

APPENDIX 6.1: Ecological Impact Assessment Methodology

1.0 INTRODUCTION

1.1 The ecological impact assessment (EcIA) contained in Chapter 6: Biodiversity has been undertaken with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) guidance¹ and the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended). It focuses on those activities that could potentially generate significant environmental effects on ecological receptors. For the purpose of the assessment, the terms 'impacts' and 'effects' are referred to in accordance with the definitions set out in the CIEEM Guidelines as follows:

- Impact: Actions resulting in changes to an ecological feature, for example, removing a hedgerow;
- Effect: Outcome to an ecological feature from an impact, for example, the changes experienced by the local population of a species arising from the loss of the hedgerow.

2.0 ZONES OF INFLUENCE

2.1 The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposal and associated activities. The zones of influence that extend beyond the direct land-take required for the proposed development have been identified based upon the nature of the completed project and the construction activities to be undertaken, informed by the consultation and Scoping process and current CIEEM and Natural England guidance where available. The zone of influence will therefore vary for different ecological features depending on their sensitivity to an environmental change. The zones of influence were used to establish the scope of baseline ecological surveys and the extent of survey area and desk study.

2.2 Zones of influence for the Site and the Proposed Development that have been considered are as follows:

- *Desk study - designated sites within 5km, extended to 10km for European Sites (Special Protection Areas (SPAs) or Special Areas of Conservation (SACs) and including Ramsar sites);*
- *Desk study - non-statutory designated sites, protected and notable habitats and species (e.g. NERC Section 41 Species of Principal Importance and Priority Habitats) within 2km;*
- *Field survey habitats - land within Site and immediately surrounding habitats where these could be surveyed from publicly accessible land or with third party permission;*
- *Field survey badgers - Site and adjacent land within at least 30m where access permitted; and,*
- *Field survey of trees for their bat roost potential - Site and adjacent boundary habitats.*

2.3 Zones of influence in relation to airborne emissions have been considered in

¹ Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment I the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine. CIEEM (2018).

Appendix 13.7 of the ES in accordance with Environment Agency guidance² for combustion processes, within the following radii from the proposed emission source:

- 10km for Ramsar Sites and European designated conservation sites, comprising existing and proposed Special Areas of Conservation (SACs) and Special Protection Areas (SPAs);
- 2km for nationally designated Sites of Special Scientific Interest (SSSIs); and
- 2km for ancient woodlands, Local Nature Reserves (LNR), and Local Wildlife Sites (LWS) and other locally designated sites ('local nature sites').

3.0 SIGNIFICANT EFFECTS

3.1 Ecological Impact Assessment (EcIA) is defined within the CIEEM guidelines as

'a process of identifying, quantifying and evaluating the potential effects of development-related or other proposed actions on habitats, species and ecosystems'.

3.2 The EIA Regulations³ require the description of the *'likely significant environmental effects of the proposed development on the environment'* (Regulation 18(3)(b)).

3.3 To determine the overall significance of each ecological effect, judgements on the sensitivity of the receptor(s) and the magnitude of impact from the Proposed Development are considered together in order to determine whether or not an effect is likely to be significant. This involves a combination of quantitative and qualitative assessment and the application of professional judgement.

3.4 For the purposes of this assessment, effects are categorised as significant or not significant in line with the EIA Regulations. The assessment considers effects at different geographic scales i.e. where effects may be discernible at a local scale but are not considered significant in the context of the EIA Regulations. For the purpose of the assessment, moderate and major effects are deemed to be 'significant' in EIA terms unless stated otherwise.

3.5 A 'significant effect' is considered to be an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general.

3.6 CIEEM guidelines on ecological impact assessment note that:

'A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant negative ecological effects can be lawfully permitted following EIA procedures.'

3.7 For ease of reference, Table 1.1 below sets out adapted CIEEM terminology, which

² Gov.uk: *Air emissions risk assessment for your environmental permit*. 2 August 2016.

<https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#screening-for-protected-conservation-areas>.

³ Town and Country Planning (Environmental Impact Assessment) Regulations (Wales 2017 (as amended)).

also shows the equivalent EIA terms as used in Chapter 6: Biodiversity.

Table 1.1 EIA regulations and CIEEM terminology used

Effect (Standard EIA-related terminology and assigned significance)		Equivalent CIEEM terminology adapted for Ecological Assessment
Negligible	Neutral	No discernible or significant on ecological integrity or conservation status (e.g. species or habitat).
Minor Adverse	Not Significant	Adverse effect on ecological integrity or conservation status, discernible/significant in ecological terms at a Local geographic scale only.
Moderate-Major Adverse	Significant	Adverse effect on ecological integrity or conservation status at a County, National or International geographic scale.

4.0 ASSESSMENT

4.1 The Proposed Development has been assessed as having a lifetime of 40 years for the purpose of this assessment and ecological effects have been described in terms of their duration as short, medium term and long-term as follows:

- Short-term effects are defined as 0 - 3 years;
- Medium term effects are defined as 3 - 15 years; and
- Long term effects are defined as > 15 years

4.2 The ecological impact assessment includes:

- An evaluation of identified important ecological features and potential receptors; faunal species, habitats and vegetation (as appropriate) on an international, national and regional basis;
- A description and evaluation of the potential effects of the Proposed Development on statutory and non-statutory sites designated for nature conservation;
- A description and evaluation of the potential effects of the Proposed Development on species and habitats;
- Mitigation measures implemented to address any identified significant adverse effects;
- An assessment of cumulative effects;
- Identification of any residual effects after mitigation; and
- Identification of opportunities for biodiversity enhancement.

4.3 For the purposes of this assessment the importance or sensitivity of an ecological

feature is considered within the context of a defined geographical area, ranging from International (high value) to Site (low/negligible), as detailed in Table 1.2.

Table 1.2 Value/sensitivity assessment

Sensitivity of Receptor / Geographic Scale of Importance	Definition examples
High - International / European	Greater than a UK scale, typically valued at a European level such as internationally designated sites (Special Protection Areas (SPA), Special Areas of Conservation (SAC) and/ or Ramsar sites) or proposed/ candidate site (pSPA or cSAC), large area of a habitat listed in Annex I of the Habitats Directive or smaller areas of such habitat which are essential to maintain the viability of the larger whole, large population of an internationally important species or site supporting such a species (or supplying a critical element of their habitat requirement) or species listed in Annex IV of the Habitats Directive.
High - National (UK)	UK: A nationally designated site (e.g. Site of Special Scientific Interest) or a discrete area which meets the selection criteria for national designation. An area of a priority habitat listed under Section 41 (England) of the Natural Environment and Rural Communities Act 2006 which constitutes a significant proportion of the UK resource of that habitat. A regularly occurring, regionally significant population of any nationally important species listed as a UK BAP / Biodiversity List and priority species listed under Section 41 (England) of the Natural Environment and Rural Communities Act 2006, and Species listed under Schedule 1 or Schedule 5 of the Wildlife and Countryside Act or Annex II or Annex IV of the Habitats Directive.
Medium Regional / County	Lancashire. Locally designated sites (Local Nature Reserves, County or Local Wildlife Sites). Areas of priority habitat which constitutes a significant proportion of the County's resource of that habitat. A regularly occurring, locally significant population of any nationally important species listed as a UK BAP / priority species and priority species listed under Section 41 (England) of the Natural Environment and Rural Communities Act 2006, and Species listed under Schedule 5 of the Wildlife and Countryside Act or Annex II or Annex IV of the Habitats Directive.
Low - Local	Local area around the Proposed Development. For example areas of priority habitat which are not large enough to meet the criteria for County value, or small but sustainable populations of a protected or notable species
Low/Negligible - Site	Considered within the context of the Site only.

4.4 Effects on ecological features have been assessed based upon the interaction between the importance, or sensitivity, of the feature and the magnitude of change it is

likely to experience. In accordance with the CIEEM guidelines (2018), an EcIA need only assess in detail, impacts upon important ecological features i.e. those that are considered important and potentially affected. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable. Where ecological features are not considered important enough to warrant further consideration, or where they will not be significantly affected, these are scoped out of the assessment presented here, and justification for exclusion is provided.

4.5 Relevant European, national and local guidance from governments and specialist organisations has been referred to in order to determine the importance (or 'sensitivity') of ecological features. Importance has also been determined using professional judgement and taking account of the results of baseline surveys and the functional role of features within the context of the geographical area.

4.6 Importance does not necessarily relate solely to the level of legal protection that a feature receives and ecological features may be important for a variety of reasons, such as their connectivity to a designated site and the rarity of species or the geographical location of species relative to their known range.

4.7 Once identified, potential impacts are described making reference to the following characteristics as appropriate: positive or negative, extent, magnitude, duration, timing, frequency, and, reversibility. The judgements on magnitude may need to be adjusted (either up or down) to reflect the duration of the change (i.e. short, medium or long term) and whether it is potentially reversible. The assessment also identifies areas where no change is anticipated and the resulting effect is described as '*not discernible*' or '*none*'.

4.8 Ecological effects are described as far as possible and where available information allows in terms of the parameters detailed in Table 1.3.

4.9 Magnitude of effect, based on the effects that the Proposed Development would have upon the resource/receptor, is considered within the range of high, medium, low, negligible. Consideration is given to scale, duration of impact/effect (and extent of Proposed Development with reference to the definitions in Table 1.2. The assessment considers how existing baseline conditions may change over time, as for example the baseline conditions could alter through operational land use, in the form of differing

management and natural growth or succession of habitats.

Table 1.3 Environmental Parameters

Environmental Parameter	Description
Magnitude	The 'size' or amount of the effect is referred to as the magnitude and is determined on a quantitative basis where possible supported by professional judgement.
Extent	The area over which an effect occurs. The magnitude and extent of an effect may be synonymous
Duration	The time over which an effect is expected to last prior to the recovery or replacement of the ecological receptor. This can be considered in terms of life cycles of species or regeneration of habitats. The duration may be longer than the duration of an activity.
Reversibility	Reversible (or temporary) effects are those that occur during the lifetime of the development and where spontaneous recovery or mitigation allows recovery within a reasonable timescale. Permanent effects are those which cannot be recreated within the proposed development or there is no reasonable chance that actions can be undertaken to reverse it.
Timing and Frequency	The timing of effects in relation to important seasonal and/or life cycle constraints. The frequency with which activities and simultaneous effects would take place can be an important determinant.

4.10 The assessment of effects is based upon the assessments of magnitude of effects and sensitivity of the resource/receptor to come to a professional judgement of how important this effect is. The magnitude of change effected on ecological receptors is described as set out in Table 1.4. The likelihood or probability that an effect will occur is addressed as far as possible based on available information. Whilst it is reasonably straightforward to identify effects that are certain to occur, or conversely will not occur, it is generally more difficult to assign a quantified level to occurrences defined as likely, unlikely or highly unlikely. In these circumstances, professional judgement has been used,

with reasoning supported by available evidence.

Table 1.4 Magnitude of Impact/Change

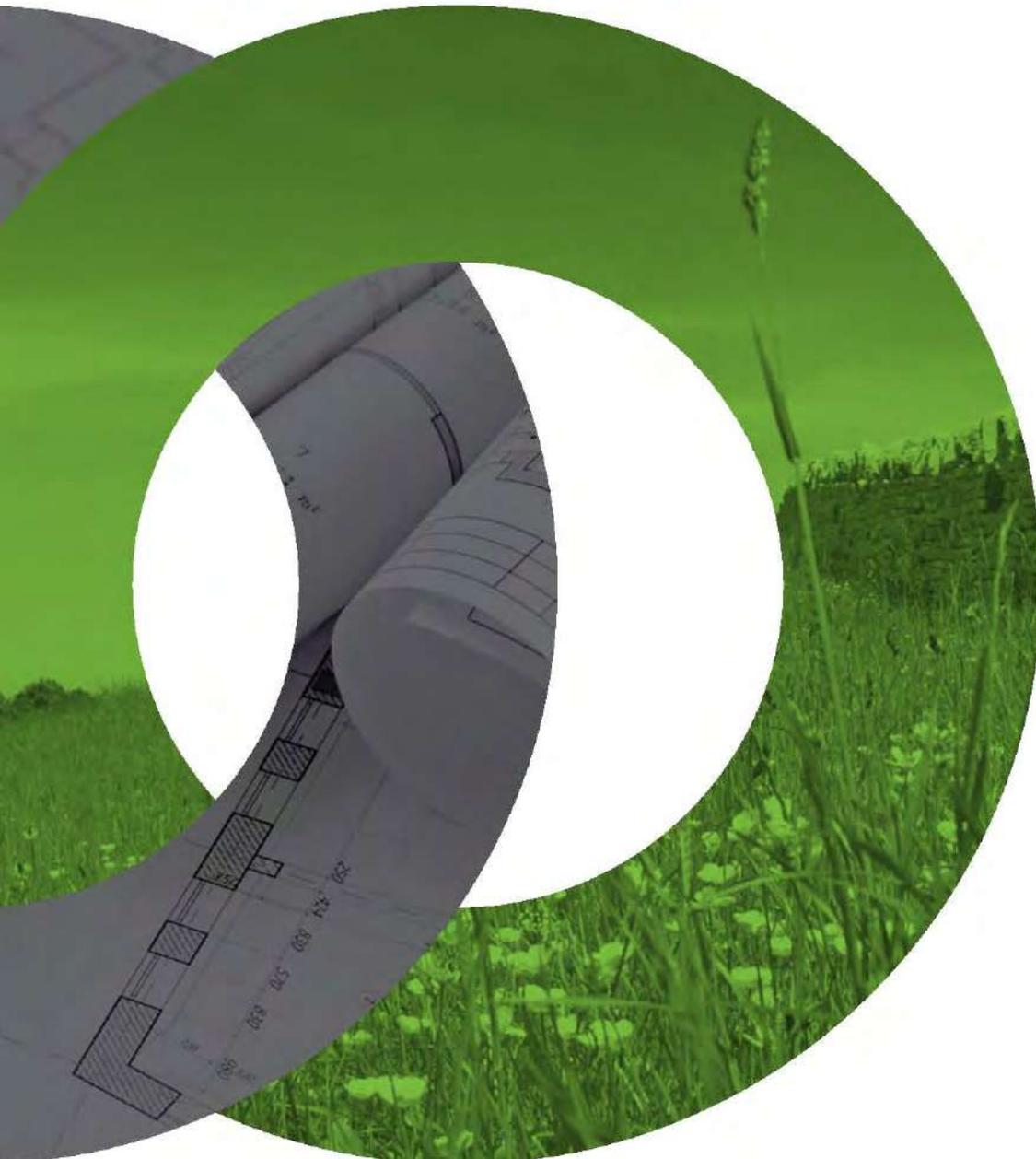
Magnitude	Criteria
High	The change may negatively or positively affect the conservation status of a site or species population, in terms of the coherence of its ecological structure and function, that sustains the habitat, complex of habitats and/or the population levels of species of interest.
Moderate	Conservation status of a site or species population will not be negatively or positively affected, but some element of the functioning of the site or population might be affected and the change to the site/ population is likely to be significant in terms of its ability to sustain some part of itself in the long term.
Low	Neither of the above applies, but some minor negative or positive change is evident on a temporary basis, or the change affects extent of habitat or individuals of a species abundant in the local area.
Negligible	No observable effect in either direction

4.11 For an effect to be significant, the ecological integrity or conservation status of a sensitive feature must be influenced in some way. It may be that the effect is substantial in magnitude or scale, irreversible, has a long-term effect, or coincides with a critical period in a species' life-cycle. Where uncertainty or limitations exist, this is acknowledged.

4.12 It is recognized that discernible effects can also occur at a local geographic scale which are not sufficiently severe to be assessed as 'significant' in accordance with the EIA approach, and do not require specific mitigation, but nonetheless merit discussion. In the interest of completeness these effects are discussed in Chapter 6: Biodiversity in relation to general construction good practices to be adopted to avoid or minimise low-level or minor disruption to local features, including for example standard pollution prevention and control measures.

Appendix 6.2;
Bryn Henllys Extension:
on behalf of Lightsource BP

Biodiversity Management Plan



Document Control				
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FIGURE 1: Bat and Bird Box Proposed Locations

APPENDIX 1: Bat and Bird Box Specifications

1 INTRODUCTION

- 1.1.1 This Biodiversity Management Plan (BMP) sets out habitat protection and enhancement measures for a proposed solar farm located on land at Bryn Henllys Extension, Waunlwyd Farm, Ystradowen, Swansea, SA9 2XX (the Site). This document also details ecological management practices to be adopted with the aim of developing and maintaining wildlife habitats to provide a net gain for local biodiversity.
- 1.1.2 Habitat enhancement measures and ongoing management practices are proposed in line with guidance produced by BRE guidance *Biodiversity Guidance for Solar Developments* (BRE, 2014¹) that will enhance and safeguard key habitats for the benefit of wildlife, and enhance the ecological value of land currently under agricultural use.
- 1.1.3 BRE guidance *Biodiversity Guidance for Solar Developments* (BRE, 2014) states that; *'with appropriate land management, solar farms have the potential to support wildlife and contribute to national biodiversity targets. Indeed, solar farms may have several additional advantages in that they are secure sites with little disturbance from humans and machinery once construction is complete. Recent research suggests biodiversity gains on solar farms can be significant'*.
- 1.1.4 Therefore, the site-specific approach provided within this report provides recommendations for long-term management of the land throughout the lifetime of the solar farm (40 years) to conserve and improve landscape habitat connectivity with the wider landscape for wildlife through protecting and enhancing potentially important wildlife corridors and habitats. This will contribute to the establishment of coherent ecological networks, supporting the targets of Planning Policy Wales.

¹ BRE (2014). *Biodiversity Guidance for Solar Developments*. Eds G E Parker and L Greene.

2 ECOLOGICAL BASELINE – PRE-DEVELOPMENT

- 2.1.1 This Biodiversity Management Plan should be read in conjunction with *Bryn Henllys Extension Site Layout and Planting Proposals*. Detailed descriptions of habitats and species can be found in the *Chapter 6; Biodiversity in the Environmental Statement* (Avian Ecology Limited, 2019²). The Site is located to the east of Ystradowen village and 3.1km to the north west of Ystradgynlais, Powys. It is located within an agricultural landscape with the Brecon Beacons National Park situated approximately 650m north of the Site.
- 2.1.2 Habitats within and immediately surrounding the Site includes improved grassland, hedgerows, hedgerow with trees, broad-leaved woodland and bare ground.
- 2.1.3 In the wider context the Site is surrounded by agricultural land with broadleaved woodland and the Afon Twrch to the west in addition to a farm dwelling and shop immediately adjacent to the west of the Site.
- 2.1.4 The Site is not located within any statutory designated site for nature conservation. Six statutory designated sites; Cwm twrch SSSI, Rhos hen-glyn-isaf SSSI, Mynydd Du (Black Mountain) SSSI, Tairgwaith SSSI, Gwrhyd meadows SSSI and Cefn gwrhyd Rhydyfro SSSI are all located within 5km of the Site. The closest of which is Cwm twrch which is 140m west and is designated as a geological conservation site. Six sites of Importance for Nature Conservation (SINCs) are within 2km of the Site, the closest being Pant-y-Brwyn SINC which is situated 500m west.

3 ECOLOGICAL MITIGATION MEASURES

3.1 Designated Sites and Habitats

- 3.1.1 No designated sites will be affected by the development. Adjacent habitats and the species they support will be protected by perimeter security fencing which will be erected first to prevent the encroachment of construction works beyond the Site boundary.
- 3.1.2 Standard measures to ensure runoff control and pollution prevention will be implemented; these measures will safeguard on-site ditches and boundary habitats as well as off-site land including Sites of Importance for Nature Conservation and associated habitats and species.
- 3.1.3 Hedgerows and associated trees on the Site will be retained and protected in-line with BS 5837:2012 *Trees in relation to design, demolition and construction*.
- 3.1.4 There will be clear delineation of working areas and access routes for vehicles entering the Site and instructions on these will be given to all site construction staff, delivery drivers and subcontractors.
- 3.1.5 During the operation of the solar farm over time, dirt and dust can accumulate on the glass surface of the module, reducing its power output. Periodic cleaning of PV modules where required will be undertaken with a soft brush and using soft, clean water which is considered to have no potential to adversely affect habitats or species.

² Avian Ecology Ltd (2019) *Chapter 6; Biodiversity. Environmental Statement*. A chapter prepared on behalf of Lightsource BP.

3.2 Birds

- 3.2.1 Site clearance works should be undertaken outside of the breeding bird season in so far as reasonably practical. The breeding bird season is generally considered to be 01st March to 31st August inclusive. Where this cannot be avoided, a suitably experienced ecologist will be appointed to undertake a pre-site clearance survey to identify the presence of any wild bird nests being built or in use (including those of ground nesting birds such as skylarks *Alauda arvensis*). Only once the appointed ecologist is satisfied that an offence under Part 1 of the Wildlife and Countryside Act 1981 (as amended) will not occur, may works proceed.
- 3.2.2 If a nesting species is identified, a suitable work exclusion zone will be established around the nest site where required, in line with best practice guidance and in consultation with the advising ecologist.
- 3.2.3 During operation, disturbance will be minimal and limited to intermittent maintenance activities. However, it is recommended that the cleaning of panels is undertaken outside of the breeding bird season in so far as reasonably practical to minimise disturbance to nesting birds.

3.3 Bats

- 3.3.1 Protection of all trees and hedgerows on Site or along access routes and adjacent land will maintain foraging and commuting opportunities. The trees within the Site are all young in age and hold negligible bat roost potential.
- 3.3.2 Buildings located in the wider survey area will not be affected by the proposed works and will not be subject to additional illumination during works.
- 3.3.3 In order to protect foraging / commuting bats, lighting required during construction and/or operation of the solar farm will be used in a sensitive manner and directed away from field boundary habitats, including habitats bordering the Site. Lighting for the solar farm will be restricted to ancillary buildings and required only for occasional maintenance and inspection visits. The site itself will not be lit. Building lighting will employ suitable low level lighting to minimise the potential for light spill (further information is provided in BCT guidance (2018) *Bats and Lighting in the UK: Bats and the Built Environment Series*³).

3.4 Badger

- 3.4.1 No evidence of badgers has been identified on Site however badgers are likely to be present in the local area. Perimeter fencing will incorporate mammal gates which are 250mm by 250 mm to ensure that animals can freely access the habitats within the Site.
- 3.4.2 A pre-construction badger *Meles meles* survey will be undertaken at a suitable time shortly prior to works commencing to check for active or any newly constructed setts (between the initial baseline survey and the construction start date) within at least 30m of construction areas.
- 3.4.3 If baseline conditions have altered and significant disturbance to badgers or their setts is considered likely during the proposed works, one or both of the following options will be incorporated:
- The development design will be amended to avoid works which may impact upon badgers and their setts (e.g. alteration of the configuration of panels and/or fencing); and/or,

³ Bat Conservation Trust. (2018). *Bats and Lighting in the UK: Bats and the Built Environment Series*.

- A disturbance licence will be obtained from Natural England before construction commences.

3.5 Amphibians and Reptiles

- 3.5.1 Land within the Site is dominated by improved grassland, which is sub-optimal terrestrial habitat for amphibian and reptile populations. However, habitats such as hedgerows and woodland (that will be retained on Site) may provide suitable habitat for widespread reptiles such as grass snake *Natrix Helvetica* and may provide suitable terrestrial habitat for amphibian species, if present.
- 3.5.2 Total land take for solar farm developments is typically low (less than 5% footprint on the ground) and construction works are low impact; of limited excavation for a temporary period of time. It is therefore considered that there will be no significant impacts on local populations of or individual amphibians and reptiles.
- 3.5.3 The proposed development will have no direct effects on ponds, and with standard good practice pollution prevention and control measures in place during construction and operation, off-site ponds and the species they support can be suitably protected from the risk of surface water runoff causing pollution.

3.6 Hazel Dormouse

- 3.6.1 Hedgerows and a small pocket of woodland are present on the Site which may be suitable for hazel dormice, if present in the area.
- 3.6.2 Both hedgerows and woodland habitats are to be retained and protected during works, with additional planting proposed to strengthen the network and add new connectivity, thereby safeguarding and enhancing potential dormouse habitat.

4 ECOLOGICAL ENHANCEMENT MEASURES

4.1 Habitat Enhancement

- 4.1.1 Management practices are proposed that will enhance the Site for the benefit of local wildlife. The design and long-term management of the land seeks to maintain and improve functionality through protecting and enhancing potentially important wildlife corridors i.e. through creation of a linear tree belt, new hedgerow creation and infill planting to strengthen existing hedgerows within and around the Site. The creation of extensive species diverse grassland habitat on fields containing solar panels which were formerly improved grassland provides increased habitat for invertebrates and foraging, shelter and breeding opportunities for other wildlife.
- 4.1.2 New hedgerow creation and infill planting (approximately 400m in total) and grassland oversown with a suitable wildflower mix, will provide suitable edge habitat favoured by foraging bird species including potentially woodlark *Lullula arborea* and nightjar *Caprimulgus europaeus*.
- 4.1.3 Grassland creation will include a species rich seed mixes to provide favourable habitat for a range of species, including invertebrates, which in turn increase foraging resources for birds and small mammals.
- 4.1.4 A linear tree belt to the north of the Site will contain native species which could be utilised by a range of species including breeding birds and foraging bats.

- 4.1.5 All planting stock supplied shall be healthy and viable and comply with BS 3936: Parts 1 to 10 as relevant, and BS 4043, the National Plant Specification, published by the Horticultural Trades Association (HTA) as appropriate. Supplying nurseries will be registered under the HTA Nursery Certification Scheme. All plants will be packed and transported in accordance with the Code and Practice for Plant Handling as produced by CPSE.
- 4.1.6 All seeding shall be carried out in accordance with BS 4428:1989 Code of Practice for general landscape operations (excluding hard surfaces), or the most up to date and current British Standard and in accordance with seed suppliers technical advice.
- 4.1.7 It is advised that herbicides are not used on Site; however, if herbicides are required, the herbicide handbook (English Nature, 2003⁴) provides guidance on appropriate herbicide use in relation to nature conservation works.
- 4.1.8 Planting will not be carried out when the ground is waterlogged, frost bound or during periods of cold drying winds.
- 4.1.9 All bare-root planting stock will be kept covered until actually planted in order to minimise water-loss and prevent the roots from drying out. Bare root stock shall be planted while dormant (November-April) or alternatively cell or container grown stock shall be used.

Hedgerow & Tree Planting

- 4.1.10 New and infill hedgerow planting (approximately 400m in total) will be carried out as part of the development which will include creating a new hedgerow to the south of the Site and strengthening and planting up gappy sections of hedgerow with native species. This will provide more species diverse and well-structured hedgerows, of value for wildlife around the Site. Planting will be in accordance with the *Site Layout and Planting Proposals Plan*.
- 4.1.11 A 5m wide linear tree belt (approximately 340m in length) will be planted to the north of the Site.. This will provide a species diverse habitat, creating wildlife corridors for a range of species and enhancing connectivity around the site and into the wider area.
- 4.1.12 Hedgerow and trees species have been selected to be appropriate to local conditions, as summarised below:

Table 4.1: Hedgerow and tree species proposed for planting

Hedgerow Planting
Field maple <i>Acer Campestre</i>
Hawthorn <i>Crataegus monogyna</i>
Hazel <i>Corylus avellana</i>
Dogwood <i>Cornus sanguinea</i>
Common Beech <i>Fagus sylvatica</i>
Blackthorn <i>Prunus spinosa</i>
Tree Planting
Field maple <i>Acer Campestre</i>

⁴ English Nature (2003) *The Herbicide Handbook: Guidance on the use of herbicides on nature conservation sites*. Natural England, Peterborough.

Hawthorn <i>Crataegus monogyna</i>
Hazel <i>Corylus avellana</i>
Goat willow <i>Salix caprea</i>
Common alder <i>Alnus glutinosa</i>
Pedunculate oak <i>Quercus robur</i>
Common holly <i>Ilex aquifolium</i>

Ground Preparation

- 4.1.13 Where necessary existing weeds will be manually removed or treated with a suitable herbicide as specified within the herbicide handbook (English Nature, 2003) or hand-weeding.
- 4.1.14 Any extraneous matter such as plastic, large pieces of wood and metal will be removed from site to a registered waste disposal facility.

Planting

- 4.1.15 Hedgerows will be notch planted in a double staggered row at 6 plants per linear metre or infilled as per planting schedule.
- 4.1.16 The exact timing of the proposed hedgerow planting will be dependent on the ground conditions but bare-root planting should ideally take place between the months of December-February inclusive. It is expected that ground conditions and climate will allow for earlier planting (i.e. before January), and this will allow the plants more time to establish a network of feeder roots before the onset of spring. Planting should avoid freezing and water logged conditions.
- 4.1.17 Planting slots shall be made using a planting spade. Plant notches should be L- shaped, using spades of a design suitable for this purpose. The planting notches must be vertical and deep enough for the roots to hang freely, with the transplant being planted so that the root collar is exactly level with the ground surface. The notch must then be closed and the soil will be well firmed round the roots in line with the guidelines as set out in BS 4428 (1989).
- 4.1.18 If ground conditions are dry during the time of planting (unlikely during December-February) then all individual plants should be well watered following planting.
- 4.1.19 All hedgerow planting stock will be protected from rabbit damage using approved proprietary 600mm clear plastic spiral guards, supported with 0.9m 12/14lb canes as advised by the manufacturer.

Grassland Creation

- 4.1.20 The BRE guidance states that, as panels are raised above the ground on posts, over 95% of a site used for solar farm development is still accessible for plant growth and complementary agricultural activities, such as conservation grazing (BRE, 2014). The RSPB briefing note on Solar Energy also states that biodiversity gains are possible where intensively cultivated arable or grassland is converted to extensive grassland and/or wildflower meadows between and/or beneath solar panels and in field margins (RSPB, 2014⁵). A significant benefit to wildlife will be therefore achieved through creation of more species and structurally diverse grassland within the Site, favourable to invertebrates, birds, mammals, amphibians, and reptiles.

⁵ RSPB (2014) *Solar Energy: RSPB Policy Briefing, December 2014*. RSPB: Sandy.

- 4.1.21 The main body of the Site is currently improved grassland. Land beneath and around the solar panels will be converted to more species-rich grassland through grass seeding where the ground has been disturbed during construction and through an on-going management regime.
- 4.1.22 Re-seeding of impacted fields, will be sown with a suitable low maintenance meadow grassland seed mix such as Emorsgate EM2 *Standard General Purpose Meadow Mix* or similar.
- 4.1.23 The difficulties of successfully establishing wildflower meadows on previously intensively managed agricultural grassland is acknowledged, and it is considered that a highly species-rich flowering meadow mix is unlikely to establish in the short-term at this Site as a result. The mix that has been selected is however considered to be robust, with a range of species able to successfully establish under a range of soil conditions to develop a reasonably diverse grassland meadow. A longer-term approach to the establishment of this species rich grassland habitat has been adopted, seeking through suitable management practices and the avoidance of fertilizers to establish an increasingly species and structurally varied grassland across the Site, which will naturally diversify over time.

Establishment

- 4.1.24 The areas to be sown will be lightly scarified to a depth of approximately 5mm with low-impact machinery/equipment, designed to avoid impacting the sub-soil and buried services or cables associated with the solar array.
- 4.1.25 The seed bed will be prepared by removing weeds using repeated surface cultivation or a suitable non-residual herbicide.
- 4.1.26 Areas will be sown in accordance with the suppliers instructions, ideally during early spring following the completion of development and underground cabling (although seeding is possible at other times of year). Seed will be sown by machine or where this is not possible, seed will be broadcast by hand.

4.2 Wildlife Enhancement

Birds

- 4.2.1 Additional bird nesting provision will be made through the inclusion of 6 bird boxes erected on trees located within the hedgerows within the Site. Precise locations will be subject to confirmation during the installation depending on tree condition at that time.
- 4.2.2 Bird boxes should ideally be installed in the autumn (September to November) following the cessation of construction works, by the appointed contractor under advice of the suitably competent ecologist.
- 4.2.3 Boxes should be erected at an appropriate height of between 1 to 5 metres. Boxes should be angled so that they face away from the prevailing wind or in a semi sheltered environment. Positioning within or close to hedgerows will increase chances of occupation. Bird boxes will be suitable for a variety of farmland bird species.
- 4.2.4 Suitable specifications for bird boxes are provided in **Appendix 1**.

Bats

- 4.2.5 Additional bat roost provision will be made through the inclusion of a minimum of 6 bat roost boxes on trees. Boxes will be erected in suitable habitats, at an appropriate height (ideally above 4m in

height) and with clear flight paths to utilise the Site boundary features. Precise locations will be subject to confirmation during the installation depending on tree condition at that time.

4.2.6 Suitable specifications for roosting boxes are provided in **Appendix 1**.

5 HABITAT MANAGEMENT

5.1.1 Habitat management will be reviewed and undertaken periodically throughout the lifetime of the solar farm, please refer to section 7. Management will be the responsibility of the current or any subsequent owner of the solar farm. All works associated with the implementation of the BMP will be undertaken by experienced contractors. The costs of any such works will be borne by the owner or any subsequent owner of the solar farm. Monitoring and reporting will be undertaken by a suitably qualified ecologist and the costs associated with monitoring reporting and any rectification works will be borne by the owner or any subsequent owner.

5.2 Hedgerow and Tree Management

5.2.1 During the establishment period (the first five years), all dead, dying or diseased stock will be replaced with stock of similar size and species by the appointed contractor at his own cost. If the failure of the plant is due to disease and the disease is considered likely to re-occur then an alternative native species of local provenance may be used as a replacement. The exact timing of the planting of replacement hedgerow and trees is dependent on the ground conditions; however, planting should ideally take place between the months of December and February inclusive, this will allow the plants more time to establish a network of feeder roots before the onset of spring.

5.2.2 The planting areas will be kept weed-free during the establishment period, using approved hand-weeding or if necessary herbicide treatment (applications in April, June and August). The herbicide handbook (English Nature, 2003) provides guidance on appropriate herbicide use in relation to nature conservation works. Where used, herbicides will be targeted and restricted to 1m width from the wood stem base to avoid impacting the wider grassland margin. Herbicides should be sprayed in appropriate weather conditions, to avoid affecting adjacent grassland areas. During the establishment period, the planted hedgerows and trees should be inspected during periods of warm weather and drought. If it is considered that the ground conditions are too dry, the planted areas will be watered on a regular basis until weather conditions are considered suitable for watering to cease.

5.2.3 During establishment, hedgerows will be trimmed outside each growing season; hedgerows will be cut back by half the growth of that year with pruning aiming to encourage the development of healthy well-shaped specimens. New hedgerows will be trimmed using powered hand-held machinery (not flail cutters) for the first 3 years until established.

5.2.4 Once established, all hedgerows will be cut on a 2-3 year flexible basis as necessary to avoid shading of the panels and protect the perimeter fencing from encroachment. Ideally not all hedgerows will be cut in the same year for the benefit of wildlife and to allow plants to flower and set seed/fruit. Established hedgerows will be cut between late September and February using a tractor mounted flail or other method as appropriate.

5.2.5 No cutting or trimming is to be undertaken during the breeding bird season (1st March to 31st August inclusive).

5.2.6 If of a sufficient amount, cuttings can be collected and used to create habitat piles / wildlife refuges in habitats adjacent to the Site.

5.2.7 After the establishment period planting guards (where used) will be removed and all hedgerows will be maintained at a height of approximately 2-4m or higher as appropriate for the operation of the Site.

- 5.2.8 Existing and newly planted trees within hedgerows will be left to grow naturally and not cut apart from pruning if necessary to maintain the health of the tree, safety or to protect panels from damage. These will be clearly marked to ensure that they are not cut back during hedgerow trimming/maintenance works.

5.3 Grassland Management

- 5.3.1 The grassland vegetation within the Site will be managed to provide a varied habitat structure providing nesting opportunities for birds and nectar, pollen and shelter for invertebrates, amphibians, reptiles and small mammals. Taller grassland vegetation will be encouraged to develop at the base of hedgerows, to provide foraging and shelter opportunities for wildlife.

Initial Management

- 5.3.2 Grassland management will be carried out in accordance with the seed supplier's technical advice during the establishment phase. Most of the sown meadow species are perennial and will be slow to germinate and grow and will not usually flower in the first growing season. There will often be a vigorous initial growth and a flush of annual weeds during the first season. This should be managed across all of the seeded areas by topping and mowing throughout the first year at regular intervals. Regular cutting to establish the grassland will take place during Year 1 after seeding and possibly also in Year 2 if growth is particularly vigorous on the ex-arable land. In the unlikely event that the grassland / meadow planting fails and the area of bare ground is greater than 20%, these areas will be re-seeded.
- 5.3.3 Problem perennial weeds will be controlled by hand pulling or if necessary careful targeted application of a non-residual herbicide by way of spot spraying with a knapsack (low pressure to avoid spray drift), or weed wiping (no herbicide application within the vicinity of dry ditches) herbicide application may be used in April, June and August. Alternatively, annual weeds can be managed by topping and mowing prior to setting seed which will encourage lateral development of the grasses. Any topping undertaken between April and July should be no lower than 200mm to prevent harm to any ground nesting birds.
- 5.3.4 Any cut material will be either removed from the site or heaped in designated areas within the Site in order to prevent nutrient build-up within the soil. Heaped material will provide suitable habitat for reptiles and invertebrates.
- 5.3.5 Specific attention should be paid to the potential presence of the following injurious (harmful) weeds: common ragwort (*Senecio jacobaea*), spear thistle (*Cirsium vulgare*), creeping thistle (*Cirsium arvense*) curled dock (*Rumex crispus*) and broad-leaved dock (*Rumex obtusifolius*); which are all listed within the Weeds Act 1959. These species should be removed from the grassland areas prior to enhancement works commencing^{6 & 7}.

⁶https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/525269/pb9840-cop-ragwort-rev.pdf

⁷https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69296/pb7190-harmful-weed-control.pdf

Long-term Management

- 5.3.6 Following establishment of a suitable sward, the grassland habitats will be managed through either grazing and/or mechanical cuts to develop nectar and pollen rich meadow grassland with a varied structure. Both management approaches are detailed below for ease of reference.

Option A: Cutting Regime

- 5.3.7 Following establishment, one or possibly two cuts will be taken per year comprising an early cut in February (if necessary) to manage regrowth around panels, and a second later in the season between August and September (each cut reducing sward height to approximately 150mm). No cutting will take place throughout the summer to allow the seeds of the later flowering species to fall prior to the cut, unless there is excessive height or tall weeds around panels which require period control. There may be circumstances when an additional summer cut is required to prevent vegetation obscuring panels, in such cases cuts should reduce sward height to no lower than 200mm to avoid impacts on nesting birds.
- 5.3.8 Cutting should adopt a systematic method (i.e. working outwards towards the boundary features); this will allow fauna such as invertebrates, amphibians, birds and small mammals to temporarily and safely vacate the area.
- 5.3.9 The management will take a flexible approach and the exact dates will be dependent upon weather conditions. A phased (rotational) cutting regime is recommended (i.e. ideally the entire area should not be cut at the same time) in order to allow for more structured grassland.
- 5.3.10 Cuttings will remain on-site for three to five days following the cut to allow seeds to disperse, and then be removed in order to remove nutrients and promote the development of a species-rich sward and placed on habitat piles located on the periphery of the Site.
- 5.3.11 The perimeter of the Site along hedgerow bases can be cut less frequently once established, with a single main cut (reducing sward height to approximately 150mm) late in the season, between August and September, subject to weather conditions. The late cut will allow the seeds of the later flowering species to fall prior to the cut. An optional earlier cut can be made in March, if necessary, to manage re-growth.

Option B: Grazing Regime

- 5.3.12 Once established the grassland within the perimeter fence can be managed by sheep grazing as an alternative to mechanical cutting. Grazing should follow a low-intensity grazing regime as follows.
- 5.3.13 The grassland would be subject to light intermittent grazing by sheep between late August / September and November where conditions allow. Moderate trampling will expose ground for colonisation by annuals the next spring; however, heavy trampling can lead to ground poaching and infestations by weed species that will be detrimental to the Site. During the spring and summer (March to August), sheep will be removed or stocking density reduced to allow summer flowering plants to set seed, and grazing will be removed in the winter period in order to prevent the compaction of wet earth.
- 5.3.14 Ideally, it is best to aim for a stocking rate just sufficient to maintain a varied structure, rather than the maximum that the grassland can support. Grazing density (Table 5.1) is based on medium sized sheep (e.g. 60kg). It is important to constantly monitor the Site to ensure the grassland is not under or over grazed and stock density and duration altered accordingly. The stocking density should be reduced in wet periods or in conditions when poaching would lead to a break-up of the sward and colonisation by aggressive weed species.

Table 5.1: A guide to stocking levels for lowland grassland (number of sheep per hectare). Adapted from the Lowland Grassland Management Handbook produced by Natural England.

Number of grazing weeks per year	Neutral Grassland (sheep per ha)
16	12.5
20	10
24	8
36	5.5
52	4

5.3.15 The following indicators will be used to review and amend stocking densities:

- An increase in the amount of uneaten grass, the accumulation of litter, an increase in vigorous rank and unpalatable grasses, and a reduction in low growing herbs indicates stocking density is too low (increase density).
- A reduction in density of plants, excessive poaching, weed invasion and the development of bare patches indicates stocking density is too high (reduce density).

5.4 Habitat Piles

5.4.1 Any wood and grass removed during habitat management or other work operations should be kept in habitat piles, placed along the edge of hedgerows, in order to provide valuable invertebrate habitat and shelter for other species including small mammals/amphibians/reptiles. These should be placed in the same locations each year.

6 ECOLOGICAL MONITORING

6.1.1 The development of the biodiversity interest of the Site will be monitored over time by a suitably experienced ecologist. A walkover survey will be undertaken on years 1, 3 and 5 and 10. This will involve an inspection of the hedgerows, trees, grassland and any other ecological features to ensure that they are being managed in a manner suitable for the enhancement of wildlife interest. Bird and bat boxes will also be checked. The results of these monitoring surveys will be used to inform future changes in management and the need or otherwise to replace missing bat/bird boxes. The management plan will be amended if necessary based on the monitoring recommendations (including amending the cutting regime if necessary).

6.1.2 Following the outcomes of each monitoring survey it will be the duty of “the Owner” of the site to amend the BMP to inform future changes in management including amending the grazing and cutting regime, if needed.

6.1.3 Monitoring procedures are outlined in **Table 6.1** (adapted from BRE guidance):

Table 6.1: Monitoring procedures and key indicators.

Biodiversity feature	Monitoring procedure	Key indicators
Hedgerows and tree belt	Walk full length of planted hedgerows and tree belt	<ul style="list-style-type: none"> • Browse damage, dead whips, weeds, gaps, dead or damaged plants.
Species diverse grassland	Walkover of planted areas	<ul style="list-style-type: none"> • Increase in the amount of uneaten grass/accumulation of litter/vigorous rank and unpalatable grasses – indicates need to increase stock densities. • Reduction in density of plants or plant species present (count and check against original seed mix species list) - Indicates need to reduce stock densities or amend cutting regime. • Excessive poaching, weed invasion or unwanted perennial weeds (docks, thistles) may need control by occasional spot treatment with an herbicide or other specific remediation. • Occasional bare patches at the edges of the grassland are acceptable as they provide diversity within the grassland habitat for invertebrates and birds.
Bird and bat boxes	Inspect each box	<ul style="list-style-type: none"> • Visually check boxes are intact, secured, and clean. Check for signs of use and record. Note if need to replace.

7 INDICATIVE MANAGEMENT SCHEDULE

7.1.1 The following management programme shows possible months in which activities will commence within the first planting period after construction:

Initial Habitat Enhancement Year 1

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 1												
Grassland creation (*recommended)			✓*	✓*	✓	✓	✓	✓	✓			
Hedgerow and tree planting	✓	✓										✓*
Installation of bird nest and bat roost boxes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

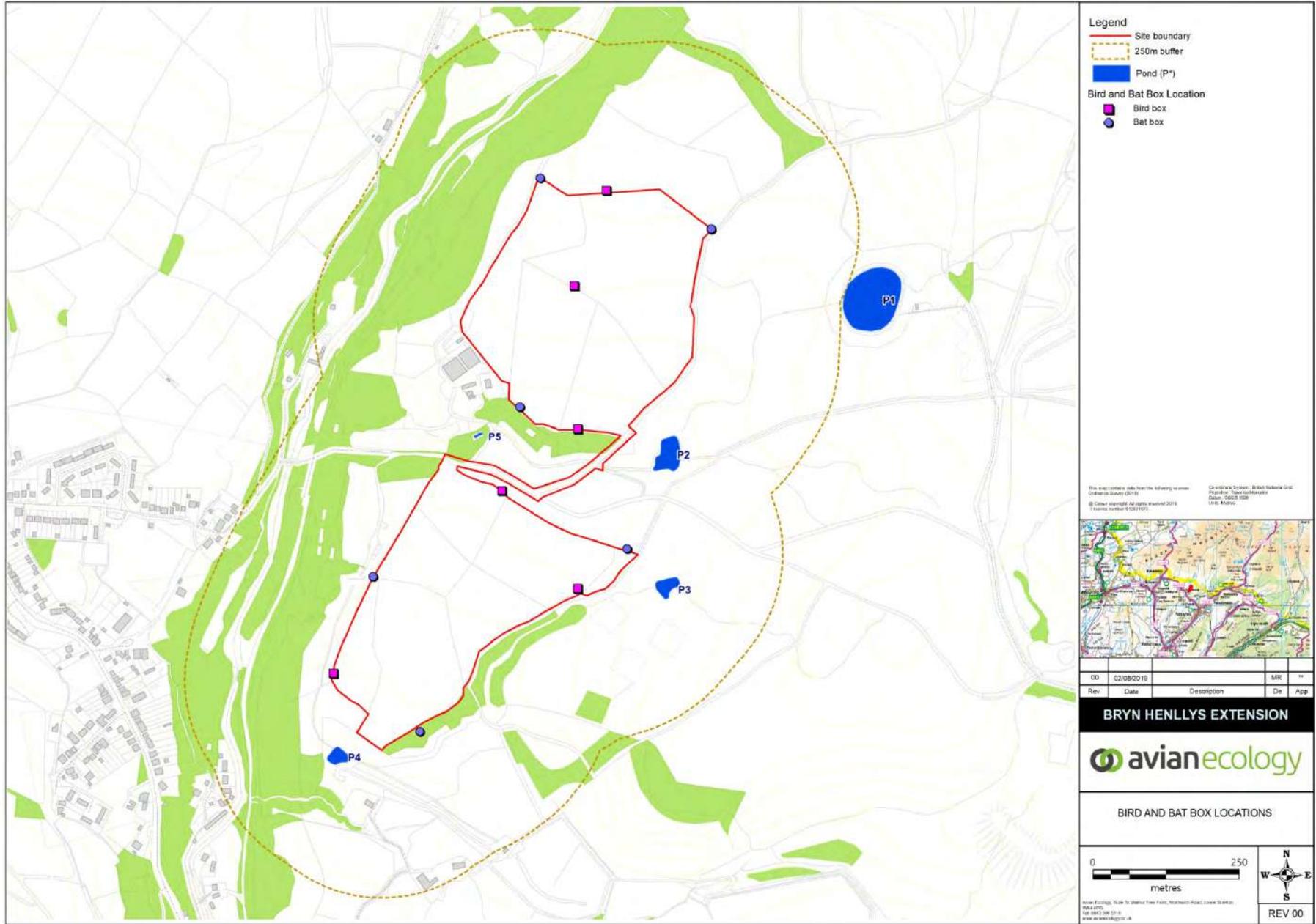
Habitat Management Year 2

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 2												
Initial management of grassland / meadows areas (targeted herbicide treatment of perennial weeds or cutting/topping where necessary)				✓		✓		✓				
Herbicide treatment or hand-weeding of hedgerow/tree planting bed .				✓		✓		✓				
Trimming of new hedgerows to encourage bushy side growth	✓	✓							✓	✓	✓	✓

Ongoing Annual Management

Management Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 3 onwards												
Grassland cutting		✓						✓	✓			
Sheep gazing	✓	✓							✓	✓	✓	✓
Herbicide treatment or hand-weeding of hedgerow/tree planting bed (establishment period up to first five years)				✓		✓		✓				
Periodic trimming of hedgerows as required	✓	✓							✓	✓	✓	✓

FIGURE 1: BAT AND BIRD BOX PROPOSED LOCATION



Appendix 1: bat and bird box specifications

Suitable Bat Roost Boxes (X12 bat boxes to be installed)		
Large Twin Crevice		Primarily for use by roosting bats but may also be used by small birds as a safe roost site. Two curved internal voids narrowing down to tight crevices at the top. Suitable for a range of bat species, mating roosts and spring and autumn roosts where the thermal mass is a benefit.
Bat chamber		Primarily for use by roosting bats including as an autumn mating roost, particularly for pipistrelles. Also likely be used by small birds as a safe roost site. 16mm hole for endoscope inspection in the base facilitating inspection, potentially avoiding working at height with the right equipment.
Siting	The bat boxes can be sited in trees and are best positioned at a height of between 3 to 6 metres. Bat boxes should ideally be sited in open sunny positions facing different directions to provide a variety of micro-habitats.	
Timing	Bat boxes can be installed at any time of year following the cessation of construction works.	
Other Notes	Note that once bats have inhabited a roost site they may only be disturbed by licensed bat workers.	
References	https://www.barkboxes.co.uk/product/large-twin-crevice/ https://www.barkboxes.co.uk/product/kent-type-twin-crevice/ https://www.barkboxes.co.uk/product/bat-chamber/	

Suitable Bird Boxes (X12 bird boxes to be installed)

<p>Great tit / tree sparrow nest box</p>		<p>Nest box and roost site with 28mm entrance suitable for great tit or tree sparrow. Likely to be used by roosting birds, and with potential for use by roosting bats.</p>
<p>Branch stub</p>		<p>Replicating a rotting branch stub with void. More likely to be used by nesting and roosting birds than roosting bats.</p>
<p>Open fronted nest box</p>		<p>For birds such as robin and pied wagtail. Open fronted but with a generous canopy to screen from aerial predators. Place in good cover not in the open.</p>
<p>Siting</p>	<p>The nest boxes should be sited in trees and are best positioned at a height of between 2 to 4 metres.</p> <p>Boxes should be angled so that they face away from the prevailing wind or in a semi sheltered environment. Positioning within or close to hedgerows will increase chances of occupation.</p>	
<p>Timing</p>	<p>Bird boxes will be erected outside of the breeding bird season, to eliminate the possibility of disturbing birds currently utilising the trees for nesting.</p>	
<p>Other Notes</p>	<p>Note that bird boxes should not be opened between the months of March to September to avoid disturbing nesting birds.</p>	
<p>References</p>	<p>https://www.barkboxes.co.uk/product/great-tit-tree-sparrow/</p> <p>https://www.barkboxes.co.uk/product/starling-box/</p>	

Suitable Bird Boxes (X12 bird boxes to be installed)

<https://www.barkboxes.co.uk/product/branch-stub/>

<https://www.barkboxes.co.uk/product/open-fronted-nest-box/>



HERITAGE DESK-BASED ASSESSMENT

BRYN HENLLYS SOLAR FARM EXTENSION: LAND AT WAUNLWYD FARM, YSTRADOWEN, SWANSEA

ON BEHALF OF: LIGHTSOURCE BP

PLANNING (LISTED BUILDING AND CONSERVATION AREAS) ACT 1990
ANCIENT MONUMENTS AND ARCHAEOLOGICAL AREA ACT 1979

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 **PLANNING**  **DESIGN**  **ENVIRONMENT**  **ECONOMICS**

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Summary

Pegasus Planning Group have been commissioned by Lightsource BP to carry out a Heritage Desk-Based Assessment for land at Waunlwyd Farm at Ystradowen in Powys.

The site appears to have comprised farmland throughout the medieval and post-medieval periods. A stone spread, located in the north-western corner of the southern parcel of the site, was excavated in 1995. It was interpreted as the probable remains of a post-medieval or modern sheep-fold or a dismantled field boundary bank. It may be the feature shown on the First Edition Ordnance Survey Map of 1878.

There is no evidence for industrial activity within the site prior to the 1960s, when the eastern part of the northern parcel and the majority of the southern parcel were subject to opencast coal mining. After restoration of these areas in the 1970s or 80s, extraction recommenced in the 1990s – this time seeming to include the western part of the northern parcel but again leaving the western strip of the southern parcel untouched. Operations ceased in 2003 and the areas restored once again.

This will have greatly impacted on the survival of archaeological remains from earlier periods. There is potential for evidence of agricultural and industrial activity, including the previously-excavated enclosure, to survive only within the western strip of the southern parcel and other marginal areas that may have escaped extraction and restoration. Any remains of historic land use are anticipated to be of low or very low significance and would not warrant preservation *in situ* or otherwise preclude development.

In accordance with pre-application advice received from CPAT and CADW, an appropriate and proportionate level of settings assessment has been carried out for designated historic assets located within a 3km radius of the site. It has been established that the site does not contribute to the significance of any of these assets through setting. As such, none of these assets are considered sensitive to the proposed development.

This Heritage Desk-Based Assessment has found no overriding heritage constraints to the proposed development.

1. Introduction

1.1 Pegasus Planning Group have been commissioned by Lightsource BP to carry out a Heritage Desk-Based Assessment for land at Waunlwyd Farm at Ystradowen, as shown on the site location plan provided at Plate 1.

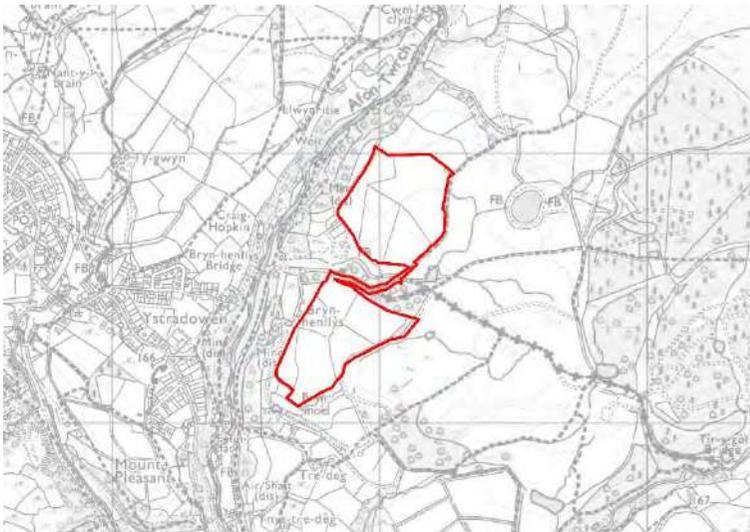


Plate 1: Site location plan

Planning history and proposals

1.2 The site lies outside of the Brecon Beacons National Park. The site is proposed for the construction of a solar farm.

¹ CIfA, 2014. *Standard and guidance for heritage desk-based assessment.*

Consultation

1.3 Pre-application advice was received from Powys Council on 8th April 2019 (19/0014/PRE).

1.4 The Clwyd-Powys Archaeological Trust (CPAT) provided the following consultation advice on 18th June 2019:

"We are in agreement with the scope of assessment set out [within the EIA scoping report] which includes a desk-based assessment, field visit and setting impact assessment. The resulting report should be sent to [CPAT] for further comment on any impacts identified and mitigation that may be required. A copy of the report should also be sent to the Historic Environment Record."

1.5 CADW provided consultation advice on 26th June 2019. They agreed with the scoping report that a DBA should be produced, consistent with the standards and guidance provided by the Chartered Institute for Archaeologists¹.

1.6 CADW recommended a 3km study area for the purposes of setting assessment. They recommended that Stage 1 of their guidance *Setting of Historic Assets in Wales*² be followed, to identify whether any other assets, in addition to the Grade II Listed Bethel Independent Chapel and a group of five Grade II

² CADW, 2017. *Setting of Historic Assets in Wales.*

Listed Buildings at Heol Giedd, Cwm Giedd, may be potentially impacted by the development proposals.

- 1.7 CADW advised that should any potential impacts be identified as part of Step 1, then susceptible assets should be progressed to Steps 2 to 4 of the assessment, in order to identify the scale of any impact and any appropriate mitigation measures. The settings assessment methodology is detailed in **Section 2** and the assessments are presented in **Section 5**.

Objectives

- 1.8 This Heritage Desk-Based Assessment accordingly describes the significance of those aspects of the historic environment that might be affected by the proposals, consistent with sections 6.1.9 and 6.1.26 of the Welsh Government's Planning Policy Wales, Edition 10, Chapter 6 (December 2018; PPW10) which provide that:

"Any decisions made through the planning system must fully consider the impact on the historic environment and on the significance and heritage values of individual historic assets and their contribution to the character of place."

"Where archaeological remains are known to exist or there is a potential for them to survive, an application should be accompanied by sufficient information, through desk-based assessment and/or field evaluation, to allow a full understanding of the impact of the proposal on the significance of the remains...."

2. Methodology

2.1 The aims of this Heritage Desk-Based Assessment are to identify any known and potential historic assets within the site, to assess the significance of any such known and potential historic assets, to assess the contribution that the site makes to the significance and heritage values of designated historic assets, and to identify any harm or benefit to them as may result from implementation of the development proposals, along with the level of any harm caused if relevant. This assessment considers the archaeological resource, built heritage and the historic landscape.

Sources of information

2.2 The following key sources have been consulted as part of this assessment:

- **CADW for information relating to designated historic assets;**
- **Clwyd-Powys Archaeological Trust, Glamorgan-Gwent Archaeological Trust, and Dyfed Archaeological Trust for Historic Environment Record (HER) data on recorded historic assets and previous archaeological works;**
- **Archival material, comprising cartographic and documentary sources, available online through The Genealogist and Promap;**
- **The Welsh Government APU online, for historic aerial photographs of the site and study area;**

- **1m resolution DTM lidar imagery, downloaded from the Lle Geoportal for Wales;**
- **Published and grey literature reports relating to heritage investigations undertaken within the environs of the site; and**
- **Online resources, including: satellite imagery available on Google Earth; geological data available from the British Geological Survey; soil data available through the Cranfield University Soilscales Viewer; and topographic and environmental data, available as Ordnance Survey Open Source.**

2.3 For digital datasets, information was sourced for a 1km study area measured from the boundaries of the site. Information gathered is discussed within the text where it is of relevance to the potential heritage resource of the site. A gazetteer of all recorded sites and findspots is included as **Appendix 1** and maps illustrating the resource and study area are included as **Appendix 3**.

2.4 Historic cartographic sources and aerial photographs were reviewed for the site and beyond this where professional judgement deemed necessary. Extracts of historic maps are reproduced in **Section 4** to illustrate the discussion of the historical development of the site.

2.5 Available LiDAR data was downloaded in composite Digital

Surface Model (DSM) and Digital Terrain Model (DTM) format, from the Lle Geoportal for Wales (accessed June 2019). The data was then processed and interrogated using industry-standard GIS software.

- 2.6 Multiple hill-shade and shaded-relief models were created, principally via adjustment of the following variables: azimuth, height, and 'z-factor' or exaggeration. The models created were colourised using pre-defined ramps and classified attribute data.
- 2.7 Due to the lack of tree-cover within the site, the results of the DSM and DTM models were broadly similar, as the 'first return' readings were consistent. Overall, the DTM modelling provided a slightly greater level of contrast. The DTM shaded relief model, with azimuths graduated by 45° intervals from 0-360°, is provided as **Appendix 3**.
- 2.8 Designated historic assets in the wider area were assessed as deemed appropriate (see **Section 5**).

Site visit

- 2.9 A site visit was undertaken by Pegasus Group in June 2019, during which the site and its surrounds were assessed. Selected historic assets were assessed from publicly accessible areas.
- 2.10 The visibility on this day was clear. Surrounding vegetation was in full leaf at the time of the site visit, and thus the potential screening that this affords was also considered when assessing

³ Welsh Government, May 2017.

potential intervisibility between the site and surrounding areas.

Assessment of significance

- 2.11 The Welsh Government's Technical Advice Note 24³ (TAN24; discussed further in Section 3) defines heritage significance as:

"the sum of the cultural and natural heritage values of a place, often set out in a statement of significance."

- 2.12 *Conservation Principles for the sustainable management of the historic environment in Wales*⁴ (Conservation Principles) defines significance as deriving from a combination of any, some or all of the following four component values:

- **Evidential value: deriving from the potential of a place to yield evidence about past human activity;**
- **Historic value: deriving from the ways in which past people, events and aspects of life can be connected through a place to the present;**
- **Aesthetic value: deriving from the ways in which people draw sensory and intellectual stimulation from a place; and**
- **Communal value: deriving from the meaning of a place for the people who relate to it, or for whom it figures in their collective experience or memory.**

- 2.13 This approach allows for a detailed and justifiable determination

⁴ CADW, 2011. *Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment in Wales*.

of significance and the values from which that significance derives. The significance of known and potential historic assets within the site has been determined in this respect and is described as relevant in this report.

- 2.14 In relation to *designated* historic assets, Listed Buildings and Conservation Areas are designated for their special architectural and historic interest, while Scheduled Monuments are primarily (but not exclusively) designated for their archaeological interest, i.e. their evidential value.

Setting and significance

- 2.15 Setting is defined in TAN24 as:

"the surroundings in which [an historic asset] is understood, experienced, and appreciated embracing past and present relationships to the surrounding landscape. Its extent is not fixed and may change as the asset and its surrounding evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect [the] ability to appreciate that significance or may be neutral."

- 2.16 Setting can thus contribute to, detract from or have a neutral effect upon significance. In addition, whilst a physical or visual connection between a historic asset and its setting will often

⁵ CADW, 2017. *Setting of Historic Assets in Wales*.

⁶ The guidance includes a (non-exhaustive) check-list of elements that may contribute to a historic asset through setting including: functional and physical relationships, topographic features, physical surroundings, original layout, buried

exist, it is not essential or determinative.

- 2.17 Of particular relevance, TAN24 further provides that:

"setting is not a historic asset in its own right but has value derived from how different elements may contribute to the significance of a historic asset."

- 2.18 As such, any impacts are described within this report (**Sections 4 and 5**) in terms of how they affect *the significance of a historic asset*, and any heritage values that contribute to that significance, through changes to setting.

Settings assessment methodology

- 2.19 The settings assessments presented in **Section 5** of this report have been undertaken in accordance with industry-standard methodology provided by CADW's *Setting of Historic Assets in Wales, Guidance Note 3*⁵. This guidance promotes a 'stepped' (iterative) approach, as follows:

- **Step 1: Assess which assets would be affected and identify their setting;**
- **Step 2: Define and analyse the settings to understand how they contribute to the significance of the historic assets and, in particular, the ways in which the assets are understood, appreciated and experienced**⁶;
- **Step 3: Assess the effects of the proposed**

or archaeological elements, views to/from/across, formal or planned vistas, prominence, views associated with aesthetic / functional / ceremonial purposes, historical / artistic / literary / place name / cultural / scenic associations, noise, smell, tranquillity / remoteness / wildness.

development, whether beneficial or harmful, on that significance or on the ability to appreciate it;

- **Step 4: Consider options to mitigate or improve the potential impact of a proposed change or development on that significance.**

Levels of significance

2.20 Under TAN24, an 'historic asset' is defined as:

"An identifiable component of the historic environment. It may consist of or be a combination of an archaeological site, a historic building or area, historic park and garden or a parcel of historic landscape. Nationally important historic assets will normally be designated."

2.21 Designated historic assets include World Heritage Sites, Scheduled Monuments, Listed Buildings, Protected Wreck Sites and Conservation Areas⁷. Registered historic assets include Registered Historic Parks and Gardens and Registered Historic Landscapes. Listed Buildings are designated in three grades as follows:

- **Grade I – buildings of exceptional, usually national interest.**
- **Grade II* - particularly important buildings of more than special interest.**
- **Grade II – buildings of special interest which warrant every effort being made to preserve**

them.

2.22 Registered Parks and Gardens are also registered Grade I, II* or II, depending on their comparative significance. In that same respect, Historic Landscapes are registered as either 'outstanding' or 'special'.

2.23 Archaeological remains that are not designated may still be nationally important, i.e. of a significance commensurate to a Scheduled Monument, these are referred to as *non-scheduled nationally important archaeological remains*.

2.24 Other historic assets include those of *special local interest* and *non-designated historic assets* of less than national importance.

Assessment of harm

2.25 Potential development effects (impacts) upon the significance of known and potential historic assets identified within the site have been determined with reference to 'harm' and/or 'benefit', consistent with PPW10.

2.26 The identification of harm would apply where the proposals would be anticipated to reduce an historic asset's significance. An attempt is made to qualify more precisely the level of any identified harm, taking into account the significance of the asset affected and the nature of any impact. The identification of benefit would apply where the proposals would be anticipated to enhance (i.e. increase) significance. It is also possible that the

⁷ TAN 24: Appendix

development proposals would cause no harm or that they would preserve significance.

- 2.27 The assessment of anticipated development effects can thus be seen to have been undertaken in accordance with a robust methodology, formulated within the context of current best practice, relevant policy provisions, and key professional guidance. Potential direct development effects, i.e. truncation of archaeological remains, are discussed in **Section 4** of this report. Potential non-physical effects, resulting from changes to setting, are discussed in **Section 5**.

3. Planning Policy Framework

3.1 This section of the report sets out the legislation and planning policy considerations and guidance contained within both national and local planning guidance which specifically relate to the site, with a focus on those policies relating to the protection of the historic environment.

Legislation

3.2 Legislation relating to the built historic environment is primarily set out within the Planning (Listed Buildings and Conservation Areas) Act (1990) which provides statutory protection for Listed Buildings and Conservation Areas.

3.3 Section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act (1990) states that:

“In considering whether to grant planning permission [or permission in principle] for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.”

3.4 With regards to development within Conservation Areas, Section 72 (1) of the Planning (Listed Buildings and Conservation Areas) Act (1990) states that:

“In the exercise, with respect to any buildings or other land in a conservation area, of any powers under any of the provisions mentioned in subsection (2), special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area.”

3.5 Notwithstanding the statutory presumption set out within the Planning (Listed Buildings and Conservation Areas) Act (1990), Section 38(6) of the Planning and Compulsory Purchase Act 2004 requires that *all planning applications are determined in accordance with the Development Plan (see below) unless material considerations indicate otherwise.*

National Policy & Guidance

Planning Policy Wales, Edition 10 (December 2018)

3.6 National policy is set out within the Welsh Government’s Planning Policy Wales, Edition 10 (PPW10). PPW10 Chapter 6 deals with the historic environment and its contribution to the Welsh Government’s seven well-being goals for a sustainable Wales. Planning Policy Wales emphasises that the positive management of change in the historic environment is based on a full understanding of the nature and significance of historic assets and the recognition of the benefits that they can deliver in a vibrant culture and economy.

3.7 Paragraph 6.1.5 of PPW10 provides that:

"The planning system must take into account the Welsh Government's objectives to protect, conserve, promote and enhance the historic environment as a resource for the general well-being... Conservation Principles highlights the need to base decisions on an understanding of the impact a proposal may have on the significance of an historic asset."

3.8 Paragraph 6.1.6 sets out the Welsh Government's specific objectives for the historic environment as follows:

- **Protect the Outstanding Universal Value of the World Heritage Sites;**
- **Conserve archaeological remains, both for their own sake and for their role in education, leisure and the economy;**
- **Safeguard the character of historic buildings and manage change so that their special architectural and historic interest is preserved;**
- **Preserve or enhance the character or appearance of Conservation Areas, while at the same time helping them remain vibrant and prosperous;**
- **Preserve the special interest of sites on the register of historic parks and gardens; and**
- **Protect areas on the register of historic landscapes in Wales.**

3.9 In relation to the setting of Listed Buildings, paragraph 6.1.10 provides that:

"There should be a general presumption in favour of the preservation or enhancement of a listed building and its setting, which might extend beyond its curtilage. For any development proposal affecting a listed building or its setting, the primary material consideration is the statutory requirement to have special regard to the desirability of preserving the building, its setting or any features of special architectural or historic interest which it possesses."

3.10 In relation to Conservation Areas, Paragraph 6.1.14 provides that:

"There should be a general presumption in favour of the preservation or enhancement of the character or appearance of conservation areas or their settings. Positive management of conservation areas is necessary if their character or appearance are to be preserved or enhanced and their heritage value is to be fully realised."

3.11 In relation to Historic Parks & Gardens, Paragraphs 1.1.17 and 1.1.18 provide that:

"Planning authorities should value, protect, conserve and enhance the special interest of parks and gardens and their settings included on the register of historic parks and gardens in Wales. The register should be taken into account in planning authority decision making."

"The effect of a proposed development on a registered park or garden, or its setting, is a material consideration in the determination of planning applications."

3.12 In relation to archaeological remains, paragraphs 6.1.23–6.1.25 provide as follows:

"The conservation of archaeological remains and their settings is a material consideration in determining planning applications, whether those remains are a scheduled monument or not.

Where nationally important archaeological remains are likely to be affected by proposed development, there should be a presumption in favour of their physical protection *in situ*. It will only be in exceptional circumstances that planning permission will be granted if development would result in direct adverse impact on a scheduled monument (or an archaeological site shown to be of national importance).

In cases involving less significant archaeological remains, planning authorities will need to weigh the relative importance of the archaeological remains and their settings against other factors, including the need for the proposed development.

Technical Advice Note 24

3.13 Technical Advice Note 24: The Historic Environment (TAN24) provides a detailed supplement to PPW10, and as such is consistent with those national policies. It contains detailed guidance on how the planning system considers the historic environment during development plan preparation and decision making on planning and listed building consent applications. It replaces Welsh Office Circulars 60/96, 61/96, and 1/98.

Local Planning Policy & Guidance

3.14 Planning applications in Powys are currently considered against the Powys Local Development Plan 2011–2026 (adopted April 2018). Relevant extracts from policies relating to the historic environment are cited below:

Strategic Policy 7: Safeguarding of Strategic Resources and Assets

"To safeguard strategic resources and assets in the County, development proposals must not have an unacceptable adverse impact on the resource or asset and its operation.

The following have been identified as strategic resources and assets in Powys:

2. Historic environment designations, including:

i. Registered Historic Landscapes.

ii. Registered Historic Parks and Gardens.

iii. Scheduled Ancient Monuments and other archaeological remains.

iv. Listed Buildings and their curtilages.

v. Conservation Areas.

AND the setting of designations i.-v."

Policy DM13: Design and Resources

"Development proposals must be able to demonstrate a good quality design and shall

have regard to the qualities and amenity of the surrounding area, local infrastructure and resources.

Proposals will only be permitted where all of the following criteria, where relevant, are satisfied:

1. Development has been designed to complement and/or enhance the character of the surrounding area in terms of siting, appearance, integration, scale, height, massing, and design detailing.

2. The development contributes towards the preservation of local distinctiveness and sense of place.

3. Any development within or affecting the setting and/or significant views into and out of a Conservation Area has been designed in accordance with any relevant adopted Conservation Area Character Appraisals and Conservation Area Management Plans, or any other relevant detailed assessment or guidance adopted by the Council..."

4. The Historic Environment

4.1 This section provides a review of the recorded heritage resource within the site and its vicinity in order to identify any extant historic assets within the site and to assess the potential for below-ground archaeological remains. A gazetteer of heritage data is included as **Appendix 1** and illustrated on Figures 1–3 in **Appendix 3**.

Designated Historic Assets

- 4.2 No designated historic assets are located within the site.
- 4.3 Designated historic assets in the 1km study area comprise the two Grade II Listed Buildings of Henllys Vale Colliery Limekilns and Chimney.
- 4.4 Designated historic assets within a 3km radius of the site (see **Section 1.6**) comprise the Grade II Listed Henglyn Isaf Farmhouse, the Grade II Listed Bethel Independent Chapel, five Grade II Listed Buildings at Heol Giedd, Cwm Giedd, and the Scheduled Monuments of Dorwen standing stone, Cwm Twrch settlement, Llwyncwmstabl round cairn, and Lorfa stone circle.
- 4.5 Designated historic assets are considered in further detail in **Section 5**.

Previous Archaeological Works

4.6 In 1994, archaeological work was undertaken prior to opencast mining (CPAT HER: prn 35992; Thomas 1995). An excavation

was undertaken of a stone spread, representing an agricultural enclosure, in the northern area of the southern parcel of the site (CPAT HER: prn 6439 / 19458; note: the HER points for the event and the monument are in slightly different locations). An excavation was also carried out at the lime kilns at Pen-y-wern (CPAT HER: prn 57792). Photographic surveys were undertaken at Brynhenllys Farm (CPAT HER: prn 58089 / 58091).

4.7 In 2002, Cambrian Archaeological Projects Ltd undertook a desk-based assessment and fieldwalking surveys prior to works to improve public footpaths and visitor facilities within Cwm Twrch Uchaf near Cwmllynfell and Ystradowen (Jones 2002).

Topography, geology and the palaeoenvironment

- 4.8 The site comprises two parcels of land of comparable size, outlying Waunlwyd Farm, to the north and south of a tributary of the Afon Twrch and a track called Heol Penygraig.
- 4.9 The land comprises part of a lobe of high ground defined to the west by the Afon Twrch and to the south and east by Nant Gwys; the point of confluence of these two rivers is at Cwm-Twrch Uchaf to the south of the southern land parcel. Cumulatively, both parcels slope to the south-west from a height of c.196m aOD to c.159m aOD.
- 4.10 The underlying bedrock across both land parcels comprises the

South Wales Middle Coal Measures, which has seen extensive exploitation (including within both land parcels) throughout the 19th and 20th centuries. This is overlain by superficial deposits of glacial (Diamicton) till along the western site boundary. The overlying soils comprise a mixture of loams and clays of low fertility, and post-extraction restored soils of only slightly greater fertility. In general, these soils are best suited to pasture and woodland.

- 4.11 The northern parcel is divided into four fields, three are currently under arable and one is under pasture. The southern parcel is divided into six fields, all of which are currently under pasture.

Prehistoric (pre-43 AD)

- 4.12 No evidence of prehistoric activity is recorded within the site and was likely located on the higher ground to the north and north-east, at an elevation of c.200m aOD and above.
- 4.13 Four potential Bronze Age huts are recorded c.550m north of the site (CPAT HER: prn 6431 / 6432 / 6346) and another singular potential Bronze Age hut and a cairn are recorded c.600m east of the northern parcel of the site (CPAT HER: prn 6429 / 6430). These remains have not been dated, and the HER states that they may equally be of medieval origin. A possible prehistoric settlement is recorded to the east of Cyllie Farm, just outside the study area, and other cairns of possible Bronze Age barrows are recorded further to the north at Derlwyn Isaf.
- 4.14 Known prehistoric ceremonial activity appears otherwise to have been focussed further to the north, along the lower south-facing

reaches of the Black Mountains.

Romano-British (AD 43 - 410)

- 4.15 No Romano-British assets are recorded within the study area.

Early medieval (410 AD – 1066) and Medieval (1066 – 1539)

- 4.16 There are no early medieval or medieval settlement remains recorded within, or within material proximity to, the site. The CPAT HER (prn 142269) makes reference to the '-llys' suffix in Brynhenllys, and observes that this may indicate the former location of a medieval court. This is disputed, however, not least as the suffix also appears as '-llysk' / '-llysg' in numerous historic documents, resulting in a different translation. While medieval settlement to the east of Cwm-Twrch is plausible, there is presently no archaeological evidence for such within, or within proximity to, the site; both Brynhenllys and Waun Lwyd were otherwise first documented as part of the Palleg Manor Estate during the mid-18th century.

Post-medieval (1540 – 1800) and Modern (1801 – present)

- 4.17 Activity within the study area during the post-medieval and modern periods is better evidenced than for previous periods. It is principally characterised by agriculture and mining.

Agriculture

- 4.18 The earliest map of the site consulted for this assessment is the

1812 Ordnance Surveyor's Map (not illustrated). It shows the site as a patchwork of enclosed fields. There is apparently a map of Brynhenllys dated 1819 (Thomas 1995, 19), but this was not reviewed for this assessment.

- 4.19 The Ystradgynlais Tithe Map dated 1844 (Plate 2) shows that the northern parcel of the site comprised part of five small fields and three larger fields and was crossed by a track that terminates c.480m to the north-east as well as the tributary of the Afon Twrch (which today follows a different course); whilst the southern parcel of the site comprised part of around 13 irregular fields. No buildings are marked in either of the parcels.



Plate 2: Extract of 1844 Tithe Map (image courtesy of The Genealogist)

- 4.20 The accompanying Tithe Apportionment states that both parcels of the site were in the ownership of Sir Charles Morgan but formed parts of two discrete holdings. The southern parcel comprised much of the land attached to Brynhenllys Farm (CPAT HER: prn 6454) with Rees Morgan in occupation; the northern parcel comprised much of the land attached to Waunlwyd Farm (CPAT HER: prn 6455), with Charles Price in occupation. This arrangement may preserve the distinction between two medieval holdings pre-dating the emergence of Palleg Manor during the later 16th century. The land within both site parcels would have been comparatively marginal, and would appear to have been primarily in use as well-managed pasture on the western margins of a large area of rough grazing on Palleg Hill.

- 4.21 The only recorded non-designated historic asset located within the site comprises the 'Brynhenllys enclosure' (CPAT HER: prn 6439): a sub-circular, stone-built enclosure, measuring c.15m SW-NE x c.20m SE-NW. The feature was excavated by CPAT and interpreted as either a sheep-fold or a purposefully-dismantled field boundary bank – perhaps related to the coppice enclosure with field barn shown on the First Edition Ordnance Survey Map of 1878 (Thomas 1995; Plates 3 and 4). The enclosure can seemingly be discerned on LiDAR imagery (**Appendix 4**).

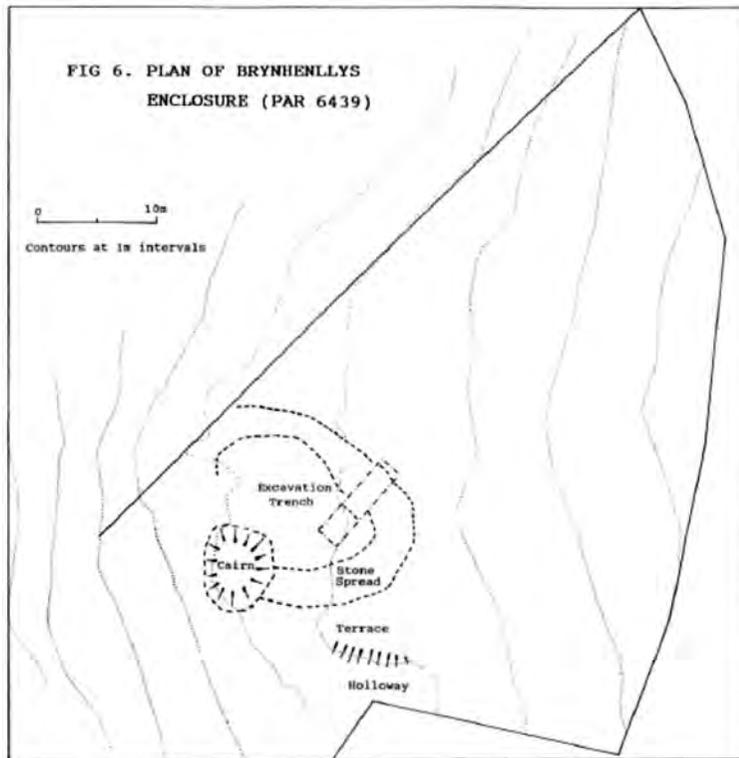


Plate 3: Plan of Brynhenllys Enclosure (Thomas 1995)

4.22 The First Edition Ordnance Survey Map shows no change to the field system of the site, but the south-eastern part of the northern parcel is identified as marsh and footpaths are shown in the western part of the northern parcel and in the southern part of the southern parcel (Plate 4).

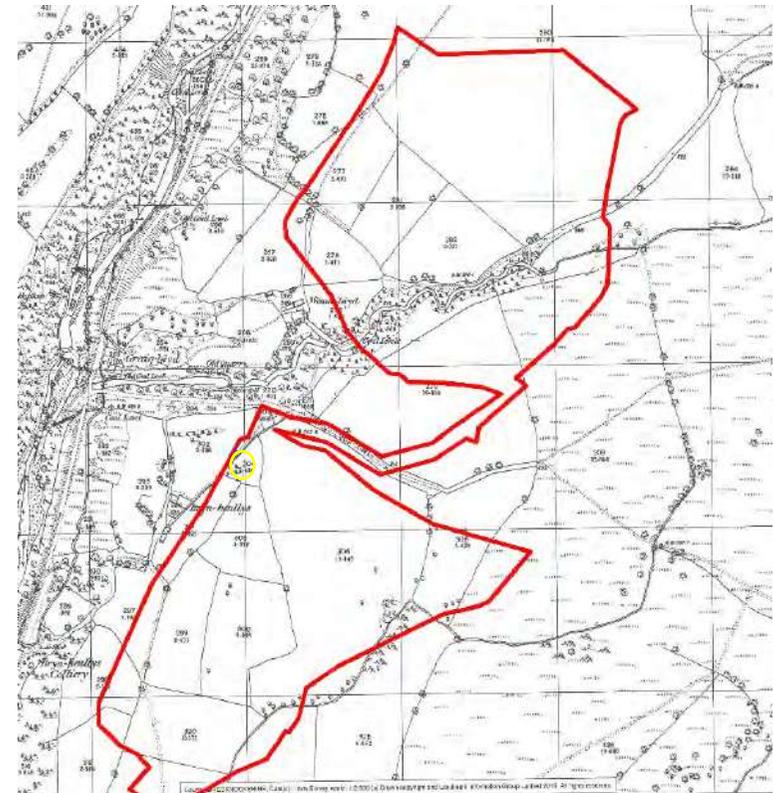


Plate 4: Extract of 1878 Ordnance Survey Map, showing the site divided into irregular fields; the coppice enclosure is circled in yellow (image courtesy of Promap with our annotation)

4.23 Examination of subsequent editions of the Ordnance Survey County Series and historic aerial photographs (not illustrated) suggests that agricultural use of the site persisted until the late-1950s/early 1960s when it was subsumed within an opencast coal mine (see below).

Mining

- 4.24 The valleys to the south and west of the site are rich in the later 19th-century remains of the local coal mining industry, as discussed in detail elsewhere (Jones 2002). Historic collieries were associated with the Brynhenllys, Waun Lwyd, Graig Llwyd and Cwm Clyd coal levels (CPAT HER: prn 6450 / 6446 / 6444 / 6449 / 23702; Dyfed HER: prn 104655 / 5504). Lime kilns are recorded at the Henllys Vale Colliery, 750m north of the site (CPAT HER prn 43209 / 19457; Dyfed HER: prn 5505; see **Section 5**) and a brickworks is recorded at Brynhenllys, c.130m west of the southern parcel of the site (CPAT HER: prn 6445; Dyfed HER: prn 104658).
- 4.25 The Upper and Lower Brynhenllys Collieries occupied the west and east sides of the Afon Twrch respectively; the latter was established first, in 1871, and was located 100m west of the southern parcel of the site (Jones 2002, 14). The nature of the association, if any, between Lower Brynhenllys Colliery and Brynhenllys Farm is not known (Thomas 1995, 19). Remains of buildings, mineral railway lines, and other infrastructure (such as leats) survive. Those at Lower Brynhenllys Colliery have been surveyed and are described by Jones (2002, 24–25). None of the identified features appear to extend into the site.
- 4.26 Brynhenllys Colliery closed in 1955, but by 1962–64, a series of trial shafts had been excavated across the moorland to the east of the site, and a large area, including most of the southern land parcel of the site and the eastern half of the northern parcel of

the site had been subsumed within an opencast coal mine (Plate 5).

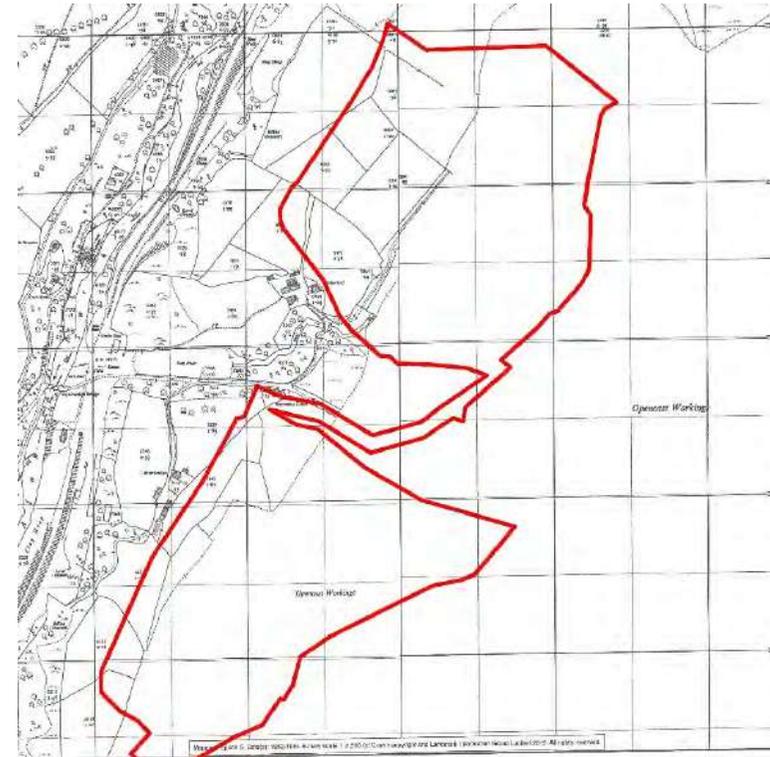


Plate 5: Extract of 1962–64 Ordnance Survey Map, showing opencast workings within much of the site (image courtesy of Promap)

- 4.27 Operations appear to have ceased and the areas restored by the late-1980s (Plate 6). The 1987 Ordnance Survey Map shows the new field layout and reinstated tracks in these areas, as well as a small building at Brynhenllys Farm tucked inside the western boundary of the southern parcel of the site. In 1993, permission

was granted for opencast mining to resume at Brynhenllys (Thomas 1995).

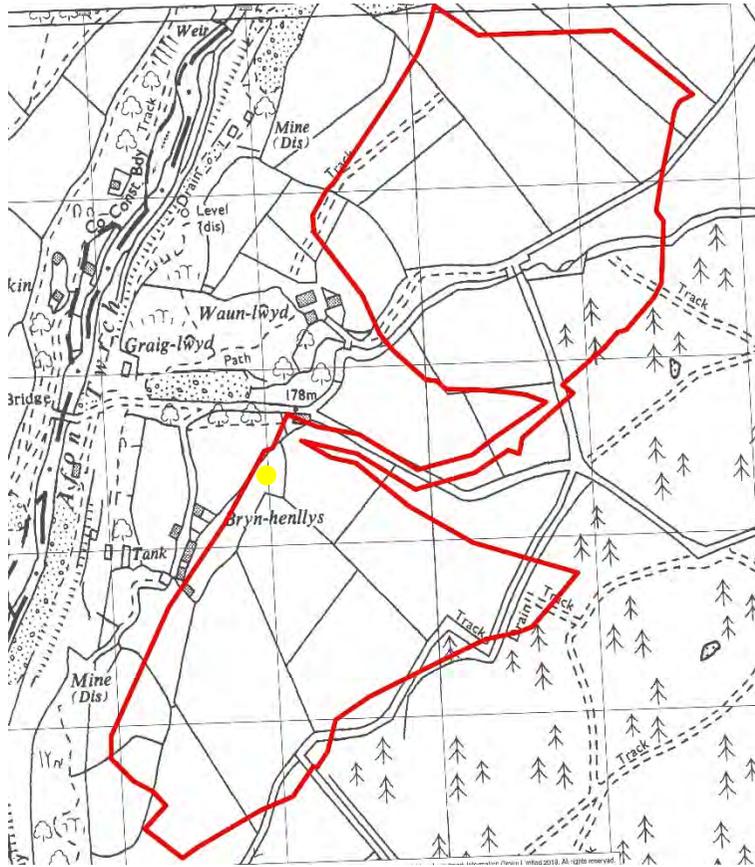


Plate 6: Extract of 1987 Ordnance Survey Map, showing restored field system across the site; yellow dot identifies approximate location of Brynhenllys enclosure (image courtesy of Promap with our annotation)

4.28 This phase of mining activity continued until 2003, following which the land was again restored to agricultural use. It would

seem, from the restoration visible on Google Earth satellite imagery of 2006, that virtually the entire site was subject to extraction in the 1990s (Plate 7). The exception may be the south-western corner of the southern parcel, which retains the same curving field boundary as documented in 1987, and the strip within the western boundary of the southern parcel since the Brynhenllys enclosure is visible on LiDAR (Appendix 4).

4.29 As part of the 1990s operations, the small building within the western boundary of the southern parcel (see above), and Brynhenllys Cottage abutting the northern boundary of the southern parcel (Powys HER: prn 6456; Thomas 1995, 19) were demolished. The buildings of Brynhenllys Farm were shells by 2006 and were demolished sometime between 2016 and 2018.



Plate 7: Google Earth satellite imagery of 2006

Summary of archaeological potential

- 4.30 Given the absence of any prehistoric, Romano-British, early medieval or medieval assets having been recorded within the site, the topographic and geological context, and the history of localised coal extraction on an industrial scale, the potential for remains from these periods to survive buried within the site is considered low and would be confined to marginal areas (namely the western strip of the southern parcel) that were not subject to opencast extraction in the 1960s/70s or 1990s/00s.
- 4.31 The remains of a post-medieval or modern enclosure have been investigated in the north-western part of the southern parcel of the site. It is a non-designated historic asset of only limited significance. There may be other remains of historic agricultural activity in marginal areas of the site unaffected by mining, but such remains would be of very low significance.
- 4.32 While no mining remains pre-dating the 1960s opencast works are recorded within the site itself, it is possible that such remains may survive buried within marginal areas of the site unaffected by mining, but such remains would be of low significance.
- 4.33 In sum, there is very limited potential for buried archaeological remains of a significance commensurate with that of a designated historic asset, and so would be unlikely to warrant preservation *in situ* or otherwise preclude development.

5. Setting Assessment

5.1 Step 1 of the methodology recommended by CADW's guidance *Setting of Historic Assets in Wales* (see *Methodology* above) is to identify which historic assets might be affected by a proposed development.

5.2 Development proposals may adversely impact historic assets where they remove a feature which contributes to the significance of an historic asset or where they interfere with an element of an historic asset's setting which contributes to its significance, such as interrupting a key relationship or a designed view.

5.3 Consideration was made as to whether any of the historic assets within a 3km radius (as requested by CADW, see **Section 1.6**), include the site as part of their setting, and therefore may potentially be affected by the proposed development.

5.4 The assets within a 3km radius of the site comprise:

- **Grade II Listed Henllys Vale Colliery Limekilns;**
- **Grade II Listed Henllys Vale Colliery Chimney;**
- **Grade II Listed Henglyn Isaf Farmhouse;**
- **Grade II Listed 74, 76, 78, 80 and 82 Heol Giedd, Cwm Giedd;**
- **Grade II Listed Bethel Independent Chapel;**

- **Scheduled Dorwen standing stone;**
- **Scheduled Cwm Twrch settlement;**
- **Scheduled Llwynchwstabl round cairn;**
- **Scheduled Lorfa stone circle.**

5.5 It was clear from the Listing and Scheduling descriptions that the significance of all of these assets is derived principally from the values embodied by their physical form and fabric, and that setting makes a lesser contribution to their significance.

5.6 No direct historical association between Henllys Vale Colliery and the site was noted in any of the data sources consulted for this assessment. As discussed in **Section 4**, throughout the 19th and first half of the 20th century, the site comprised farmland whilst the industrial areas were focussed along the Afon Twrch and its tributary (Thomas 1995). There is no intervisibility between the site and the built and earthwork remains of the colliery on account of the topography and intervening tree cover along the Afon Twrch. The site does not contribute to the significance of either the Listed limekilns or the Listed chimney through setting.

5.7 In the case of the remaining Listed Buildings, which lie 2–3km south-east of the site, no historical association or intervisibility with the site was identified. There is no evidence that the site was ever part of the landholdings of Henglyn Isaf Farmhouse.

All of the Listed Buildings are best appreciated at close range, from their immediate surrounds. The site does not feature in any designed views to/from the farmhouse or the cottages at Heol Giedd. The chapel is not visible at long-range; it is not a landmark place of worship within the landscape in the same way as a church with a tower or spire. The site does not contribute to the significance of either the Listed Farmhouse or the Listed cottages through setting.

- 5.8 The Scheduled Monuments lie 1.5–3km north-east of the site, occupying the south-facing slopes of the uplands. They are part of the extensive prehistoric ceremonial landscape of the Black Mountains. The Scheduled Monuments accordingly have group value with one another and the many other (also Scheduled) standing stones, stone circles, and cairns distributed across the Brecon Beacons National Park. No prehistoric remains are recorded within the site, which occupies a more lowland zone. The Scheduled Monuments are best appreciated at close range; they are not visible from the site. It is unlikely that the site is readily distinguishable in long-ranging south-westerly views from any of the Scheduled Monuments, despite their elevated location. The site does not contribute to the significance of any of the Scheduled Monuments through setting.

6. Conclusions

- 6.1 This Heritage Desk-Based Assessment has found no overriding heritage constraints to the proposed development.
- 6.2 The site appears to have comprised farmland throughout the medieval and post-medieval periods. A stone spread, located in the north-western corner of the southern parcel of the site, was excavated in 1995. It was interpreted as the probable remains of a post-medieval or modern sheep-fold or a dismantled field boundary bank. It may be the feature shown on the First Edition Ordnance Survey Map of 1878.
- 6.3 There is no evidence for industrial activity within the site prior to the 1960s, when the eastern part of the northern parcel and the majority of the southern parcel were subject to opencast coal mining. After restoration of these areas in the 1970s or 80s, extraction recommenced in the 1990s – this time seeming to include the western part of the northern parcel but again leaving the western strip of the southern parcel untouched. Operations ceased in 2003 and the areas restored once again.
- 6.4 This will have greatly impacted on the survival of archaeological remains from earlier periods. There is potential for evidence of agricultural and industrial activity, including the previously-excavated enclosure, to survive only within the western strip of the southern parcel and other marginal areas that may have escaped extraction and restoration. Any remains of historic land

use are anticipated to be of low or very low significance and would not warrant preservation *in situ* or otherwise preclude development.

- 6.5 In accordance with pre-application advice received from CPAT and CADW, an appropriate and proportionate level of settings assessment has been carried out for designated historic assets located within a 3km radius of the site. IT has been established that the site does not contribute to the significance of any of these assets through setting. As such, none of these assets are considered sensitive to the proposed development.

7. Sources

Cartographic Sources

- 1844 Tithe Map and Apportionment for Ystradgynlais
- 1878 Ordnance Survey County Series for Brecknockshire, 1:2,500
- 1899 Ordnance Survey County Series for Glamorganshire, 1:2,500
- 1905 Ordnance Survey County Series for Brecknockshire, 1:2,500
- 1918 Ordnance Survey County Series for Brecknockshire, 1:2,500
- 1921 Ordnance Survey County Series for Carmarthenshire, 1:10:5,60
- 1962–64 Ordnance Survey Plan, 1:2,500
- 1987–89 Ordnance Survey Plan, 1:10,000

Published sources

- Jones, R. S., 2002. *Archaeological Desk-Top Assessment and Field Survey: Fford y Glowyr, Cwm-Tyrch*. Cambrian Archaeological Projects Ltd.
- Sambrook, R. P. and James, H., 1995. *The South East Dyfed Anthracite Coalfield*. Dyfed Archaeological Trust Ltd.
- Thomas, D. 1995. *Brynhenllys Opencast, Powys: Archaeological Investigations*. CPAT Report prepared for British Coal Opencast: South Wales Region.

Appendix 1: Gazetteer of Historic Assets

Heritage Data

CPAT HER Events

PRN	Site Name	NGR
19458	Brynhenllys enclosure, excavation 1994	SN 7571 1244
35992	Brynhenllys opencast, mitigation project 1994	SN 762 126
57789	Brynhenllys cottage, photographic survey 1994	SN 76 12
57792	Pen-y-wern, excavation 1994	SN 762 126
58089	Brynhenllys farm, photographic survey 1994	SN 7570 1240
58091	Pen-y-wern, photographic survey 1994	SN 7570 1240
121745	Round huts in central and north-east Wales, desktop assessment 1998	SO 1038 896634
123124	Medieval and Post-Medieval Industry, assessment project 2011-12	SO 10483 96629
141540	The Llys and the Maerdref in East and North-East Wales, scheduling enhancement project 2014-15	SO 06728 26995
141996	Medieval and Post-Medieval Industry, desk based assessment 2011-12	SO 10483 96629
142249	The Llys and the Maerdref in East and North-East Wales, desk-based assessment 2014-15	SO 06728 26995

CPAT HER Monuments

PRN	Site Name	Description	NGR
6429	Brynhenllys cairn	Area of disturbed stone sited on local summit. One elongated mound 12m long by 0.5m wide and 0.5m high and one circular mound 0.75m diameter and 0.4m high plus two possible sites of similar features. Possibly the remains of shooting butts though may be built on site of sepulchral cairn base.	SN 7687 1308
6430	Brynhenllys hut I	Area of disturbed ground on gentle south-east facing slope. Possibly the remains of a Bronze Age hut scoop though may merely be a natural hollow accentuated by erosion.	SN 7681 1293
6431	Pen y Wern hut I	Foundation of D-shaped dry-stone built hut c6m E-W by 5m N-S with walls 0.5m thick and surviving to 0.4m high. Constructed with an inner and outer boulder kerb with smaller stone infill. Possible entrance on west side. Sited on north bank of, and immediately adjacent to, deep stream gorge. Siting would suggest that this is perhaps a medieval feature though may possible be Bronze Age.	SN 7640 1344
6432	Pen y Wern hut II	Foundation of D-shaped dry-stone built hut c6m E-W by 5m N-S with walls 0.5m thick and surviving to 0.4m high. Constructed with an inner and outer boulder kerb with smaller stone infill. Possible entrance on west side. Sited on north bank of, and immediately adjacent to, deep stream gorge. Siting would suggest that this is perhaps a medieval feature though may possible be Bronze Age. Trenched by CPAT in 1995 with inconclusive results (CPAT 1998).	SN 7644 1347
6433	Pen y Wern trackway	Length of terraced trackway running, for about 40m, from the top of the north side of steep stream gorge downslope towards the stream. Presumably connecting huts (PORN 6431, 6432) with stream. Siting, and the possible association with hut sites, would suggest that this is perhaps a medieval feature.	SN76351345
6434	Pen y Wern hut III	Foundation of D-shaped dry-stone built hut c6m E-W by 5m N-S with walls 0.5m thick and surviving to 0.4m high. Constructed with an inner and outer boulder kerb with smaller stone infill. Entrance on south side. Sited at confluence of two E-W streams, on the south bank of, and immediately adjacent to, the northernmost (deeper) stream gorge. Abutted on the west by a spur wall (PRN 6435) and perhaps associated with them (the whole possibly forming a small settlement). Siting, and the possible association with the limekiln, would suggest that this is perhaps a medieval feature though may possible be Bronze Age. Similar structure PRN 6431,	SN 765 01341

		6432 c50m to the north on opposite bank of stream. Excavated in 1995 by D Thomas.	
6435	Pen y Wern wall	Length of tumbled dry-stone walling running, for about 15m, west from side of hut PRN 6434 towards stream confluence. Survives as rubble bank c1.5m across and up to 0.5m high. Presumably associated with hut PRN 6434. Siting, and the possible association with hut sites, would suggest that this is perhaps a medieval feature though may possibly be Bronze Age. See also huts 6431, 6432, c 50m to the north, on opposite bank of stream.	SN 7638 1341
6436	Pen y Wern hut IV	Foundation of three sides of a rectangular dry-stone built hut c 4m SW-NE by 1.5m SE-NW (the north west side being destroyed by stream erosion). The surviving walls are formed by a setting of single boulders with smaller stone infilling some of the interspaces. There is no obvious entrance. Sited at confluence of two E-W streams, on the south bank of, and immediately adjacent to, the northernmost (deeper) stream gorge. Adjacent to a circular hut (PRN 6434) a limekiln (6437) and a large pit (PRN 6438) and perhaps associated with them (the whole forming a small settlement). Siting, and the possible association with the limekiln, would suggest that this is perhaps a medieval feature.	SN 7641 1344
6437	Pen y Wern kiln	Foundation of circular dry-stone built kiln c5m across with surviving boulder wall 0.5m thick and up to 0.6m high constructed on top. Comprises a dry-jointed stone line pit, of relatively crude construction, partially built into northern bank of stream with a dry-stone revetment around its southern side. Described as a kiln (disused) by OS 1964 and is possibly a limekiln. There is little evidence of burning debris on, or around, the site which may suggest a relatively short working life. The kiln is sited at the confluence of two E-W streams adjacent to huts PRN 6434, 6436 and pit 6438 - which may be a source of limestone for this kiln, and it perhaps associated with them (the whole possibly forming a small settlement). Siting, the relative crudity of construction, and its apparent associations, would suggest that this is perhaps a medieval feature.	SN 7643 1341
6438	Pen y Wern pit	Circular pit c3m across and 1.5m deep. Sited at confluence of two E-W streams immediately adjacent to possible limekiln 6437 and is probably a quarry pit for this kiln.	SN 7652 1341

6439	Brynhenllys enclosure	Foundation of circular dry-stone built enclosure c15m across surviving as an annular rubble spread c1.5m thick and up to 0.8m high, with massive clearance cairn built on south-western side (presumably after dereliction). Occupies highest ground at the narrowest point of a narrow N-S field (which adjoins Brynhenllys farm buildings), merging with the field wall on the western side and separated from the boundary on the east by a slight terrace 2.5m wide and a hollow way 2m wide. Very probably some form of fold or pen associated with the farm buildings to the south, and therefore of post-medieval date, though siting and morphology are reminiscent of a ring cairn. Depicted as a former enclosure occupied by trees by OS but not obviously part of the present field system. Excavation in 1994 showed it to be a modern feature - see PRN 19458.	SN 7578 1247
6440	Brynhenllys cairn II	Irregular mound of ill-sorted stone apparently built up against (and slightly over) extant post medieval field wall. Almost certainly a relatively modern field clearance cairn associated with the cultivation of the present field system.	SN 7658 1224
6441	Tre Deg Cairn	Irregular turf covered mound c1.5m across and 0.3m high. Sited within level pasture field. Possibly a clearance feature though may be natural.	SN 7587 1190
6442	Cwm Clyd level	Coal mine recorded on 1st edition OS 1878 but little now apparent.	SN 7614 1330
6443	Brynhenllys colliery I	Site of former drift mine centred on given NGR though extending along river Twrch both to north and south (from roughly SN75841299 to SN75641270). Vestigial building remains, including pit head buildings, an incline, shafts and spoil heaps etc. Serviced by mineral railway (PRN 6448) now disused.	SN 757 128
6444	Graig Lwyd level I	Site of former coal level. No obvious remains now apparent, other area of general disturbance, spoils heaps. Serviced by mineral railway PRN 6448 now disused.	SN 7562 1257
6445	Brynhenllys brickworks	Site of former silica brickworks centred on given NGR though extending along river Twrch both northwards from the area of the Graig Lwyd levels, PRN 6444 and 6449, and southwards to the edges of Brynhenllys colliery II, PRN 6446 (from roughly SN75601255 to SN SN75401255). Vestigial building remains, including roads, loading areas etc. Serviced by mineral railway (PRN 6448) now disused.	SN 75599 12433
6446	Brynhenllys colliery II	Site of former drift mine centred on given NGR though extending along river Twrch both to north and south (from roughly SN75491255 to SN75521220). Vestigial building remains, including pit head buildings, an incline, shafts and spoil heaps etc. Serviced by mineral railway (PRN 6448) now disused. Some of the office buildings	SN 7557 1235

		may survive within Brynhenllys farm (PRN 6454). Operations were powered by 3 waterwheels turned by water from leats. The uppermost feeder was tapped from just below the weir, opposite Upper Brynhenllys Colliery. Nothing remains of the waterwheels or associated machinery. The leat can however be traced from the weir, following a course roughly parallel to the tramroad. This feeder also turned the wheel which operated the machinery at the silica brickworks (Powell, D, 1992, 67).	
6448	Caerlliau branch mineral railway	Site of former railway branch line branching from the main mineral line at Caerlliau with coal levels and other works (PRN 6443-6447, 6449) along the Twrch valley as far as Cwm Clyd (PRN 6442). Line traceable for most of this length except where overlain by subsequent industrial works. Sleepers, fishplates and other fixings surviving at many locations.	SN 7553 1150
6449	Graig Lwyd level II	Site of former coal level. No obvious remains now apparent, other area of general disturbance, spoils heaps. Serviced by mineral railway PRN 6448 now disused.	SN 7560 1254
6450	Waun Lwyd Level	Site of former coal level. No obvious remains now apparent, other area of general disturbance on the fringe of subsequent opencast workings which have since been reclaimed.	SN 7594 1261
6451	Brynhenllys trial shaft I	Site of former trial shaft. Site totally removed by opencast workings which have now been restored as area of coniferous forestry.	SN 7665 1265
6452	Brynhenllys trial shaft II	Site of former trial shaft. Site totally removed by opencast workings which have now been restored as area of coniferous forestry.	SN 7674 1265
6453	Brynhenllys level	Site of former coal level. No obvious remains now apparent other than area of general disturbance to the south of the more recent and more extensive Brynhenllys colliery I (PRN 6443). Serviced by mineral railway (PRN 6448) now disused.	SN 7570 1273
6454	Brynhenllys farm	Post medieval farmstead complex comprising stone farmhouse (rendered) and stone ancillary buildings set lineally on N-S trackway, the whole being set within a system of dry-stone banked regular fields. Farm buildings no longer in use and are dilapidating. Some of the outbuildings to the farm may originally have been offices for the adjacent Brynhenllys colliery II (6446). (Thomas, D 1994d, 84).	SN 7570 1240

6455	Waun Lwyd Farm	Post medieval nucleated farmstead complex comprising stone farm house and ancillary buildings set around the house and yard, the whole lying within system of dry-stone banked regular fields which emulate those to be found the adjacent Brynhenllys farm (PRN 6454) but which appear to be largely a modern creation (possibly the result of realignment following recent opencast working in the area). Farmhouse is occupied by the farm buildings are dilapidating. See also PRN 19460 (Thomas, D 1994d, 84).	SN 7586 1267
6456	Brynhenllys Cottage	Relatively modern cottage set against E-W road. Probably associated with Waun Lwyd (PRN 6455) Brynhenllys (PRN 6454) farmstead-settlement system (Thomas, D 1994d, 84).	SN 7584 1254
6457	Graig Lwyd House	Former site of building (presumably house-farmstead though possibly associated with adjacent coal mining activity - see PRN 6444) called Graig Lwyd. No building no surviving in area of disturbance.	SN 7584 1254
6693	Pen y Wern pit	Circular pit c3m by 2m across and 1m deep. Sited at confluence of two E-W streams immediately adjacent to possible limekiln 6437 and is probably a quarry pit for this kiln.	SN 7652 1341
6694	Pen-y-wern field boundary	Field boundary defining the eastern boundary of the site, c25m long and up to 0.5m high. The bank cuts off the promontory suggesting it may have had a defensive purpose at some time. Excavation of a section of the boundary revealed it to be 1.8m wide, edged on both sides by large boulders 0.3m to 0.6m diameter and peaty topsoil had been used as infill. No evidence was found for an earlier defensive function (Thomas, D 1995i, 11).	SN 7645 1343
19250	Brynhenllys coal mine	Open cast coal mine (Silvester, R J & Brassil, K S 1991, 19). Survey and excavation carried out in 1994 in advance of opencast mining. This included a limekiln and other structures at Pen-y-wern and the Brynhenllys enclosure which proved to be a relatively modern field enclosure. A photographic record was made of Brynhenllys farm, Waunlwyd Farm and Brynhenllys Cottage as well as industrial sites along the eastern side of Cwm Twrch. See PRNs 19459, 19460, 19461, 19462. (Thomas, D 1994d, 84).	SN 762 126
19457	Pen-y-wern limekiln	Limekiln of intermittent flare kiln type, typical of rural areas. It appeared to have been rarely, if ever, used. (Thomas, D 1994d, 84).	SN 7648 1378

23702	Cwm-twrch Uchaf Level	Level, captured from 1:25,000 map (OS, 1988)	SN 76249 11255
43209	Henllys limekilns	This site consists of 5 enormous rubble-choked kilns which are structurally sound. The bank of kilns was built into a steep slope, probably partly artificial, for top-loading. The kilns appear to have been constructed in 2 phases. The northern 3 have tall, stone-faced arches, the passages having been extended by the addition of a second facing wall. Their interior is also of stone. the later kilns are better preserved and retain their inner brick walls and tapping arches. The circular kilns have a brick lining above square bases (Powell, D, 1992, 67-8).	SN 7627 1378
43210	Henllys chimney	A circular red brick chimney rising some 30.5m above its octagonal base and capped by a now incomplete ornamental corbel. There is an archway on the southern side of the base, part of which has now collapsed. The chimney lining has deteriorated and loose yellowish bricks lie inside on a basal fill of coal dust and ash. The purpose of the chimney is not clear as surrounding buildings were demolished in the 1950's. May have acted as a ventilation shaft for underground workings, despite the conflicting evidence of coal and ash found. Local people say the chimney was once attached to an engine house. The impressive size of the chimney is the result of its location in a narrow valley - it had to be sufficiently tall to allow the smoke to escape (Powell, D, 1992, 68).	SN 7624 1378
43211	Henllys masonry pylons	Beyond the kilns (PRN 43209) are the remains of 3 or 4 stone-built towers which may have carried an aqueduct. As it is not possible to follow the line taken by the associated leat, their purpose is not yet clear (Powell, D, 1992, 68).	SN 7623 1383
43212	Henllys Slant	The stone-lined entrance to Henllys Slant is still visible, partially hidden by debris which has fallen down from above (Powell, D, 1992, 68).	SN 7617 1364
43213	Henllys screening wall	The entrance to the colliery is dominated by a large flat area surrounded by the imposing screen wall. After being hauled up the slant by steam engine, coal was taken to the top of the screen wall by truck and then poured down the chute onto the conveyor belts. After sorting, it was loaded into the trucks and taken down the valley on the tramline. The screens were operated by water power at least in the initial stages of development. Water was taken from a weir at SN76321388 via a stone-lined leat, to a wheel pit at the eastern end of the screening wall. A shallow depression marks the former channel, which returned the water back to the river (Powell, D, 1992, 68).	SN 7619 1361

127030	Gilfach, colliery	Colliery noted on early Ordnance Survey mapping during Glastir private woodland project	SN 75926 11447
127031	Gilfach Colliery, old level I	Level noted on early Ordnance Survey mapping during Glastir private woodland project	SN 75928 11500
127032	Gilfach Colliery, building I	Building noted on early Ordnance Survey mapping during Glastir private woodland project	SN 75999 11468
127033	Gilfach Colliery, old level II	Level noted on early Ordnance Survey mapping during Glastir private woodland project	SN 76011 11359
127034	Gilfach Colliery, building II	Building noted on early Ordnance Survey mapping during Glastir private woodland project	SN 76056 11424
127035	New Palleg Colliery	Colliery noted on early Ordnance Survey mapping during Glastir private woodland project	SN 76125 11370
127036	New Palleg Colliery, building	Colliery building noted on early Ordnance Survey mapping during Glastir private woodland project	SN 76156 11340
127037	New Palleg Colliery, old level	Level noted on early Ordnance Survey mapping during Glastir private woodland project	SN 76190 11340
127038	Gilfach Colliery, level III	Level noted on early Ordnance Survey mapping during Glastir private woodland project	SN 76026 11337
127039	Gilfach Colliery, building III	Building noted on early Ordnance Survey mapping during Glastir private woodland project	SN 75920 11473
127040	Gilfach Colliery, Engine House	Engine house noted on early Ordnance Survey mapping during Glastir private woodland project	SN7605911341
127041	New Palleg Colliery, level (coal)	Level noted on early Ordnance Survey mapping during Glastir private woodland project	SN 76372 11294
142269	Bryn-henllys placename	Place-name incorporating 'Llys', depicted on 1st edition Ordnance Survey map (Silvester 2015).	SN 75705 12419

GGAT HER

PRN	Name	Summary	NGR
GGAT01699.0w	Swansea Vale Railway	The Swansea Vale Railway had its origins in a series of tramways built along the valley from the eighteenth century onwards. During 1845 work began to construct a private mineral railway to carry coal from Swansea to Pontardawe.	SS 71224 13921
GGAT07150w	Cwm-Llynfell Chapel	Cwm-Llynfell Chapel. Can be seen on the 1st edition OS map of 1878 and the 2nd edition of 1898.	SN 74683 12400
GGAT07152w	Cwm-Llynfell School	Cwm-Llynfell School. Can be seen on the 1st edition OS map of 1878 but by the 2nd edition OS map of 1898 it is not labelled.	SN 74637 12393
GGAT07153w	Dismantled Railway	Dismantled railway. Can be seen on the 1st edition OS map of 1878.	SN 74649 11899
GGAT07154w	Old coal levels	Old Coal level. Can be seen on the 1st edition OS map of 1878, the 2nd edition map of 1898.	SN 74611 12259
GGAT07155w	Unknown structure	Unknown structure visible on the 1st edition OS map of 1878.	SN 74664 12224
GGAT07156w	Ty-Newydd	Ty Newydd. Building visible on the 1st edition OS map of 1878. Also visible on the 2nd edition OS map of 1898.	SN 74593 12105
GGAT07157w	Old shaft	Old shaft, can be seen on the 1st edition OS map of 1878.	SN 74674 12043
GGAT07158w	Hendre Forgan Colliery	Hendre Forgan Colliery can be seen on the 1st edition OS map of 1878 and the second edition OS map of 1899/1905.	SN 74958 11600
GGAT07159w	Coedffaldon Colliery	Coedffaldon Colliery. Can be seen on the 3rd edition OS map of 1918.	SN 74876 11705
GGAT07160w	Mount Pleasant, Unknown structure	Unknown structure, Mount Pleasant. Can be seen on the 3rd edition OS map of 1918.	SN 75278 11846

GGAT07161w	Mount Pleasant, Unknown Structure	Unknown structure, Mount Pleasant. Visible on the 3rd edition OS map of 1918.	SN 75316 11796
GGAT07162w	Unknown structure	Unknown structure, Mount Pleasant. A structure can be seen on the 2nd edition OS map of 1899/1905 as well as the 3rd edition map of 1918.	SN 75297 11661
GGAT07163w	Mount Pleasant, Unknown structure	Mount Pleasant, Unknown structure. Two structures close together can be seen on the 1st edition OS map of 1878 as well as the 2nd edition OS map of 1899/1905 and the 3rd edition map of 1918.	SN 75332 11673
GGAT07164w	Mount Pleasant, Unknown structure	Mount Pleasant, Unknown Structure. Can be seen on the 1st edition OS map of 1878, the 2nd edition OS map of 1899/1905 and the 3rd edition map of 1918.	SN 75355 11623
GGAT07165w	Halfmoon Cottages- ruins	Halfmoon Cottages can be seen marked on the 1st edition OS map of 1878 and the 2nd edition of 1905 but do not appear by the 3rd edition of 1918.	SN 75457 11432
GGAT07166w	Bryn-Morgan Colliery	Bryn Morgan Colliery can be seen on the first edition OS map of 1878. By the 2nd edition OS map of 1899/1905 the colliery is marked 'disused'.	SN 75663 10941

Dyfed HER

PRN	Name	Summary	NGR
10069	Cwm-Clyd	NONE GIVEN	SN 7616 1350
104655	Bryn-henllys	The former colliery of Bryn-henllys identified on the Ordnance Survey 2nd edition mapping (1905). Levels, slag heaps and tips are recorded here on the recent Ordnance Survey mapping.	SN 757 129
104656	Craig-hopkin	The former cottage of Craig-hopkin recorded on the Ordnance Survey 2nd edition mapping (1905). Marked in outline on the recent Ordnance Survey mapping. Presumed ruinous.	SN 7554 1270

104657	Graig-lwyd	The former cottage of Graig-lwyd recorded on the Ordnance Survey 2nd edition mapping (1905). Marked in outline on the recent Ordnance Survey mapping. Presumed ruinous.	SN 7562 1260
104658	NONE GIVEN	A brick works recorded on the Ordnance Survey 2nd edition mapping (1905). It is not known what survives of the brickworks today.	SN 7555 1252
104659	Pen-y-wern	The former cottage of Pen-y-wern, identified on the Ordnance Survey 2nd edition mapping of 1905. Marked in outline on the recent OS. Presumed ruinous.	SN 7648 1378
110303	Ddol-Gam I	Building appears on 2nd edition, 1:10560 1905 OS map	SN 7564613945
110306	Cwm-Clyd	Building appears on 2nd edition, 1:10560 1905 OS map	SN 7616613502
110691	NONE GIVEN	OS 1878 shows a small square building and associated small enclosure (within larger enclosure on open moorland). Marked and named on OS 1878, and 1905, not marked on current maps.	SN 76474 13967
110695	NONE GIVEN	Rectangular building marked in outline on OS 1878, close to the settlement of 'Gelli', but outside of the enclosed area on open land. A farmstead which had been abandoned by this time? Industrial (mining) remains?	SN 76357 13941
19973	Bryn-Henllys Bridge	NONE GIVEN	SN 7555 1254
19974	Ystrad Owen	NONE GIVEN	SN 7538 1228
19976	Felin Fach	NONE GIVEN	SN 7539 1193
19977	NONE GIVEN	NONE GIVEN	SN 7538 1170
20810	Henllys Vale Colliery	The chimney is circular and of red brick rising to 30.5m above its octagonal base capped by a damaged ornamental corbel. Archway on southern side of the base. The surrounding buildings were demolished in the 1950s.	SN 76219 13717
21175	Ty Gwyn	Farmstead shown on 1812 Original OS Surveyors Drawings and still appearing on late 20th century maps as an occupied property.	SN 7505 1295

21414	Ddol-Gam	Not marked on the 1812 original surveyors drawing 2" sheet 189. JH 94 Appears to be shown as deserted on 1989 OS Pathfinder map.	SN 7565 1395
21517	Ystrad Owen	Farmstead recorded on 19th and early 20th century OS maps. Present condition unknown.	SN 749 125
21960	Cwm-Twrch	Ruined cottage site.	SN 75848 13212
22060	Cwmllynfell	NONE GIVEN	SN 7487 1188
22076	Henllys Vale Colliery	Leat for Henllys Vale Colliery.	SN 7628 1386
22120	Henllys Vale	Four isolated walls or masonry pylons lie north of the lime kilns PRN 5505. The top of the walls are level although the site slopes considerably.	SN 762 137
29795	St. Margaret's Church	Built c.1900.	SN 74876 12396
29796	Ystradowen Primary School	Built c.1913.	SN 7526 1228
32297	Llwyn Yr Yn	A group of irregular earthworks on the south-west-facing slopes above Henllys Vale coalmine.	SN 7620 1400
5504	Henllys Vale	Opened as the Henllys Vale Colliery by the Black Mountain Anthracite Company in 1898. Prior to this coal had been extracted at henllys for use in the lime kilns, PRN 5505, by the Black Mountain Silica Sand, Lime, Brick and Colliery Company Ltd.	SN 76255 13763
5505	Henllys Vale	Henllys Vale coalmine limekilns. Five limekilns built into a steep slope. They appear to have been constructed in two phases. The northern 3 have tall, stone-faced arches with an extended passage. Their interiors are of stone.	SN 762 137

CADW Data

Reference Number	Name	Period	Type and Grade	NGR
15831	Henllys Vale Colliery Chimney	19 th /20 th century	Grade II Listed Building	SN 76220 13720
15832	Henllys Vale Colliery Lime Kilns		Grade II Listed Building	SN 76254 13763
25951	Henglyn Isaf Farmhouse	18 th century	Grade II Listed Building	SN 78208 12022
25946	74 Heol Giedd, Cwm Giedd	19 th century	Grade II Listed Building	SN 78782 11336
25947	76 Heol Giedd, Cwm Giedd	19 th century	Grade II Listed Building	SN 78781 11343
25948	78 Heol Giedd, Cwm Giedd	19 th century	Grade II Listed Building	SN 78780 11349
25949	80 Heol Giedd, Cwm Giedd	19 th century	Grade II Listed Building	SN 78779 11356
25950	82 Heol Giedd, Cwm Giedd	19 th century	Grade II Listed Building	SN 78778 11362
23086	Bethel Independent Chapel	20 th century	Grade II Listed Building	SN 77029 09932
BR333	Dorwen Standing Stone	Prehistoric	Scheduled Monument	SN 77300 14238
CM354	Cwm Twrch Settlement	Post-medieval to Modern	Scheduled Monument	SN 76990 15646
BR334	Llwyncwmstabl round cairn	Prehistoric	Scheduled Monument	SN 77879 15194
BR388	Lorfa Stone Circle	Prehistoric	Scheduled Monument	SN 78601 14986

Appendix 2: Selected Designation Descriptions

Henllys Vale Colliery Lime Kilns

Very large bank of lime kilns associated with the quarries on the Black Mountain behind, to which it was linked by tramway incline. Probably dating from the 1880s, it became part of the Henllys Vale Colliery which began in 1898 and operated as an anthracite drift mine until 1915. The owners were initially the Black Mountain Anthracite Co, later the New Henllys Anthracite Co. Ltd. Most of the colliery buildings were demolished in the 1950s, but the surviving chimney and limekilns were restored as part of the land reclamation scheme c1986.

Bank of four limekilns built into the hillside in coursed rubble limestone with brick drawing arches. The kiln bank is unusually large, about 10m high, and well preserved. It seems to have been built in two parts, the more northerly half appears older. It is heavily battered and has a raised band and two drawing arches of different heights. A blocked arch to the right does not appear to relate to a kiln, but the upper N end is very eroded. To the S, slightly set back, the later pair of kilns with more vertical walls and no raised band. This also has two drawing arches to the front, but the left kiln has drawing arches from both the front and the side.

Impressively tall crucibles, mostly circular and lined in brick approached by brick-arched tunnels of varying length from the front. The most southerly kiln has a square free-standing inner lining at ground level with arches N and S, small arch E, presumably to allow greater access, though the space between the lining and bedrock in some places is very constricted. The bricks of this inner lining are coved out to meet the main shaft walls. The second kiln shows more bedrock and rubble stone in the crucible, partly octagonal. The northern pair of kilns have longer brick-vaulted entry passages, some 5m in the left one, and the right one runs in diagonally SW for some 7m, with skew-arch to front.

Henllys Vale Colliery Chimney

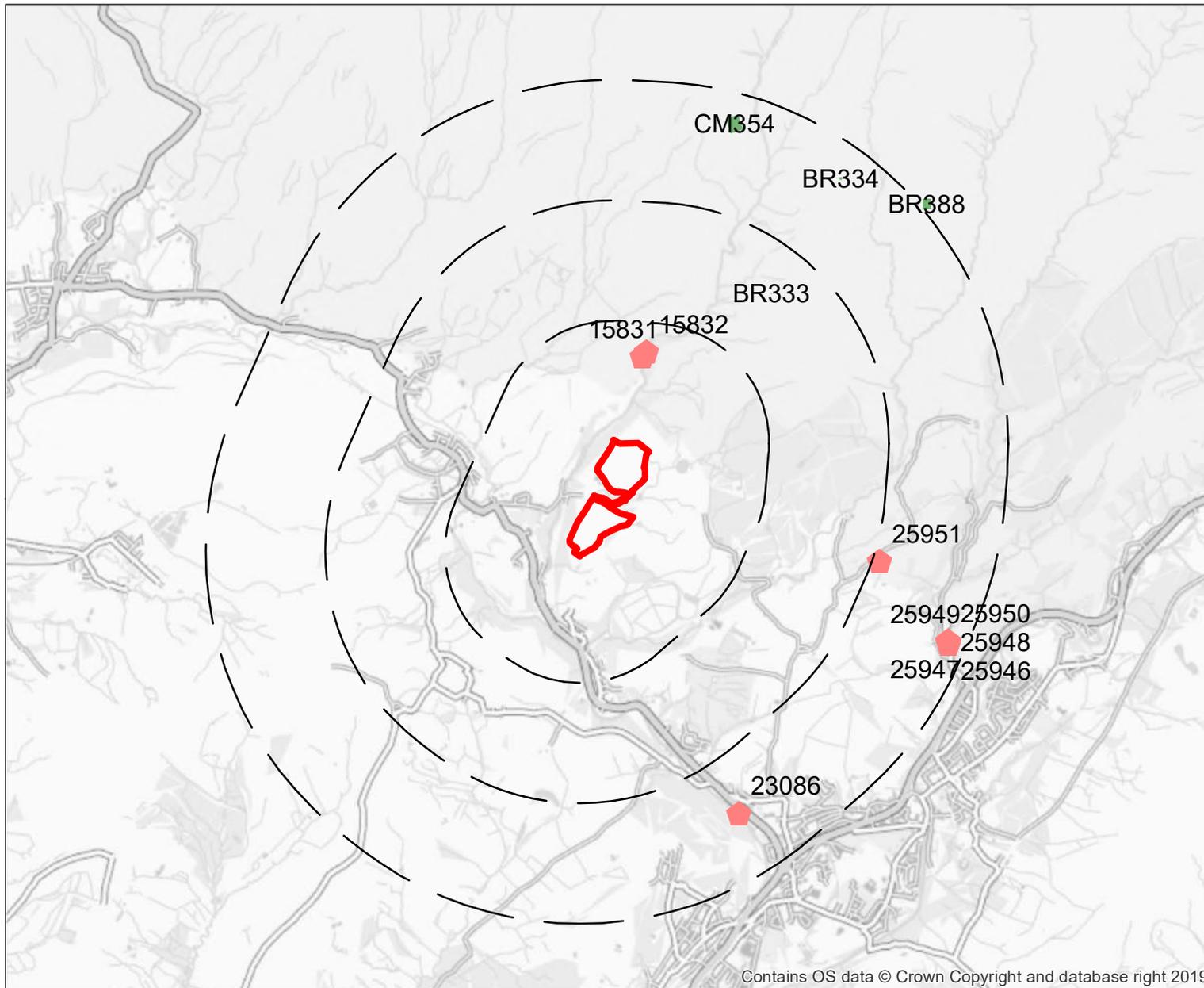
Colliery chimney built for Henllys Vale Colliery, an anthracite drift mine that operated from 1898 to 1918, initially owned by the Black Mountain Anthracite Co., later by the New Henllys Anthracite Co. Ltd. The tall chimney served the boilers for the steam engines, notably a haulage engine which operated the drift. It was unusually tall owing to the constricted valley setting. Most of the colliery buildings were

demolished in the 1950s but the chimney and adjacent limekilns were restored under a land reclamation scheme c1986. The limekilns, served by the incline railway into the Black Mountain predate the colliery by a few years.

Colliery chimney of exceptional quality, over 30m high, circular on an octagonal base. Red brick of varied shades, banded in alternate courses of headers and stretchers. The base is octagonal, rising to about 3m, and has an archway on the south side for a flue. The chimney shaft tapers gradually to a corbelled ring at the top.

Listed as a fine example of a Victorian industrial chimney and for group value with the adjacent bank of lime-kilns.

Appendix 3: Figures



KEY

-  Site
-  1km
-  2km
-  3km

Listed Buildings

Grade

-  II
-  Scheduled Monuments

Figure 1: Designated Heritage Assets

Bryn Henllys Solar Farm Extension

Client: Lightsource BP

DRWG No: P18-2622 Sheet No: - REV:-

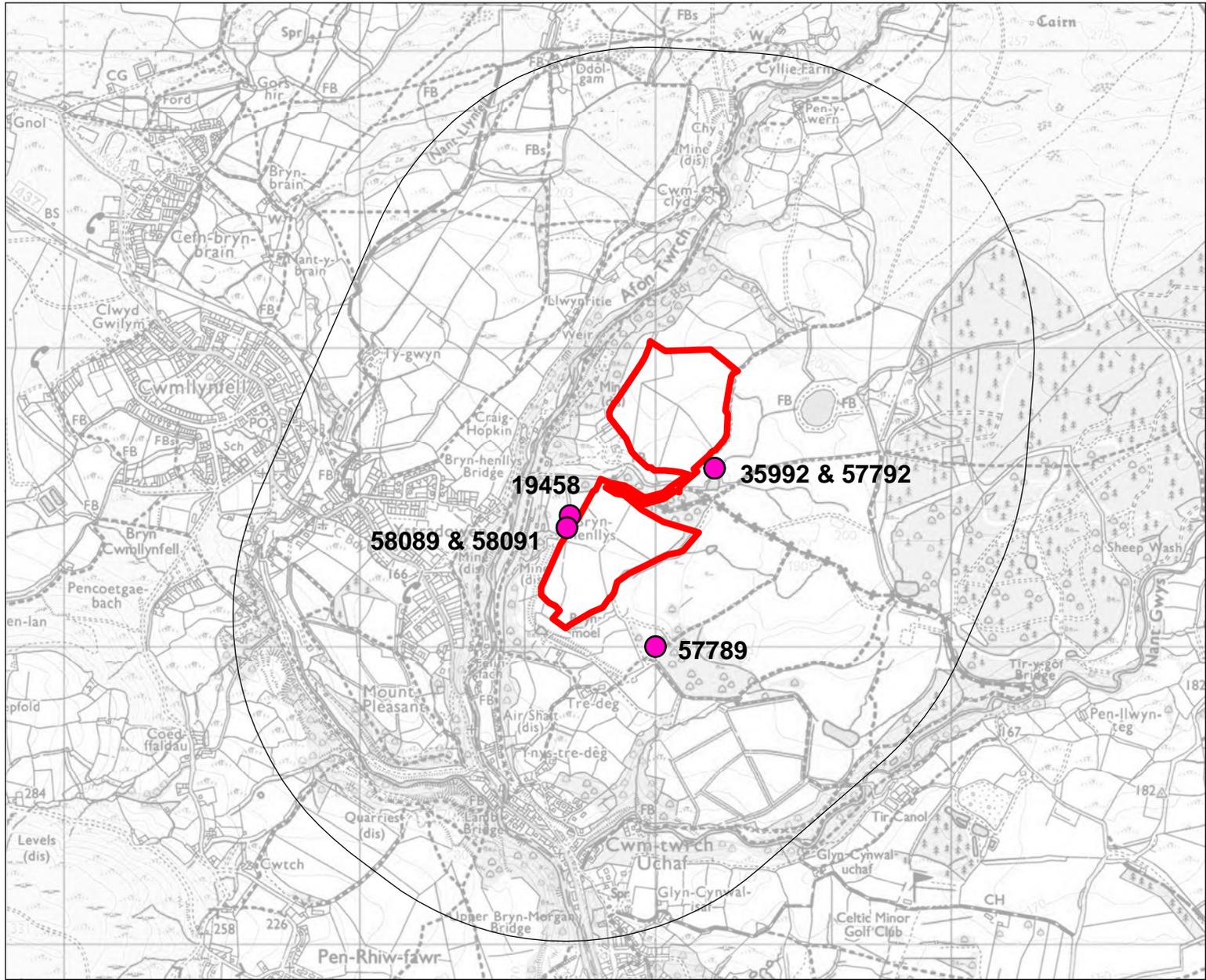
Drawn by: EP Approved by: GS

Date: 23/07/2019

Scale: 1:50,000 @ A3

0 3 km





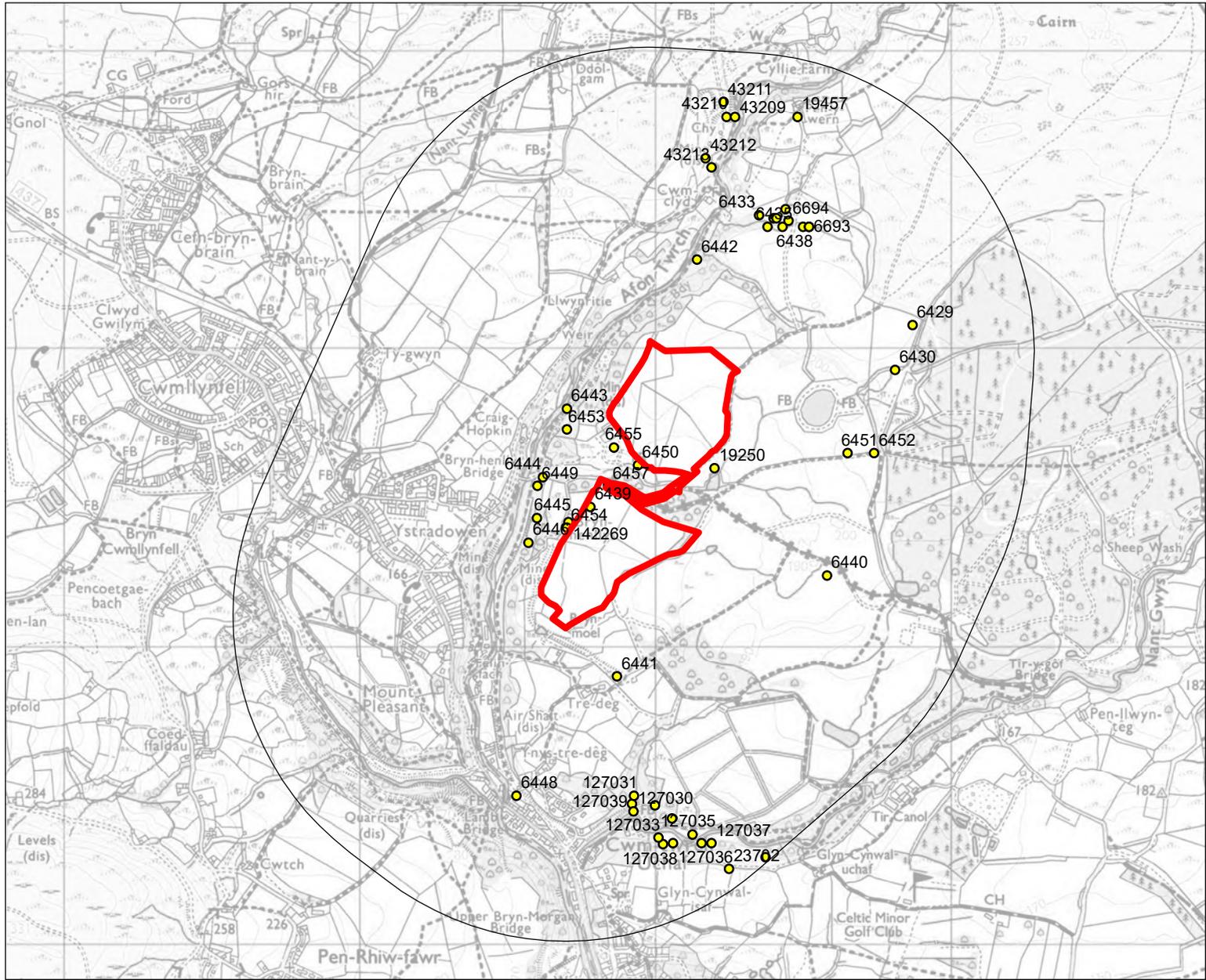
KEY

- Site
- 1km
- Event

Figure 2: CPAT HER 'Events'

Bryn Henllys Solar Farm Extension

Client: Lightsource BP
 DRWG No: P18-2622 Sheet No: - REV:-
 Drawn by: EP Approved by: GS
 Date: 23/07/2019
 Scale: 1:20,000 @ A3



KEY

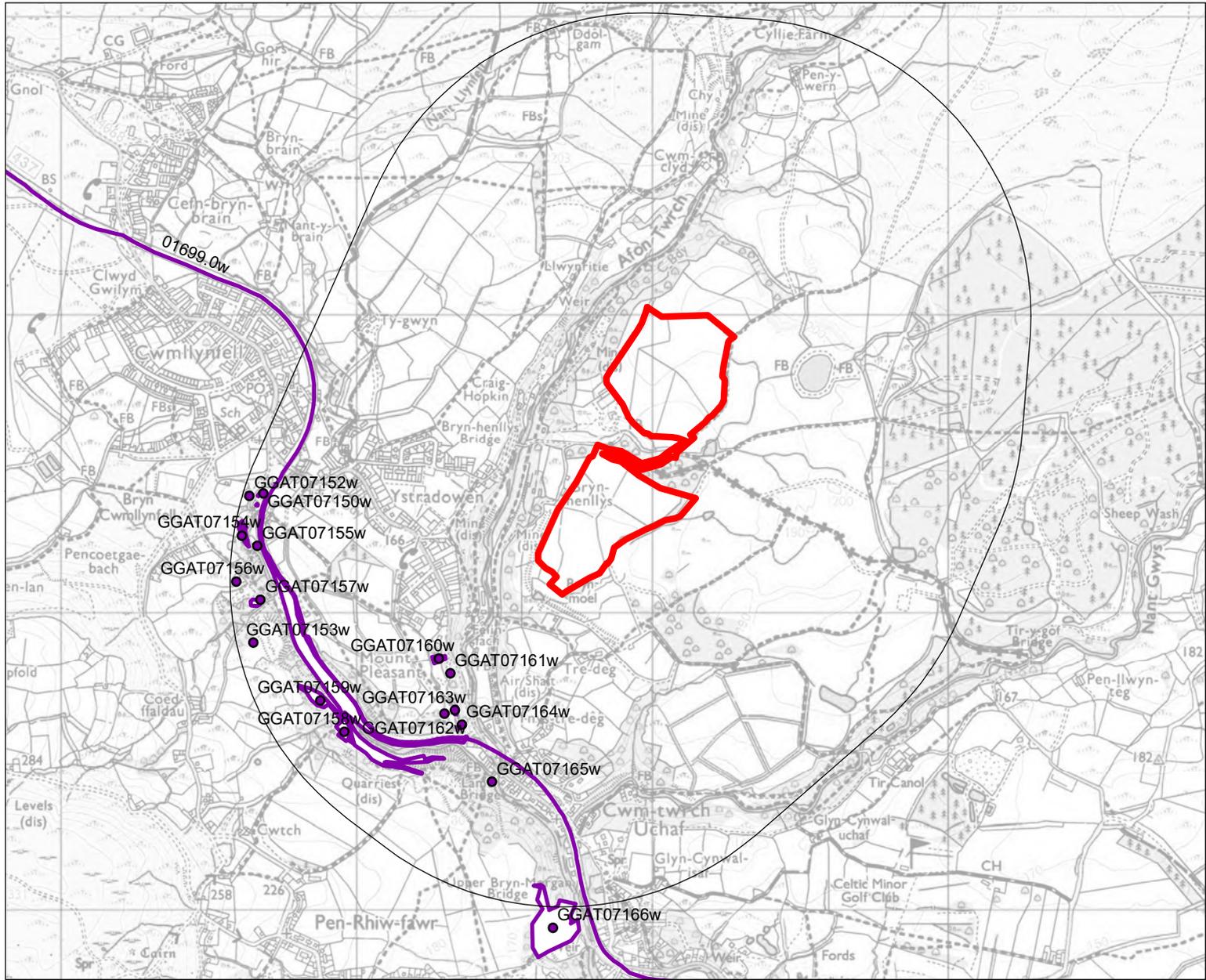
- Site
- 1km
- Monuments

Figure 3: CPAT HER 'Monuments'

Bryn Henllys Solar Farm Extension

Client: Lightsource BP
 DRWG No: P18-2622 Sheet No: - REV:-
 Drawn by: EP Approved by: GS
 Date: 23/07/2019
 Scale: 1:20,000 @ A3





- KEY**
- Site
 - 1km
 - Monument
 - Monument

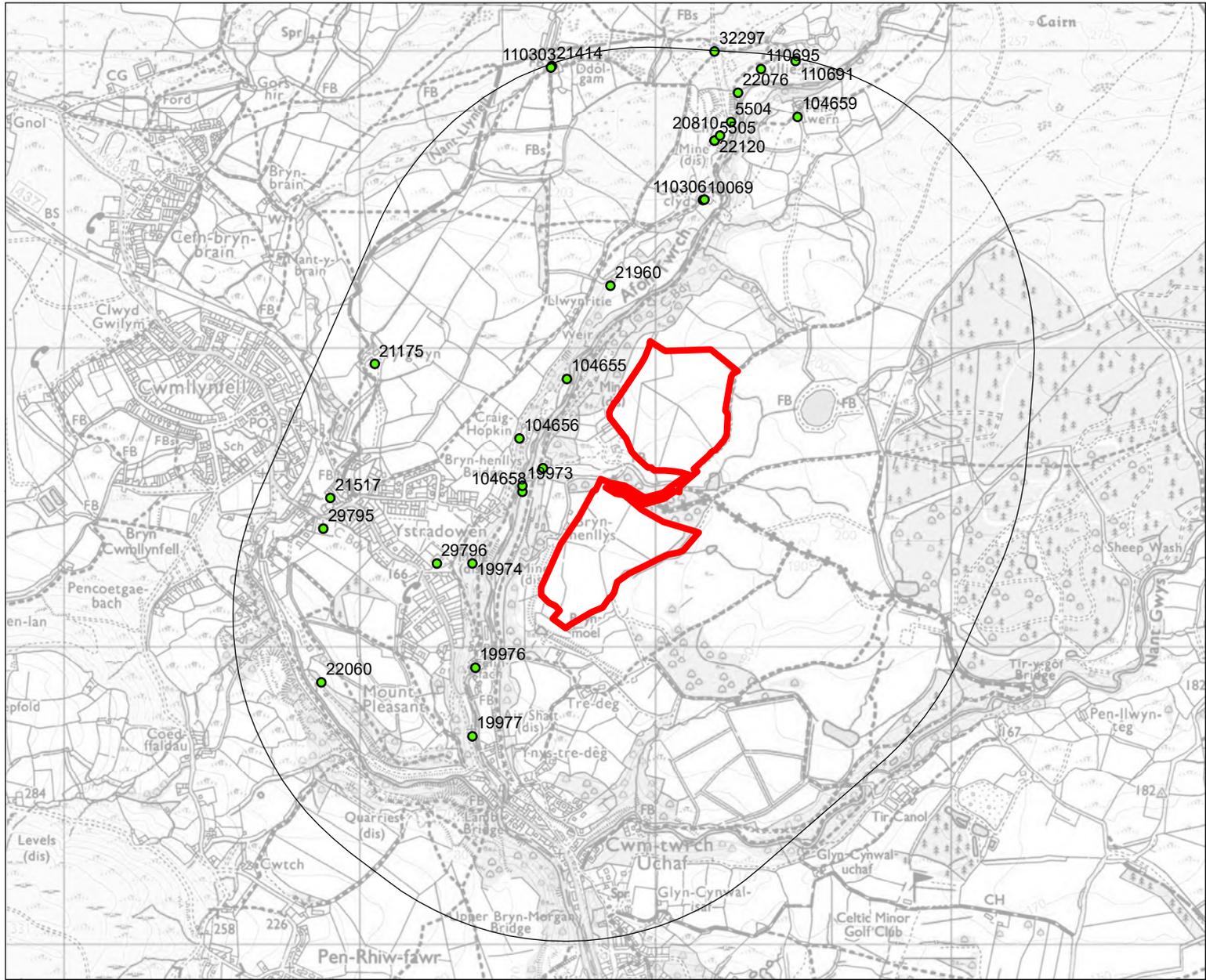
Figure 4: GGAT HER 'Monuments'

Bryn Henllys Solar Farm Extension

Client: Lightsource BP
 DRWG No: P18-2622 Sheet No: - REV:-
 Drawn by: EP Approved by: GS
 Date: 23/07/2019
 Scale: 1:20,000 @ A3

0 1 km





KEY

- Site
- 1km
- Monuments

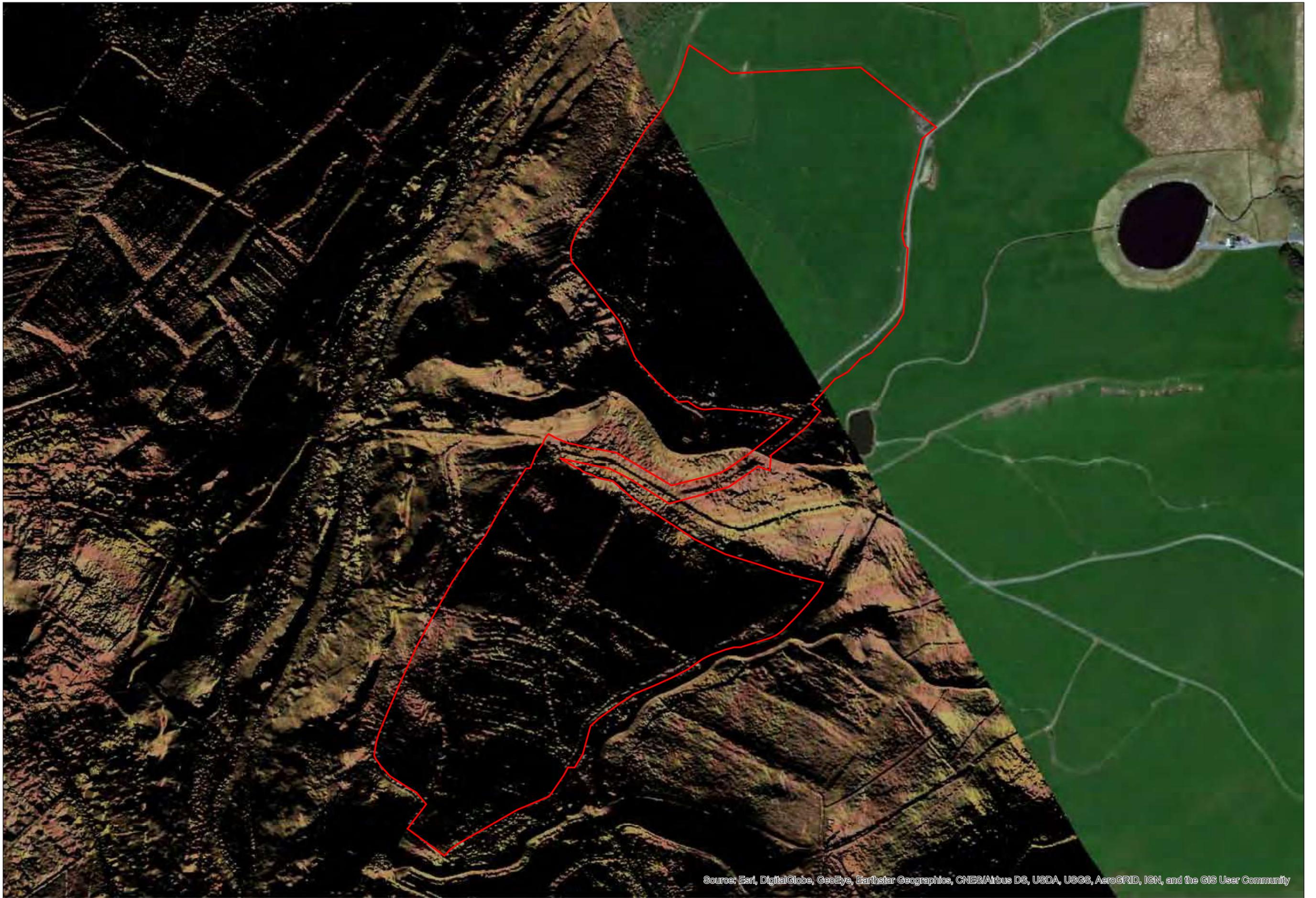
Figure 5: Dyfed HER 'Monuments'

Bryn Henllys Solar Farm Extension

Client: Lightsource BP
 DRWG No: P18-2622 Sheet No: - REV:-
 Drawn by: EP Approved by: GS
 Date: 23/07/2019
 Scale: 1:20,000 @ A3



Appendix 4: Processed LiDAR imagery



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 150 m

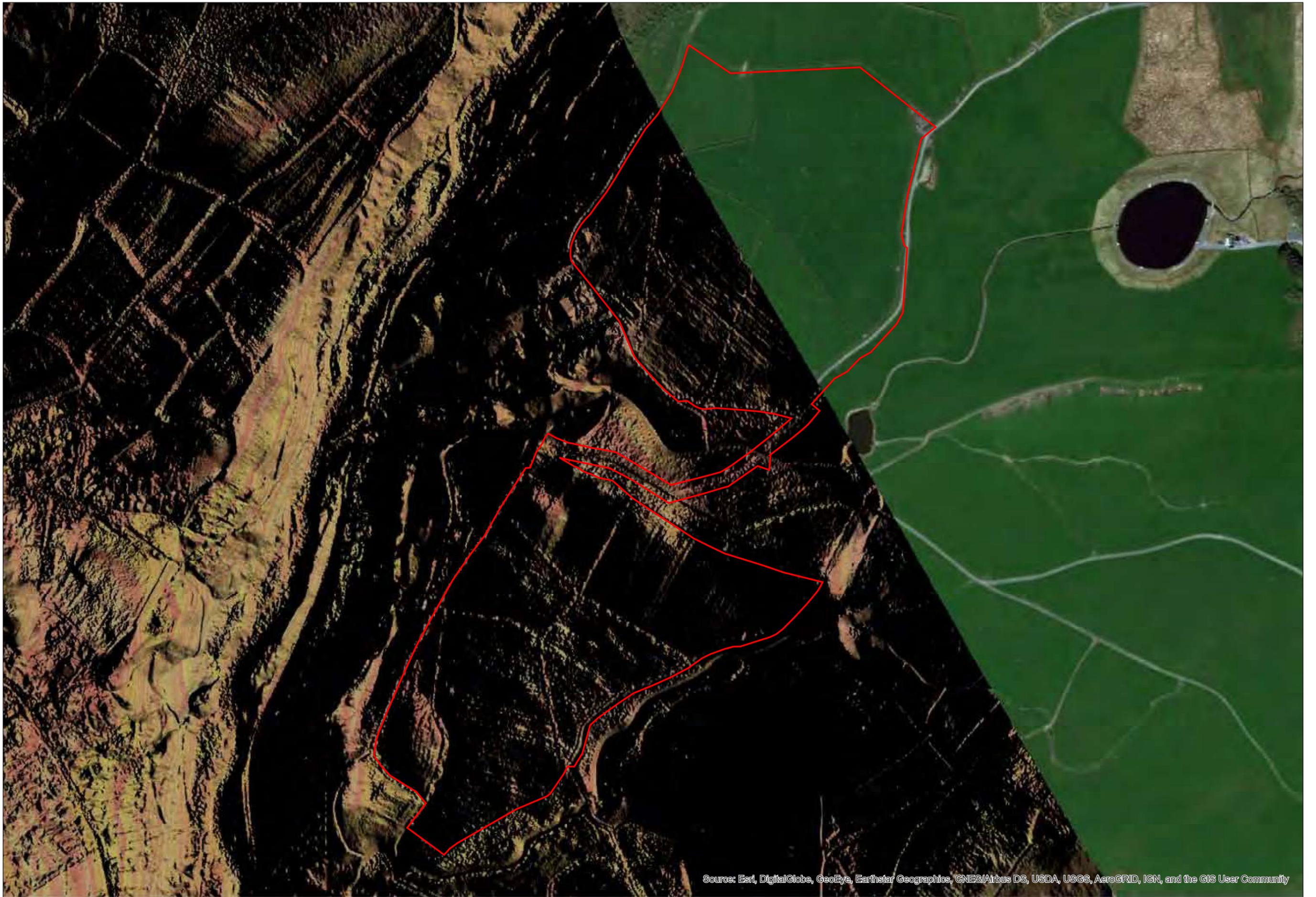




Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 150 m

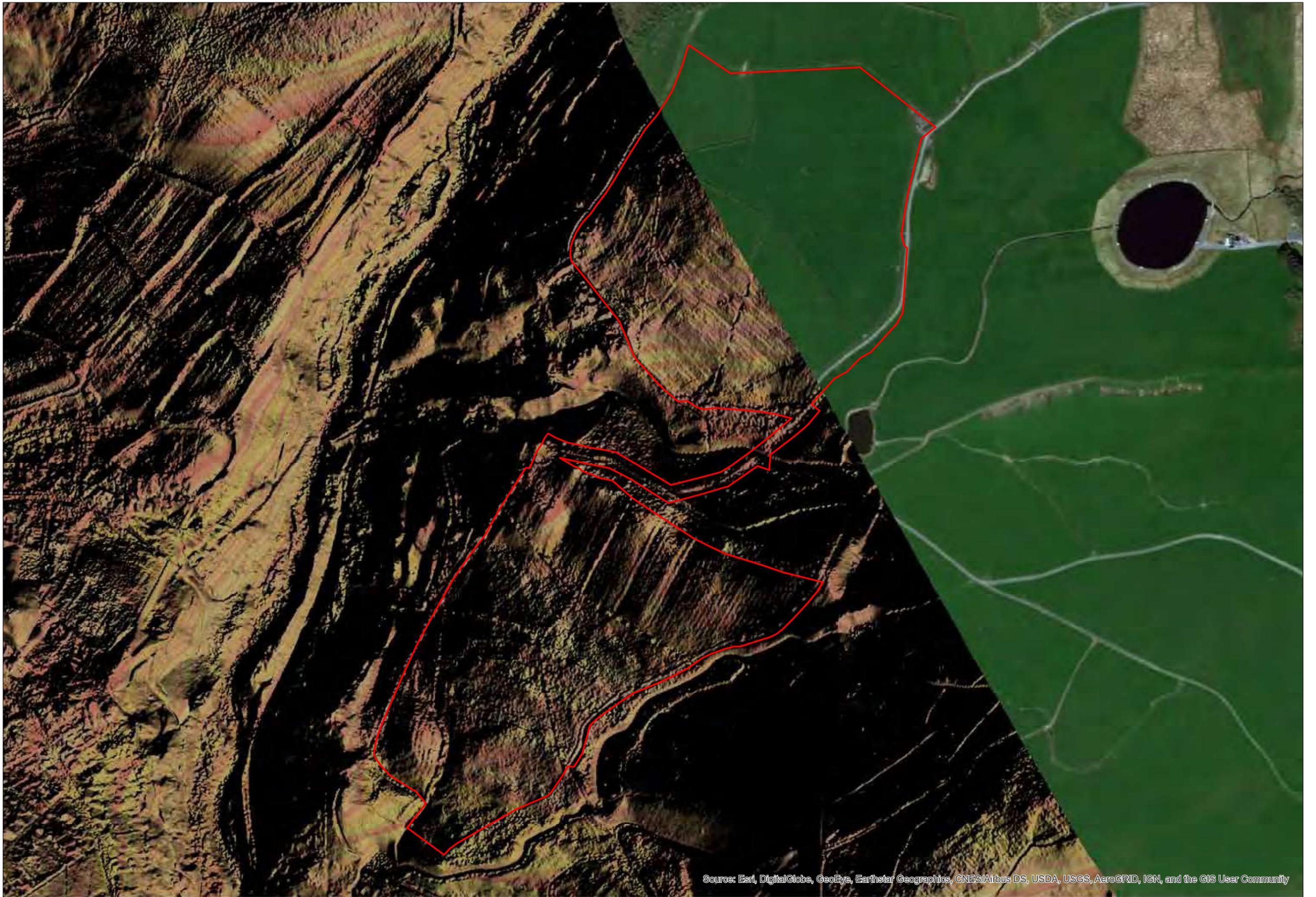




Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 150 m





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

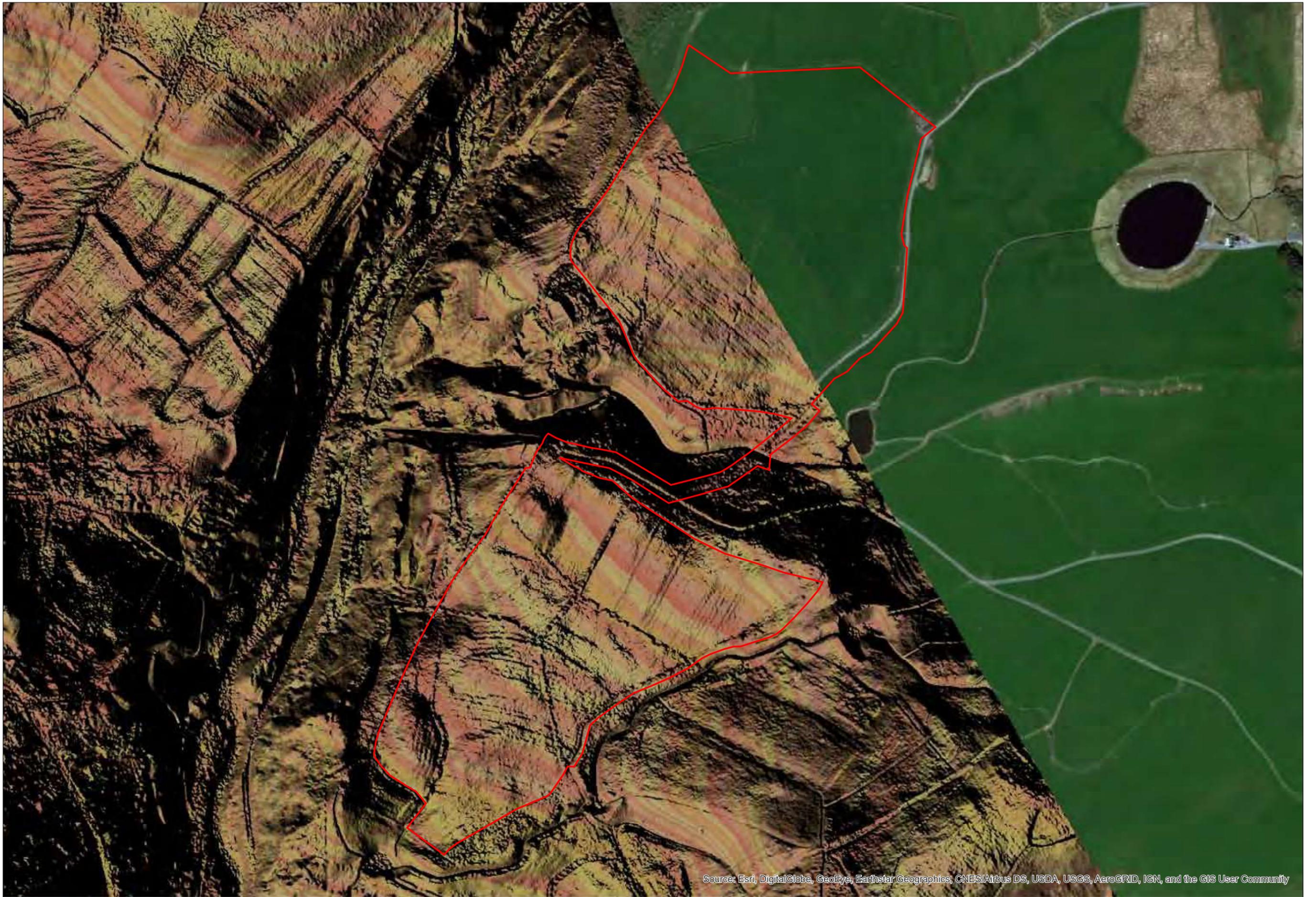
0 150 m





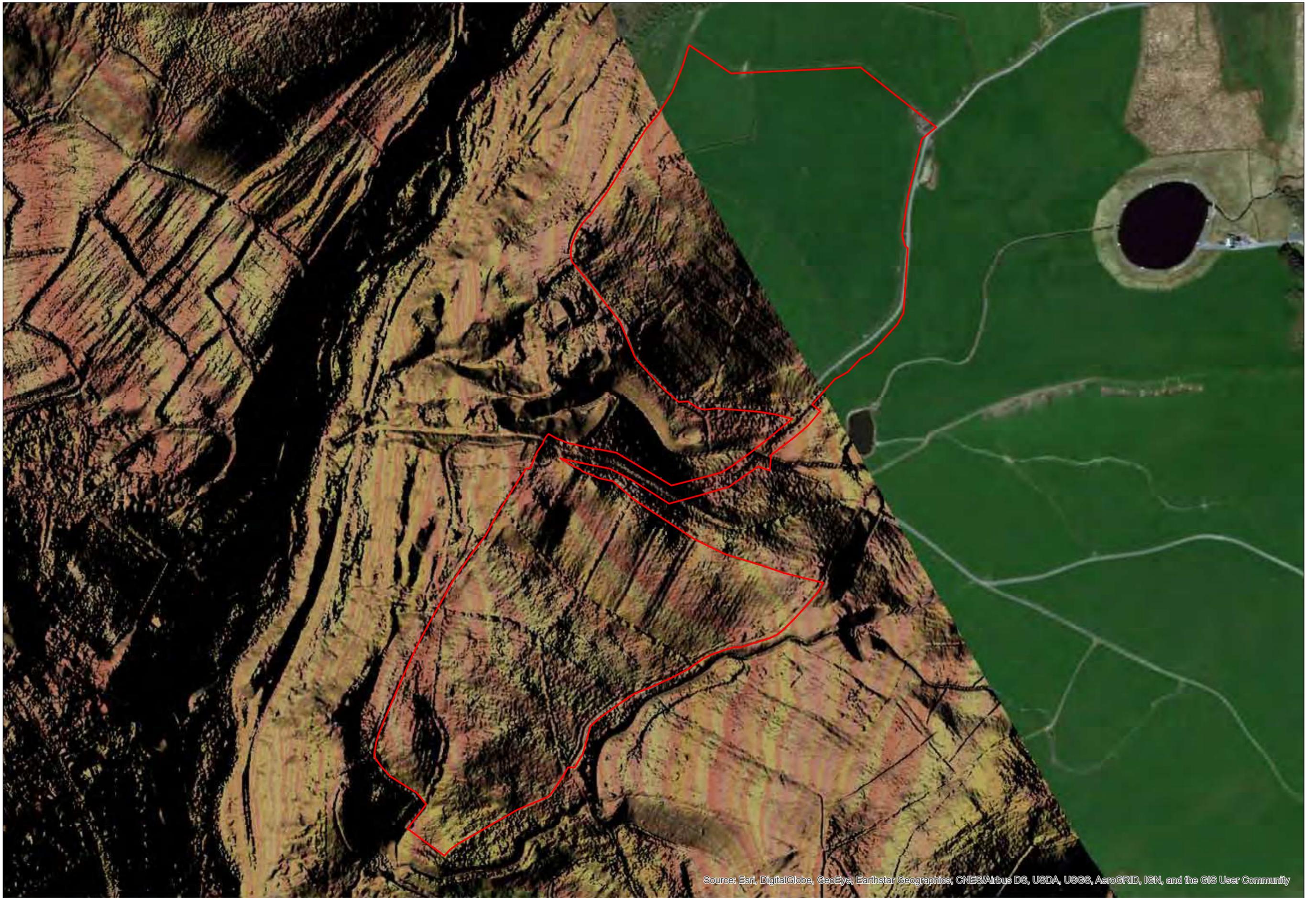
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

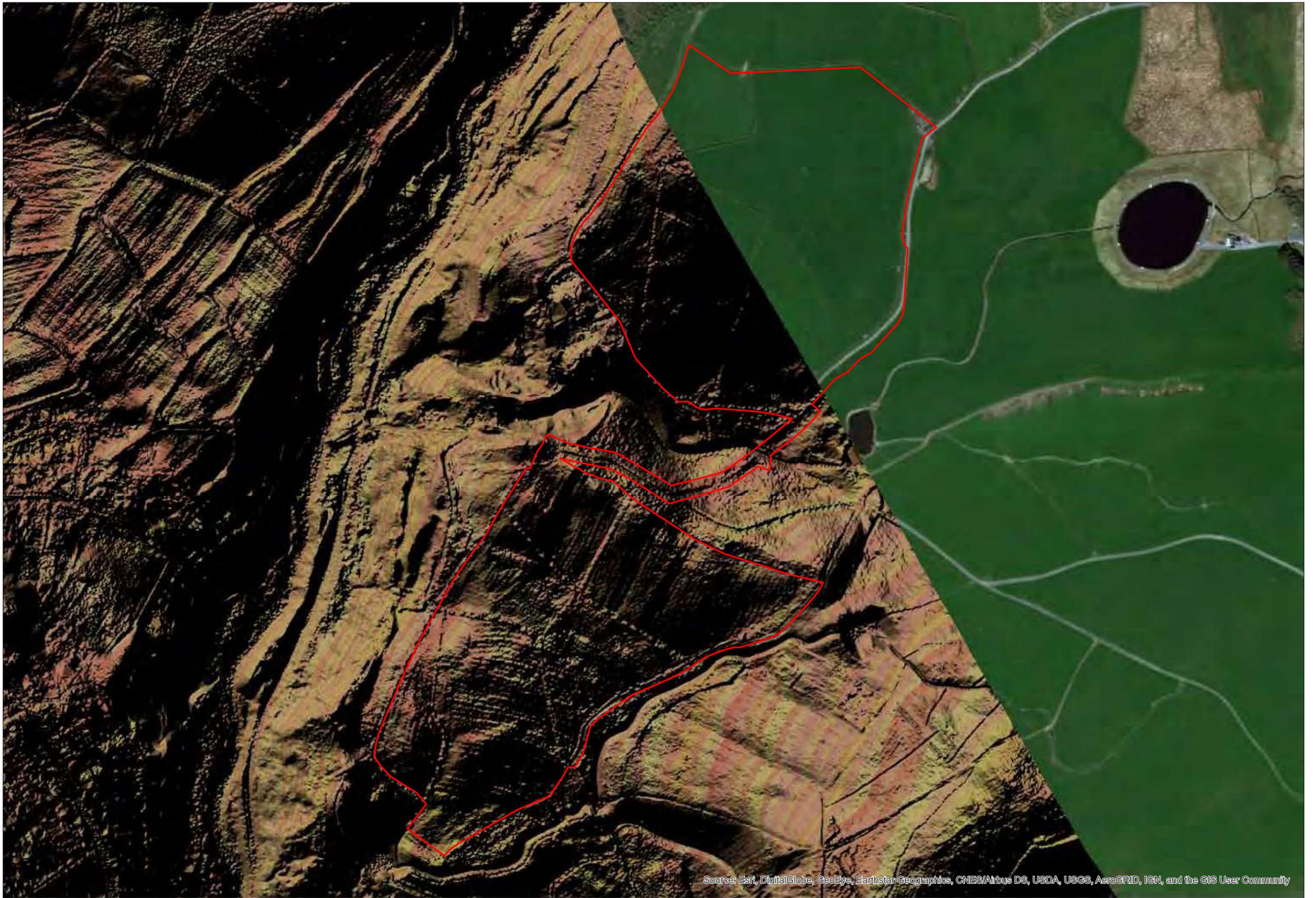




Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 150 m

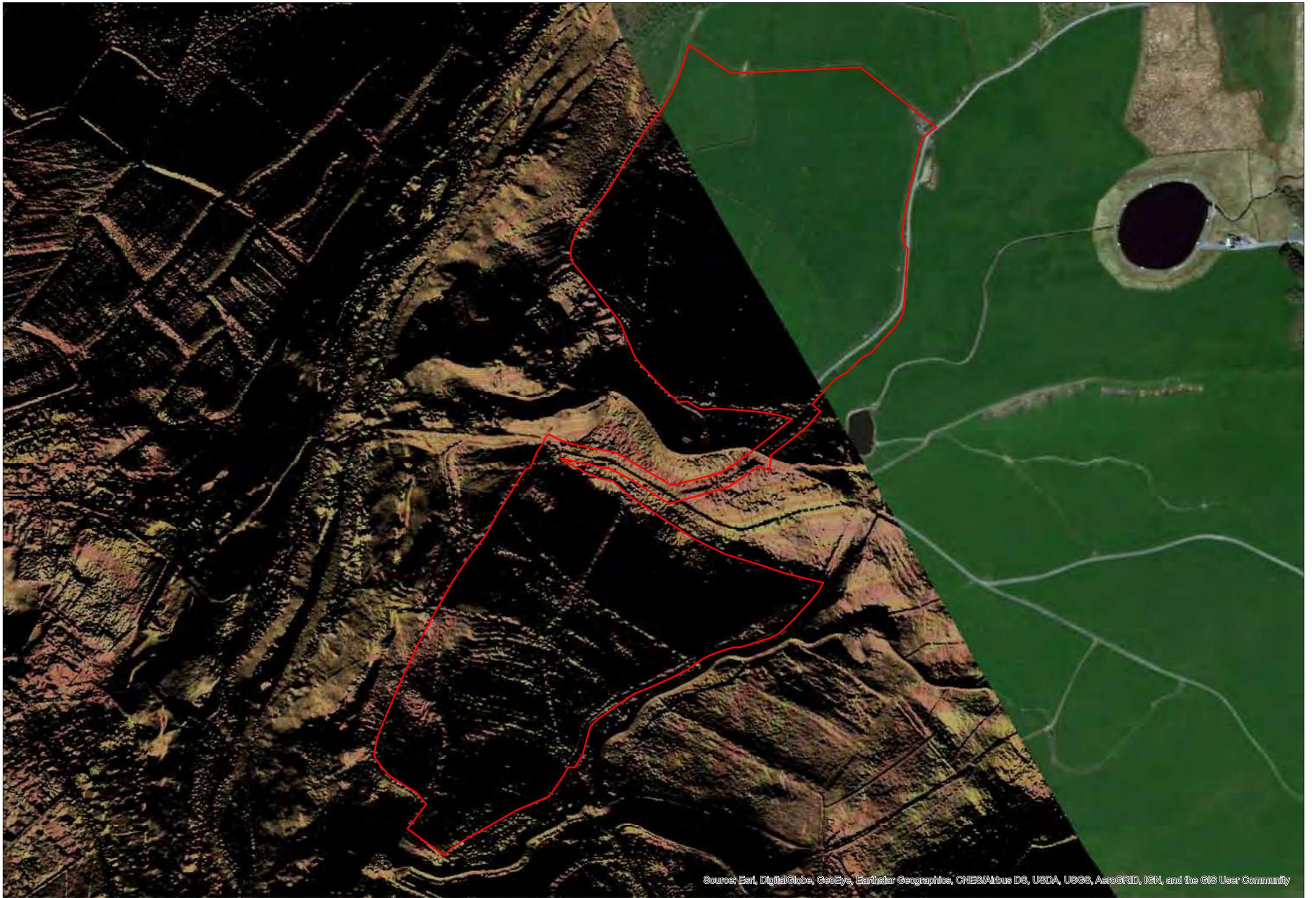




Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 150 m





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 150 m



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