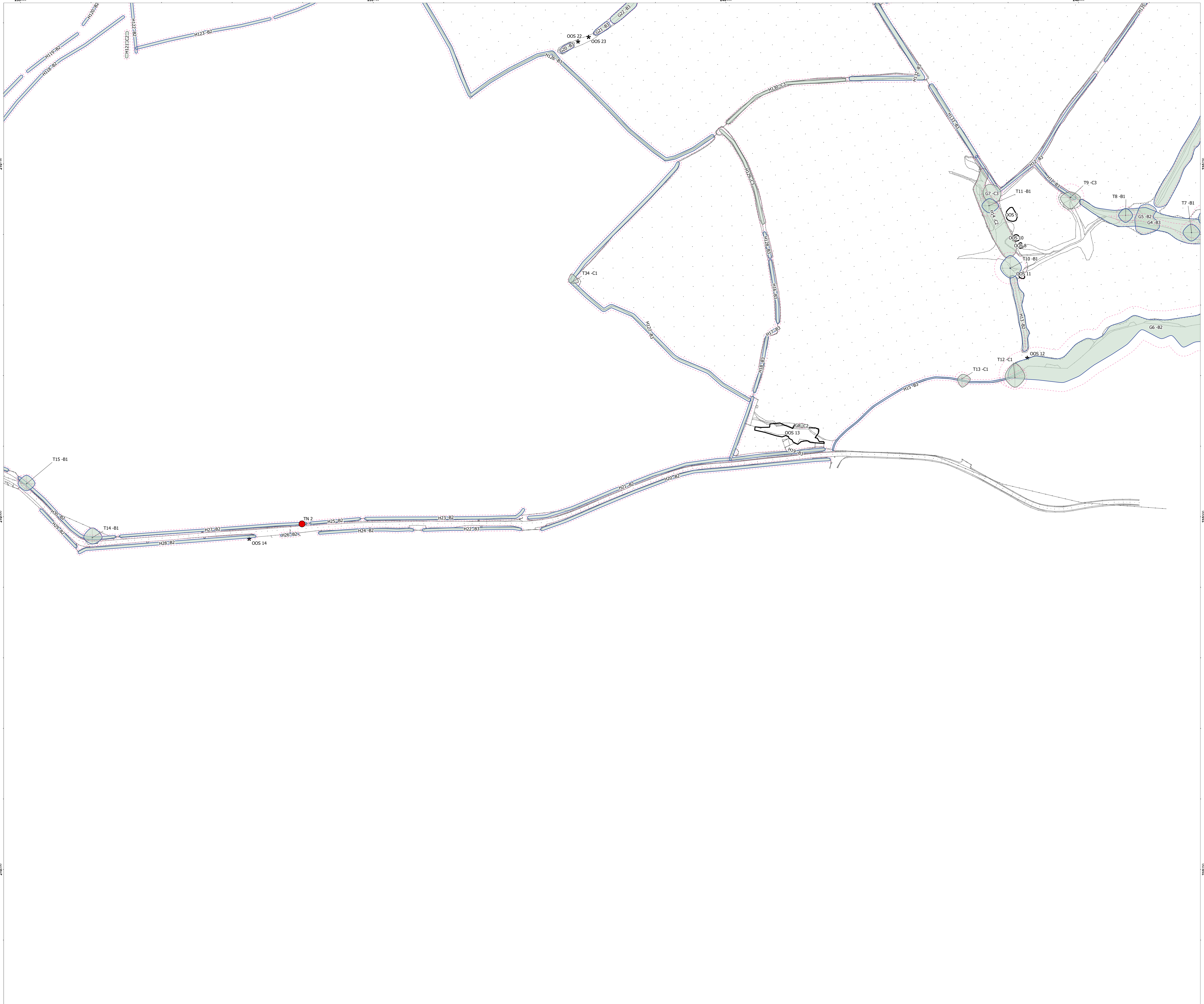
Barton Hyett Associates
Arboricultural Consultants

Tel: 01386 576161
Address: Office SE, Deer Park Business Centre,
Eckington, Pershore, Worcestershire, WR10 3DN

DRAWING PRODUCED BY

SUMMIT GEO

enquiries@barton-hyett.co.uk



KEY

- Category A Tree - High quality (Retention highly desirable)
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- Target Note

Label	Description
OOS 1	Post and wire fence line dominated by bramble.
OOS 2	Off site group adjacent to boundary. Dilapidated farm building heavily clad in ivy. Rooting areas likely to be O/S site.
OOS 3	Standing dead ash. NOT ON TOPO
OOS 4	Standing dead ash. TREE NOT PLOTTED ON TOPO
OOS 5	Off-site semi mature broadleaf woodland; avg. dia. 350mm & max. height 12m
OOS 6	Standing dead ash. TREE NOT PLOTTED ON TOPO
OOS 7	Brambles
OOS 8	Patch of gorse & bramble
OOS 9	Patch of gorse & bramble
OOS 10	Patch of bramble
OOS 11	Patch of gorse & bramble
OOS 12	Standing dead oak. Height- 2m.
OOS 13	Large scrub group dominated by gorse and bramble.
OOS 14	Norway spruce, approx dia. 350mm & height 10m
OOS 15	Brambles brushed by flail
OOS 16	Hedge banking colonised by small brambles, dogrose, gorse & ash
OOS 17	Small thorn & brambles, brushed & maintained as hedge
OOS 18	Brambles, brushed by flail
OOS 19	Brambles & bracken
OOS 20	Small self seeded willow, thorn & brambles growing on N back of ditch, partly brushed by flail
OOS 21	JKW established atop spoil heap
OOS 22	Standing dead.
OOS 23	Standing dead.
OOS 24	Treeless Embankment
OOS 25	Gorse and bramble
OOS 26	Hedge made up of gorse
OOS 27	Hedge made up of gorse

Target Notes

Label	Description
TN 1	Disused gateway, approach blocked by moderate sized deadwood
TN 2	Milk kit-stand, c. 1950s
TN 3	Disused gateway, heavily colonised by brambles

Tree Canopy Area

Category	Total SQM
B	2304.8
C	1217.4

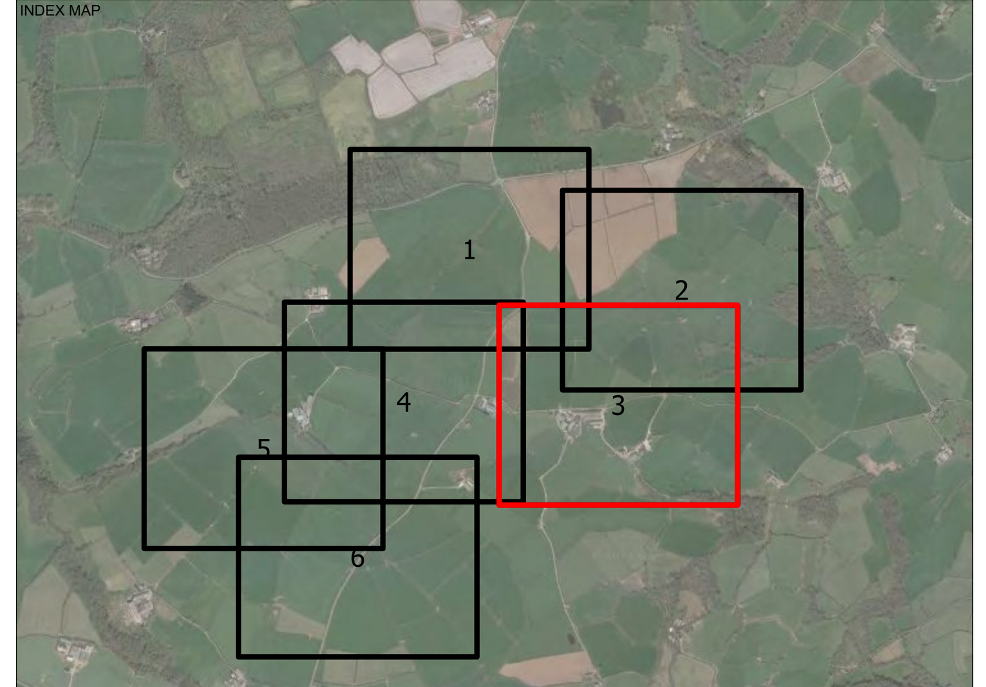
Tree Group Canopy Area

Category	Total SQM
B	19817
C	494.9

Hedgerow Canopy Area

Category	Total SQM
B	30452
C	3802.2

INDEX MAP



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N
GRID NORTH

0 20 40 80 Meters

PROJECT TITLE

Heolddu Solar (6507)

DRAWING TITLE

Tree Survey Plan

SCALE	Scale: 1:1,250 @ A1	DRAWING NUMBER	BHA_6507_01

DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
AT	IH	-	3 of 6	14/12/2024

COORDINATE SYSTEM / DATUM: **British National Grid / Newlyn Datum (AOD)**

CLIENT: **Qualitas Energy**

CREDITS

Barton Hyett Associates
Arboricultural Consultants

Tel: 01386 576161
Address: Office 5E, Deer Park Business Centre, Eckington, Pershore, Worcestershire, WR10 3DN

DRAWING PRODUCED BY

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enquiries@barton-hyett.co.uk

Section 2

KEY

●	Category A Tree - High quality (Retention highly desirable)
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INDEX MAP

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Heolddu Solar (6507)

DRAWING TITLE
Tree Survey Plan

SCALE **Scale: 1:1,250 @ A1**
DRAWING NUMBER **BHA_6507_01**

DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
AT	**IH**	**-**	**4 of 6**	**14/12/2024**

COORDINATE SYSTEM / DATUM **British National Grid / Newlyn Datum (AOD)**

CLIENT **Qualitas Energy**

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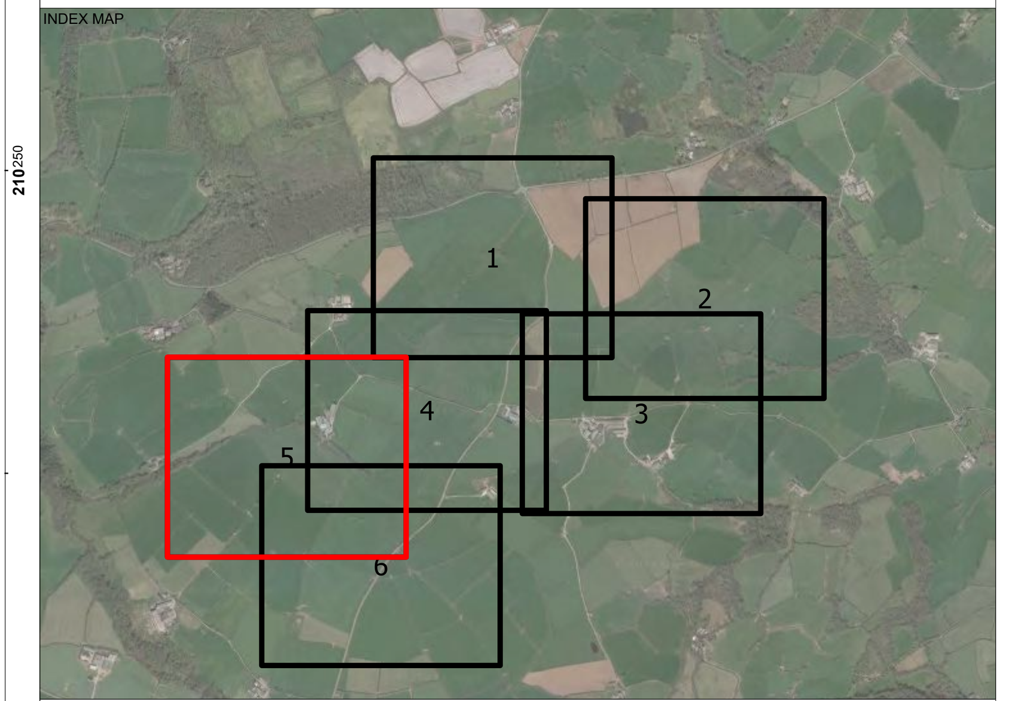

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SCALE	DRAWING NUMBER
Scale: 1:1,250 @ A1	BHA_6507_01

DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
AT	IH	-	5 of 6	14/12/2024

COORDINATE SYSTEM / DATUM

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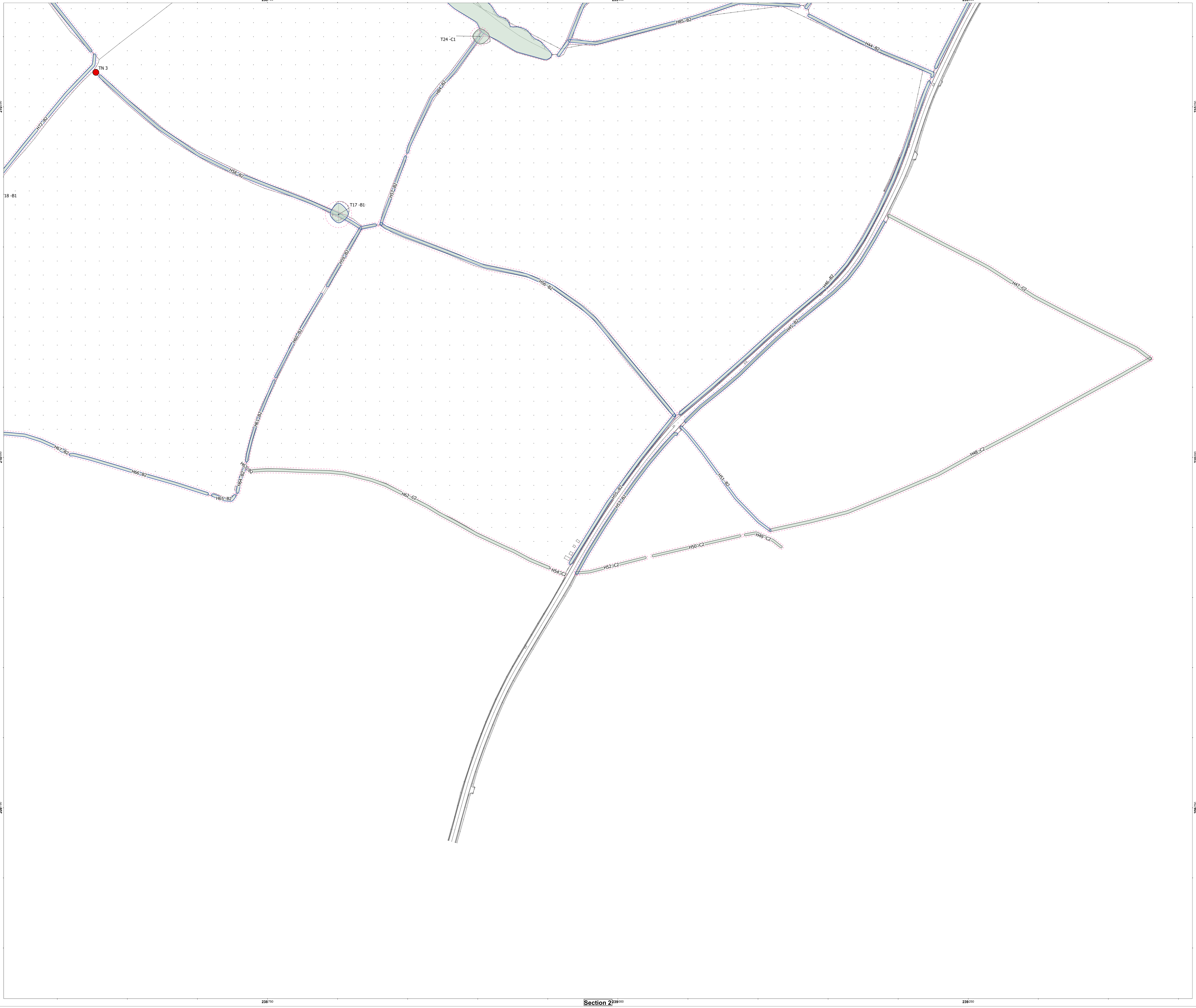

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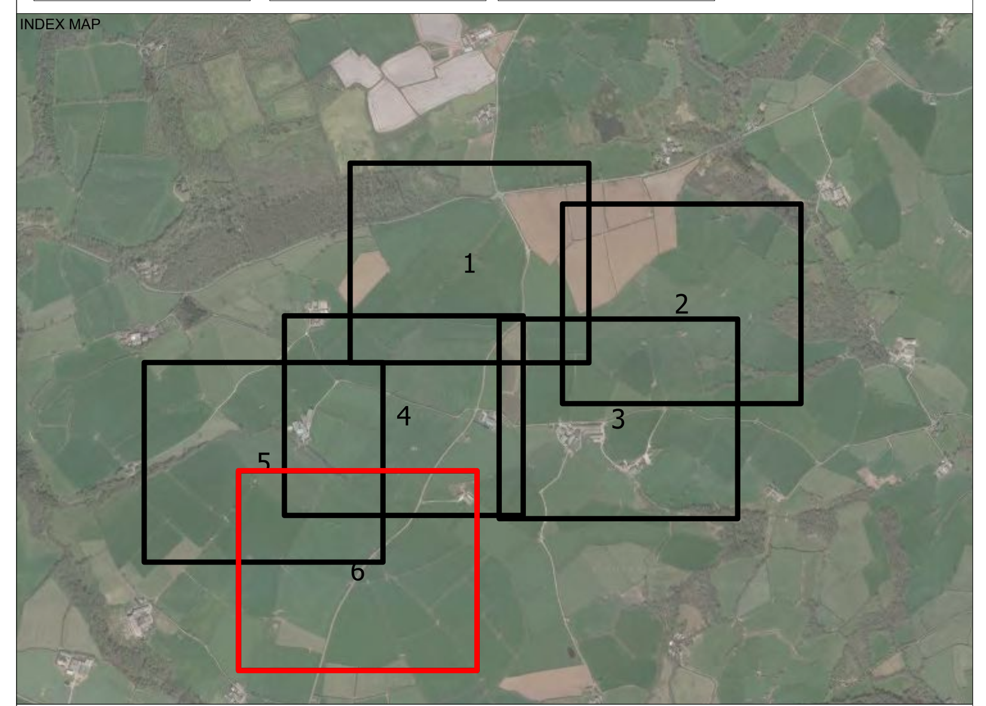

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SCALE	DRAWING NUMBER
Scale: 1:1,250 @ A1	BHA_6507_01

DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
AT	IH	-	6 of 6	14/12/2024

COORDINATE SYSTEM / DATUM

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CLIENT

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TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Barton Hyett
Arboricultural Consultants

INDIVIDUAL TREES

Ref	Species	On/off site	Height (m)	No. of stems	Est diam?	Calc. / actual stem dia. (mm)	Crown radii (m) N-E-S-W	Av. low crown height (m)	1st branch ht (m)	1st branch dir.	Life stage	Special importance	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)	RPA m²
T1	Holly	On	6.0	3	Yes	300	4.0-3.0-2.0-2.0	2.0	1.0	SE	EM	None	Hedgerow tree. Asymmetric canopy weighted towards the NE. TREE NOT PLOTTED ON TOPO.	Fair	Fair	10+	C1	3.6	41.0
T2	Ash (Common)	Off	5.0	1	Yes	600	4.0-5.0-4.0-3.0	0.0	2.5	SE	SM	None	Off site tree located north of boundary hedge. It does over hang the developable site. NOT ON THE TOPO	Fair	Fair	10+	C1	7.2	163.0
T3	Oak (English)	Off	15.0	1	Yes	900	12.0-14.0-12.0-10.0	4.0	2.5	S	EM	None	Off site tree of good form and vitality.	Good	Good	40+	B1	10.8	366.0
T4	Oak (English)	On	12.0	1	None	640	9.0-9.0-7.0-6.0	4.0	3.0	NW	EM	None	Epicormic growth on scaffold limbs.	Good	Good	20+	B1	7.7	185.0
T5	Oak (English)	On	14.0	1	None	970	9.0-6.0-5.0-6.0	5.0	2.5	NW	LM	None	Cavities between buttress roots on south side. Aged exposed strip of sap wood to west. Large deadwood on canopy. Tree doesn't meet veteran criteria but is regarded to be locally notable.	Good	Fair	40+	B3	11.6	426.0
T6	Oak	On	18.0	2	None	920	9.0-8.0-7.0-6.0	2.5	0.0	None	M	None	Established on N embankment of water course; S of root plate undermined with exposed roots although this looks to be long standing & the tree has shaped to this; stem to E is dominant with smaller stems to W showing burrs to root collar; possibly two separate trees but soar to be a shared root system; not plotted on topo	Good	Fair	40+	B1	11.0	383.0
T7	Oak (English)	On	8.0	1	None	660	6.0-6.0-6.0-6.0	4.0	4.0	W	M	None	Epicormic growth on scaffold limbs. Good form and vitality.	Good	Good	20+	B1	7.9	197.0

TREE SURVEY SCHEDULE

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OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

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T8	Oak (English)	On	5.0	1	Yes	550	5.0-5.0-5.0-5.0	4.0	3.0	SW	EM	None	Stunted form within hedge line. Evenly formed canopy. Ivy to stem.	Good	Good	20+	B1	6.6	137.0
T9	Ash (Common)	On	14.0	1	Yes	800	4.0-7.0-8.0-7.0	4.0	3.0	W	M	None	Large sections of deadwood throughout canopy. Low vigour. Adjacent to field access. Water logging within rooting area. Exposed & damaged roots. Pockets of decay around old wound sites. Good habitat value. Recommend tree be reduced to 6m habitat monolith	Poor	Poor	<10	C3	9.6	290.0
T10	Oak	On	13.0	2	None	930	9.0-8.0-7.0-7.0	2.5	0.0	None	M	None	Established on shallow embankment which is likely the old hedge bank; change of levels within root plate; heavily waterlogged ground to N; NE; E; & NW; dominant stem to E shows non progressive lean to E; low & squat form in a relatively sheltered location; likely that tree is a remnant pleacher from historical hedge line; visible basal cavity to S with adaptive growth	Good	Fair	40+	B1	11.2	391.0
T11	Oak	On	14.0	1	None	610	5.0-7.0-5.0-5.0	2.5	2.0	N	EM	None	Established adjacent to brook; main stem splits @3m into two scaffold limbs which form a cohesive yet asymmetric crown (windswept to E); decay pocket around wound site to E @3.5m (good habitat value); not plotted on topo	Good	Fair	40+	B1	7.3	168.0

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

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T12	Ash (Common)	On	13.0	1	Yes	700	10.0-7.0-7.0-7.0	5.0	3.0	W	M	None	Profusion of epicormic growth on scaffold limbs. Class 2-3 ash die back infection. Ivy to stem but not dense.	Fair	Fair	10+	C1	8.4	222.0
T13	Oak (English)	On	6.0	1	Yes	400	3.0-6.0-6.0-3.0	3.0	2.0	S	SM	None	Located south of hedge line. Over hanging branch to north has been pruned. Dead ivy to stem.	Fair	Fair	20+	C1	4.8	72.0
T14	Ash (Common)	On	15.0	2	Yes	580	7.0-7.0-4.5-6.0	3.5	0.0	None	EM	None	Main stem splits @root collar into two scaffold stems; recently pruned around telecom lines	Good	Fair	20+	B1	7.0	152.0
T15	Ash (Common)	On	13.0	3	Yes	550	6.0-6.0-5.0-6.0	3.5	0.0	None	EM	None	Main stem splits @ground level into three scaffold stems; recently pruned around telecom lines	Good	Fair	20+	B1	6.6	137.0
T16	Ash (Common)	On	14.0	1	Yes	500	6.0-6.0-6.0-6.0	4.0	4.0	N	EM	None	Main stem splits @6m into a wide spreading crown; lower stem swathed in ivy; second stem removed to W of lower stem @0.5m; Stage 2 ADB	Fair	Fair	20+	C1	6.0	113.0
T17	Ash (Common)	On	14.0	5	Yes	780	8.0-7.0-6.0-6.0	3.0	0.0	None	M	None	Multi stemmed coppice stool forming a slightly disjointed crown; pruning in last 24 months around lower crown to increase headroom; birds nest to mid crown @8m	Good	Fair	40+	B1	9.4	275.0

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T18	Oak (Turkey)	On	16.0	2	None	910	7.0-7.0-7.0-7.0	3.0	0.0	None	EM	None	Twin stemmed forming a cohesive & slightly congested crown; pruning in last 18 - 24 months around lower crown to increase headroom; birds nest to N of crown @8m; burrowing animal has excavated between buttresses	Good	Fair	40+	B1	10.9	375.0
T19	Ash (Common)	On	14.0	4	Yes	600	7.0-7.0-6.0-5.0	3.5	0.0	None	EM	None	Main stem splits @1m into 4 scaffold stems; Stage 1 ADB	Fair	Fair	20+	C1	7.2	163.0
T20	Ash (Common)	On	18.0	3	Yes	1070	8.0-7.0-7.0-7.0	2.5	0.0	None	M	None	Tri-stemmed tree established atop of hedge bank forming a cohesive crown; main stem stems swathed in ivy; not plotted on topo; at the edge of an ASNW site	Poor	Fair	<10	C3	12.8	518.0
T21	Ash (Common)	On	16.0	2	Yes	850	7.0-5.0-7.0-5.0	3.5	0.0	None	M	None	Dead standing co-dominant tree; limbs beginning to fail with debris on ground. Recommend tree be reduced to 6m habitat monoliths	Poor	Fair	<10	C3	10.2	327.0
T22	Oak	On	15.0	1	Yes	700	7.0-7.0-7.0-7.0	3.0	3.0	SW	M	None	Established on sloping site between fields; not plotted on topo	Good	Fair	40+	B1	8.4	222.0
T23	Alder (Common)	On	15.0	6	Yes	930	6.0-6.0-5.5-5.0	3.5	0.0	None	EM	None	Multi stemmed tree established close to brook; not plotted on topo	Good	Fair	20+	B1	11.2	391.0
T24	Ash (Common)	On	14.0	4	Yes	560	5.5-7.0-5.5-5.0	3.0	0.0	None	EM	None	Main stem splits @1m into 4 scaffold stems; Stage 1 ADB	Fair	Fair	20+	C1	6.7	142.0

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Ref	Species	On/off site	Height (m)	No. of stems	Est diam?	Calc. / actual stem dia. (mm)	Crown radii (m) N-E-S-W	Av. low crown height (m)	1st branch ht (m)	1st branch dir.	Life stage	Special importance	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)	RPA m²
T25	Hawthorn	On	3.0	8	Yes	250	1.0-1.5-2.0-1.0	0.3	0.0	None	M	None	Multi stemmed tree growing adjacent to gulley / drain; partly exposed roots to N; possibly remnant of old hedge line	Good	Fair	20+	B1	3.0	28.0
T26	Oak	Off	13.0	1	Yes	700	8.0-8.0-7.0-7.0	3.5	3.5	W	M	None	Main stem splits @ 3.5m into four scaffold limbs forming a wide spreading & slightly sparse crown (wind swept to E); small to medium sized deadwood throughout crown; main stem & union swathed in ivy; water logged ground to E; pruning to lower crown carried out in last 3+ years to increase headroom; birds nest to W of crown @10m	Good	Fair	40+	B1	8.4	222.0
T27	Oak	On	14.0	1	Yes	700	8.0-8.0-7.0-5.5	3.5	3.0	S	M	None	Main stem splits @ 3m into three scaffold limbs forming a wide spreading crown (wind swept to E); small to medium sized deadwood throughout crown with prolific Lammas growth; main stem heavily burred; water logged ground to E; pruning to lower crown carried out in last 3+ years to increase headroom	Good	Fair	40+	B1	8.4	222.0
T28	Ash (Common)	On	15.0	6	Yes	860	6.0-5.0-5.0-5.0	3.0	0.0	None	EM	None	Multi stemmed tree on field boundary; Stage 3 ADB throughout crown. Recommend felling	Poor	Fair	<10	C1	10.3	335.0
T29	Ash (Common)	On	15.0	7	Yes	930	6.0-7.0-6.0-5.0	3.0	0.0	None	EM	None	Multi stemmed tree on field boundary; Stage 2 ADB within crowns of 4x stems to S	Fair	Fair	10+	C1	11.2	391.0

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Ref	Species	On/off site	Height (m)	No. of stems	Est diam?	Calc. / actual stem dia. (mm)	Crown radii (m) N-E-S-W	Av. low crown height (m)	1st branch ht (m)	1st branch dir.	Life stage	Special importance	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)	RPA m²
T30	Oak	On	8.0	1	Yes	550	5.0-4.0-2.0-2.0	2.0	2.0	E	EM	None	Non progressive lean to E; asymmetric crown windswept to E	Fair	Fair	20+	B1	6.6	137.0
T31	Willow (Goat)	On	7.0	1	Yes	400	5.0-6.0-3.0-2.5	2.0	2.5	E	EM	None	Typical for age & species; asymmetric crown windswept to E	Good	Fair	20+	B1	4.8	72.0
T32	Ash (Common)	On	12.0	5	Yes	340	1.0-1.0-1.0-1.0	6.0	0.0	None	EM	None	Multi stemmed dead tree on field boundary. Fell to ground level	Poor	Poor	<10	C1	4.1	52.0
T33	Willow (Grey)	On	7.0	1	Yes	400	4.0-4.0-1.0-1.0	3.0	2.0	NE	EM	None	Hedgerow tree. Asymmetric canopy weighted towards the NE. TREE NOT PLOTTED ON TOPO.	Fair	Fair	10+	C1	4.8	72.0
T34	Oak (English)	On	4.0	2	None	30	6.0-5.0-0.5-1.5	2.5	2.5	NE	SM	None	Asymmetric form dictated by coastal winds. Growing from hedgerow	Fair	Fair	10+	C1	0.0	0.0
T35	Hawthorn	On	3.0	1	None	200	2.0-2.0-2.0-2.0	1.0	0.75	N	M	None	Single tree of good form and vitality. TREE NOT PLOTTED ON TOPO	Good	Fair	20+	B1	2.4	18.0
T36	Oak (English)	On	5.0	1	Yes	40	6.0-6.0-3.0-2.0	3.0	2.0	NE	SM	None	Hedgerow tree. Asymmetric canopy weighted towards the NE.	Fair	Fair	10+	C1	0.6	1.0

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Barton Hyett
Arboricultural Consultants

GROUPS OF TREES

Ref	Species	On/off site	Height range (m)	No. of trees	Est diam?	Max stem diam (mm)	Av. crown radius (m)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
G1	Ash	Off	15-20	2	Yes	700.0	9.0	6.0	M	Both trees exhibit symptoms of class 3-4 of Ash Die Back; located behind boundary fence.	Poor	Poor	<10	C2	8.4
G2	Pedunculate Oak; hawthorn; hazel; gorse	On	16	10	None	620.0	10.0	4.0	M	Cohesive group. All trees are mature specimens; generally good in form and vitality. Deadwood in canopies associated with age and species. Damage to buttress roots caused by livestock. Other species occur as understory / outgrown hedge.	Good	Good	40+	B2	7.4
G3	Oak	On	15 - 18	2	None	700.0	7.0	2.0	M	Close grown oak forming cohesive canopy. Tree to W is dominant. Tree to E is laterally suppressed with a non progressive lean to E.	Good	Fair	40+	B2	8.4
G4	Grey Willow; hazel; blackthorn; dog rose; holly; hawthorn	On	4-8	100	Yes	70.0	5.0	2.0	M	Linear field boundary hedge; unbroken apart from gated access. Gorse; bramble and ivy sparsely dispersed in the hedgerow.	Good	Good	20+	B3	0.8
G5	Oak; Ash	On	15-18	3	None	750.0	10.0	4.0	M	Small mature group of x2 Ash and x1 Oak forming cohesive canopy. Early signs of Ash Die Back but not significant.	Fair	Good	20+	B2	9.0
G6	Pedunculate oak; Alder; Ash.	On	10-15	24	Yes	950.0	5.0	4.0	M	Linear group of mature trees forming cohesive canopy. Eastern end of group is adjacent to field entrance. Potential access route location within Root Protection Areas. The trees straddle a water course. Understory of holly; hazel; bramble; hawthorn; goat willow.	Fair	Fair	20+	B2	11.4
G7	Aspen; oak; goat willow; hawthorn	On	6 - 10	18	None	160.0	1.0	3.0	SM	Declining stems established in heavily waterlogged area; aspen may have been planted with the belief that the trees would alleviate the ground conditions; one stem to S of plot has failed with debris on ground	Poor	Poor	<10	C3	2.0
G8	Grey willow and hawthorn.	On	4	3	Yes	200.0	2.0	1.0	M	Growing adjacent to watercourse. Components to a larger scrub group.	Fair	Fair	10+	C2	2.4
G9	Ash; oak; beech; hazel; hawthorn; holly; elder; dogrose	Off	1 - 17	60	Yes	700.0	7.0	2.0	EM	Stand of predominantly beech; ash & oak established on sloping site; occasional dead ash stems; some ash showing Stage 1 - 2 ADB; maintained hedge to SE boundary brushed by flail; crowns of trees overlap ASNW site	Good	Fair	20+	B2	8.4
G10	Beech; hornbeam; ash	Off	14 - 16	4	Yes	650.0	7.0	2.0	EM	Stand of 2x beech; 1x hornbeam & 1x ash; established atop of hedge bank; large tear out wound to E of northern most beech @3m with associated exposed heartwood & decay; possibly remnants of old hedge	Good	Fair	20+	B2	7.8

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Barton Hyett Arboricultural Consultants

Ref	Species	On/off site	Height range (m)	No. of trees	Est diam?	Max stem diam (mm)	Av. crown radius (m)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
G11	Ash; goat willow; hawthorn	On	12 - 15	3	Yes	450.0	6.0	2.0	EM	Stand of 2x ash; 1x thorn & 1x willow; 2x ash established to S with thorn & willow to N of brook; minor historical storm damage to upper crown of willow	Fair	Fair	20+	B2	5.4
G12	Goat willow	On	8	3	Yes	300.0	4.0	2.0	EM	Multi stemmed trees established to N & S of brook	Fair	Fair	20+	B2	3.6
G13	Ash; oak; goat willow; sycamore; hazel; hawthorn; holly	On	2 - 15	45	None	450.0	5.0	0.0	SM	Stand of trees to field boundary on sloping site; predominantly ash & sycamore & all other species occur as understory; brook runs through plot; hedge to S boundary brushed by flail	Good	Fair	20+	B2	5.4
G14	Sycamore; hazel; holly; blackthorn	On	2 - 13	25	None	400.0	3.0	0.0	SM	Stand of trees to field boundary; predominantly sycamore & all other species occur as understory; brook runs through plot; hedge to S boundary brushed by flail	Good	Fair	20+	B2	4.8
G15	Oak; ash; sycamore; goat willow; blackthorn; hawthorn; hazel; holly; dogrose	On	2 - 15	150	None	400.0	4.0	0.0	EM	Stand of trees between fields; predominantly ash with oak & all other species occur as understory; gulley/drain runs through plot; hedge to N & S boundaries brushed by flail; various ash stems showing Stage 1 - 3 ADB	Good	Fair	20+	B2	4.8
G16	Oak	Off	14	2	Yes	700.0	7.0	3.5	M	Both main stems split @ 3m into multiple scaffold limbs forming a wide spreading crowns (wind swept to E); small to medium sized deadwood throughout crowns with prolific Lammas growth to inner crown; main stem of tree to N lightly swathed in ivy; water logged ground to E; pruning to lower crown carried out in last 3+ years to increase headroom	Good	Fair	40+	B2	8.4
G17	Sycamore	On	14	2	Yes	400.0	4.0	0.0	EM	Multi stemmed trees established within hedgerow	Good	Fair	20+	B2	4.8
G18	Sycamore; ash; holly	Off	12 - 14	12	Yes	450.0	5.0	4.0	EM	Stand of 2x ash & 10x sycamore; multi stemmed trees established atop of bank which partly flanks the highway; limited understory formed by several holly	Good	Fair	20+	B2	5.4
G19	Goat willow; ash; oak; hawthorn	Off	2 - 14	15	Yes	500.0	5.0	2.5	EM	Multi stemmed trees; outgrown hedge; ditch to NW	Good	Fair	20+	B2	6.0
G20	Hawthorn	On	4	8	None	130.0	2.0	1.0	LM	Aged hedge line depleted to the point where sections are grouped rather than recorded as a cohesive form.	Fair	Fair	20+	B3	1.6
G21	Hawthorn; hazel; blackthorn.	On	4	8	None	120.0	2.0	1.0	LM	Aged hedge line depleted to the point where sections are grouped rather than recorded as a cohesive form.	Fair	Fair	20+	B3	1.5

TREE SURVEY SCHEDULE

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEY DATE: 02-05/12/2024

PROJECT NO: 6507

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

CLIENT: QUALITAS ENERGY

Barton Hyett
Arboricultural Consultants

Ref	Species	On/off site	Height range (m)	No. of trees	Est diam?	Max stem diam (mm)	Av. crown radius (m)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
G22	Hawthorn; hazel; blackthorn.	On	4	12	None	190.0	2.0	1.0	LM	Historic hedge line depleted to the point where sections are grouped rather than recorded as a cohesive form.	Fair	Fair	20+	B3	2.3
G23	Hawthorn; hazel; blackthorn; holly; ash.	On	4	20	None	270.0	2.0	1.0	LM	Historic hedge line depleted to the point where sections are grouped rather than recorded as a cohesive form. Cavities in stems; natural bracing; 8m gap between groups	Fair	Fair	20+	B3	3.2
G24	Hawthorn.	On	2	2	None	130.0	2.0	1.0	LM	Historic hedge line depleted to the point where sections are grouped rather than recorded as a cohesive form. 9m gap from group to the west.	Fair	Fair	20+	B3	1.6
G25	Hawthorn; hazel;	On	2	2	None	220.0	2.0	1.0	LM	Historic hedge line depleted to the point where sections are grouped rather than recorded as a cohesive form.	Fair	Fair	20+	B3	2.6
G26	Hawthorn; hazel; ash.	On	2-4	7	None	250.0	2.0	1.0	LM	Historic hedge line positioned on elevated ground; depleted to the point where sections are grouped rather than recorded as a cohesive form.	Fair	Fair	20+	B3	3.0
G27	Hawthorn; hazel; willow	On	2-4	16	None	270.0	2.0	1.0	LM	Historic hedge line positioned on elevated ground; depleted to the point where sections are grouped rather than recorded as a cohesive form. Willow at northern tip has collapsed.	Fair	Fair	20+	B3	3.2
G28	Hawthorn; hazel; grey willow; ash.	On	2-4	28	None	240.0	2.0	1.0	LM	Historic hedge line depleted to the point where sections are grouped rather than recorded as a cohesive form.	Fair	Fair	20+	B3	2.9
G29	Hawthorn; hazel;	On	2-4	12	None	200.0	2.0	1.0	LM	Historic hedge line depleted to the point where sections are grouped rather than recorded as a cohesive form. Gorse fills in much of the gaps between trees creating a boundary feature.	Fair	Fair	20+	B3	2.4

TREE SURVEY SCHEDULE

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEY DATE: 02-05/12/2024

PROJECT NO: 6507

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

CLIENT: QUALITAS ENERGY

Barton Hyett
Arboricultural Consultants

HEDGEROWS

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H1	blackthorn; hazel; hawthorn; holly.	On	3.0	2	100	0.1	M	Part of continuous hedge broken up by gaps created by live stock but maintaining a cohesive canopy. Bramble; and ivy; to a lesser extent present. It appears the hedge has previously maintained by flail but this has recently lapsed.	Good	Good	20+	**B3**	1.3
H2	blackthorn; hazel; hawthorn	On	3.0	2	100	0.1	M	Part of continuous hedge broken up by gaps created by live stock. Bramble and ivy to a lesser extent present. It appears the hedge has previously maintained by flail but this has recently lapsed. 5m gap between this section and the next.	Good	Good	20+	**B3**	1.3
H3	blackthorn; hazel	On	3.0	4	100	0.1	M	Part of continuous hedge broken up by gaps created by live stock. Bramble and ivy to a lesser extent present. It appears the hedge has previously maintained by flail but this has recently lapsed.	Good	Good	20+	**B3**	1.3
H4	Hawthorn; grey willow; hazel	Off	4.0	3	200	0.1	M	Short section of hedge containing trees left to establish. The hedge is cohesive with small copse.	Good	Fair	20+	**B3**	2.4
H5	blackthorn; hazel; holly; dog rose	On	2.0	3	100	0.1	M	Dense continuous hedgerow with no gaps or recess for gates. Flailed on adjacent landowner side. Developable side has been routinely flailed until recently. bramble grows amongst the hedge.	Good	Good	20+	**B3**	1.3
H6	Grey willow; hazel; blackthorn;	On	4.0	3	300	0.2	M	Management of this section of hedge differs; parts are tightly cropped by the flail. Other parts set slightly aback from the boundary line have been left unmanaged.	Good	Fair	20+	**B3**	3.6
H7	Goat willow; blackthorn; hazel; hawthorn; holly.	On	2.5	1.5	70	0.1	M	Tightly cropped on all sides by flail. HV power line overhead western end. Bracken; bramble; gorse; within the hedge. There're x2 gate openings in this hedge line; 1 at the Webster point; another midway. Other than these openings the hedge is solid with no gapping.	Good	Good	20+	**B3**	0.8
H8	Blackthorn; hazel; hawthorn; gorse	On	2.5	1.5	70	0.1	M	Historically cropped on all sides by flail but had not been cut in last 18 - 24 months	Good	Good	20+	**B3**	0.8
H9	Goat willow; blackthorn; hazel; hawthorn; holly.	On	2.5	1.5	70	0.0	M	Historically cropped on all sides by flail. HV power line overhead @approx. mid point	Good	Good	40+	**B3**	0.8
H10	Hazel; hawthorn; oak; goat willow; holly	On	5.0	5	140	0.8	M	Predominantly hazel hedge established atop of banking. Does not look to have been cut back for 18 - 24 months	Good	Fair	40+	**B2**	1.7

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H11	Goat willow; blackthorn; hazel; hawthorn; holly	On	2.25	1.75	90	0.0	EM	Linear field boundary hedge consisting of mix broadleaf and small section of holly. Has been historically cropped on all sides by flail but not cut recently	Good	Fair	20+	B3	1.1
H12	Goat willow; blackthorn; hazel; hawthorn; holly; ash;	On	2.5	1.5	70	0.3	M	Linear field boundary hedge consisting of mix broadleaf and small section of holly. Tightly cropped on all sides by flail. There's a gap of approximately 9m mid way in the hedgerow. HV power lines above at northern end of the hedgerow	Good	Good	20+	B3	0.8
H13	Hawthorn; hazel; gorse; blackthorn; dogrose; gorse	On	4.5	5.5	100	0.0	M	Old outgrown hedge; occasional gaps <1m; historically brushed by flail although this hasn't been cut recently (12 - 18 months)	Good	Fair	40+	B2	1.3
H14	Hawthorn; goat willow; gorse	On	6.0	5	160	0.0	EM	Outgrown hedge; stems located either side of brook; sporadic gaps <2m; historically the sides have been brushed by flail although this hasn't been cut recently	Fair	Fair	20+	C2	2.0
H15	Hazel; hawthorn; blackthorn; dog rose; holly.	On	2.0	1	100	0.5	EM	Flailed hedge line; bramble dominates in sections but kept under control by regular flailing.	Good	Good	20+	B3	1.3
H16	Hazel; hawthorn; blackthorn; holly.	On	2.0	2	100	0.2	M	Traditionally it has been maintained by flailing but this appears have lapsed by a year. 3m gap in hedge created by livestock. Bramble and gorse present.	Good	Good	20+	B3	1.3
H17	Hazel; hawthorn; blackthorn;	On	2.0	2	100	0.2	M	Traditionally it has been maintained by flailing but this appears have lapsed by a year. The northern end stops at 5m gated access. Bramble in abundance.	Good	Good	20+	B3	1.3
H18	Hazel; hawthorn; blackthorn; holly.	On	2.0	2	100	0.2	M	Traditionally it has been maintained by flailing but this appears have lapsed by a year. The northern end stops at 5m gated access. Bramble in abundance.	Good	Good	20+	B3	1.3
H19	Hazel; hawthorn; blackthorn; dog rose; holly.	On	2.0	2	100	0.2	M	Section of hedge is adjacent to the highway. Traditionally it has been maintained by flailing but this appears have lapsed by a year. The northern end stops at 5m gated access.	Good	Good	20+	B3	1.3
H20	Hazel; hawthorn; blackthorn; dog rose; holly.	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Good	40+	B2	1.0
H21	Hawthorn; hazel; holly; blackthorn; ash; sycamore; elder	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H22	Blackthorn; hazel; ash; sycamore	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	20+	B3	1.0
H23	Hawthorn; hazel; holly; blackthorn; oak; sycamore; elder	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H24	Blackthorn; hazel; holly; sycamore	On	2.0	2	80	0.0	EM	Brushed by flail; becomes patchy to W with sections colonised by brambles	Good	Fair	20+	B2	1.0
H25	Hawthorn; hazel; holly; blackthorn; ash; sycamore	On	2.0	1.75	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H26	Blackthorn; hazel; holly	On	2.0	2	80	0.0	EM	Brushed by flail; to frontage of dwelling	Good	Fair	20+	B2	1.0
H27	Hawthorn; hazel; holly; blackthorn; ash	On	2.0	1.75	80	0.0	SM	Brushed by flail; occasional old pleached stems	Good	Good	40+	B2	1.0
H28	Hazel; holly; blackthorn; sycamore	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Good	40+	B2	1.0
H29	Hazel; gorse; blackthorn	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Good	40+	B2	1.0
H30	Hawthorn; holly; hazel; blackthorn; ash; sycamore	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H31	Hawthorn; hazel; blackthorn; ash; dogrose; elder	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H32	Hazel; leylandii	Off	1.5	1.5	70	0.0	SM	Partially maintained; hazel section choked by climbing plant; to frontage of dwelling	Fair	Fair	20+	C2	0.8
H33	Sycamore; leylandii; berberris; cotoneaster; buddleia	Off	1.5	1.5	70	0.0	SM	Partially maintained; stems encroaching outside of fenced boundary; to frontage of dwelling	Fair	Fair	20+	C2	0.8
H34	Hawthorn	On	1.5	1.25	70	0.0	SM	Brushed by flail; spindly self seeded hedge; partially choked by brambles	Good	Fair	20+	C2	0.8
H35	Hawthorn	On	1.5	1.25	70	0.0	SM	Brushed by flail; spindly self seeded hedge; partially choked by brambles	Good	Fair	20+	C2	0.8
H36	Hawthorn	On	1.5	1.25	70	0.0	SM	Brushed by flail; spindly self seeded hedge; partially choked by brambles	Good	Fair	20+	C2	0.8
H37	Hawthorn	On	1.5	1.25	70	0.0	SM	Brushed by flail; spindly self seeded hedge; partially choked by brambles	Good	Fair	20+	C2	0.8
H38	Hawthorn	On	1.5	1.25	70	0.0	SM	Brushed by flail; spindly self seeded hedge; partially choked by brambles	Good	Fair	20+	C2	0.8
H39	Hawthorn; blackthorn; hazel; gorse; elder	On	2.0	2	90	0.0	EM	Brushed by flail; occasional old pleached thorn stems	Good	Fair	40+	B2	1.1
H40	Hazel; hawthorn; holly; blackthorn; goat willow; dogrose	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H41	Hazel; hawthorn; holly; blackthorn; ash; oak; elder	On	2.0	2	80	0.0	EM	Brushed by flail; occasional mature oak & elder stems	Good	Good	40+	B2	1.0

TREE SURVEY SCHEDULE

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEY DATE: 02-05/12/2024

PROJECT NO: 6507

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

CLIENT: QUALITAS ENERGY

Barton Hyett
Arboricultural Consultants

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H42	Hazel; hawthorn; holly; blackthorn; sycamore; oak; goat willow; elder; dogrose	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H43	Hawthorn; blackthorn; hazel; holly; ash; goat willow	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0
H44	Hawthorn; blackthorn; gorse; dogrose	On	2.0	2	80	0.0	EM	Brushed by flail; hedge bank is becoming colonised by brambles & bracken	Good	Fair	20+	B2	1.0
H45	Hawthorn; blackthorn; hazel; dogrose	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H46	Blackthorn; hawthorn; hazel; holly; goat willow; ash; dogrose	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H47	Hawthorn; hazel; blackthorn; goat willow; ash; dogrose; gorse	On	2.0	2	90	0.0	SM	Brushed by flail; hedge bank is becoming colonised by brambles & bracken	Fair	Fair	20+	C2	1.1
H48	Hawthorn; hazel; holly; blackthorn; goat willow; ash; oak; dogrose	On	2.0	2	90	0.0	SM	Brushed by flail; hedge bank is becoming colonised by brambles & bracken	Fair	Fair	20+	C2	1.1
H49	Hawthorn; blackthorn; hazel; gorse	On	2.0	1.5	80	0.0	SM	Brushed by flail; patchy / spindly hedge; sample recorded where feature abuts survey area	Fair	Fair	20+	C2	1.0
H50	Hawthorn; blackthorn; ash	On	2.0	1.5	80	0.0	SM	Brushed by flail; patchy / spindly hedge	Fair	Fair	20+	C2	1.0
H51	Hawthorn; blackthorn; hazel; holly; ash	On	2.0	1.5	80	0.0	SM	Brushed by flail; sample recorded where feature abuts survey area	Good	Good	40+	B2	1.0
H52	Hazel; hawthorn; blackthorn	On	2.0	1.5	80	0.0	SM	Brushed by flail; hedge bank is becoming colonised by brambles & bracken	Fair	Fair	20+	C2	1.0
H53	Hawthorn; blackthorn; hazel; ash	On	2.0	2	80	0.0	SM	Brushed by flail; sample recorded where feature abuts survey area	Good	Good	40+	B2	1.0
H54	Hazel; blackthorn	On	2.0	2	70	0.0	SM	Brushed by flail; hedge bank is becoming colonised by brambles & bracken	Fair	Fair	20+	C2	0.8
H55	Hawthorn; hazel; holly; blackthorn; ash; oak; dogrose	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H56	Hawthorn; blackthorn; hazel; holly; ash	On	2.0	2	130	0.0	EM	Brushed by flail; hedge bank is becoming colonised by brambles & bracken; mature ash coppice stems within bank maintained as part of hedge; approx. 3m section to W of feature bare of hedging stock	Good	Fair	20+	B2	1.6
H57	Blackthorn; hazel; dogrose; gorse	On	2.0	1.75	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H58	Hawthorn; blackthorn; hazel; gorse; dogrose	On	2.0	2	80	0.0	SM	Brushed by flail; small sporadic gaps becoming colonised by bracken	Good	Fair	40+	B2	1.0
H59	Hawthorn; blackthorn; hazel; goat willow; dogrose	On	2.0	1.75	80	0.0	EM	Brushed by flail; hedge bank is becoming colonised by bracken	Good	Fair	20+	B2	1.0
H60	Hawthorn; blackthorn; hazel; ash; dogrose; elder	On	2.0	1.5	80	0.0	EM	Brushed by flail; hedge bank is becoming colonised by bracken	Good	Fair	20+	B2	1.0
H61	Hawthorn; blackthorn; hazel; dogrose	On	2.0	1.5	80	0.0	EM	Brushed by flail; hedge bank is becoming colonised by bracken	Good	Fair	20+	B2	1.0
H62	Hawthorn; hazel; blackthorn; ash	On	2.0	2	90	0.0	SM	Brushed by flail; hedge bank has three sections approx. 5m in length toward the SE of the feature which is becoming colonised by brambles & bracken	Fair	Fair	20+	C2	1.1
H63	Hazel; blackthorn	On	5.0	2.5	100	0.0	EM	Outgrown hedge with stems established as trees medium sized trees; sides brushed by flail & top growth left unchecked	Good	Fair	20+	B2	1.3
H64	Hawthorn; blackthorn; elder	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H65	Hawthorn; blackthorn	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H66	Hawthorn; hazel; blackthorn; holly; sycamore; ash	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H67	Hawthorn	On	2.0	2.5	108	0.0	M	Brushed by flail; old remnant / orphan section; bank partly undermined	Good	Good	40+	B2	1.3
H68	Hawthorn; hazel; blackthorn; goat willow; gorse; dogrose	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H69	Hawthorn; blackthorn	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H70	Hazel; hawthorn; blackthorn; ash; gorse; dogrose	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H71	Hawthorn	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H72	Hawthorn; blackthorn; hazel; dogrose	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H73	Hawthorn; blackthorn; ash; goat willow; holly; gorse; dogrose	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H74	Hazel; hawthorn; blackthorn; ash; sycamore; elder; gorse	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H75	Hazel; hawthorn; holly; goat willow	On	5.0	2.5	140	0.0	EM	Outgrown hedge with stems established as trees medium sized trees; sides brushed by flail & top growth left unchecked	Good	Fair	20+	B2	1.7

TREE SURVEY SCHEDULE

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SURVEY DATE: 02-05/12/2024

PROJECT NO: 6507

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

CLIENT: QUALITAS ENERGY

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H76	Hazel; goat willow	On	6.5	6	250	0.0	EM	Outgrown hedge adjacent to brook	Good	Fair	20+	B2	3.0
H77	Hawthorn	On	2.0	1.5	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H78	Hawthorn	On	2.0	1.5	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H79	Hazel; goat willow	On	6.5	6	250	0.0	EM	Outgrown hedge adjacent to brook	Good	Fair	20+	B2	3.0
H80	Hazel; goat willow	On	6.0	5	180	0.0	EM	Outgrown hedge adjacent to brook	Good	Fair	20+	B2	2.2
H81	Hawthorn; blackthorn; holly; goat willow; ash; dogrose; gorse; elder	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H82	Hazel; goat willow	On	4.5	5	120	0.0	SM	Outgrown hedge adjacent to brook	Good	Fair	20+	C2	1.5
H83	Hawthorn; blackthorn; sycamore; gorse; hazel; elder	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H84	Blackthorn; hazel; dogrose; gorse	On	2.0	1.75	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0
H85	Hawthorn; blackthorn; hazel; ash; sycamore; gorse	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0
H86	Hawthorn; blackthorn; hazel; holly; sycamore; oak	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0
H87	Hazel; hawthorn; holly; blackthorn; sycamore	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0
H88	Hawthorn; blackthorn; goat willow; oak; sycamore; dogrose	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0
H89	Hawthorn; hazel; blackthorn; sycamore; holly; dogrose	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0
H90	Hawthorn; holly; hazel; field maple; ash; dogrose	On	1.25	1	70	0.0	SM	Brushed by flail; small patches becoming colonised by bramble; ash occurs as a few soradic young stems	Good	Fair	20+	B2	0.8
H91	Hawthorn; blackthorn	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H92	Hawthorn; blackthorn; elder	On	2.0	2	90	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.1
H93	Hawthorn; blackthorn	On	2.0	1.5	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H94	Hawthorn; hazel	On	2.0	1.5	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H95	Hawthorn; blackthorn; holly; hazel; beech; goat willow; dogrose; gorse	On	2.0	1.5	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0

TREE SURVEY SCHEDULE

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PROJECT NO: 6507

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

CLIENT: QUALITAS ENERGY

Barton Hyett
Arboricultural Consultants

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H96	Hazel; hawthorn; holly; oak; dogrose; gorse	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	20+	B2	1.0
H97	Hawthorn; blackthorn; hazel; oak; ash; holly; sycamore; elder	On	2.0	1.75	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H98	Hazel; hawthorn; holly; blackthorn; goat willow; oak; ash; gorse	On	2.0	2	80	0.0	SM	Brushed by flail	Good	Good	40+	B2	1.0
H99	Hawthorn; blackthorn; hazel; oak; ash; holly; dogrose	On	2.0	1.75	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H100	Hawthorn; blackthorn; hazel; oak; sycamore; elder	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	40+	B2	1.0
H101	Goat willow; oak; holly; dogrose	Off	2.0	1.5	70	0.0	SM	Brushed by flail; patchy hedge formed by sporadic small trees / re-gen from old stumps; plot partially choked by brambles & bracken	Fair	Fair	20+	C2	0.8
H102	Hawthorn; blackthorn; holly; oak; goat willow; gorse	On	2.0	2	80	0.0	EM	Brushed by flail; partly choked by brambles & bracken; side of hedge to W not cut leaving clumps of straggly re-gen	Fair	Fair	20+	B2	1.0
H103	Hawthorn; blackthorn; oak; holly; ash; hazel; beech; gorse	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	40+	B2	1.0
H104	Blackthorn; holly; hazel; ash; goat willow; sycamore; dogrose	On	1.5	1.5	90	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.1
H105	Hazel; hawthorn; sycamore; dogrose	On	1.0	1.5	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H106	Hawthorn; hazel; holly; blackthorn; ash	On	1.5	1.5	80	0.0	SM	Brushed by flail; sporadic small gaps <2m	Good	Fair	20+	C2	1.0
H107	Hawthorn; hazel	On	1.5	1.5	80	0.0	SM	Brushed by flail; sporadic small gaps <1m	Good	Fair	20+	C2	1.0
H108	Hazel; holly; ash; sycamore; elder	On	1.5	1.5	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H109	Hazel; blackthorn; sycamore	On	1.5	1.5	80	0.0	SM	Brushed by flail; becoming colonised by brambles	Fair	Fair	20+	B2	1.0
H110	Hazel; goat willow; sycamore; oak; beech	On	1.5	1.25	70	0.0	SM	Brushed by flail; patchy / spindly hedge which is heavily colonised by brambles & bracken; ditch to NW	Fair	Fair	20+	C2	0.8
H111	Blackthorn; goat willow; hazel; dogrose	On	1.5	1.5	70	0.0	SM	Brushed by flail; becoming colonised by brambles & bracken	Good	Fair	20+	C2	0.8

TREE SURVEY SCHEDULE

PROJECT NO: 6507

SITE NAME: HEOLDDU SOLAR SCHEME

SURVEYORS: DH (AREA 1, OPTIONS 1 & 2, CABLE ROUTES)
OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H112	Hazel; holly; blackthorn; hawthorn; oak; ash	On	1.5	1.5	90	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.1
H113	Hawthorn; blackthorn; holly; ash; gorse; elder	On	2.0	2	80	0.0	EM	Brushed by flail	Good	Fair	40+	B2	1.0
H114	Sycamore; hawthorn; blackthorn	On	2.0	2	100	0.0	EM	Brushed by flail; predominantly sycamore stems with heavily pleached lower limbs forming hedge; thorn stems establishing between sycamore	Good	Fair	20+	B2	1.3
H115	Hawthorn; blackthorn; oak; ash; gorse	On	2.0	2	100	0.0	SM	Brushed by flail; hedge bank is becoming colonised by brambles & bracken; occasional old pleached ash stem within hedge	Good	Fair	20+	B2	1.3
H116	Hawthorn; blackthorn; hazel; ash; elder	On	2.0	1.75	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H117	Hawthorn; blackthorn; oak; ash; gorse	On	2.0	2	80	0.0	SM	Brushed by flail; hedge bank is becoming colonised by brambles & bracken	Good	Fair	20+	B2	1.0
H118	Blackthorn; hazel; oak	On	2.0	1.75	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H119	Blackthorn; hazel; ash; holly; sycamore	On	2.0	1.75	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H120	Hawthorn	On	2.0	1.75	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H121	Elder	On	2.0	2	90	0.0	SM	Brushed by flail; elder stems to N with remainder of plot becoming colonised by brambles & bracken	Fair	Poor	20+	C2	1.1
H122	Hawthorn; hazel	On	2.0	1.75	80	0.0	SM	Brushed by flail	Good	Fair	20+	B2	1.0
H123	Hawthorn; gorse; ash; sycamore; elder	On	2.0	1.75	80	0.0	SM	Brushed by flail; 3x sections to W of plot <3m heavily colonised by brambles	Good	Fair	20+	B2	1.0
H124	Hawthorn; ash; elder	On	2.0	1.75	80	0.0	SM	Brushed by flail; 2x sections to approx. middle of plot <2m heavily colonised by brambles	Good	Fair	20+	B2	1.0
H125	Hawthorn; ash; hazel	On	2.0	1.75	80	0.0	SM	Brushed by flail; sample recorded where feature abuts survey area	Good	Fair	20	B2	1.0
H126	Grey willow; blackthorn; hazel; holly.	On	3.0	2.5	100	0.1	M	Dense continuous hedgerow with no gaps or recess for gates. Flailed on adjacent landowner side. Developable side has been routinely flailed until recently. Gorse; bracken; bramble grow amongst the hedge.	Good	Good	20	B3	1.3
H127	Grey willow; blackthorn; hazel; holly; ash;	On	3.0	2.5	100	0.1	M	Dense continuous hedgerow with no gaps or recess for gates. Flailed on adjacent landowner side. Developable side has been routinely flailed until recently. Gorse; bracken; bramble grow amongst the hedge.	Good	Good	20	B3	1.3

TREE SURVEY SCHEDULE

PROJECT NO: 6507

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SURVEY DATE: 02-05/12/2024

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Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H128	hawthorn; honeysuckle; blackthorn	On	2.0	2.0	100	0.2	M	Traditionally it has been maintained by flailing but this appears have lapsed by a year. 3m gap in hedge created by livestock. Bramble present.	Good	Fair	20	B3	1.3
H129	Hazel; hawthorn; blackthorn; grey willow; holly.	On	2.0	2.0	100	0.2	M	Traditionally it has been maintained by flailing but this appears have lapsed by a year. This section contains more gaps created by livestock than other hedges on site.	Good	Fair	20	C3	1.3
H130	Hazel; hawthorn; blackthorn; grey willow; holly.	On	2.0	2.0	100	0.2	M	Traditionally it has been maintained by flailing but this appears have lapsed by a year. This section contains more gaps created by livestock than other hedges on site.	Good	Fair	20	C3	1.3
H131	Grey willow; blackthorn; hazel; holly.	On	3.0	3.0	100	0.1	M	Dense continuous hedgerow with no gaps or recess for gates. Flailed on adjacent landowner side. Developable side has been routinely flailed until recently. Gorse; bracken; bramble grow amongst the hedge.	Good	Good	20	B3	1.3
H132	blackthorn; hazel; hawthorn; dog rose; holly	On	3.0	3.0	100	0.1	M	Dense continuous hedgerow with no gaps or recess for gates. The hedge had been routinely flailed until recently. Gorse; bracken; bramble grow amongst the hedge.	Good	Good	20	B3	1.3
H133	blackthorn; hazel; hawthorn; dog rose; holly	On	3.0	3.0	100	0.1	M	Dense continuous hedgerow with no gaps or recess for gates. The hedge had been routinely flailed until recently. Gorse; bracken; bramble grow amongst the hedge.	Good	Good	20	B3	1.3
H134	blackthorn; hazel; hawthorn; dog rose; holly	On	3.0	3.0	100	0.1	M	Dense continuous hedgerow with no gaps or recess for gates. The hedge had been routinely flailed until recently. Gorse; bracken; bramble grow amongst the hedge. 5m Gated field access at southern end prevents cohesiveness with another hedge	Good	Good	20	B3	1.3
H135	Goat willow; blackthorn; hazel; hawthorn; holly; ash;	On	2.5	1.5	70	0.3	M	Linear field boundary hedge consisting of mix broadleaf and small section of holly. Tightly cropped on all sides by flail. There's a gap of approximately 9m mid way in the hedgerow. HV power lines above at northern end of the hedgerow	Good	Good	20	B3	0.8
H136	Goat willow; blackthorn; hazel; hawthorn; holly.	On	2.5	1.5	70	0.1	M	Tightly cropped on all sides by flail. HV power line overhead western end. Bracken; bramble; gorse; within the hedge. There're x2 gate openings in this hedge line; 1 at the Webster point; another midway. Other than these openings the hedge is solid with no gapping.	Good	Good	20	B3	0.8

TREE SURVEY SCHEDULE

PROJECT NO: 6507

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OK (AREA 2)

SURVEY DATE: 02-05/12/2024

CLIENT: QUALITAS ENERGY

Ref	Species	On/off site	Av. height (m)	Av. width (m)	Av. stem diam (mm)	Av. low crown height (m)	Life stage	General observations	Health & vitality	Structural condition	Estimated remaining contribution (Years)	BS 5837 Category	RPA radius (m)
H137	blackthorn; hazel; ash; hawthorn.	On	3.0	3.0	100	0.1	M	Dense continuous hedgerow with no gaps or recess for gates. The hedge had been routinely flailed until recently. Gorse; bracken; bramble grow amongst the hedge. HV lines overhead.	Good	Good	20	B3	1.3
H138	hazel; hawthorn	On	3.0	2.0	100	0.1	M	Part of continuous hedge broken up by gaps created by live stock. Bramble present. It appears the hedge has previously maintained by flail but this has recently lapsed. 5m gap between this section and the next.	Good	Good	20	B3	1.3
H139	hazel; hawthorn	On	3.0	2.0	100	0.1	M	Part of continuous hedge broken up by gaps created by live stock. Bramble present. It appears the hedge has previously maintained by flail but this has recently lapsed. 4m gap between this section and the next.	Good	Good	20	B3	1.3
H140	blackthorn; hazel; hawthorn; holly; oak;	On	3.0	2.0	100	0.1	M	Part of continuous hedge broken up by gaps created by live stock but maintaining a cohesive canopy. Bramble; and ivy; to a lesser extent present. It appears the hedge has previously maintained by flail but this has recently lapsed.	Good	Good	20	B3	1.3
H141	Grey willow; blackthorn; hazel; holly; ash	On	3.0	3.0	100	0.1	M	Dense continuous hedgerow with no gaps or recesses for gates. Flailed on adjacent landowner side. Developable side has been routinely flailed until recently. Gorse; bracken; bramble grow amongst the hedge. HV lines overhead	Good	Good	20	B3	1.3

- The tree survey was carried out with reference to the methodology set out in BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.
- Trees were surveyed individually or as groups where it was considered that they had grown together to form cohesive arboricultural features either aerodynamically (trees that provide companion shelter), visually (e.g. avenues or screens) or culturally (including for biodiversity). However, where it was considered that there was an arboricultural need to differentiate between attributes trees within groups and/or woodlands were also surveyed as individuals.
- Within the tree survey schedule, each surveyed TREE (T), GROUP (G), HEDGEROW (H), WOODLAND (W) or SHRUB MASS on or adjacent to the site is given a reference number which refers to its position on the tree survey and constraints plan.
- TREE SPECIES are listed by common name.
- OOS: The recorded Out Of Scope trees and features refer to either a dead-standing or failed tree; a stump or minor shrubs; where trees are inaccessible or located off-site and unlikely to be affected by the development or, it is found that the trees are undersized according to BS 5837:2012, which stipulates a minimum recordable diameter of 75mm.

The **DIMENSIONS** taken are:

- STEM-No. indicates the number of main stems (i.e. whether the trunk divides at or below 1.5m; (used in the calculation of root protection area (RPA)) "m-s" = Multi-stemmed.
- STEM DIAMETER (measured in millimetres), obtained from the girth measured at approx. 1.5m. For trees with 2 to 5 sub-stems, a notional figure is derived from the sum of their cross-sectional areas. For multi-stemmed trees, the notional diameter may be estimated on the basis of the average stem size x the number of stems. Note: a notional diameter may be estimated where measurement is not possible.
- HEIGHT (measured in metres), recorded to the nearest half metre for dimensions up to 10m and to the nearest whole metre for dimensions over 10m.
- The CROWN SPREAD, taken at the four cardinal points to derive an accurate representation of the tree crown, recorded up to the nearest half metre for dimensions up to 10m and to up the nearest whole metre for dimensions over 10m.
- CROWN CLEARANCES, expressed both as the existing height above ground level of the first significant branch along with its direction of growth (e.g., 2.5m-N) and also in terms of the overall crown e.g., the average height of the crown above ground level. Measurements are recorded to the nearest half metre for dimensions up to 10m and to the nearest whole metre for dimensions over 10m.
- ESTIMATES: where any measurement has had to be estimated, e.g., due to inaccessibility, this is indicated by a "#" suffix to the measurement as shown in the Tree Survey Schedule.

LIFE STAGE is defined as follows:

Y Young: Normally stake dependent, establishing trees. Should be growing fast, usually primarily increasing in height more than spread but as yet making a limited impact upon the landscape.

SM Semi-mature: Established young trees, normally of good vigour and still increasing in height but beginning to spread laterally. Beginning to make an impact on the local landscape and environment. Semi-mature are still capable of being transplanted without preparation, up to 300mm girth and not yet sexually mature.

EM Early-mature: Not yet having reached 75% of expected mature size. Established young trees, normally of good vigour and still increasing in height but beginning to spread laterally. Beginning to make an impact on the local landscape and environment.

M Mature: Well-established trees, still growing with some vigour but tending to fill out and increase spread. Bark may be beginning to crack and fissure. In the middle half of their safe, useful life expectancies.

LM Late-mature: In full maturity but possibly beyond mature and in a state of natural decline. Still retaining some vigour but any growth is slowing.

A Ancient: A tree that has passed beyond maturity and is old/aged compared with other trees of the same species. Typically having a very wide trunk and a small canopy.

PHYSIOLOGICAL CONDITION (HEALTH & VITALITY):

Essentially a snapshot of the general health of the tree based upon its general appearance, its apparent vigour and the presence or absence of symptoms associated with poor health, physiological stress etc. (fungal infections may be recorded here but decay giving rise to structural weakness would be recorded under 'Structural Condition' – see next parameter):

Good: No significant health issues.

Fair: Indications of slight stress or minor disease (e.g., the presence of minor dieback/deadwood or epicormic shoot growth).

Poor: Significant stress or disease noted; larger areas of dieback than above.

Dead: (or Moribund).

STRUCTURAL CONDITION:

Features affecting the structural stability of the tree include decay, significant deadwood, root-plate instability or significant damage to structural roots, weak forks (e.g. those where bark is included between the members) etc. Classified as:

Good: No obvious structural defects: basically sound.

Fair: Minor, potential or incipient defects.

Poor: Significant feature(s) likely to lead to actual failure in the medium- to long-term.

Dead: (or Moribund).

ESTIMATED REMAINING CONTRIBUTION:

An estimate of the length of time in years that a tree might be expected to continue to make a useful contribution to the locality at an acceptable level of risk (based on an assumption of continued routine maintenance):

- Less than 10 years
- 10+ years
- 20+ years
- 40+ years

SPECIAL IMPORTANCE:

Trees that are particularly notable as high-value trees such as ancient trees/woodland or veteran trees. Such trees may be regarded as the principal arboricultural features of a site and pose a significant constraint to potential development.

An ***ancient*** tree is one that has passed beyond maturity and is very old compared with other trees of the same species. Very few trees reach the ancient life stage. ***Veteran*** trees are often very old but not necessarily so; they may be regarded as 'survivors' that have developed some of the characteristic features of an ancient tree but have not necessarily lived as long. All ancient trees are veterans but not all veteran trees are ancient.

The term '*notable*' carries no weight within the National Planning Policy Framework (NPPF), but is a term that recognises a mature tree which may stand out in the local environment because it is large in comparison with other trees around it.

Ancient woodland is an area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland (ASNW), plantations on ancient woodland sites (PAWS) and ancient replanted woodland (ARW).

QUALITY CATEGORY:

Trees are classed as category U, A, B or C, based on criteria given in BS 5837:2012; summary definitions as follows (see BS 5837 for further details). Categories A, B and C are further characterised by the use of sub-categories, which attempt to identify what aspect of the tree is the main source of its perceived value, These are:

(1) arboricultural qualities
(2) landscape qualities, and
(3) cultural, historic or ecological/conservation qualities.

Examples of these qualities for each of the three categories are given below, although these are indicative only.

Note: This is NOT a health and safety classification; the classification does not take into account any requirement for remedial tree care or ongoing maintenance apart from that which may affect the trees' general suitability for retention.

CATEGORY A: HIGH QUALITY:

Trees or groups whose retention should be given a particularly high priority within the design process. Normally with an expected useful life expectancy of at least 40 years.

A1: Notably fine specimens; rare or unusual specimens; essential component trees within groups, semi-formal or formal plantings (e.g., dominant trees within an avenue etc.).
A2: Trees, groups or woodlands of particular visual importance as landscape features.
A3: Trees, groups or woodlands of particular significance by virtue of their conservation, historical, commemorative or other value (e.g., veteran trees or wood pasture).

CATEGORY B: MODERATE QUALITY

Trees or groups of some importance with a likely useful life expectancy in excess of 20 years. Their retention would be desirable; selective removal of certain individuals may be acceptable but only after full consideration of all alternative courses of action.

B1: Fair quality but not exceptional; good specimens showing some impairment (e.g., remediable defects, minor storm damage or poor past management).
B2: Acceptable trees situated such as to have little visual impact within the wider locality. Also the number of trees, perhaps in groups or woodlands, whose value as landscape features is greater collectively than would warrant as individuals (such that the selective removal of an individual would not impact greatly upon the trees' overall, collective value).
B3: Trees, groups or woodlands with clearly identifiable conservation or other cultural benefits.

CATEGORY C: LOW QUALITY:

Trees or groups of rather low quality, although potentially capable of retention for at least approx. 10 years. Also small trees with stems below 150mm diameter.

Potentially retainable, but not of sufficient value to be regarded as a significant planning constraint.

C1: Unremarkable trees of very limited merit or significantly impaired condition.
C2: Trees offering only low- or short-term landscape benefits; also secondary specimens within groups or woodlands whose loss would not significantly diminish their landscape value.
C3: Trees with extremely limited conservation or other cultural benefits.

CATEGORY U: VERY LOW QUALITY

Trees likely to prove to be unsuitable for retention for longer than 10 years should any significant increase in site usage arise as a result of development. E.g., dead or moribund trees; those at risk of collapse or in terminal decline; trees that will be left unstable by other essential works such as the removal of nearby category U trees; trees infected by pathogens that could materially affect other trees; low-quality trees that are suppressing better specimens. (Category U trees may have conservation values that it might be desirable to preserve. This category may also include trees that should be removed irrespective of any development proposals.)

ROOT PROTECTION AREA (RPA):

These are normally represented as a circle centred on the base of each tree stem with a radius of 12 times the stem diameter, measured at 1.5m above ground level. The shape of the RPA may be altered where site conditions dictate that there are sound reasons to do so.

VETERAN OR ANCIENT TREE BUFFER (VTB/ATB)

In line with the Standing Advice produced by the Forestry Commission and Natural England, this is a buffer zone (in metres) around an ancient or veteran tree that should be at least 15 times larger than the diameter of the tree. The buffer zone should be 5m from the edge of the tree's canopy if that area is larger than 15 times the tree's stem diameter.

ANCIENT WOODLAND BUFFER (FOR ASNW, PAWS OR ARW)

In line with the Standing Advice produced by the Forestry Commission and Natural England, this is a buffer zone of at least 15 metres to avoid root damage. Where assessment shows other impacts are likely to extend beyond this distance, a larger buffer zone may be required.

THE IMPORTANCE OF TREES

Wider benefits:

There is a growing body of evidence that trees bring a wide range of benefits to the places where people live.

Some *economic* benefits of trees include:

- Trees can increase property values
- As trees grow larger, the lift they give to property values grows proportionately
- They can improve the environmental performance of buildings by reducing heating and cooling costs, thereby cutting bills
- Mature landscapes with trees can be worth more as development sites
- Trees create a positive perception of a place for potential property buyers
- Urban trees improve the health of local populations, reducing healthcare costs

Some *social* benefits of trees include:

- Trees help create a sense of place and local identity
- They benefit communities by increasing pride in the local area
- They can create focal points and landmarks
- They have a positive impact on people's physical and mental health
- They can have a positive impact on crime reduction

Some *environmental* benefits of trees include:

- Urban trees reduce the 'urban heat island effect' of localised temperature extremes
- They provide shade, making streets and buildings cooler in summer
- They help remove dust and particulates from the air
- They help to reduce traffic noise by absorbing and deflecting sound
- They help to reduce wind speeds
- By providing food and shelter for wildlife, they help increase biodiversity
- They can reduce the **effects** of flash flooding by slowing the rate at which rainfall reaches the ground
- They can help remediate contaminated soil

On new development sites:

Trees bring many benefits to new development. Where retained successfully they can form important and sustainable elements of green infrastructure, contribute to urban cooling and reduce energy demands in buildings. Their importance is acknowledged in relation to adaptation to the effects of climate change. Other benefits brought by trees include:

- Increasing property values
- Visual amenity
- Softening, complementing and adding maturity to built form
- Displaying seasonal change
- Increasing wildlife opportunities in built-up areas
- Contributing to screening and shade
- Reducing wind speed and turbulence

NATIONAL PLANNING POLICY

Paragraph 6.4.43 of the Planning Policy Wales - Edition 12, February 2024 (PPW) states in relation to Ancient Woodland:

'Ancient woodland, semi-natural woodlands, individual ancient, veteran and heritage trees and ancient hedgerows are irreplaceable natural resources, and have significant landscape, biodiversity and cultural value. Such trees, woodlands and hedgerows are to be afforded protection from development which would result in their loss or deterioration unless very exceptionally there are significant and clearly defined public benefits; this protection must prevent potentially damaging operations and their unnecessary loss139. In the case of a site recorded on the Ancient Woodland Inventory, authorities should consider the advice of NRW. Planning authorities should also have regard to the Ancient Tree Inventory, work to improve its completeness and use it to ensure the protection of trees and woodland and identify opportunities for more planting as part of the Green Infrastructure Assessment, particularly in terms of canopy cover'.

The PPW goes on to state:

'The protection and planting of trees and hedgerows should be delivered, where appropriate, through locally-specific strategies and policies, through imposing conditions when granting planning permission, and/or by making Tree Preservation Orders (TPOs)140. They should also be incorporated into Green Infrastructure Assessments and plans'.

STATUTORY CONTROLS

Statutory tree protection

Works to trees that are covered by Tree Preservation Orders (TPOs) or are within a Conservation Area (CA) require permission or consent from the Local Planning Authority. Where information is available on any Statutory designations such as this they are identified within the summary table in Section 1 and on the Tree Survey and Constraints Plan in Section 2.

Notwithstanding specific exceptions and in general terms, a TPO prevents the cutting down, uprooting, topping, lopping, wilful damage or wilful destruction of protected trees or woodlands without the prior written consent of the LPA.

Penalties for contravention of a TPO tend to reflect the extent of damage caused but can, in the event of a tree being destroyed, result in a fine of up to £20,000 if convicted in a Magistrates' Court, or an unlimited fine if the matter is determined by the Crown Court.

Similarly, and again notwithstanding specific exceptions, it is an offence to carry out any works to a tree in a Conservation Area with a trunk diameter greater than 75mm diameter at 1.5 height without having first provided the LPA with 6 weeks written notification of intent to carry out the works.

On many non-residential sites (excluding specific exemptions) there is also a statutory restriction relating to tree felling that relates to quantities of timber that can be removed within set time periods. In basic terms, it is an offence to remove more than 5 cubic metres of timber in any one calendar quarter without having first obtained a felling licence from the Forestry Commission.

Any proposed tree works that are planned to be carried out on-site must be carried out in accordance with the statutory controls outlined.

Statutory Wildlife Protection

Although preliminary visual checks from ground level of likely wildlife habitats are made at the time of surveying, detailed ecological assessments of wildlife habitats are not made by the arboriculturist and fall outside of the scope of this report.

Trees that contain holes, splits, cracks and cavities could potentially provide a habitat for protected species such as bats in addition to birds and small mammals. It is advised that in some instances specialist ecological advice may be required. This may result in tree works being carried out following a detailed climbing inspection of the tree to ensure that protected species or their nests/roosts are not disturbed. If any are found, the site manager, site owner or consulting arboriculturist should be informed and appropriate action taken as recommended by the appointed Ecologist or the relevant Statutory Nature Conservation Organisation (SNCO): Natural England, Scottish Natural Heritage or Natural Resources Wales.

It is advised that tree/hedgerow works are carried out with the understanding that birds will generally nest in trees, hedges and shrubs between March and August. This time period only indicates likely nesting times and as such diligence is required when undertaking tree works at all times.

Irrespective of the time of year and other than any actions approved under General Licence, it is an offence to intentionally kill, injure or take any wild bird or to intentionally take, damage or destroy the nest or eggs of any wild bird. Ideally, tree operations should be avoided during the likely bird nesting period. However, any tree works should always only be carried out following a preliminary visual check of the vegetation.

For information, the Wildlife and Countryside Act 1981 (as amended), The Countryside and Rights of Way Act 2000 (as amended) and the Conservation of Habitat and Species Regulations 2010, form the basis of the statutory legislation for flora and fauna in England and Wales. A different legislative framework applies in Scotland and Northern Ireland.

Any proposed tree works that are planned to be carried out on site must be carried out in accordance with any relevant statutory controls, outlined above.

DESIGN GUIDANCE

Approach

The approach adopts the guidelines set out in the British Standard BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations. The process is broken down to coordinate with the key elements within both the RIBA Plan of Work (2013) and British Standard 5837:2012 as set out in the table below:

Information Stage	RIBA Stage	BS 5837:2012
Stage A – Tree Survey	2: Concept	4: Feasibility
Stage B – Arboricultural Impact Assessment	3: Developed design	5: Proposals
Stage C – Arboricultural Method Statement	4: Technical design	6: Technical Design
Stage D – Arboricultural Site Supervision	5: Construction	7: Demolition and construction

A hierarchical approach is adopted to achieve optimum use of the site and location of built structures. This is set out below:

Avoid

The starting point of Site layout design should be to avoid the RPA of retained trees and provide suitable clearance from above ground constraints [tree canopies]. Where possible building lines should be at least 2m outside the RPA to provide working space for construction. However, protection measures can be taken if such clearance is not achievable.

Mitigate

Where intrusion within the RPA is unavoidable then its impact on the tree can be mitigated by specialist measures:

Foundations that avoid trenching e.g., screw piles, suspended floor slabs or casting at ground level for lightweight structures such as bin and cycle stores.

Limited use may be made for parking, drives or hard surfaces within the root protection areas, subject to advice from a qualified arboriculturist. Cellular confinement systems that enable hard surfaces to be built above existing soil levels are acceptable methods subject to site-specific soil conditions.

Service runs that cannot be routed outside the RPA(s) can be installed by, for example, thrust boring, directional drilling, air excavation or hand digging. These operations often require supervision by the project arboriculturist.

Compensate

Replacement planting can ensure the continuity of tree cover where tree removal is unavoidable or desirable. Off-site provision may be considered in some circumstances but this will require negotiation with the local planning authority.

Considerations:

For proposed residential developments, consideration must be given to numerous factors relating to future tree growth and orientation.

Tree constraints

Root Protection Areas:

With reference to BS 5837:2012, a root protection area (RPA) is defined as "a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure should be treated as a priority". "**The default position [when considering design layout in relation to RPAs] should be that structures are located outside the RPAs of trees to be retained**".

BS 5837:2012 states (4.6.2) that, "where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced." The BS goes on to state that, "modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution," and that any deviation from the original circular plot should take into account:

- Morphology and disposition of roots;
- topography and drainage;
- soil type and structure;
- the likely tolerance of the tree to root damage/disturbance.

Additional buffer zones beyond the RPA:

The following text is taken from the Standing Advice produced by the Forestry Commission and Natural England as included in the National Planning Policy Guidance:

'A buffer zone's purpose is to protect ancient woodland and individual ancient or veteran trees. The size and type of buffer zone should vary depending on the scale, type and impact of the development'.

Ancient woodland buffer:

'For ancient woodlands, you should have a buffer zone of at least 15 metres to avoid root damage. Where assessment shows other impacts are likely to extend beyond this distance, you're likely to need a larger buffer zone. For example, the effect of air pollution from development that results in a significant increase in traffic'.

Ancient and veteran tree buffer:

'A buffer zone around an ancient or veteran tree should be at least 15 times larger than the diameter of the tree. The buffer zone should be 5m from the edge of the tree's canopy if that area is larger than 15 times the tree's diameter'.

Above ground:

Above ground constraints posed by trees describe the capacity for trees to have an overbearing or dominating effect on new developments; usually post-occupancy. Typical above ground constraints include a number or combination of inconveniences including shading, branch spread, movement of trees during strong winds and so on. If not adequately considered, above ground constraints can lead to repeated requests to fell or heavily prune retained and protected trees.

Shade:

Adverse shading and blocked views from windows raise concerns for incoming residents, which may lead to pressure to fell or remove trees in the future. Wherever possible it is advisable to arrange fenestration away from tree canopies to lessen the conflict or increase window size to accommodate ambient light.

Conversely, appropriately designed development can use existing or new trees to create necessary and welcome shade and screening.

As part of the adopted approach the above considerations and constraints are assessed cumulatively to provide clear and site-specific advice on the areas of a site most suitable for the location of development.

Dependent on the site and nature of the proposed development, the Tree Survey and Constraints Plans may show the following:

Recommended Developable area - an advisory area defined to minimise arboricultural impacts using standard approaches to construction. Restricting proposed development to this area will limit the risk of harm to retained trees and of the Local Planning Authority objecting to the proposed development. It may be possible to propose development outside of this area but specific 'low impact' construction techniques may need to be recommended.

Recommended Buffer to development - similar to the Recommend Developable Area but defined as a line marking a suitable buffer to retained trees. More commonly used on large sites or sites where the presence of trees is localised.

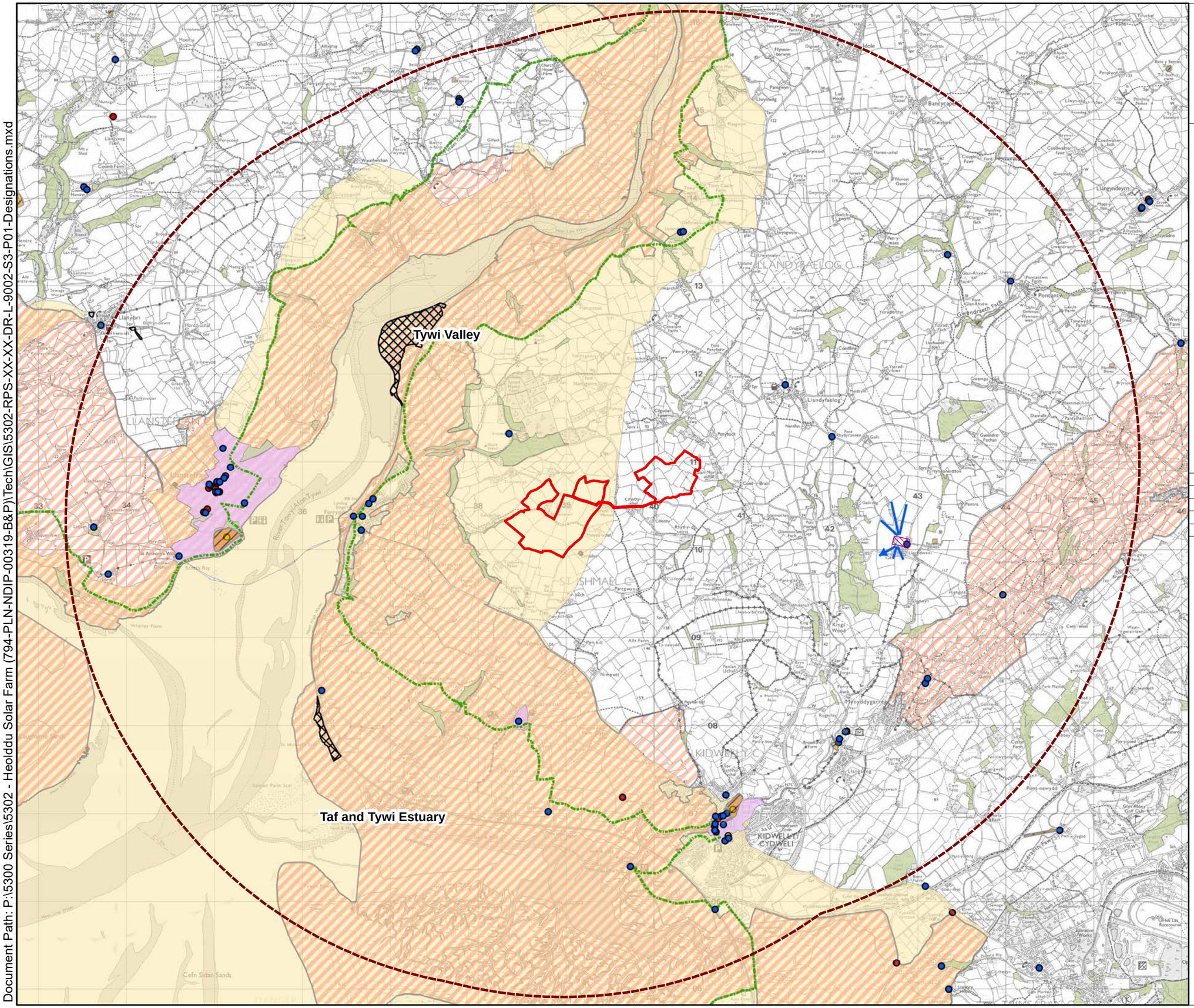
Tree Opportunities

Depending on the scale of developments existing trees can often provide opportunities to enhance the existing arboricultural resource of a site by bringing it into good management or by putting in place remedial measures e.g., soil amelioration.

Appropriately designed new tree planting is extremely important in maintaining healthy and sustainable tree populations. For the reasons highlighted, new trees can bring many benefits to new developments. It is critical to the establishment of new tree planting that the locations, species and specification of new trees are appropriate. Subsequently, the sourcing of high-quality stock, suitable planting and the provision of post-planting maintenance are essential to allow new trees to establish and mature over time.

Appendix 5.1

Landscape Figures



Document Path: P:\5300 Series\5302 - Heolddu Solar Farm (794-PLN-NDIP-00319-B&P)\Tech\GIS\5302-RPS-XX-XX-DR-L-9002-S3-P01-Designations.mxd

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Legend

- Study Area (5km radius)
- Special Landscape Area
- Historic Landscapes
- Wales Coast Path
- Significant Views
- Registered Common Land
- Historic Parks and Gardens
- Conservation Areas
- Ancient Woodland
- Scheduled Monument

Listed Buildings

Grade

- I
- II
- II*

Rev	Description	By	Ckd	Date
P01	First Draft	GL	PH	04.12.24

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A TETRA TECH COMPANY

Lakesbury House, Hiltingbury Road, Chandlers Ford
Hampshire SO53 5SS
United Kingdom
T: +44 2380 810 440 E: rpsso@rpsgroup.com

Client: Qualitas Energy

Project: Heolddu Solar Farm

Title: Landscape Planning Designations

Status	Title	Date Created
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Task Team Manager	Information Author	Task Information Manager
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RPS Project Number	Suitability	Revision
794-PLN-NDIP-00319	S3	P01

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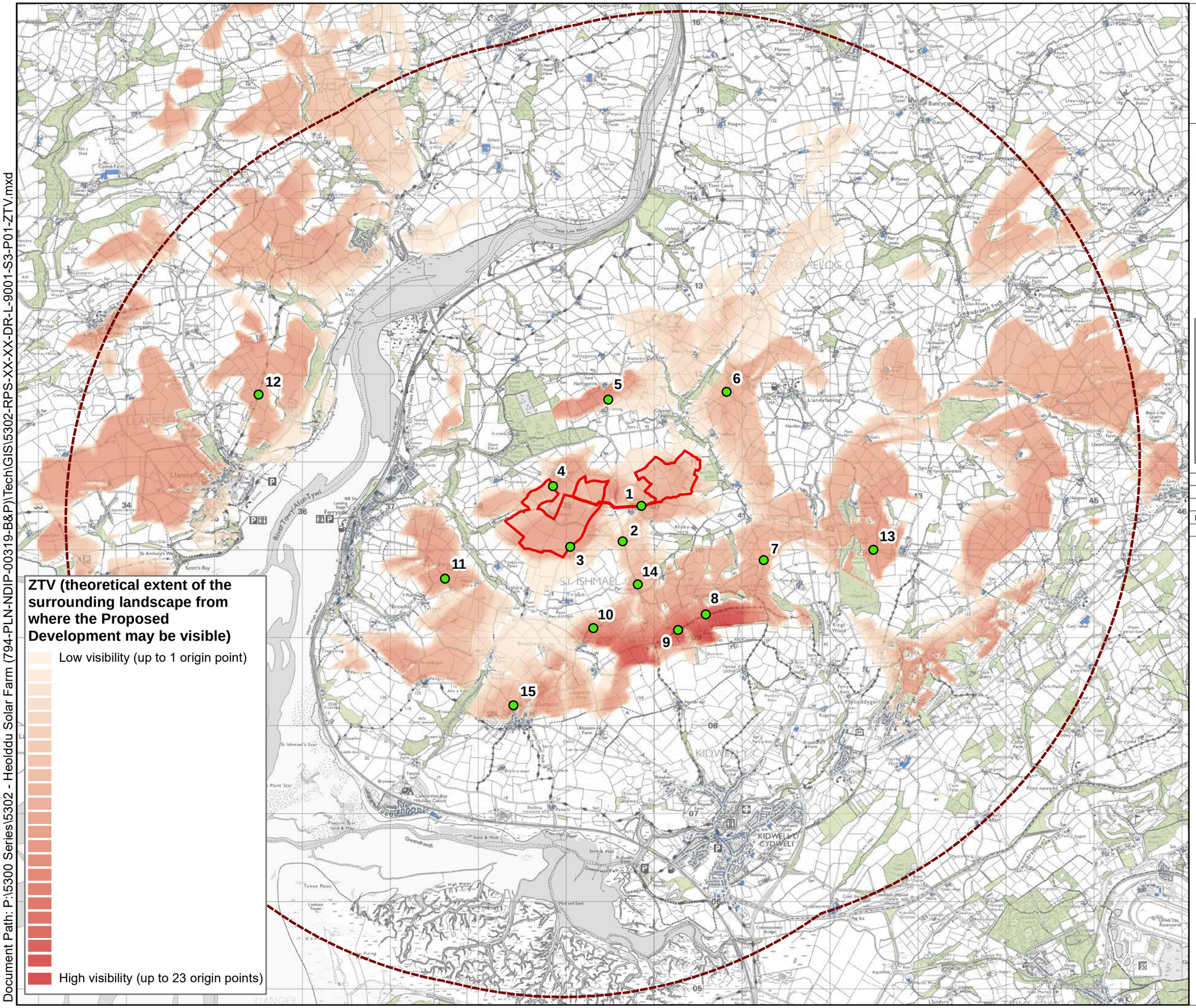

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Legend

- Application Site Boundary
- Study Area (5km radius)
- Woodland
- Settlement
- Representative Viewpoints

Note:
ZTV compiled assuming observer height as 1.7 m at eye level, and takes into account screening effects of local settlements at 9 m and existing vegetation / woodland at a height of 11 m.

23 origin points, from within draft Application Site, have been used to illustrate the full parameters of the Proposed Development. Including:

23 set at 3 m above existing ground level (EGL), within the approximate centre the fields containing solar arrays.

3 m (substation control building) represents the maximum height of built elements within the Application Site. With the solar arrays at 2.85 m EGL.

OS Terrain 5 data has been used for generating the ground model.

Rev	Description	By	Ckd	Date
P01	First Draft	GL	PH	04.12.24

MAKING COMPLEX EASY
A TETRA TECH COMPANY

Lakesbury House, Hiltingbury Road, Chandlers Ford
Hampshire SO53 5SS
United Kingdom
T: +44 2380 810 440 E: rpsso@rpsgroup.com

Client: Qualitas Energy

Project: Heolddu Solar Farm

Title: Zone of Theoretical Visibility (ZTV)

Status	Title	Date Created
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Task Team Manager	Information Author	Task Information Manager
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RPS Project Number	Suitability	Revision
794-PLN-NDIP-00319	S3	P01

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ZTV (theoretical extent of the surrounding landscape from where the Proposed Development may be visible)

Low visibility (up to 1 origin point)

High visibility (up to 23 origin points)

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13

Notes
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Legend

- Application Site Boundary
- Study Area (1km radius)
- Residential Receptor Reference
- Residential Receptor Primary Direction of View
- Woodland
- Settlement

Note:
ZTV compiled assuming observer height as 1.7 m at eye level, and takes into account screening effects of local settlements at 9 m and existing vegetation / woodland at a height of 11 m.

23 origin points, from within draft Application Site, have been used to illustrate the full parameters of the Proposed Development. Including:

23 set at 3 m above existing ground level (EGL), within the approximate centre the fields containing solar arrays.

3 m (substation control building) represents the maximum height of built elements within the Application Site. With the solar arrays at 2.85 m EGL.

OS Terrain 5 data has been used for generating the ground model.

Rev	Description	By	Ckd	Date
P01	First Draft	GL	PH	11.02.25

MAKING COMPLEX EASY
A TETRA TECH COMPANY

Lakesbury House, Hiltingbury Road, Chandlers Ford
Hampshire SO53 5SS
United Kingdom
T: +44 2380 810 440 E: rpsso@rpsgroup.com

Client: Qualitas Energy

Project: Heolddu Solar Farm

Title: Zone of Theoretical Visibility (ZTV) and Residential Receptors

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Appendix 5.2

LVIA Methodology

APPENDIX 5.2: LANDSCAPE AND VISUAL IMPACT ASSESSMENT METHODOLOGY

Assessment Criteria and Assignment of Significance

Relevant Guidance

1.1 As a matter of best practice, this Landscape and Visual Impact Assessment (LVIA) has been undertaken based on the relevant guidance on landscape and visual impact assessment (LVIA) described in the following documents:

- *Landscape Character Assessment: Guidance for England and Scotland* (The Countryside Agency and Scottish Natural Heritage, 2002);
- *Guidelines for Landscape and Visual Impact Assessment, Third Edition* (GLVIA3) (Landscape Institute and Institute of Environmental Management and Assessment, 2013);
- *An Approach to Landscape Character Assessment* (Natural England, 2014);
- *Technical Guidance Note 2/19 Residential Visual Amenity Assessment* (Landscape Institute, 2019); and
- *Technical Guidance Note 02/21: Assessing landscape value outside national designations* (Landscape Institute, May 2021).

Distinction Between Landscape and Visual Effects

1.2 As set out in the GLVIA3, paragraph 2.21, landscape and visual effects are assessed separately, although the procedure for assessing each is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

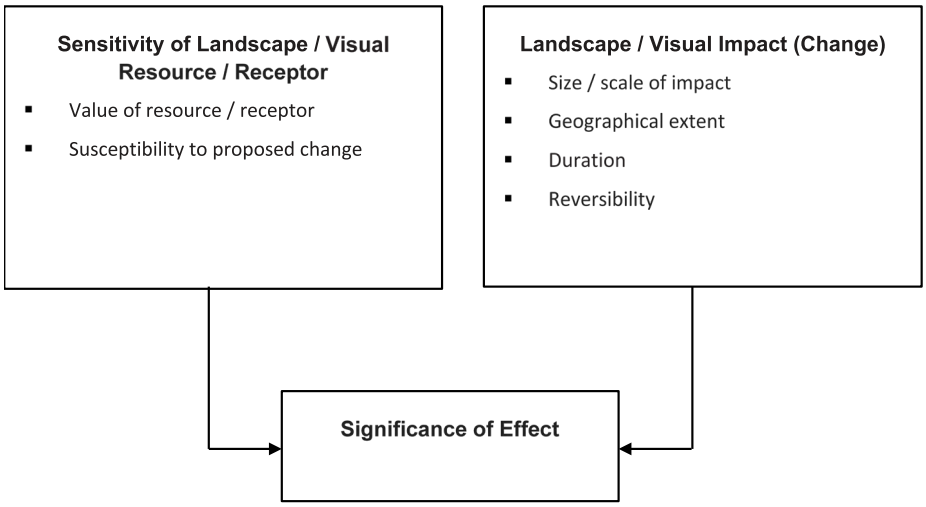
- Landscape effects relate to the effects of the Proposed Development on the physical and other characteristics of the landscape and its resulting character and quality.
- Visual effects relate to the effects on views experienced by visual receptors (e.g. footpath users, road users, people in their places of work etc) and on the change in views experienced by people.

Assessment Criteria and Assignment of Significance of Effects

1.3 GLVIA3 sets out broad guidelines rather than detailed prescriptive methodologies. The methodologies tailored for the assessment of this development is based on GLVIA3 guidance, which recommends that an assessment *"concentrates on principles and process"* and *"does not provide a detailed or formulaic recipe"* to assess effects, it being the *"responsibility of the professional to ensure that the approach and methodology are appropriate to the task in hand"* (preface to GLVIA3). The effects on the landscape resources or visual receptors (people) are assessed by considering the proposed change in the baseline conditions (the impact of the proposal) against the type of landscape resource or visual receptor (including the importance and sensitivity of that resource or receptor). The methodology is set out in detail below and

summarised in Diagram 1. These factors are determined through a combination of quantitative (objective) and qualitative (subjective) assessment using professional judgement.

Diagram 1: Assessment Methodology Summary



Sensitivity

Sensitivity of landscape receptors

1.4 The sensitivity of a landscape receptor is a combination of "*judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape*" (GLVIA, para 5.39). For the purpose of this assessment, susceptibility and value of landscape receptors are defined as follows:

- Landscape susceptibility: "*the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*" (GLVIA, para 5.40).
- Value of the landscape receptor: "*The value of the Landscape Character Types or Areas that may be affected, based on review of designations at both national and local levels, and, where there are no designations, judgements based on criteria that can be used to establish landscape value; and, the value of individual contributors to landscape character, especially the key characteristics, which may include individual elements of the landscape, particularly landscape features, notable aesthetic, perceptual or experiential qualities, and combinations of these contributors*" (GLVIA, para 5.44).

1.5 Sensitivity is not readily graded into bands. However, descriptions of landscape susceptibility and value are set out in Table 1 below.

Table 1: Definitions of Landscape Sensitivity

Sensitivity	Typical Descriptors Landscape Resource/Receptor Susceptibility	Landscape Resource/Receptor Value
Very High	Exceptional landscape quality, no or limited potential for substitution. Key elements / features well known to the wider public.	Nationally/internationally designated/valued landscape, or key elements or features of nationally/internationally designated landscapes.
High	Strong/distinctive landscape character; absence of landscape detractors.	Regionally/nationally designated/valued countryside and landscape features.
Medium	Some distinctive landscape characteristics; few landscape detractors.	Locally/regionally designated/valued countryside and landscape features.
Low	Absence of distinctive landscape characteristics; presence of landscape detractors.	Undesignated countryside and landscape features.
Negligible	Absence of positive landscape characteristics. Significant presence of landscape detractors.	Undesignated countryside and landscape features.

Sensitivity of visual receptors

1.6 Visual receptors are always people. The sensitivity of each visual receptor (the particular person or group of people likely to be affected at a specific viewpoint) *"should be assessed in terms of both their susceptibility to change and in views and visual amenity and also the value attached to particular views"* (GLVIA, para 6.31). For the purpose of this assessment, susceptibility and value of visual receptors are defined as follows:

- Visual susceptibility: "*The susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of: The occupation or activity of people experiencing views at the particular locations; and, the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations*" (GLVIA, para 6.32).
- Value of views: Judgements made about the value of views should take account of: "*recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations; and, indicators of value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment (such as parking places, sign boards or interpretive material) and references to them in literature or art*…" (GLVIA, para 6.37).

1.7 Sensitivity is not readily graded in bands and GLVIA notes, with regards to visual sensitivity, that the division of who may or may not be sensitive to a particular change "*is not black and white and in reality, there will be a gradation in susceptibility to change*" (GLVIA, para 6.35). In order to provide both consistency and transparency to the assessment process, however, Table 2, below defines the criteria which have guided the judgement as to the intrinsic susceptibility and value of the resource/receptor and subsequent sensitivity to the Proposed Development.

Table 2: Definitions of Visual Sensitivity

Sensitivity	Typical Descriptors Visual Receptor Susceptibility	Value of View
Very High	Observers, drawn to a particular view, including those who have travelled from around Britain and overseas to experience the views.	See paragraph 1.6 and 1.7, above
High	Observers on the public rights of way network in the countryside are more sensitive to visual change.	See paragraph 1.6 and 1.7, above
Medium	Observers enjoying the countryside from vehicles on quiet/promoted routes or pedestrians on less scenic/urban rights of way are moderately sensitive to visual change.	See paragraph 1.6 and 1.7, above
Low	Observers in vehicles or people involved in outdoor activities where attention is not focused on landscape are less sensitive to visual change.	See paragraph 1.6 and 1.7, above
Negligible	Observers in vehicles or people involved in frequent or frequently repeated activities are less sensitive to visual change.	See paragraph 1.6 and 1.7, above

Magnitude of Impact

Magnitude of impact on landscape resources and receptors

1.8 The magnitude of impact or change affecting landscape receptors depends on the size or scale, geographical extent of the area influenced and its duration and reversibility. These factors are described below:

- Size or scale: "*The extent of the existing landscape elements that will be lost, the proportion of the total extent that this represents and the contribution of that element to the character of the landscape…; the degree to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by addition of new ones…"* and, "*whether the effect* [impact] *changes the key characteristics of the landscape, which are critical to its distinctive character*" (GLVIA, para 5.49).
- Geographical extent: Distinct from scale or size, this factor considers the geographical area over which the landscape impacts will be felt, it might, for example, be a moderate loss of landscape receptors or character over a large area, or a large loss of receptors or character over a very localised area. At para 5.50 GLVIA3 notes that *"in general effects* [impacts] *may have an influence at the following scales, although this will vary according to the nature of the project and not all may be relevant on every occasion: at the site level within the development site itself; at the level of the immediate setting of the site; at the scale of the landscape type or character area within which the proposal lies; and, on a larger scale, influencing several landscape types or character areas*." For the purposes of this LVIA, the assessment considers the impact of the Proposed Development on the published landscape character areas, both at local and national level, i.e. the third and fourth landscape scales.

1.9 Duration and reversibility: Duration is categorised as short, medium or long-term. GLVIA explains that as there are no standard lengths of time within these categories, the appraisal must state what these are and why these have been chosen (GLVIA, para 5.51). Reversibility is described as "*a judgement about the prospects and practicality of the particular effect being reversed in, for example, a generation*" (GLVIA, para 5.52). Projects can be considered to be permanent (irreversible), partly reversible or fully reversible. For the purposes of this assessment the Proposed Development is considered to be temporary.

Magnitude of impact on visual receptors

1.10 As with the magnitude of landscape impacts, the magnitude of impact or change affecting visual receptors depends on the size or scale, geographical extent of the area influenced and its duration and reversibility. These factors are described below:

- Size or scale: Judgements need to take account of: "*the scale of the change [impact] in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the Proposed Development; the degree of contrast or integration of any new features or changes in the landscape with existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture; and, the nature of the view of the Proposed Development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses*" (GLVIA, para 6.39).
- Geographical extent: This will vary from viewpoint to viewpoint and will reflect: "*the angle [orientation] of view in relation to the main activity of the receptor; the distance of the viewpoint from the Proposed Development; and, the extent of the area over which the changes [impacts] would be visible*" (GLVIA, para 6.40).

1.11 Duration and reversibility of visual effects: As with landscape impacts, duration should be categorised as short, medium or long-term and projects considered to be permanent (irreversible), partially reversible or fully reversible (GLVIA, para 6.41). For the purposes of this assessment the impacts on views of the Proposed Development is considered to be temporary.

1.12 The magnitude of the predicted impact has been described using criteria outlined above and Diagram 1 and detailed in methodology below. Magnitude of impact has been classified on a four-point scale (Large, Medium, Small and Negligible). The definitions of terms relating to the magnitude of impact are set out in Table 3, below.

Table 3: Example Definitions of Magnitude of Impact

Magnitude of Impact	Typical Descriptors	
	Landscape Resource	Visual Resource
Large	Total loss or addition or/very substantial loss or addition of key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of dominant, uncharacteristic elements with the attributes of the receiving landscape.	Complete or very substantial change in view, dominant involving complete or very substantial obstruction of existing view or complete change in character and composition of baseline, e.g., through removal of key elements.
Medium	Partial loss or addition of or moderate alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that may be prominent but may not necessarily be substantially uncharacteristic with the attributes of the receiving landscape.	Moderate change in view: which may involve partial obstruction of existing view or partial change in character and composition of baseline, i.e. pre-development view, through the introduction of new elements or removal of existing elements. Change may be prominent but would not substantially alter scale and character of the surroundings and the wider setting. Composition of the views would alter. View character may be partially changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant.

Magnitude of Impact	Typical Descriptors	
	Landscape Resource	Visual Resource
Small	Minor loss or addition of or alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that may not be uncharacteristic with the surrounding landscape.	Minor change in baseline, i.e. pre-development view, – change would be distinguishable from the surroundings whilst composition and character would be similar to the pre-change circumstances.
Negligible	Very minor loss or addition of or alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that are not uncharacteristic with the surrounding landscape approximating to a 'no-change' situation.	Very slight change in baseline, i.e. pre-development view, – change barely distinguishable from the surroundings. Composition and character of view substantially unaltered.

Significance of effects

1.13 It is recognised that new development will lead to some landscape and visual effects. However, it should be stressed that not all landscape and visual effects arising will be significant.

1.14 GLVIA3 explains, at paragraph 5.55, that a staged approach can be adopted when assessing landscape significance "*susceptibility to change and value can be combined into an assessment of sensitivity for each receptor, and size/scale, geographical extent and duration and reversibility can be combined into an assessment of magnitude for each effect. Magnitude and sensitivity can then be combined to assess overall significance*."

1.15 Within this assessment, the assessment of significance has taken the following into account (as appropriate):

- reference to regulations or standards;
- reference to best practice guidance;
- reference to policy objectives;
- reference to criteria, for example designations or protection status;
- outcomes of consultation to date; and
- professional judgement based on local / regional / specialist experience.

1.16 Significance varies depending on the receptor's sensitivity and the magnitude of impact of the project. The distance to the development can be a major factor in determining the magnitude of the impact. Those resources or receptors closer to the project are likely to experience a greater significance of effects than those further away.

1.17 A significant effect would not necessarily mean that the effect is unacceptable in planning terms. What is important is that the likely effects of any proposal are transparently assessed and understood in order that the determining authority can bring a balanced and well-informed judgement to bear when making any decision. This judgement should be based upon weighing up the benefits of the proposal against the anticipated effects, both positive and negative.

1.18 The matrix, at Table 4, has been used to guide the assessment of effects. Where the matrix provides a choice of level of effects, e.g., Minor to Moderate, the assessor has exercised professional judgement in determining which of the levels is more appropriate.

Table 4: Assessment of Significance of Effects Matrix

Sensitivity	Magnitude of Impact			
	Negligible	**Small**	**Medium**	**Large**
Negligible	Negligible	Negligible to Minor	Negligible to Minor	Minor
Low	Negligible to Minor	Negligible to Minor	Minor	Minor to Moderate
Medium	Negligible to Minor	Minor	Moderate	Moderate to Major
High	Minor	Minor to Moderate	Moderate to Major	Major to Substantial
Very high	Minor	Moderate to Major	Major to Substantial	Substantial

1.19 The significance of effect on landscape, views and visual amenity has been described according to the five-point scale shown in the above matrix (Substantial, Major, Medium, Minor, Negligible or Neutral). A description of these terms is provided in Table 5, below.

Table 5: Definitions of Significance Criteria

Magnitude	Typical Descriptors Landscape Resource	Visual Resource
Substantial	Where proposed changes would be uncharacteristic and/or would significantly alter a landscape of exceptional landscape quality (e.g., internationally designated landscapes), or key elements known to the wider public of nationally designated landscapes (where there is no or limited potential for substitution nationally).	Where proposed changes would be uncharacteristic and/or would significantly alter a view of remarkable scenic quality, within internationally designated landscapes or key features or elements of nationally designated landscapes that are well known to the wider public.
Major	Where proposed changes would be uncharacteristic and/or would significantly alter a valued aspect of (or a high quality) landscape.	Where proposed changes would be uncharacteristic and/or would significantly alter a valued view or a view of high scenic quality.
Moderate	Where proposed changes would be noticeably out of scale or at odds with the character of an area.	Where proposed changes to views would be noticeably out of scale or at odds with the existing view.
Minor	Where proposed changes would be at slight variance with the character of an area.	Where proposed changes to views, although discernible, would only be at slight variance with the existing view.
Negligible	Where proposed changes would have an indiscernible effect on the character of an area.	Where proposed changes would have a barely noticeable effect on views/visual amenity.
Neutral	Where there is a balance of proposed changes, both negative and positive, which leave the character of an area effectively unaltered.	Where there is a balance of proposed changes, both negative and positive, which leave the visual amenity of an area effectively unaltered.

1.20 In this assessment, those effects of Moderate and below are not considered to be significant. Those effects to be Major and above are considered to be significant.

January 2025

Appendix 5.3

Habitat Plan

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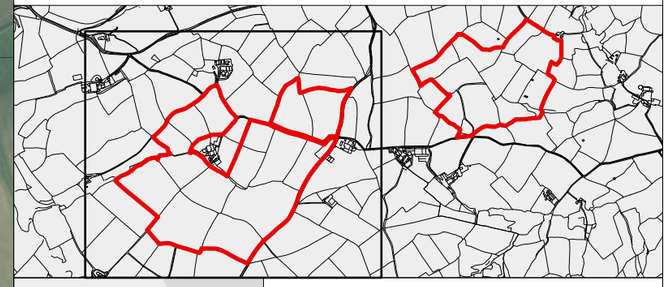
Legend

- Application Boundary
- A1.1.1 - Woodland - broadleaved - semi-natural
- A3.1 - Scattered trees - broadleaved
- B4 - Improved grassland
- J5 - Hardstanding
- G2 - Running water
- J2.1.2 - Intact hedge - species-poor
- J2.3.2 - Hedge with trees - species-poor
- Target Note

Target Notes

2. Large dead tree
3. Mammal slide/run - down stream bank on south side



Project Name	**Heolddu Solar**
Drawing Title	**Phase 1 Habitat Plan - Winter Walkover**
Figure Number	**1.1**
Drawing Number	**NDIP00319-0004-02**

Rev	Date	Status	By	CB
02	07/02/2025	FINAL	AC	LR

Scale @ A3	Plot Size	Datum
1:5,000	**294 x 277 mm**	**OSGB 1936**

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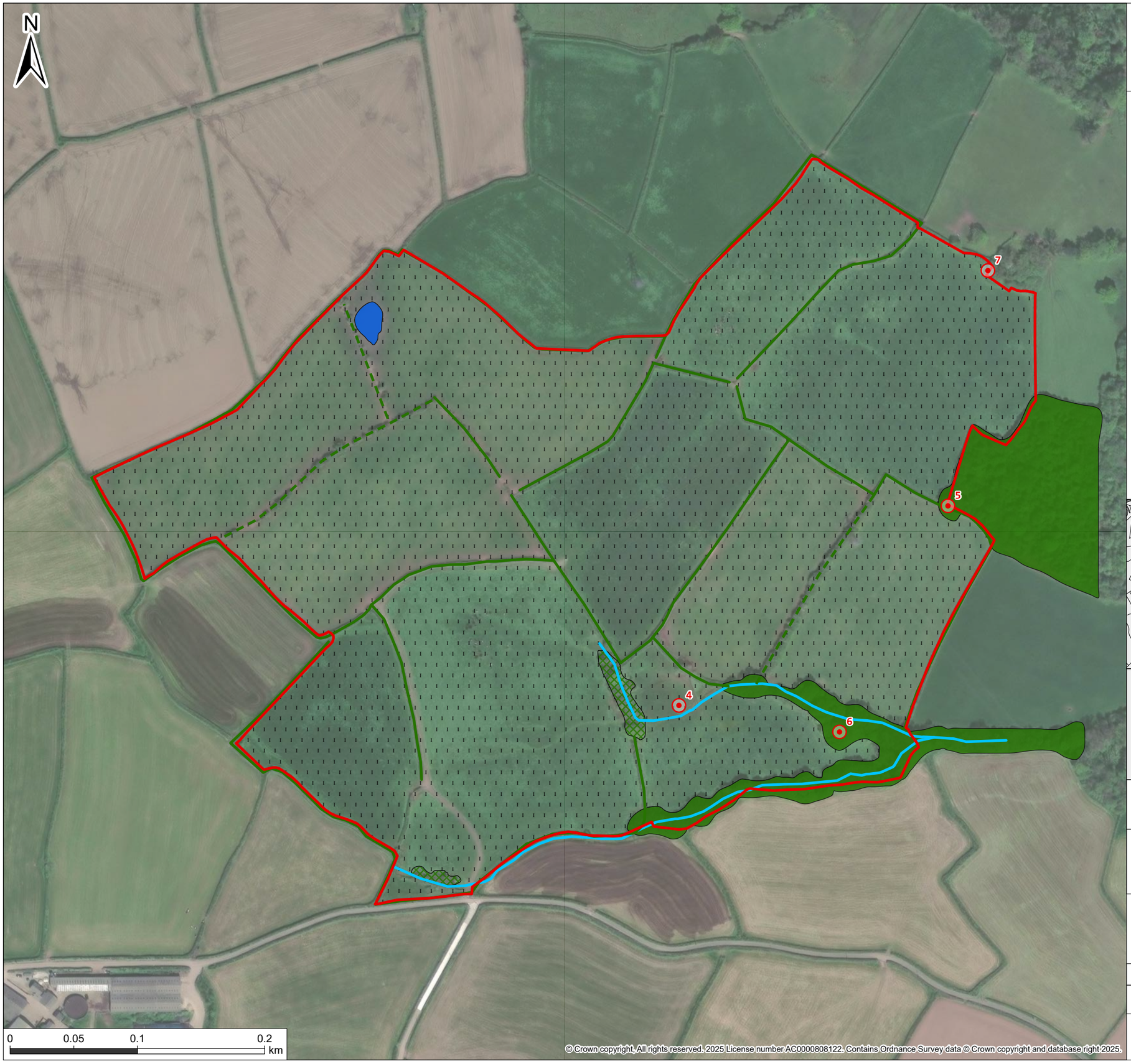

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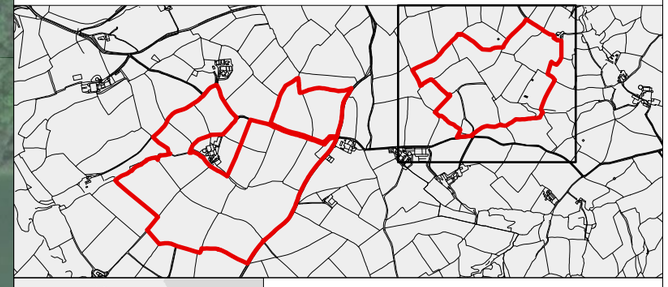
Qualitas energy

Legend

- Application Boundary
- A1.1.1 - Woodland - broadleaved - semi-natural
- A2.1 - Dense scrub
- B4 - Improved grassland
- G1 - Standing water
- G2 - Running water
- J2.1.2 - Intact hedge - species-poor
- J2.2.2 - Defunct hedge - species-poor
- Target Note

Target Notes

4. Juncus - Soft rush becomes more abundant near stream
5. Mature oak - Group of mature oak trees
6. Mature 'individual' trees - Group of mature oak trees
7. Dilapidated stone structure



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