DAVID CLEMENTS ECOLOGY LTD

RHONDDA CYNON TAFF COUNTY BOROUGH COUNCIL
LARGE RENEWABLE ENERGY PROJECTS

PROPOSED COED ELY SOLAR FARM
AND
PRIVATE WIRE ROUTE (PWR)

COEDELY, Nr TONYREFAIL, GLAMORGAN

ECOLOGICAL ASSESSMENT

May 2023

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	A Clements	Invertebrate surveys	16/06/2022
	J Lee	Birds; dormouse surveys	May-Nov 2021
	J Dangerfield	Dormouse surveys	May-Nov 2021
	L Badham	Dormouse; eDNA surveys	May-Nov 2021
	A Macliston	Dormouse; eDNA surveys	May-Nov 2021
	P Roberts	Bird surveys	Mar-Jun 2021; Apr-Jun 2023

CONTENTS

SUMMARY

- The solar farm site lies in an area of high biodiversity value, with several designated Wildlife Sites (non-statutory sites) nearby and in one case adjacent.
- The majority of the solar farm site comprises habitats which are at least nominally considered to be of conservation value, although in some cases (eg the neutral grassland, plantation woodland) these are probably not of sufficient quality to qualify as 'priority habitats'.
- Remnant areas of marshy grassland in the west and east of the solar farm site are of high biodiversity value, as are areas of colliery spoil grassland (CSG) in the centre and north-east. The site as a whole supports over 60 plant species which are habitat-characteristic, and at least 10 local plant species including bee-orchid.
- The solar farm site as a whole comfortably meets or exceeds local SINC designation criteria and thresholds and is therefore assessed as being of 'District' (ie county-borough) value for wildlife. In total the site supports at least 10 'Qualifying Species' and 20 'Contributory Species' for designation as a SINC in the county borough.
- The solar farm site supports a range of scarce and declining/local fauna species. These include 'Section 7' listed (ie 'priority') mammals such as brown hare and hedgehog, as well as foraging badger and bats. All parts of the site are likely to have significance for mammals.
- Some 32 species of birds are confirmed or likely to be nesting including cuckoo, a 'Schedule 1' species, and 9 other 'Section 7' listed species. 19 of the nesting/likely nesting species are considered to be of conservation importance including skylark, meadow pipit, stonechat, bullfinch, linnet and reed bunting, amongst others. Key bird nesting habitats include the woodlands, scrub, hedgerows and open grasslands.
- The solar farm site supports common reptile species (slow-worm and common lizard) and is likely to support common amphibians including common toad (all 'priority species'). The rare and protected great crested newt has not been found on the site, however.
- The solar farm site supports a good invertebrate fauna which includes at least 7 'Section 7' listed species and a further 17 local species. These include small heath butterfly, cinnabar moth and brown-banded carder-bee as well as local species such as scarce blue-tailed damselfly and burnet companion moth.
- The Private Wire Route (PWR) running from the solar farm site to the Royal Glamorgan Hospital some 3km to the south-east primarily affects highway verges of relatively low ecological value.

Implications for Development

- The site is proposed for solar generation use in the future, with solar panel arrays (PVAs) to be installed on the central, southern and south-eastern parts of the site.
- A literature review of available research and expert opinion on PVAs and wildlife has concluded that with appropriate consideration concerning the location, design and post-construction management, it is possible for PVA-type solar farms to be integrated into the surrounding habitats with minimal adverse impacts and that they may, in some cases, even be beneficial in terms of species diversity and abundance.

- The solar farm layout proposed at Coed Ely avoids PVA installations on the key areas of habitat in the west and north-east, including the main plateau, and should avoid causing any significant loss or disruption to the main areas of habitat which are of greatest biodiversity value.
- It is therefore considered that a PVA development can be integrated with the known interests of this site, with special care being taken in respect of ground-nesting birds such as skylark and meadow pipit, as well as other fauna such as brown hare and common reptiles.
- The mitigation of impacts to ground-nesting birds will be contingent upon appropriate post-development management to create and maintain suitable nesting conditions.
- A detailed long-term post-development management strategy will be compiled for the whole site, with appropriate resources for implementation, monitoring and review being made available for the lifespan of the project.
- Although not expected to be necessary, any felling or lopping of larger trees would be preceded by further survey to establish their potential value for roosting bats, with licensing and mitigation as required.
- Site clearance and development operations will be subject to a clearance strategy do as not to impact nesting birds (nesting season approximately March to August inclusive).
- An appropriate reptile mitigation and clearance strategy will also be implemented ahead of site clearance, outside of the hibernation period (ie not between November to February).
- Opportunities will be taken for the enhancement of the retained and undeveloped habitats, especially in the management of the existing grassland and wetlands, and the maintenance of existing and creation of new aquatic/wetland habitats.
- No lighting of the solar farm site at night is anticipated or desirable, other than emergency lighting for the substation. The emergency lighting will take into account use of the site by bats and other nocturnal fauna and will be baffled accordingly.
- No significant impact is anticipated as a result of the PWR installation. The affected verge habitats will be restored to their previous condition after installation.

1.0 INTRODUCTION

Report prepared by:

1.1 David Clements Ecology Ltd (DCE), Penarth, Glamorgan

On behalf of:

1.2 Rhondda Cynon Taff County Borough Council (RCTCBC)

Instructed via:

1.3 -

Site Name

1.4 Proposed Coed Ely Solar Farm and Private Wire Route (PWR)

OS Grid Reference

1.5 Centre of site: ST 007 859

Elevation & Aspect

1.6 The solar farm site lies at approximately 125-250m ASL and is broadly east-facing.

Location & Extent **See Plan 1**

1.7 The site is approximately 33ha in extent and lies west of the village of Coedely, about 0.75km south-west of the village of Tonyrefail, in the Rhondda Cynon Taff district of Glamorgan, in South Wales.

Brief Description of Site

1.8 The proposed solar farm site falls in two parts lying west and east of a tarmac farm trackway. The larger western part, which lies on the higher ground, comprises a former spoil and slag tip for the nearby Cwm/Coedely colliery and coking works (also variously rendered as 'Coed Ely', 'Coed-ely' and/or 'Cwm-coedely') which ceased operations in 1986. The tip, which contained spoil contaminated with coking products including tars, cyanide, sulphates and benzoles, was restored in the early 2000s with some 200,000m^3 of contaminated materials being aggregated and encapsulated in a lined *in situ* containment in the upper, western part of the site and capped with crushed stone and clean colliery spoil. A complex surface drainage system was installed to prevent any drainage or leachates from entering the nearby Ely River (Afon Elai), and the site was landscaped to create a series of east-facing terraces extending eastwards beneath a domed plateau in the west. The latter comprises the main deposit of the encapsulated contaminated materials and is studded with dip-wells. The smaller eastern part of the site lies on the lower ground which continues the slope from the upper site. This also largely comprises respread colliery spoil.

The great majority of the site comprises secondary habitats which have developed on artificially deposited substrates. The western site mainly comprises open neutral grasslands, believed to be of sown origin, together with numerous small blocks of planted broadleaved woodland, and subdivided by planted native hedgerows. The site also contains a remnant of pre-existing marshy grasslands in the north-west and a number of small ponds, as well as an artificial lagoon and a small seasonal watercourse which flows

along the northern site boundary and discharges from the site at its north-eastern extremity. The smaller eastern site mainly comprises neutral pasture grasslands, also on soils derived from colliery spoil, together with several blocks of planted broadleaved woodland and areas of scrub. The eastern site also contains a small remnant area of marshy grassland as well as the watercourse of the main drain from the western site.

The Private Wire Route (PWR) comprises the corridor of a buried high voltage cable connection which extends from the lower eastern edge of the solar farm site to the Royal Glamorgan Hospital (RGH), some 3km away to the south-east.

Site Context

1.9 The solar farm site lies in a rural location just south of the Tonyrefail/Thomastown/Taylorstown settlement, the edge of which lies about 0.75km away to the north. The site is almost entirely surrounded by open semi-upland pastureland and moorland, and is accessed from the farm track which crosses through it. There are extensive windfarm developments on the open moorlands to the west. The site lies immediately above the former Coedely Colliery located in the valley-bottom to the east, the cleared site of which is currently being redeveloped as a business park. The corridor of the Ely River also passes through the valley bottom about 0.5km to the east of the site, together with the A4119 trunk road. The site is not open to public access.

Designated Wildlife Sites in the Vicinity **See Plan 1**

Statutory Sites Data from https://magic.defra.gov.uk/MagicMap.aspx

1.10 The site does not contain or lie adjacent to any statutory sites of biodiversity interest, such as Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) etc. The nearest such site appears to be the Rhos Tonyrefail SSSI, several parts of which lie about 0.75-1km away to the north (see Plan 1).

Non-statutory Sites Data from South-East Wales Biological Records Centre (SEWBReC)

1.11 There are a number of non-statutory Sites of Importance for Nature Conservation (SINCs) in the vicinity, the nearest being the Tonyrefail Mountains SINC (No. 107) which covers large areas of semi-upland grassland and upland habitats to the west and south, including land which is immediately adjacent to the western boundary of the solar farm site (see Plan 1). Another very large SINC at Mynydd Meiros/Mynydd Garthmaelog (No.s 83 & 92) lies about 1km away to the south, and there are other SINCs covering both the course of the nearby Ely River and the tributary valley of the Nant Llanilid (Llanilid Valley SINC, No. 108) which lies about 0.75km to the north.

Site Development Proposals **See Fig 1**

1.12 The site is proposed for development as a solar generation site using photovoltaic arrays (PVAs). In addition, a buried 11kv cable will be installed running from the solar farm site to the Royal Glamorgan Hospital about 3km away to the south (the 'Private Wire Route' or PWR).

Purpose of Surveys

1.13 Surveys were carried out to determine the suitability of the site for development as proposed, to assess the significance of any impacts arising and to make recommendations for mitigation, compensation and enhancement.

The western part of the site was subject to an Extended Phase 1 (ie baseline) survey in 2020-2021, the results of which were reported in DCE (2021). This report recommended that various aspects should be subject to more detailed (ie Phase 2) survey, in particular nesting birds (especially in regard to skylark), dormouse, great crested newt and invertebrates. The 2021 report was updated with the additional survey results and presented as DCE (2022). The present report sets out a further update and revision of the 2022 report based on additional surveys carried out in 2023. Unlike the earlier reports, the present report also covers the eastern part of the solar farm site as well as the corridor of the PWR.

Existing Records Data from South-East Wales Biological Records Centre (SEWBReC)

1.14 Existing records for the site were obtained from the local biodiversity records centre in the region in 2021, updated in 2023. There are few records from the site itself, although the surrounding area is reasonably well covered.

The present survey has also had access to invertebrate records compiled by Liam Olds under the auspices of the Colliery Spoil Biodiversity Initiative (CSBI) on land immediately adjacent to the north and east.

Survey Methods

1.15 The western site was initially subject to an Extended Phase 1 survey in August and September 2020 in accordance with the recommendations of the Chartered Institute of Ecology and Environmental Management (CIEEM 2013) and based on a custom modification of the Phase 1 Habitat Survey methodology developed by the former Nature Conservancy Council (JNCC 2010). The results were set out in the report of DCE (2021), with the biodiversity and wildlife conservation value of the site being assessed against the criteria set out in Appendix 1 of the present report. The western site was subsequently subject to detailed (ie Phase 2) surveys in respect of nesting birds, dormouse, great crested newt (eDNA method) and invertebrates carried out in accordance with the guidance provided by BTO (2015), Bright *et al* (2006), Biggs *et al* (2014) and Drake *et al* 2007, respectively. The original Phase 1 habitat and vegetation survey was also subject to *ad hoc* updating during the various Phase 2 surveys carried out in 2021 and 2022, with the results being set out in the report of DCE (2022).

The eastern site was initially subject to a Reconnaissance Phase 1 survey in late February 2023 (see DCE 2023) and subsequently at Extended Phase 1 level in May 2023, at which time the habitat survey data for the western site was also updated. The breeding bird fauna of both the eastern and western sites was also surveyed/resurveyed in 2023 [ongoing at the time of writing].

The habitats of the PWR were surveyed at Reconnaissance Phase 1 level in May 2023.

The combined results of all of the above surveys are presented herewith in the current report.

Survey Constraints

1.16 The surveys of the main solar farm site were not subject to any significant constraints.

Access into the central section of the PWR corridor was constrained by the active construction works associated with the A4119 Improvement Scheme, with some sections having to be surveyed by car and by reference to current aerial photography (Google Earth, 2021-2022 data).

2.0 SURVEY RESULTS

2.1 The following section sets out the combined results of the surveys carried out in the main solar farm area. The habitats of the PWR are dealt with separately at the end of this section.

A Habitats & Vegetation **See Plan 2**

A2.1 Lists of the plant species recorded are given at Appendix 3. The latter includes species recorded in previous surveys by other sources where these have been reliably reported from the site itself.

Priority & Notable Habitats **See Appendix 2**

A2.2 The solar farm site supports broadleaved woodland, marshy grassland, semi-improved neutral grassland, post-industrial grassland, native hedgerows and ponds, all of which are nominally listed under Section 7 of the Environment (Wales) Act 2016 as 'habitats of principal importance for conservation in Wales (formerly 'Priority Habitats').

Several of the habitats present on the site are not especially good example, with many only narrowly meeting, and in some cases probably just failing, the criteria for inclusion set out by Maddock (2011) – for example the secondary woodlands and the semi-improved neutral grasslands. Exceptions, however, comprise some of the areas of marshy grassland, the post-industrial grassland, some of the neutral grassland, and the ponds and hedges.

Protected, Priority & Notable Plant Species **See Appendix 2**

A2.3 No specially protected plant species are recorded from the site to date.

No 'priority' plant species were recorded, ie 'species of principal importance for the conservation of biodiversity in Wales', as listed under Section 7 of the Environment (Wales) Act 2016 (EWA).

No nationally rare or scarce plant species have been recorded from the site to date. However, the present surveys recorded at least 10 local species which are typical of upland and/or colliery spoil habitats in the region, including bee-orchid (*Ophrys apifera*), southern marsh-orchid (*Dactylorhiza praetermissa*), round-leaved wintergreen (*Pyrola rotundifolia*), sneezewort (*Achillea ptarmica*), western gorse (*Ulex gallii*), fairy flax (*Linum catharticum*), bog pondweed (*Potamogeton polygonifolius*), bog pimpernel (*Anagallis tenella*), tormentil (*Potentilla erecta*), heath bedstraw (*Galium saxatile*) and bell heather (*Erica cinerea*).

Invasive Non-native Plant Species **See Appendix 2**

A2.4 A non-native cotoneaster species, possibly wall cotoneaster (*Cotoneaster horizontalis*) was noted in several locations around the western site, mainly associated with dry, open colliery spoil. Buddleia (*Buddleja davidii*) also occurs on the site at low densities. The spread of these species in the open countryside is subject to regulation under the Wildlife & Countryside Act 1981. Evidence of ash-dieback disease was also noted in several areas.

Description of the Habitats & Vegetation **See Plan 2**

Broadleaved Woodland & Scrub

A2.5 The western site contains 17 blocks of woodland, almost all of which are of plantation origin dating from the 2000s. There are 16 geometric blocks of broadleaved plantation located mainly around the periphery of the site, together with one block of mixed plantation and secondary woodland located at the north-easternmost corner of the site. These woodlands are all fenced to exclude stock. The canopy seldom exceeds about 6-8m in height, with trunk diameters of about 15-20cm and occasionally up to about 35-40cm. Most of the plantations appear to be located on mixed topsoil and mine-spoil substrates similar to those of the adjacent grasslands, but several are at least partly located over large surface deposits (presumably artificial) of sandstone boulders and rubble.

All of the plantation blocks comprise mixtures of mainly native broadleaves, chiefly comprising lower-growing species such as common alder (*Alnus glutinosa*), hazel (*Corylus avellana*), field maple (*Acer campestre*), rowan (*Sorbus aucuparia*), holly (*Ilex aquifolium*), common hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*) and willows (*Salix* spp), although there are also some scattered pedunculate oak (*Quercus robur*), ash (*Fraxinus excelsior*) and birch (*Betula* spp). Some of the younger ash show signs of ash-dieback disease caused by the invasive non-native fungus *Hymenoscaphus fraxineus*. Common gorse (*Ulex europaeus*) also occurs locally, together with scatters of non-native species of alder (*Alnus* spp) and whitebeam (*Sorbus* spp). The planted areas tend to be dense and impenetrable, with a very shaded ground flora mainly comprising ivy (*Hedera helix*), creeping bent (*Agrostis stolonifera*) and bramble (*Rubus fruticosus* agg), together with other shade-tolerant species such as male-fern (*Dryopteris felix-mas*), hart's-tongue fern (*Phyllitis scolopendrium*) and herb-robert (*Geranium robertianum*) etc.

Blocks of planted woodland also occur along the eastern (lower) boundary of the western site, with grassland clearings between which have secondarily become variably infilled with scrub. The latter mainly comprises hawthorn, grey willow (*Salix cinerea*), blackthorn and gorse. The neutral grassland clearings are similar to those of the rest of the site (see below). One of the plantation blocks on the southern site boundary contains an open patch of colliery spoil grassland (see below).

The eastern site contains three main blocks of woodland, being wooded along its entire eastern boundary by an extension of a much larger valleyside woodland belt which runs extensively off-site to the north, east and south of the site. There are also several blocks of young to medium-aged scrub, mainly of willow and/or alder. The internal woodlands are broadly similar to those of the western site, being mainly of plantation origin although also incorporating elements of natural regeneration and a scatter of larger trees, the latter mainly associated with the banks of the various watercourses which run through the woodland blocks. These woodlands are probably of similar age to those of the western site and are similarly fenced against stock. Willows and alder are the main species represented, together with all of the other species mentioned above in varying quantities. There is little or no understorey and the ground flora is dominated by ivy and bramble, with bracken (*Pteridium aquilinum*) also locally prominent.

The easternmost woodland area is continuous with the valleyside woodlands off-site to the east. Whilst much, if not all, of the off-site woodland near the site is probably secondary in origin it nevertheless appears at least partly semi-natural, with a canopy of

mature oak and ash over a patchy understorey of birch, hawthorn, willows, hazel, rowan and other species, together with abundant bramble. Alder and willows predominate in areas where the ground is wet. In many places the substrate is clearly derived from colliery spoil, and there are numerous remnants of former coal-mining and other industrial archaeology, including some substantial sections of masonry walls, buildings and weirs etc. Ivy and bramble predominate in the ground flora, together with various ferns including bracken. Other ground flora species within or near the site include herb-robert, wood avens (*Geum urbanum*), foxglove (*Digitalis purpurea*), goldenrod (*Solidago virgaurea*), creeping bent, bluebells (both native *Hyacinthoides non-scriptus* and hybrids, *H.* x *massartiana*), cleavers (*Galium aparine*) and common nettle (*Urtica dioica*), amongst others.

Hedgerows & Standard Trees

A2.6 The western site contains a number of lengths of planted broadleaved hedgerow, mainly extending along the upper and lower edges of the terraces. These were all planted in the early 2000s. The hedges are mostly contained within stock-proof fences and comprise even-aged canopies of native shrubs including hawthorn, blackthorn, hazel, field maple, dogwood (*Cornus sanguinea*), blackthorn (*Rhamnus cathartica*), ash and willows. None of the internal hedgerows contain standard trees, and there are no hedgebanks. The ground flora beneath typically comprises neutral grassland or, more occasionally, colliery spoil grassland (see below) together with scatters of taller species such as foxglove, goldenrod, common ragwort (*Senecio jacobaea*), thistles (*Cirsium* spp) and docks (*Rumex* spp) within the stock-proof fences.

There are some short sections of older remnant hedgerow along the northern and southern boundaries of the western site, mostly on the lower ground to the east. These are mainly represented by groups of medium-mature standard trees of oak and ash of between about 30-40cm diameter at breast-height (dbh), standing on remnant hedgebanks. Some of the ash trees along the southern boundary at the easternmost end are derived from old hedge plashings. There are also some short lengths of gorse, willow, hawthorn and blackthorn scrub on these boundaries, often mixed with dense bramble. Bracken occurs frequently along the northern boundary bank. There are no large mature standard trees anywhere within the western site and it is unlikely that any of the hedges would meet the criteria for qualification as 'important hedgerows' under the Hedgerows Regulations 1997.

The eastern site supports a section of planted scrub hedge along its western boundary with the farm track and there is some remnant hedgerow along the southern boundary, the latter demarcated by old hedgebanks, sections of scrub and scatters of large standard trees of oak and ash. Bracken and bramble are frequent along these features, together with foxglove, ragwort, thistles and docks etc.

The eastern site also contains several groups of large mature trees and shrubs which stand out in the open grasslands, especially near the farm track. These mostly have trunk diameters of about 40-50cm but some larger specimens also occur. Several of the larger trees support broken limbs, cavities and other features which are likely to be of value to roosting bats and/or cavity-nesting birds. The tree species include oak, ash and alder and there are also a few large old shrubs of hawthorn.

Semi-improved Acid-tending Neutral Grassland

A2.7 The majority of the western site comprises semi-improved acid-tending neutral grassland which is presumably of seeded origin. This grassland is present on all of the terraces and is generally present in dense swards, especially where the soils are deeper. The neutral grasslands of the site grade into marshy grasslands to the west and locally on damp ground elsewhere, and also into 'colliery spoil grasslands' (CSG) on shallower soils and steeper slopes. There are also some very small areas of strictly acid grassland, mainly alongside tracks and on shallower soils to the west, so that overall the site presents a fairly complex mosaic of differing grassland types. Almost all of the site grasslands appear to be grazed by sheep at some time of the year, although the grazing pressure appears to be quite light.

The neutral swards are grass-dominated and relatively species-poor, comprising mixtures of Yorkshire fog (*Holcus lanatus*), common bent (*Agrostis capillaris*), brown bent (*A. vinealis*), rough meadow-grass (*Poa trivialis*), red fescue (*Festuca rubra*), sweet vernal-grass (*Antoxanthum odoratum*) and timothy (*Phleum pratense*). Common rye-grass (*Lolium perenne*) is generally infrequent but is locally common near to the main southern access track. Crested dog's-tail (*Cynosurus cristatus*) is locally frequent, and a few small areas to the west appear to support sheep's fescue (*Festuca ovina*). Rushes (*Juncus* spp) are common throughout, with soft rush (*J. effusus*) especially abundant on damper soils.

Broadleaved herbs are generally infrequent on the terraced areas and comprise species such as yarrow (*Achillea millefolium*), cat's-ear (*Hypochaeris radicata*), common mouse-ear (*Cerastium fontanum*), creeping buttercup (*Ranunculus repens*), ribwort plantain (*Plantago lanceolata*), white clover (*Trifolium repens*), bird's-foot trefoil (*Lotus corniculatus*), black medick (*Medicago lupulina*), creeping cinquefoil (*Potentilla reptans*), perforate St John's-wort (*Hypericum perforatum*) and sorrel (*Rumex acetosa*). Taller species include ragwort, thistles and goldenrod. Where the sward appears more acid (often on shallower soils to the west) species such as tormentil (*Potentilla erecta*), heath bedstraw (*Galium saxatile*) and heath speedwell (*Veronica officinalis*) occur, together with occasional western gorse (*Ulex gallii*). Bell heather (*Erica cinerea*), a local species, has previously been recorded on the western boundary (SEWBReC data) and also occurs within the site.

The diversity and frequency of broadleaved herbs is locally greater in some areas, including near to the lagoon and at the north-eastern corner of the site, where additional species include common knapweed (*Centauria nigra*), lesser stitchwort (*Stellaria graminae*), sneezewort, cut-leaved crane's-bill (*Geranium dissectum*), red clover (*Trifolium pratensis*), least trefoil (*T. dubium*) and primrose (*Primula vulgaris*).

In addition to rushes, damp areas in hollows and along ditch-lines etc support additional species including jointed rush (*Juncus articulatus*), tufted hair-grass (*Deschampsia cespitosa*), hairy sedge (*Carex hirta*), marsh thistle (*Cirsium palustris*), common fleabane (*Pulicaria dysenterica*), willowherbs (*Epilobium* spp) and field horsetail (*Equisetum arvense*).

The western site also contains some sections of drier acid-neutral grassland near the western boundary, particularly associated with some shallow hollows of unknown origin. These are probably of native origin and comprise mixtures of common bent, red fescue and other grasses, together with broadleaved herbs including yarrow, cat's-ear, bird's-

foot trefoil, sorrel and tormentil. Locally, where the sward is thinner, sheep-fescue and mouse-eared hawkweed (*Pilosella officinarum*) also occur.

The majority of the eastern site comprises species-poor, grass-dominated, acid-trending neutral pasture grasslands grazed by sheep. Those in the southern half of the site appear to have arisen in the period since the early 2000s, the site having been cleared of surface vegetation and presumably exploited as a source of clean soils for use during the spoil encapsulation operations on the western site. The swards appear to have been at least partially reseeded and are generally closely-cropped. Grass species dominate, including common bent, brown bent, Yorkshire fog and occasional crested dog's-tail, sweet vernal-grass and red fescue. Mosses are abundant, especially on the damper lower slopes. Broadleaved herbs are generally very infrequent, chiefly comprising species such as creeping buttercup, dandelion (*Taraxacum officinalis* agg), common mouse-ear, self-heal (*Prunella vulgaris*), ribwort plantain (*Plantago lanceolata*), lesser celandine (*Ficaria verna*), white clover (*Trifolium repens*), thistles and docks.

Where the ground is damp the pasture grasslands give way locally to rush-pasture, with extensive colonisation mainly by soft rush, although jointed rush and tufted hair-grass (*Deschampsia cespitosa*) are also locally frequent or abundant. These species are particularly abundant along the minor ditch-lines which cross the open grasslands in places. Where grazing pressure is relaxed locally, bracken and bramble are present, either as scattered plants or in small stands, and common nettle also occurs.

Rush-pasture

A2.8 There is a large area of rush-dominated pasture on the domed plateau of the western site, and smaller areas also occur elsewhere. These are overwhelmingly dominated by soft rush and creeping bent, together with smaller quantities of other species including hard rush (*J. inflexus*), jointed rush, tufted hair-grass, marsh thistle, common sedge (*Carex nigra*), hairy sedge, willowherb, tormentil and marsh bedstraw (*Galium palustre*). Purple moor-grass (*Molinia caerulea*) also occurs sparingly.

Species-poor rush pasture also occurs extensively in the fields of the eastern site, comprising mainly stands of common rush and jointed rush, together with tufted hair-grass, creeping bent and occasional marsh thistle.

Marshy Grassland

A2.9 Marshy grassland communities mainly occur at the western end of the western site and appear to be at least partially of natural origin and on undisturbed soils, especially to the south-west. Soft rush and jointed rush are abundant, together with Yorkshire fog, creeping bent and other grasses including velvet bent (*Agrostis canina*), sweet vernal-grass, rough meadow-grass, red fescue, tufted hair-grass and occasional purple moor-grass. Jointed rush, hairy sedge and other *Carex* spp also occur locally. Broadleaved herbs are relatively frequent and include marsh bedstraw, tormentil, greater bird's-foot trefoil (*Lotus pedunculatus*), creeping buttercup and bog stitchwort (*Stellaria alsine*). Where the ground is wetter, water mint (*Mentha aquatica*), marsh thistle, marsh willowherb (*Epilobium palustre*), fleabane, wild angelica (*Angelica sylvestris*) and lesser spearwort (*Ranunculus flammula*) occur. Sneezewort is occasional in drier areas. This vegetation conforms well with the M23a *Juncus effusus-Galium palustre* community of the National Vegetation Classification (NVC: Rodwell 1991).

A sloping declivity in the southern part of the eastern site also contains an area of marshy grassland. This is seasonally wet in places, with open runnels, seepages and pools

particularly on the mid and lower slopes. This habitat is moderately species-rich, containing frequent to locally abundant sedges and characteristic 'rhos pasture' plants such as purple moor-grass, marsh thistle, lesser celandine, marsh bedstraw, tormentil and occasional bog pimpernel, as well as ling-heather. The marshy grassland is not heavily grazed and is being actively colonised by bramble and willow scrub, particularly on the upper slopes alongside the farm track. The marshy grassland gives way to rush dominated rush-pasture at the edges.

Colliery Spoil Grasslands

A2.10 'Colliery spoil grassland' (CSG) is an umbrella title given to heterogenous plant communities which have developed secondarily on tipped colliery arisings such as overburden, shales, tailings and fines etc. They are very diverse in character, variously containing elements of acid, neutral and calcareous grasslands as well as other habitats such as heathlands, marshes, fens and ruderal ('wasteground') communities. Lichens and mosses may also be prominent. These elements often arise in complex mosaics, and grade freely into other adjacent communities such as neutral grasslands, marshy grasslands, heathlands and scrub etc. A few plant species, such as pearly everlasting (*Anaphalis margaritacea*) for example, are considered characteristic (Miller *et al* 2007). CSG falls within the definition of 'open mosaic habitats on previously developed land', a 'priority habitat' listed under Section 7 of the EAW 2016 as described by Maddock (2010).

CSG is mainly present on well-drained steeper slopes of the western site, especially in the north-west but also alongside tracks, banks and verges elsewhere. The CSG grades freely into the other grasslands of the site, and also includes areas of denser sward on deeper soils as well as some swards on damp soils.

The CSGs comprise a heterogenous mixture of species. The most typical swards occur on well-drained slopes and comprise skeletal mixtures of grasses such as common bent, Yorkshire fog, red fescue and crested dog's-tail, together with patches of glaucous sedge (*Carex flacca*). Broadleaved herbs in these areas include bird's-foot trefoil, creeping cinquefoil, barren strawberry (*Potentilla sterilis*), cat's-ear, perforate St John's-wort, tormentil, mouse-eared hawkweed, colt's-foot (*Tussilago farfara*), fairy flax (*Linum catharticum*), lesser hawkbit (*Leontodon saxatilis*), red clover (*Trifolium pratense*), least trefoil (*T.dubium*), black medick, daisy (*Bellis perennis*), pearly everlasting and occasional heath speedwell and western gorse. Where the spoil is deeper, other species may include sneezewort, rosebay willowherb (*Chamerion angustifolium*), hemp-agrimony (*Eupatorium cannabinum*), teasel (*Dipsacus fullonum*), great mullein (*Verbascum thapsus*), docks, thistles and meadow horsetail, often with a thin and spindly cover of bramble. Damper soils may also support additional species including marsh thistle, common fleabane, great willowherb, tufted hair-grass and purple moor-grass.

Southern marsh-orchid (*Dactylorrhiza praetermissa*) and bee-orchid (*Ophrys apifera*), both local species, occur occasionally in the CSG areas, and especially in the north-east of the western site near Ponds P3-P5. Round-leaved wintergreen (*Pyrola rotundifolia*), another local species, was also found at the edges of woodlands in the north-east and occurred sporadically elsewhere.

The eastern site contains very little CSG, which mostly occurs as narrow strips alongside the trackway which crosses the site from east to west.

Ponds

A2.11 The western site contains one large artificial lagoon and several smaller ponds. The rectangular lagoon measures about 30m x 10m and stands within a 2m-high wire-fence enclosure. It has a butyl liner and appears deep (1m+) and presumably acts as an attenuation lagoon for the tip drainage system. Two small metal equipment-store containers stand nearby. The lagoon banks comprise very skeletal CSG and there is no emergent/marginal vegetation, although the lagoon does contain a floating/submerged stand of pondweed (*Potamogeton natans*) and may also contain other submerged species.

Two small natural mire-ponds (P1 & P2) each of about 10m x 8m are present in the marshy grassland area at the western end of the site. These are shallow and largely encroached by wetland vegetation. Aquatic and wetland species include reedmace (*Typha latifolia*), bog pondweed (*Potamogeton polygonifolius*), bog pimpernel (*Anagallis tenella*), common spike-rush (*Eleocharis palustris*), soft rush, jointed rush, marsh bedstraw, water-crowfoot (*Ranunculus* (*Batrachium*) sp) and common duckweed (*Lemna minor*). Small willow (*Salix* sp) shrubs stand around and within the ponds.

Ponds P3-P5 occur at the easternmost end of the site, largely concealed within or under scrub. Ponds P3 and P4 measure about 12-15m in length by about 8-10m in width and are largely infilled with reedmace. Few other wetland species are visible, although some pondweed and duckweed are present locally. Bramble, willow and alder are encroaching from the banks. It seems likely that pond P3 was originally excavated as part of the site drainage scheme, and that P4 arose spontaneously in a still section of drainage ditch. Pond P5 appears to have arisen naturally in a circular hollow and is almost completely overshadowed by scrub. This shallow pond is about 8m in diameter and supports a dense cover of soft rush, together with pondweed and duckweed.

Watercourses

A2.12 A small seasonal watercourse flows along the northern boundary of the western site. This is partially overshadowed by adjacent scrub, bramble and bracken but is open elsewhere. The trapezoidal channel is lined with sandstone and supports little wetland vegetation, the latter chiefly comprising soft rush and creeping bent. An unidentified crane's-bill (*Geranium* sp – probably *G. molle*) is conspicuous along the ditch edges and stone-lined banks, and the banks also support hart's-tongue and male-fern. This watercourse also flows across the eastern site.

There are numerous other artificial channels crossing both the western and eastern sites. These are almost all similarly trapezoidal stone-lined features, and most were dry at the times of survey. Creeping bent, crane's-bill and soft rush are the main species present. Erosion is visible in places, and repairs were carried out during the summer of 2022 using clean rubble and chippings.

Rocky Substrates

A2.13 There are several large deposits of sandstone boulders and rubble at the eastern end of the western site, which appear to be of artificial origin. Some of these are more-or-less concealed under scrub or plantations but are open elsewhere. These support coarse scatters of species such as hart's-tongue, male-fern, polypody (*Polypodium* sp), herb-robert, colt's-foot, foxglove, thistles, docks, common gorse, grey willow (*Salix cinerea*) and buddleia (*Buddleja davidii*). There is also rubble beneath the scrub-woodland block on the southern boundary of the eastern site.

Some small areas of seemingly natural bare sandstone outcrop are exposed amongst the acid-tending grassland at the westernmost end of the western site.

Private Wire Route (PWR) **See Plans 3-7**

A2.14 The PWR comprises an 11kv cable link which runs from the eastern, lowermost edge of the solar farm site to the Royal Glamorgan Hospital (RGH) some 3km away to the south-east. The cable will be buried in a trench which mostly runs either alongside or under existing highways and access tracks. Where it runs alongside a highway the trench is located in the adjacent roadside verge, which will be restored once the installation has been completed. The section of the PWR which runs through the Coedely Business Park was installed some time previously to the time of survey.

The PWR corridor is shown on Plans 3-7 and is divided into three sections. The affected habitats in each section are described as follows:

Section 1: Coed Ely Solar Farm to Coedely Roundabout (Plans 3-4)

A2.15 The PWR trench runs under or alongside the existing tarmac of the access track leading up to the solar farm site. The habitats on either side comprise revegetated colliery spoil supporting a mixture of CSG, ruderal vegetation, and willow and other scrub including some areas of planted broadleaves.

At the foot of the slope, the PWR then runs southwards in the grassland verge of the main Coedely Business Park access road. The verge mainly comprises secondary neutral grassland of moderate species diversity, presumably of sown origin, and is irregularly mown. The verge is bounded to the east by an embankment supporting mixed deciduous scrub, which includes some planted broadleaves, but which is mainly dominated by willows. Beyond the embankment lies the corridor of the A4119 trunk road. To the west the verge is bounded by the tarmac business park access road, beyond which lie recently created development platforms comprising levelled colliery spoil supporting patchy and skeletal CSG and rush-pasture habitats. There is a neutral grassland verge on the opposite side of the access road which mainly supports rather rank CSG and neutral grassland, together with low sections of embankment supporting belts of broadleaved scrub and recent plantings. Black pea (*Lathyrus niger*), an introduced species, is frequent in the verges alongside the business park road.

At the southern end of this section the PWR traverses the corridor of the River Ely via an existing pipe-bridge before passing through a small area of secondary scrub and ruderal vegetation. It crosses under the highway and continues in the verge of the Coedely Roundabout and the A4119.

Section 2: Coedely Roundabout to Ynysmaerdy Roundabout (Plans 4-6)

A2.16 The PWR runs in the verge of the A4119 trunk road, which was undergoing extensive improvement works at the time of survey involving extensive earthworks and soil-stripping etc. The affected verge comprises mainly rather rank neutral grassland, together with areas of tall ruderal vegetation, bramble and scrub. The grassland verges are mown in many sections. Much of the route has belts of mixed scrub or developing woodland alongside it, beyond which lie variably improved neutral grassland pastures. There are mature trees nearby in some sections. At the southernmost end, the PWR runs alongside the semi-natural woodland which flanks the course of the River Ely.

Section 3: Ynysmaerdy Roundabout to RGH (Plans 6-7)

A2.17 The PWR runs in the southern verge of the Ynysmaerdy Roundabout, where it diverts off the A4119 and follows the access road into the Royal Glamorgan Hospital site. As in the previous sections, the PWR mainly runs in mown semi-improved neutral grassland verges alongside the access road. Habitats alongside the route include the wooded embankment of the A4119 to the east, and the landscaped grounds and buildings of the hospital site to the west. The affected verges are moderately species-rich in places, supporting species such as bluebells (*Hyacinthoides* sp), primrose (*Primula vulgaris*), cuckooflower (*Cardamines pratensis*) and common vetch (*Vicia sativa*) locally. The woodland alongside locally contains bluebells (including both native bluebell, *Hyacinthoides non-scriptus*, and hybrids), wood anemone (*Anemone nemorosa*), enchanter's nightshade (*Circaea lutetiana*), primrose and lesser celandine. Elsewhere, the invasive non-native ground-elder (*Aegopodium podagraria*) is locally abundant.

B Fauna

B2.1 Fauna species recorded from the site are listed at Appendix 4.

Protected, Priority & Notable Fauna Species **See Appendix 2**

B2.2 Protected species recorded on the site chiefly comprise nesting birds and common reptiles. Some 32 bird species are either confirmed, probably or possibly nesting in the habitats of the site including cuckoo, a 'Schedule 1' (ie specially protected) species, together with resident populations of slow-worm and common lizard. Badger, grass snake and/or adder may also occur. Bats also forage over the site but no roosts of these species have been detected to date.

Resident 'priority species', ie those listed on Section 7 of the Environment (Wales) Act 2016 as being of 'principal importance for the conservation of biodiversity in Wales', include seven of the nesting/likely nesting bird species and the two common reptiles, plus at least five invertebrate species. Other priority species such as badger, grass snake, and adder may also be present.

No nationally rare or scarce fauna species are recorded to date, but the site supports at least 19 nesting/likely nesting bird species which are considered to be of conservation importance either in Wales and/or in the wider UK, as well as at least 17 local species of invertebrates.

Invasive Non-native Fauna Species **See Appendix 2**

B2.3 Grey squirrel has been recorded from several locations within 2km of the site, however, and could potentially occur while foraging or commuting.

Description of the Fauna

Bats

B2.4 All species of bat and their roosting sites are protected under the Conservation of Habitats & Species Regulations 2017 (the 'Habitats Regulations' – See Appendix 2). The roosting places used by bats are also protected against unauthorised disturbance or obstruction under the amended Wildlife & Countryside Act 1981. Several bats are listed as priorities for conservation under Section 7 of the Environment (Wales) Act 2016.

Several species of bat have been recorded from within about 2km of the site, including foraging by common pipistrelle, soprano pipistrelle and noctule along the farm track and within the windfarm immediately to the east and south of the western site. The great majority of the surrounding records comprise common and soprano pipistrelle, although brown long-eared bat, noctule, serotine and various myotid species have also been recorded within about 1-1.5km of the site (SEWBReC data). Several of these species are known to roost locally.

The site contains no standing buildings other than the two metal-container equipment-sheds near the lagoon, and few other built structures besides some sections of drystone boundary wall, stone-lined ditches and culverts etc. Although roosting use of such structures could not be entirely ruled out, such use is not considered to be very likely and no roosting evidence was found by the present survey.

There are no large mature trees on the western site, and the few medium-mature boundary trees present did not appear to support any obvious features which might be used for roosting. The eastern site, however, contains a number of mature trees with features such as split and hanging limbs, cavities and damaged bark etc which could very well offer 'potential roosting features' (PRFs) for bats.

There are numerous records of bats foraging in the area surrounding the site, and the habitats of the site itself also appear to be suitable for such use. Some probable bat feeding evidence (discarded moth wings) was found alongside the northern site boundary stream.

Otter

B2.5 Otter is also a 'Habitats Regulations species' (see Appendix 2) afforded legal protection which is similar to that of bats (see above). It is also a 'Section 7' listed species. Otter is well established throughout the catchment of the Ely River and has been recorded within about 1km of the site (SEWBReC data). No evidence of this species was found within the site itself, however, and the occurrence of this species as anything other than a casual visitor is considered unlikely. Some foraging in and around the lagoon and ponds, and along the seasonal watercourses, may occur on occasion.

Dormouse

B2.6 Dormouse is also a 'Habitats Regulations species' (see Appendix 2) afforded legal protection which is similar to that of bats (see above). It is also a 'Section 7' listed species. This species has been recorded at distances of between about 2-3km away, mainly in woodlands (SEWBReC data) but was considered unlikely to occur on the site itself due to its relative elevation and lack of suitable off-site habitat connectivity. Nevertheless, given the presence of a network of planted broadleaved woodlands and hedgerows on the western site, some of which are likely to be affected by the proposed solar farm development, it was recommended that a detailed survey for dormouse should be carried out in order to rule this species out.

A dormouse survey using some 300 artificial nesting tubes was therefore carried out between May and November of 2021, the results of which were as follows:

Visit Date	***Dormouse Presence***	***Notes***
05/05/2021	(Nest-tubes deployed)	
0/06/2021	Nil	
29/07/2021	Nil	
23/08/2021	Nil	1x wood mouse present
29/09/2021	Nil	
21/10/2021	Nil	
04/11/2021	Nil	1x wood mouse present

Hazelnuts, a favoured food of dormouse, were also collected on the site and examined for evidence of handling by this species, but no such evidence was found.

Badger

B2.7 Badger is fully protected in the UK under the terms of the Protection of Badgers Act 1992, which includes its nesting sites (see Appendix 2). Current interpretation of the Act also infers a degree of protection to areas which are of key significance to foraging badgers.

There are numerous records of badger from the area surrounding the site, including several records of setts (nesting burrows) (SEWBReC data). The present survey found evidence of badger on the site, including one well-marked trail (see Plan 2) with hair-snags and foraging signs elsewhere. No obvious setts were found on the site, however, although the presence of these could not be ruled out in the denser areas of scrub and bramble etc. The site is clearly suitable for foraging use by this species.

Other 'Section 7' Listed Mammals

B2.8 Brown hare is a local and declining 'Section 7' listed species which is recorded from several locations in the near vicinity (SEWBReC data). A leveret (young hare) was seen on the western site near the southern boundary, and droppings and adults of this species were seen in several locations on the site during the various surveys. Brown hare is considered likely to be resident and breeding on the site.

Hedgehog, which is of similar status to brown hare, is also recorded at several locations near to the site (SEWBReC data). Droppings likely to be of this species were found on the track near the entrance at the south-eastern corner of the western site.

Brown hare (and badger, if shown to be resident) are listed as 'Qualifying Species' for the designation of a SINC in the county borough (WBP 2008a).

Other Mammals

B2.9 A range of common and ubiquitous mammals is likely to occur on the site. These are likely to comprise a mixture of resident and visitor species such as fox, grey squirrel and mice, voles and shrews etc. Rabbit, grey squirrel, wood mouse and evidence of a vole species were all seen on the site by the present surveys. Stoat is recorded from a location nearby (SEWBREC data) and could also be present on the site.

Birds

B2.10 Nearly all bird species are protected against killing or injury as individuals, and this protection extends to their nests, eggs and young. A number of especially rare species are subject to enhanced protection and may not be disturbed whilst nesting without authorisation ('Schedule 1 species' - see Appendix 2). Many bird species are listed as being of 'red list' (ie high) or 'amber list' (ie medium) conservation status either in Wales and/or in the wider UK (RSPB 2017; 2021), with several of these also being listed as being of 'principal importance' for conservation in Wales.

A wide range of bird species have been recorded both from the area surrounding the site, including many notable species (SEWBReC data). These include Schedule 1 raptors such as goshawk, merlin, peregrine, hobby and red kite, and other Schedule 1 birds such as crossbill, barn owl, brambling, redwing and fieldfare. Several of these species are known to be nesting within 2-3km of the site.

The 2020 Phase 1 surveys recorded some 21 bird species from the site, including 5 species of conservation concern comprising skylark, meadow pipit, song thrush, green woodpecker and stonechat, all of which were considered likely to be nesting at that time, with the possible exception of green woodpecker (DCE 2021).

Several skylark were observed singing over the site in August 2020, suggesting that this 'Section 7' species may be nesting. Skylark is well established in the vicinity, with recent records from at least eight sites in the Coedely area. Meadow pipit, another

ground-nesting species, was also recorded on the site and is similarly well established locally (SEWBReC data).

In order to establish the status of the bird fauna in more detail, a 'Breeding Bird Survey' (BBS) was carried out on the western site between March and June of 2021, with special reference to the presence of ground-nesting species such as skylark and meadow pipit. Four survey visits were made following a transect route which covered all parts of the site, with surveys commencing within 1 hour of sunrise in suitable (ie fair) weather conditions. The survey results from the 2021 survey are provided at Appendix 4.

In April to June of 2023 the western site was resurveyed for breeding birds, along with the eastern site. The results are provided at Appendix 4.

Some 51 species of bird have now been recorded on the site to date in total. These include 15 species confirmed nesting, with a further 12 species 'probably' nesting and 5 species 'possibly' nesting, suggesting a total nesting fauna in the region of 32 species in total. A further 19 species were recorded as visitors to the site.

The nesting (confirmed/likely) fauna included the notable species cuckoo, green woodpecker, whitethroat, song thrush, stonechat, willow warbler, dunnock, redstart, bullfinch, linnet and reed bunting. 2-3 territories of nesting skylark were detected on the site, together with 6-8 territories of nesting meadow pipit. Willow warbler, a 'Red List' species in Wales, was the most numerous breeding species with 24 territories recorded on the site in 2021. Ten of the recorded nesting birds are listed as 'Contributary Species' for the designation of a SINC in the county borough (WBP 2008a).

Most of the skylark and meadow pipit activity was recorded in the north-western and western areas of the site, although some activity by the latter was also detected on the east-facing neutral grassland terraces in the eastern parts of the site.

Reptiles

B2.11 Four native reptile species occur in South Wales, comprising common lizard, slow-worm, adder and grass snake. These four species are all afforded so-called 'partial protection' under the amended Wildlife & Countryside Act 1981, which prohibits the deliberate killing or injury of individuals. However, there is no direct protection extended to the habitats which support these species. All four common reptiles are listed as 'Section 7' species in Wales.

Slow-worm was recorded under a rock in the eastern part of the western site, and common lizard was seen on one of the sandstone boulder deposits. Both of these species are recorded from numerous locations within 1km of the site and are likely to be well-established residents. Adder and grass snake are also recorded from sites nearby and could well be present (SEWBReC data; Olds 2020, pers comm). Slow-worm and common lizard are both listed as 'Contributary Species' for the designation of a SINC in the county borough (WBP 2008a).

Amphibians

B2.12 Five native amphibian species occur in South Wales, comprising common frog, common toad, smooth newt, palmate newt and great crested newt (GCN). The latter species is a nationally rare and declining 'Habitats Regulations' species afforded full protection under UK legislation, which also extends to the habitats which support it. The other four species are not afforded any direct statutory protection, other than with respect to trade, but common toad is listed as a 'Section 7' species in Wales (see Appendix 2).

Common toad, common frog and palmate newt have all be recorded in recent years from 'Coedely Colliery', although these were not seemingly from within the tip area itself (SEWBReC data). Nevertheless, it is considered extremely likely that all three occur there and are likely to be breeding in the lagoon and ponds of the western site.

The rare and protected great crested newt (GCN) has not been recorded within 2km of the site and is considered unlikely to occur although this could not be ruled out at the time of the 2021 survey. The lagoon on the western site was, however, noted to contain predatory fish (see below) which is usually contraindicative for this species.

In order to refine the information on GCN, an eDNA survey was carried out based on water samples collected from the large lagoon and five smaller ponds of the western site on 3 May 2021 in accordance with the Technical Advice Note of Biggs *et al* (2015) and approved by Natural Resources Wales. The samples were analysed by SureScreen Scientific Ltd, with the following results:

Pond No. (see Plan 2)	***Results***
Lagoon	Nil
Pond 1	Nil
Pond 2	Nil
Pond 3	Nil
Pond 4	Nil
Pond 5	Nil

Fish

B2.13 About 60 species of freshwater fish occur in the wild in the British Isles, around 40 of which are native species, the rest being introduced by coarse fisheries or from the pet trade etc. Five relict glacial lake species are protected in Britain under the Wildlife & Countryside Act 1981, as amended, and one riparian and coastal species (sturgeon) is also listed under the Habitats Regulations 2017. Ten fish species are listed as conservation priorities in Wales under Section 7 of the EWA, including native anadromous migratory species such as Atlantic salmon, brown/sea trout and European eel. About 20 native species are considered to be scarce, declining or otherwise of conservation significance in Britain as a whole.

Goldfish were observed in the lagoon, a non-native species which is now widely established in the wild in Britain. This species may have been deliberately introduced or may have arrived as eggs carried on the feet of visiting birds. No other fish species were recorded, but it is possible that common small species such as stickleback may be present in some or all of the waterbodies on the site.

The lack of permanent watercourses rules out the presence of most riverine species although European eel, a 'Section 7' migratory species, may make its way along the main seasonal ditch at certain times of the year since this species is adapted to traverse dry land when it is not too desiccated. European eel is recorded in the nearby Ely River and other watercourses in the vicinity (SEWBReC data).

Invertebrates

B2.14 Upwards of 37,000 species of terrestrial and freshwater invertebrates are recorded in Britain, including around 29,000 insect species, occurring in every available habitat.

About 40 invertebrate species are afforded full statutory protection in the UK, and many other species are accorded varying levels of conservation significance (see Appendix 2).

There are a large number of existing invertebrate records for the area around the site, including many moth-trap records. These include numerous rare, scarce and declining species (SEWBReC data). Surveys of the nearby 'Coedely Colliery' by Liam Olds of the CSBI during the period 2015-2020 have to date yielded over 190 species, including at least 11 which are of conservation concern. The latter include small heath, dingy skipper and grayling butterflies, six-belted clearwing moth, scarce skimmer dragonfly, the bee-fly *Bombylius canescens* and various micromoths, bugs and wasps. The habitats of the site are potentially suitable for many of these species.

Detailed surveys of the western site for invertebrates were carried out in 2021 and 2022 (see Appendix 6). These surveys recorded a total of some 193 invertebrate species on the site, including the following five 'species of principal concern for conservation' in Wales (ie 'Section 7-listed' species). These species are all also 'Qualifying Species' (QS) for the designation of a SINC in the county borough (WBP 2008a):

Species	Common Name	Section 7	SINC
Coenonymphus pamphilus	Small heath	S7	QS
Arctia caja	Garden tiger-moth	S7	QS
Tyria jacobaea	Cinnabar moth	S7	QS
Chiasmia clarthrata	Latticed heath moth	S7	QS
Bombus humilis	Brown-banded carder-bee	S7	QS

In addition, a further 17 local or uncommon species were recorded, several of which are either 'Qualifying Species' (QS) or 'Contributary Species' (CS) for the designation of a SINC in the county borough (WBP 2008a).

Species	Common Name	Status	SINC
Conocephalus discolor	Long-winged conehead cricket	Local	QS
Orthocephalus coriaceus	Capsid bug	Local	
Corizus hyoscyami	Red and black bug	Local	CS
Ischnura pumilio	Scarce blue-tailed damselfly	Local	CS
Cordulegaster boltonii	Golden-ringed dragonfly	Local	CS
Orthetrum cancellatum	Black-tailed skimmer	Local	
Sympetrum danae	Black darter	Local	CS
Euclidia glyphica	Burnet companion	Local	QS
Zygaena trifolii	Five-spot burnet	Local	
Crambus pratella	Grass-moth	Local	
Ochsenheimeria taurella	Micromoth	Local	
Oxystoma pomonae	Weevil	Local	CS
Dolichopus brevipennis	Long-legged fly	Local	
Teuchophorus spinigerellus	Long-legged fly	Local	CS
Dichetophora obliterata	Snail-killing fly	Local	
Herina frondescentiae	Picture-winged fly	Local	
Gymnomerus laevipes	Mason-wasp	Local	

Key areas for invertebrate biodiversity on the western site were identified as comprising the western marshy grasslands and their associated Ponds P1 & P2; the CSG areas, particularly in the area around the lagoon; the northern boundary bank with its associated larger trees and seasonal watercourse; and the north-easternmost corner of the site containing Ponds P3-P5 and the associated CSG, neutral grassland and rubble habitats

nearby. The marshy grassland area of the eastern site is also likely to be of value for invertebrates. These areas of elevated interest are indicated on Plan 7.

3.0 ECOLOGICAL ASSESSMENT OF THE SITE

See Plan 8

3.1 There is currently no nationally accepted system for the categorising of sites or features of biodiversity significance below the level of national value, criteria for which are set out by the former Nature Conservancy Council (1989, as amended by JNCC 2019 *et seq*). However, guidance for the identification of non-statutory sites of county significance (ie SINCs) is available in this instance (WBP 2008a; WBP 2008b).

For the purposes of this study the habitats and features of the site have therefore been evaluated and graded in accordance with the categories set out in Appendix 1. The site evaluation is illustrated at Plan 8.

District Value

3.2 Whilst much of the site is of fairly recent artificial and secondary origin, it nevertheless largely comprises habitats which are considered to be conservation priorities in Wales and includes some elements of what appear to be original native marshy grasslands containing small bog-pools. These habitats collectively support at least 10 local plant species which are considered characteristic of upland and/or of colliery spoil grasslands, including bee orchid, southern marsh-orchid and round-leaved wintergreen, amongst others. The habitats of the site comfortably meet or exceed the published criteria and/or thresholds for SINC designation in respect of neutral grassland, acid grassland, calcareous grassland and marshy grassland (WBP 2008a), whilst round-leaved wintergreen and bee-orchid are also 'Qualifying' and 'Contributory' species for such designation respectively.

The site supports resident brown hare and hedgehog, both conservation priorities in Wales, and is also used at least occasionally by badger and foraging bats. At least 32 species of birds are currently either confirmed, probably or possibly nesting, including cuckoo, a 'Schedule 1' species, and 9 other 'Section 7' listed species. Some 17 of the nesting/likely nesting bird species are afforded some level of conservation concern either in Wales or in the wider UK, including skylark, meadow pipit, stonechat, bullfinch, linnet and reed bunting, amongst others.

Other fauna species of conservation significance known to occur on the site include common reptiles such as slow-worm and common lizard, and a wide range of characteristic invertebrates which include at least 7 'Section 7' listed species and a further 17 local species.

In total the site supports some 10 'Qualifying Species' and 20 'Contributory Species' for designation as a SINC in the county borough (WBP 2008a). The site lies within an area of high biodiversity value, with many rare, local and habitat-characteristic species recorded either adjacently or nearby, at least some of which could also be expected to occur on the site.

On this basis, the site as a whole comfortably meets or exceeds the published criteria and/or thresholds for consideration as a SINC in the county borough context and is therefore assessed as being of District value for wildlife in its entirety.

Local Value

3.2 The habitats directly affected by the PWR corridor (not shown on Plan 8) are not considered to be of any greater than Local value for wildlife.

4.0 IMPACTS OF DEVELOPMENT

Development Proposals

See Figs 1 & 2

4.1 The site is proposed for development as a solar generation site using photovoltaic arrays (PVAs) as shown at Fig 1 below. The PVAs will occupy about 7.5ha in total.

Fig 1: Proposed layout for PVA development

4.2 The 'tables' of PVA panels are proposed to be pile-mounted in twinned ranks, with each rank sloping in the opposite direction (ie a 'tented' arrangement – see Fig 2). There will be a 4m wide ride between each of the twinned ranks.

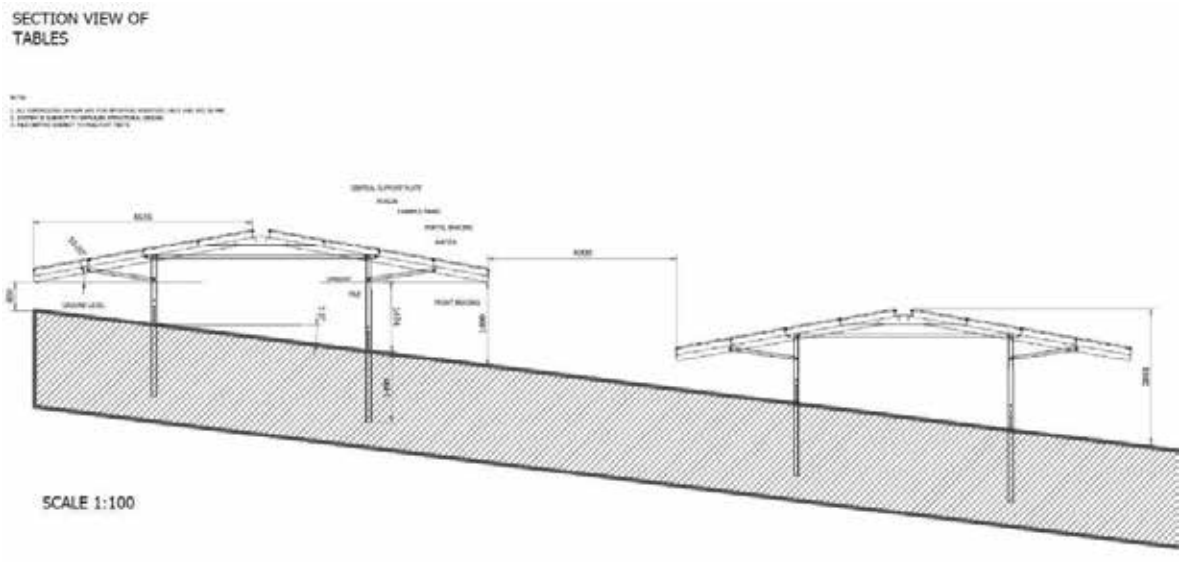

Fig 2: Proposed design of PVA tables

Potential Development Impacts

4.3 Solar generation plants tend to be preferred on elevated and south-facing locations where sun-exposure is maximised. The arrays of solar panels on the present site are therefore chiefly confined to the upper southern and eastern parts of the site, with areas to the west and north being either less suitable or unsuitable for such use, as indicated at Fig 1. Some parts of the site will therefore be retained in their present undeveloped condition, including the most significant habitats identified for invertebrates and plant species (as indicated on Plan 8).

Solar generation arrays can have adverse impacts on vegetation through a range of factors such as shading and the alteration of ground-level irrigation, drainage and wind patterns etc under and around the panels. The installation of panels may also restrict or alter the management regime of the site, especially where panels are low to the ground, resulting in the increased dominance of shade-tolerant species, coarse grassland and ruderal species at the expense of finer and more species-rich grassland swards. The management of swards below panels, whether by grazing or mowing, may also be restricted or prevented. In addition, the physical installation of solar panel infrastructure can result in the loss or degradation of site vegetation through the construction of new maintenance and access trackways, surface and subsurface cable routes and control-equipment etc. The panels themselves may require the excavation of post-holes or the construction of concrete platforms for support, resulting in significant ground disturbance.

There is also scope for significant and varied impacts to fauna. These can include, for example, the exclusion of ground-nesting birds such as lapwing which require uninterrupted sight-lines, or of fauna species which will not tolerate shade. The installation of solar panel arrays may introduce vantage points for predators of both chicks and small mammals, such as corvids or raptors. Unsuitable site management, such as mowing at insensitive times of the year, may cause disruption to a wide range of fauna including nesting birds and invertebrates, and the intrusion of maintenance staff and vehicles may result in increased levels of disturbance affecting a wide range of species. Any lighting of the site at night, such as security lighting etc, could cause significant impacts to nocturnal fauna including bats and moths etc.

Conversely, some impacts may actually be beneficial. The secure fencing of solar array sites may exclude or deter terrestrial predators such as fox, for example, to the advantage of smaller mammal species and ground-nesting birds, whilst the erection of tall panels in open landscapes may provide additional song-posts for territory-holding birds or even elevated nesting-sites for some species. Sensitive vegetation management aimed at keeping the panels clear of encroachment may result in more advantageous conditions for plants, invertebrates and other fauna of conservation value. Disturbed or bare-ground conditions as a result of PVA installations may also favour some invertebrates and other fauna species of interest, potentially including skylark.

Literature Review

4.3 A detailed literature review by Taylor *et al* (2019) examined much of the then-available literature relating to the potential impacts of ground-mounted photovoltaic solar arrays on wildlife. This report cited research indicating that, *inter alia*, PVAs of the type being considered at Coedely can potentially have a wide variety of impacts on both site ecology and species. These impacts may be adverse (negative), beneficial (positive) or neutral, however, and are typically both site- and species-specific, meaning that it is difficult to draw

broad conclusions.

Cited examples included:

- PVA panels which generate horizontally polarised light can adversely affect sensitive aquatic invertebrate populations in some situations (eg Horvath *et al* 2010). The invertebrates mistake the panels for open water and lay their eggs on them, where they then perish. Gridding the panels with non-reflective white strips reduced this effect, and it was noted that the type of panels most often employed in the UK are grid-formed panels with anti-reflective films in which the reflection of polarised light is likely to be substantially reduced.
- Studies of habitat fragmentation for invertebrates by PVAs are limited but tend to indicate that resident invertebrate populations are able to adapt (eg Guiller *et al* 2017).
- Several studies indicate that bird mortality as a result of collisions with PVA panels does occur but suggest that this is only likely to be significant for very large arrays in areas where there are large numbers of migrating birds. A policy briefing by RSPB (2014) concluded that there is little scientific evidence for fatality risks to birds from PVAs.
- Studies indicate that PVA installations can potentially affect the composition of nesting bird faunas on sites, typically causing a reduction in diversity. A study by Montag *et al* (2016), for example, found that skylark in the UK tends to nest in undeveloped control plots rather than within adjacent or nearby PVA sites, and concluded that ground-nesting birds generally are likely to avoid PVA sites due to their requirement for unbroken lines of sight from the nest. Pre- and post-construction studies in the USA suggested that the impacts are site- and species-specific but that, for example, small passerines tended to be more abundant after PVA construction and raptors and corvids less so. These impacts may have related to changes in the management regime, however.
- There has been limited research into the impacts of PVAs on bats, although studies have shown that bats can mistake horizontal PVA-like surfaces for water and vertical PVA-like surfaces for open flight-routes. It is also possible that bats are attracted to forage around PVA panels because of their propensity to attract flying invertebrates. There was no evidence to suggest that fatal collisions with tilted PVA panels occur in the field, however, or that panel collisions generally are likely to be a significant source of mortality to bats except perhaps under certain exceptional conditions.

Notwithstanding the above, the studies by Montag *et al* (2016) indicated that overall, there was a greater diversity and abundance of birds found within PVA sites than in control plots. Comparative studies of flowering plants and pollinator invertebrates also generally showed higher levels of diversity and abundance within PVA sites compared with control plots, together with higher levels of bat foraging activity and larger numbers of brown hare. The study also found that whilst skylark may not nest under PVA panels they do nest within solar farm boundaries in open areas away from the panels. At least some of these beneficial impacts are likely to have arisen from habitat enhancement measures undertaken at the time of construction (eg resowing with wildflower seed mixtures) and wildlife-friendly management regimes with the PVA sites.

A policy briefing by RSPB (2014) concluded that provided PVA sites are appropriately designed and sited, there is little evidence to indicate that there are likely to be significant adverse wildlife impacts and some evidence of beneficial impacts. This view contrasts

somewhat with that of a report by Birdlife Europe (2011), however, which concluded that there are likely to be negative impacts to birds, especially ground-nesting species. It was admitted, however, that the scientific evidence for this is limited, and that some nesting bird species may actually be attracted to and benefitted by PVA sites.

Studies by Armstrong *et al* (2014; 2016) compared microclimatic and ecosystem processes under PVAs with undeveloped grassland plots and found seasonal and diurnal variations in soils and air microclimate under the former. These comprised increased ranges in cooling and drying under PVAs in summer, and slightly decreased cooling under PVAs in winter. Temperature and humidity variation, and plant species diversity and biomass, were all lower under the PVAs compared to open areas. These impacts are not necessarily adverse in themselves, however, but are likely to result in changes to the biota of PVA sites.

Studies undertaken since the 2019 review of Taylor *et al* include those of Shotton (2020) for an MRes project which looked at bird use (foraging, resting and roosting) of solar farms in the Central England. This found that solar farms are used by birds at similar levels to other land-use types (eg pasture, meadow), and typically at significantly higher levels than in arable fields. The top ten species recorded in solar farms comprised swallow, carrion crow, goldfinch, blackbird, woodpigeon, starling, yellowhammer, skylark, jackdaw and lesser whitethroat. Typically, bird usage was highest within the centre of the PVA areas rather than around the margins. The numbers of birds were found to decrease with sward height, which appears to be optimal at between 7-20cm, falling sharply above about 25-27cm.

A study by Blaydes *et al* (2022) in the UK showed that bumblebee (*Bombus* spp) density and nesting density in solar farms is driven primarily by the site management regime, with twice as many bees foraging and nesting in solar farms which are managed as wildflower meadows, compared with those with only wildflower margins. Large, elongated and [foraging] resource-rich solar farms were found to be the most effective at increasing bumblebee density in the surrounding landscapes, with implications for local crop pollination. There were twice as many bees found in areas around large solar farms managed for wildflowers when compared with smaller sites managed as turf grass. An earlier study of pollinators on solar farms by Blaydes *et al* (2021) resulted in ten recommendations for maximising pollinator potential, comprising (1) providing a diverse mix of flowering plant species; (2) planting or maintaining hedgerows at the site boundaries; (3) ensuring season-long availability of foraging resources for pollinators; (4) providing nesting sites and breeding resources for pollinators on the site; (5) graze, or mow at low intensity, late in the season; (6) create and maintain a varied vegetation structure; (7) minimise use of agrochemicals; (8) target management for pollinators especially in homogenous and intensive agricultural-dominated landscapes; (9) promote connectivity to semi-natural habitats off-site; and (10) seek to generate a range of microclimatic conditions.

A study by Kampherbeek *et al* (2023) showed that the presence of PVAs offered sheep relief from excessive heat, wind and rain which thus increased potential for grazing activity. Forage digestibility and protein content was found to be higher under PVA ranks than in surrounding native rangeland and sheep spent more time grazing in the former than in the latter. The study suggested that a combination of intensive (ie 1-day) and rotational (ie 4-day) grazing gave the best results in terms of both stock foraging efficiency and site management.

Almost all studies to date have emphasised the paucity of the available research and the need for further detailed investigation of the specific impacts and effects of PVAs on wildlife and ecology.

Informal Communications

4.4 Contact with Gareth Harris, an ecologist working at a confidential solar array site in Wiltshire, suggested that nesting skylark numbers in particular could potentially be adversely affected by the construction of a PVA site on open grasslands (pers comm, 12 Jan 2021). Following three years' of bird surveys in 2015, 2017 and 2019, nesting skylark numbers were found to have fallen on a PVA site as compared with an adjacent undeveloped pasture grassland site, where the numbers remained approximately unchanged. At least some of this decline was probably due to adverse or unsuitable post-development management within the PVA site, however. Of the skylarks nesting within the PVA site (approximately 15 territories) none achieved a second brood, in contrast with the control site. Skylarks were not found to nest under the panels, where the vegetation became too lush and damp. Nesting chiefly occurred on shorter-sward areas between the panel arrays ('tramlines') and on remnant concrete pads from demolished buildings. Skylarks were seen landing onto short-sward areas and then moving into more tufted, longer swards where nests were presumed to be located. Mowing or grazing in the late summer/autumn and late winter was recommended. Skylark territories were seen to be set up mainly in March, although occasionally as early as January, and all nesting ceased after about the end of August.

Contact with Rob Spencer, an ecologist working at the Kencot Hill solar farm in Oxfordshire, suggested that with appropriate management a PVA site can support a better population of skylark than an adjacent area of arable field (pers comm, 13 Jan 2021). Bird abundance was found to be higher generally on the PVA site compared with an adjacent arable control plot, with skylark nesting both under and between the PVA panels of the former (see Bodsworth 2016). The PVA grassland is mown in autumn and late winter. 15x15m test plots within the PVA were mown short in areas between the panels as potential nesting areas for skylark based on a method trialled successfully in South Africa for other related lark species, but these were not used, with skylarks preferring to nest on areas of disturbed ground between and under the panels which had arisen during construction. Skylarks frequently perch on, and sing from, the PVA panels at this site.

Contact with Fran Tattershall, an ecologist working at the Westmill solar and wind generation site in Wiltshire, confirmed that both skylark and brown hare are resident on the PVA site, which is grazed by goats or sheep in spring and summer (pers comm, 04 Mar 2021). No other management is usually necessary as there is sufficient room for the stock to graze beneath the panels, although some localised weed control may become necessary at times. The panels are tilted at 30^{o} and are raised on legs, with 7m tramlines between the ranks. The site was resown with a wildflower seed mixture at the time of construction. It was noted that rabbits had occasionally caused problems by chewing through cables.

All of the above-mentioned PVA sites are enclosed by high wire-mesh security fences which appear to exclude or deter foxes. Predation of chicks and small mammals by corvids or raptors was not considered to be a problem on any of the sites.

Overall Conclusions

4.5 As noted above, there is currently insufficient targeted research to allow a detailed evaluation of the potential impacts of ground-mounted PVAs on wildlife. It is clear that such impacts do occur, however, and that these can vary significantly from site to site and from species to species, depending on the individual circumstances of the site. Having said that, it does also appear to be the case that with appropriate consideration and input concerning the location, design and, perhaps most crucially, post-construction management, it is possible for PVA-type solar farms to be integrated into the surrounding habitats with

minimal adverse impacts and that they may, in some cases, even be beneficial in terms of species diversity and abundance (see eg Montag *et al*, 2016; Bodsworth 2016).

Mitigation Measures for Solar Sites

4.6 In addition to the recommendations by Blaydes *et al* (2021) in respect of pollinators (see above), a review by Gasparatos *et al* (2017) suggested a number of more general biodiversity mitigation measures for solar sites, the primary one of which was to preferentially locate these in areas with low existing biodiversity value. Where this cannot be achieved, however, recommended strategies from various sources including RSPB (2014) and BRE (Parker & Greene 2014), and summarised by Taylor *et al* (2019) include:

- Retention or installation of boundary features such as hedges, ditches, stone walls, rough grassland, field margins and scrub.
- Planting of pollinator and nectaring strips.
- Secure fencing to exclude or deter larger predators such as fox or badger, but not smaller mammals and other vertebrates. Ideally, the fences should be planted with climbing plants such as honeysuckle (*Lonicera periclymenum*).
- Provision or retention of high value grasslands such as wildflower meadow or tussocky semi-natural grasslands.
- Installation of features such as new ponds, nest-boxes, bat-boxes, reptile hibernacula, log-piles, bee-walls and beetle-banks etc.

The post-construction management of the site is recognised as being crucial to the performance of the site as a biodiversity feature, particularly the management of grassland under and around the PVA panels.

5.0 RECOMMENDATIONS

Statutory Obligations

5.1 Any future development on this site must seek to avoid causing significant adverse impacts to protected species known to occur on the site, including:

- Nesting birds
- Common reptiles
- Badger

Any site clearance works must not cause harm or disturbance to any birds which may be nesting on the site at the time. Any clearance or construction works affecting potential bird-nesting habitats, including open grasslands, trees, hedges and scrub etc, should therefore avoid the main nesting season which runs approximately from March to August inclusive. Alternatively, any works which must necessarily be conducted during this period must be preceded by a survey to ensure that no nesting birds are present. In the event that any nesting birds are discovered immediately prior to or during any works, all work in the immediate area must cease immediately and appropriate expert advice obtained.

Site clearance works must not cause harm to any common reptiles which may be present on the site. A detailed Method Statement (Reptile Mitigation Strategy) should be prepared in consultation with the local planning authority ecologist prior to site clearance and implemented accordingly.

Badger occurs but is not currently thought to have any nesting burrows ('setts') on the site. In the event that any setts are detected in the future, however, and that these may be adversely affected by the development, an appropriate scheme of mitigation must be agreed with Natural Resources Wales (NRW) and a development licence obtained in advance as required.

Site-specific Recommendations

5.2 The following comprise outline recommendations in respect of the proposed development at the Coed Ely site, based on the details available at the time of writing. Where the current development proposals have already been designed to meet the recommendations made herewith, this is indicated below.

- The main vegetation interest of the western site comprises the marshy grassland located at the western end of the site, and the CSG/neutral grasslands around the lagoon and in the north-eastern corner of the site. In the eastern site the main interest comprises the area of marshy grassland in the north of the site (see Plan 7). It is therefore recommended that development, and any incidental disturbance arising as a result of development, should be avoided in these areas as far as possible.
- Current nesting activity by skylark and meadow pipit is also mainly concentrated in the western and plateau areas of the western site, and therefore the avoidance of development in these areas, as currently proposed, should minimise the risk of adverse impact to these species.

The current development proposals adhere to this recommendation.

- The PVA panels should be arranged so as to accommodate ground-nesting birds such as skylark and meadow pipit within the solar farm site. Evidence from similar sites elsewhere suggests that it is possible to integrate solar generation plants with both these

species. The main factor in doing so successfully appears to comprise the appropriate after-management of the site rather than the design, location and/or spacing of the panels. It is not certain that skylark would necessarily nest within the proposed solar farm area at Coed Ely since its current nesting activity takes place outside of the area where PVAs are likely to be installed, but meadow pipit may well do so.

The current development proposals envisage the retention of large areas (about 19ha, or 72%) of the existing grassland in an undeveloped condition and also incorporate rides of 4m width between the ranks of PVA tables, which will be managed for use by ground-nesting species such as skylark and meadow pipit.

· The post-development management programme for the site should cover the whole site, including the retained grasslands referred to above, in order to maintain these in an optimal condition for biodiversity interest. This is especially relevant to the north-eastern area which is currently fenced against stock and is rapidly becoming overgrown and trending towards scrub.

This recommendation is met within the current proposals.

· PVA panels should be pole-mounted, rather than standing on concrete plinths, and the lowest edge should be elevated at least 75cm above ground-level to allow management or grazing of the underlying vegetation.

The current proposals exceed these recommendations.

· Where construction operations result in bare ground areas these should not be reseeded but allowed to revegetate naturally, thus hopefully creating further areas of CSG. These areas should be managed with the other grasslands of the site.

This recommendation is met within the current proposals.

· Post-development management should aim to retain the majority of the existing grasslands, including that under the PVAs, at an average sward-height of between about 20-30cm, with sward density low enough to allow access to the ground in places. Some areas of short sward (10-15cm) should also be encouraged locally.

This recommendation will be met within the current proposals under the terms of a management plan to be formulated and agreed with the local planning authority.

· The grasslands under and around the PVA panels, and also within the wider site, should ideally be managed by grazing with sheep or otherwise by mowing. Grazing should be undertaken between August to February inclusive, at sufficient levels to achieve the sward recommendations given above. Stocking levels should ideally be significantly reduced, or stock withdrawn entirely, during the spring and summer months although experience at Kencot Solar Farm in Oxfordshire suggests that light sheep grazing does not deter or interfere significantly with nesting by skylark or meadow pipit. Where grazing is the main management method used, some periodic, localised strimming or mowing may also be necessary in areas which are not grazed sufficiently by the stock, in order to prevent the development of rank swards, ruderal vegetation and scrub. A late winter (ie Feb) cut may also be desirable but should take care not to interfere with or disturb any early nests of skylark or other ground-nesting species. Any late winter/early spring cuts must be subject to pre-surveys by a suitably qualified person to ensure that no nests are present.

These recommendations will be met within the current proposals under the terms of a management plan to be formulated and agreed with the local planning authority.

· Where mowing is the preferred method, this should be undertaken primarily in late

summer/autumn (ie late Aug to end Sep) and again, if necessary, in late winter (ie Feb) although as mentioned above, care must be taken not to disturb any early nests with the latter. Mowing with hand-operated equipment (ie strimming) is preferred to tractor-mounted mowing although the latter may be acceptable in some areas of the site. Ideally, the arisings should be collected and removed from the site. Where more frequent mowing is required, for example for PVA access or maintenance reasons (eg in the 'tramlines') care must be taken to avoid disturbing or damaging any bird nests which may be present. In any areas which are to be maintained in a 'short-sward' condition mowing should commence before skylarks begin establishing territories (ie from end of Feb) and repeated at frequent (eg fortnightly) intervals to maintain a short (ie 50mm) sward-height until the end of the breeding season (ie end Aug) in order to deter nesting in the tramlines.

The current proposals envisage the site being grazed by sheep, but in the event that mowing becomes necessary this will be addressed under the terms of a management plan to be formulated and agreed with the local planning authority and will be in accordance with the above recommendations.

· Consideration could also be given to differentially grazing the PVA area with sheep and the marshy grasslands in the western end and plateau of the site which would better benefit from autumn grazing with cattle. This would require more a complex fencing arrangement, however, as cattle are not suitable for grazing amongst PVAs, as well as a more labour-intensive stock management regime.

It is not clear if this recommendation can be met under the current proposals but the viability of doing so is being investigated at the time of writing.

· None of the hedgerows of the site should be removed. The hedges should stand within undeveloped corridors measuring at least 5m width on either side of the hedge centreline. Hedges should be cut on rotation in the autumn/winter period and maintained at a height of between about 1.5-2.5m.

The current proposals envisage the removal of about 280m (ie about 17%) of the existing internal hedgerows of the western site, to be off-set by the planting of new hedgerows elsewhere on the site. The management of the retained and new hedgerows will meet the above recommendations.

· The secondary woodland areas of the site are uncharacteristic of the surrounding area but are used by nesting and roosting birds of interest. Any woodland areas which are to be removed for construction purposes must be cleared during the autumn/winter period (ie Sep to Feb) to avoid causing impact to nesting birds. Arisings should be used to create 'ecopiles' within and around the adjacent woodlands and elsewhere within the semi-improved neutral grassland areas – see Appendix 7.

No woodland is proposed for clearance under the current development proposals.

· Scrub encroachment onto open grasslands, especially that at the north-easternmost end of the site, should also be cleared back. Scrub should be subject to regular management to maintain it within defined limits, by means of rotational cutting in the autumn/winter period, with management of the grasslands by grazing or mowing as recommended above.

This recommendation will be met within the current proposals under the terms of a management plan to be formulated and agreed with the local planning authority.

· The existing ponds should be retained, with periodic management to reduce the encroachment of bramble and scrub where this is significantly shading the open water (ie ponds P3-P5). The periodic winter removal of some of the emergent vegetation to retain

open water would be desirable where ponds are becoming closed-over (eg Ponds P1-P2).

This recommendation will be met within the current proposals under the terms of a management plan to be formulated and agreed with the local planning authority.

· Consideration should be given to the creation of new ponds elsewhere on the site, especially in the rush-pasture plateau and western marshy grassland areas. These should be of minimum 5-10m diameter, with a natural shape and shelved profile, to a maximum depth of about 1m, and allowed to vegetate naturally.

This recommendation will be met within the current proposals under the terms of a management plan to be formulated and agreed with the local planning authority.

· Any larger trees or shrubs which need to be felled or cut back should be subject to more detailed survey to accurately establish their use by roosting bats. In the event that bats are found to be roosting, any works to the affected trees will require the issue of a derogation licence by NRW and the implementation of appropriate mitigation measures.

It should not be necessary to fell or cut-back any of the larger trees on the site, since these are all located around the site periphery or are in other areas which are not affected by the current development proposals.

· Consideration should be given to the establishment of a scatter of new standard trees of pedunculate oak within the hedges and other site boundaries, and perhaps also within the open grasslands. These should be protected against grazing stock and encouraged to form open-grown maiden or 'parkland' trees.

This recommendation will be met within the current proposals under the terms of a management plan to be formulated and agreed with the local planning authority.

· Fencing of the PVA plots should be designed to exclude or deter larger terrestrial predators such as fox and badger but should permit continued access by small mammals and reptiles etc including brown hare. Sections of fence with gaps of about 120mm below the lower edge should therefore be provided at intervals of about 20-25m.

This recommendation will be met within the current proposals under the terms of a management plan to be formulated and agreed with the local planning authority.

· Consideration should be given to the installation of bird-nesting and bat-roosting boxes on suitable larger trees around the site. Suitable examples are shown at Appendix 8.

This recommendation will be met within the current proposals under the terms of a management plan to be formulated and agreed with the local planning authority.

· Night-time lighting of the site should be avoided wherever possible as any such lighting could have adverse impacts on a wide range of nocturnal fauna such as bats and moths etc. Any night-time lighting which is considered necessary, however, must be in accordance with the guidance provided by the Bat Conservation Trust[1].

No artificial lighting of the site at night is currently anticipated other than emergency lighting for the DNO substation. This will be vectored and baffled to prevent light-spill outside of the target area.

[1] See https://www.bats.org.uk/our-work/buildings-planning-and-development/lighting

Other General Provisions

5.3

- Contractors would be provided with a 'toolbox talk' at the outset of site clearance and construction works setting out the known and possible habitat and species constraints, and the mitigation measures which are required. The toolbox talk would also set out procedures to be followed in the event that there are unexpected encounters with protected species etc. All contractors carrying out clearance works would be warned of the possible presence of bats, nesting birds and common reptiles etc, and of their protected status. It would be clearly understood that in the event of any being found during works, all works would cease in the affected area until appropriate expert advice has been sought.
- A Wildlife Protection Plan (WPP) will be drawn up for the site clearance and construction stages, setting out detailed measures to ensure that the identified interests, potential interests and statutory obligations etc are appropriately treated. The WPP would include, for example, the agreed vegetation, reptile and non-native species clearance strategies, and identify the individuals who will be responsible for ensuring that the ecological mitigation requirements are met.
- Responsibility for implementation of the WPP would be assigned to an appropriately qualified and/or experienced member of the development team who would function as an 'Ecological Clerk of Works' (ECOW).
- A detailed five-year Biodiversity Management Plan (BMP) will be drawn up to guide the long-term management and maintenance of both the semi-natural habitats and other ecological features of the developed site. Implementation of the BMP would be funded by the developer. The BMP would be reviewed and reiterated with any necessary revisions at five-yearly intervals.
- Post-development monitoring surveys (ie Breeding Bird Survey, plants and invertebrates) will be undertaken at two-yearly intervals commencing in Year 1 after completion of the development, at repeated for at least three cycles, in order to record any changes or effects relative to the pre-development results set out in the present report. The survey results would also be used to refine the tasks set out in the BMP where necessary.
- The services of an appropriately qualified and licensed ecologist would be available on an 'on-call' basis throughout the entire development period in order to deal promptly with any protected species or other ecological matters which may arise during the clearance and construction works.

These recommendations have all been accepted within the current development proposals and are separately addressed elsewhere.

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APPENDIX 1: DEFINITIONS OF SITE VALUE

International Value

Site carrying an internationally recognised designation such as Ramsar Site, World Heritage Site, Special Protection Area, Special Area of Conservation, Biosphere Reserve or Biogenetic Reserve, or:

Habitats: site supporting nationally significant areas of habitats of defined international community interest.
Species: site supporting nationally significant populations of species of defined international community interest.

National Value

Site meeting published Site of Special Scientific Interest (SSSI) designation criteria (NCC 1989; JNCC 2019 *et seq*), whether so designated or not.

Habitats: site supporting nationally significant areas of habitats of defined national rarity or interest.
Species: site supporting nationally significant populations or communities of UK Red Data Book, Nationally Notable or protected species (other than badger).

County Value

Site identified as a County Wildlife Site (CWS), Site of Importance to Nature Conservation (SINC) or similar at the county level (ie greater than district, borough or city level); meeting published CWS designation criteria (where these exist), but falling short of SSSI designation criteria, whether designated as a CWS or not.

Habitats: site supporting good examples of nationally threatened habitats, or extensive areas of habitats which are rare or unique in the county.
Species: site supporting large or strong populations or communities of nationally rare or protected species (other than badger), or of species which are rare in the county and uncommon nationally.

District Value

Sites failing to meet County Value criteria, but nevertheless supporting habitats, species or communities which appreciably enrich the ecological resource of the county, especially by virtue of their size or extent.

Habitats: sites supporting habitats uncommon in the county, small but unmodified fragments of nationally threatened habitats, or comprising extensive areas or systems of semi-natural habitats.
Species: sites supporting nationally rare species, or strong populations or communities of regionally uncommon species, which would not otherwise be present (ie they are critically dependant on the site characteristics).

Local Value

Habitats which fail to meet District Value criteria, but which appreciably enrich the ecological resource of the locality. This category can be further divided into:

- **High Local Value**: just failing to meet District Value Criteria; supporting species which are notable or uncommon in the county; or species which are uncommon, local or habitat-restricted nationally, and which might not otherwise be present in the area.

- **Local Value**: sites which are of ecological value only in the context of their immediate surroundings. Rare or uncommon species may occur but are not restricted to the site or critically dependent upon it for their survival in the area.

Sites failing to meet any of the above can be considered as being of '**Negligible**' ecological value.

APPENDIX 2: STATUTORY & POLICY FRAMEWORK FOR BIODIVERSITY

The following sets out a brief review of the key legal and key policy elements affecting wildlife species in Wales. It is not intended to be comprehensive and only the most recent and relevant articles are mentioned.

The review sets out our interpretation and understanding of key elements of the legislation and policy insofar as they apply to typical planning and development operations, based on our experience. The interpretations given below are for guidance only, however, and do not constitute legal advice. In all cases the reader is advised to consult the original legal and policy documents for the definitive wordings, and where necessary to obtain qualified legal advice.

The Conservation of Habitats & Species Regulations 2017 ('Habitats Regulations')

The Habitats Regulations were originally enacted to implement the obligations of ***EU Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora & Fauna*** (the 'EU Habitats Directive') into British law, and in so doing created the highest tier of legal protection for wildlife species in UK, the so-called 'European Protected Species' (EPS). These species include, *inter alia*:

- All species of bats
- Hazel dormouse ('dormouse')
- Eurasian Otter ('otter')
- Great crested newt
- Natterjack toad
- Sand lizard
- Smooth snake

The Regulations also cover a small number of very rare plant species such as lady's-slipper orchid.

The requirements of the Habitats Regulations were given continuance following the UK's withdrawal from the EU ('Brexit') in 2019 by the ***Conservation of Habitats & Species (Amendment) (EU Exit) Regulations 2019***, and therefore continue to apply unchanged at the time of writing. EPSs are hereafter referred to as 'Habitats Regulations Species' (HRS) to reflect this change in the legislative framework.

In summary, and *inter alia*, all HRS animal species are protected as individuals against deliberate killing, injury, capture or disturbance, at all stages of their lives, and in addition, the places used for breeding or resting by these species may not be damaged or destroyed. Breeding and resting places are also afforded protection against deliberate disturbance, or the blocking of access, under the amended ***Wildlife & Countryside Act 1981*** (see below). HRS plant species may not be picked (in any part), collected, uprooted or destroyed at any point in their life cycle.

The main exceptions to these provisions are either that the activities were authorised by the relevant statutory body (in this case, Natural Resources Wales – NRW) and, where required, were carried out under a licence ('derogation') obtained in advance. Offences which occur as an incidental result of some other otherwise lawful activity (ie 'accidental' or 'unintentional' offences) are not exempt under the Regulations but may be viewed more leniently where (a) they could not reasonably have been foreseen, (b) the activity causing the offence ceased as soon as the presence of HRS, or their habitats, became apparent, and (c) NRW were informed immediately and appropriate expert advice sought to evaluate and remediate the situation.

Bats

The legal protection covers any place or feature which is used for resting during the day ('day roosts') and also any places which are used for hibernation in winter. Places which are used for short periods of resting at night ('night roosts'), or as customary stations for the handling and processing of food ('feeding perches'), are not usually accorded the same level of importance as day roosts and hibernation sites, although they are in fact still subject to the Regulations and in some cases may be deemed important enough to be accorded full protection.

Dormouse

Protection is usually considered to extend to any habitat, such as woodland, scrub, hedgerows and bramble stands etc, where dormouse occurs and where nests may therefore be present. The continuity of the habitats occupied by dormouse with other areas of similar connecting habitat may also be a matter for statutory consideration under the Regulations.

Otter

Protection is usually considered to extend to any watercourse or waterbody which is used by otter, and which may therefore contain nests or resting places ('holts'). It also extends to any areas of terrestrial habitat away from watercourses and waterbodies where these also contain holts, and the connectivity of such places with the occupied aquatic habitats may also be a matter for statutory consideration under the Regulations.

Great crested newt

Protection is usually considered to extend to any watercourse or waterbody which is occupied by great crested newt (GCN), and which may therefore be used for breeding. It also extends to any terrestrial habitats used by GCN during its non-aquatic phases, especially those places which are used for hibernation in winter or sheltering during adverse weather conditions. Typically the latter will be physically connected to a breeding pond (or ponds) but may lie anything up to

2km away. At minimum, a terrestrial hinterland of 10m width around the edges of a breeding pond will be considered to be protected where this contains habitats which are suitable for terrestrial use by GCN.

Protected Sites

The Habitats Regulations also set out to protect certain rare and valuable habitat types, such as ancient semi-natural woodland, heathland, bogs and species-rich grasslands etc. This is done through the identification and designation of specifically protected sites known as Special Areas of Conservation (SACs). SACs are subject to the highest level of legal protection against damage, destruction, degradation or harmful uses or activities which is available in the UK. All such sites are also designated as Sites of Special Scientific Interest (SSSIs) under the Wildlife & Countryside Act 1981 (see below).

The Wildlife & Countryside Act 1981 (WCA)

This much amended and complex piece of legislation is the means by which protection is afforded at the next tier of species below the HRSs and is the primary source of protection in respect of birds. Species afforded protection under the WCA include, *inter alia*:

- All species of birds
- Water vole
- Red squirrel
- Common reptiles (ie slow-worm, common lizard, grass snake, adder)
- Marsh fritillary butterfly
- Pearl mussel
- Various plants, ferns, mosses, liverworts, lichens & fungi

Birds

In summary, all wild birds are protected against deliberate killing, injury or capture, and this protection extends to their eggs and young. It is also illegal to destroy, damage or remove the nest of any bird either while it is in use or being built. For certain rare species which are listed on Schedule 1 of the Act the protections go even further: it is illegal to disturb any Schedule 1 bird species, either deliberately or unintentionally ('recklessly'), while it is building a nest or actually nesting, or to disturb the dependant young of any such bird. Exceptions to these general principles affect some specific game, food or pest species, but only under certain specified and defined conditions and usually in accordance with a licence issued in advance by NRW.

Actions which cause an adverse impact to birds or their nests which arise as an incidental result of some otherwise lawful activity, such as the trimming or removal of hedges, trees or scrub for example, would not constitute an offence provided that the activity could not have reasonably been avoided. As a general result of the provisions of the WCA therefore, the deliberate destruction, removal or clearance of habitats containing nesting birds would almost invariably constitute an offence because the impacts to birds could reasonably have been foreseen and avoided, for example by carrying out the clearance activities at a time when birds are not nesting.

Except under certain specified conditions, the clearance or removal of nests or nesting habitats is generally not illegal if it is carried out at a time of year when no birds are nesting or if it can otherwise be shown that no nesting birds are present at the time (eg by means of advance survey).

Activities which might adversely affect Schedule 1 birds such as barn owl, kingfisher or birds of prey can be undertaken provided a licence has been obtained in advance from NRW and appropriate mitigation measures are put in place.

Animals Other than Birds

Animals other than birds, such as water vole, red squirrel, marsh fritillary and pearl mussel for example, are listed on Schedule 5 of the Act, and are afforded protection which is generally similar to that of HRSs. The individual animals may not be deliberately killed, injured or captured, in any of their life stages, and it is also illegal to destroy or damage any places which these animals use for shelter or protection, or to disturb an animal using such a place or obstruct access to it, whether deliberately or unintentionally.

As with birds, impacts to Schedule 5 animals which arise as an incidental result of an otherwise lawful activity do not constitute an offence provided those impacts could not have reasonably been foreseen and avoided.

Water Vole & Red Squirrel

In the case of nest-making animals such as water vole and red squirrel, protection will normally be taken to extend to the entirety of any suitable, or potentially suitable, nesting or sheltering habitats which are occupied by a residential population of the species concerned. The connectivity of these habitats with other similar habitats in the wider vicinity may also be a matter for statutory consideration.

Marsh Fritillary Butterfly & Pearl Mussel

For species which do not make nests, protection will normally be taken to extend to the entirety of any habitats which are suitable, or potentially suitable, for breeding or sheltering and which are occupied by a residential population of the species concerned. The connectivity of these habitats with other similar habitats in the wider vicinity may also be a matter for statutory consideration.

Common Reptiles
Slow-worm, common lizard, grass snake and adder are afforded so-called 'partial protection' under the WCA. The animals themselves may not be deliberately killed or injured, but they may be captured and the habitats which support them are not afforded any direct protection in themselves.

As with other Schedule 5 animals, adverse impacts which arise as an incidental result of an otherwise lawful activity do not necessarily constitute an offence provided those impacts could not reasonably have been foreseen and avoided. Under current interpretation this is taken to mean that the destruction or clearance of habitats which are known to support common reptiles, or where such reptiles could reasonably be expected to occur, without the implementation of measures to minimise or avoid causing incidental death or injury to reptiles, would be likely to constitute an offence.

Protected Plants
About 180 species of plants, ferns, mosses, liverworts, lichens and fungi are afforded protection under Schedule 8 the WCA. These may not be intentionally picked (in any part), uprooted or destroyed, unless authorised under licence. As with Schedule 5 animals, adverse impacts which arise as an incidental result of an otherwise lawful activity do not necessarily constitute an offence provided those impacts could not reasonably have been foreseen and avoided.

Protected Sites
The WCA also sets out mechanisms for the protection and conservation of habitats and features of high biodiversity value through the identification and designation of specifically protected sites. These include Sites of Special Scientific Interest (SSSIs), National and Local Nature Reserves (NNRs/LNRs) and National Parks etc. Such sites are subject to wide-ranging legal protection against damage, destruction, degradation, exploitation or other harmful activities or uses.

The Protection of Badgers Act 1992 (PBA)
Badger is protected primarily in relation to animal welfare and cruelty, as a result of illegal persecution. Badgers are protected against intentional killing, injury, 'cruel ill-treatment' or capture in all of their life stages. Their nesting burrows ('setts') may not be destroyed, damaged, dug into or obstructed and it is illegal to disturb a badger while occupying a sett, either deliberately or 'recklessly' (ie unintentionally as a result of failure to take due care). The PBA is also taken to confer a degree of protection to foraging areas which are critical to the support of a badger family-group ('clan') where the loss of this would otherwise result in their starvation. As with other protected species, adverse actions which arise as a result of an otherwise lawful activity do not constitute an offence provided those impacts could not reasonably have been foreseen and avoided. A number of specified exemptions are provided in connection with certain legal farming and fox-hunting activities which may impact badgers.

The protection of setts only applies to those which are in 'current use' and not to those which are abandoned. However, many badger setts are occupied only intermittently throughout the year and therefore 'current use' should not be taken to imply *continuous* use.

Actions to remove badger setts on development sites may be undertaken under a licence issued by NRW and in accordance with agreed mitigation measures, and licences may also be issued to allow the removal or exclusion of badgers from sites. Such operations may not occur during the breeding ('close') season, however, which is usually taken to be between December to June inclusive, due to the risk of trapping lactating females and young below ground.

Environment (Wales) Act 2016 (EWA)
Section 7 of the EWA contains the most recent lists of species and habitats which are considered to be of 'principal importance for the conservation of biodiversity in Wales'. These lists replaced those which were previously given under s.42 of the ***Natural Environment & Rural Communities Act 2006***, which in turn replaced the 'Priority Species' listed under the UK Biodiversity Action Plan of 1995 and its Welsh equivalent. Species listed under s.7 of the EWA include many of those afforded protection under the articles described above, including otter, dormouse, water vole, nesting birds, common reptiles and great crested newt, for example, as well as additional species such as:

- W. European hedgehog ('hedgehog')
- Brown hare
- Harvest mouse
- Polecat
- European eel ('eel')
- Atlantic salmon ('salmon')
- Brown & sea trout
- Garden tiger moth
- Cinnabar moth
- Small heath butterfly
- Hornet robberfly
- Shrill carder bee
- Flat sedge
- Wild chamomile
- Common toad

and many other plant and animal species which are not otherwise specifically afforded statutory protection for wildlife conservation reasons (although they may in some cases be afforded some element of protection for other reasons, such as animal welfare or cruelty).

Section 7 of the EWA also identifies a number of habitat-types which are of 'principal value for conservation in Wales'. These include:

- Lowland mixed deciduous woodland
- Hedgerows
- Lowland meadows
- Upland flushes, fens & swamps

- Purple moor-grass & rush-pastures (in Wales, often referred to as 'rhos pastures')
- Reedbeds
- Blanket bog
- Sand dunes
- Rivers & ponds

Although not protected as such, the EWA requires statutory authorities to take such 'Section 7' species and habitats into account when considering the management and development of sites in Wales, and to take "*all reasonable steps*" to maintain and enhance their populations. The presence of such species and habitats is a 'material consideration' on sites where planning permission is sought for development. ***Planning Policy Wales (2021)*** (PPW, 11th Edition) requires Local Planning Authorities (LPAs) to have regard to the presence of 'Section 7' species and habitats and to avoid adverse impacts as a result of development wherever possible. Developments which are considered essential in the public interest must seek to minimise adverse impacts and incorporate appropriate mitigation/compensation measures where adverse impacts cannot be avoided.

Sites of Importance for Nature Conservation (SINCs)

SINCs comprise so-called 'third-tier' sites which have been identified as having biodiversity conservation value at the sub-national (ie regional, county, county-borough or local) level. They are usually identified by the LPA, often in collaboration with other local conservation bodies such as the county Wildlife Trust, and may appear under range of different names (eg 'Wildlife Site', 'County Wildlife Site' etc). Such sites are not specifically protected in law (ie they are 'non-statutory') but they are recognised as a 'material consideration' on sites where planning permission is sought for development. As with 'Section 7' habitats, PPW (2021) requires LPAs to avoid adverse impacts as a result of development wherever possible, and developments which are considered essential in the public interest must incorporate appropriate mitigation/compensation measures where adverse impacts cannot be avoided.

Invasive Non-native Species

Schedule 9 of the ***Wildlife & Countryside Act (1981)*** sets out lists of plant and fauna species which are subject to statutory regulation in Britain. These currently include plants such as Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and wall cotoneaster (*Cotoneaster horizontalis*), and animals such as signal crayfish, aquarium terrapin, Asian hornet and copyu. The lists are updated regularly.

The import, sale, transport, cultivation and keeping of these species is generally forbidden except under a specially issued licence, and it is illegal to allow these species to escape or spread into the wild, either deliberately or by accident. This includes any part and all life-stages of the species concerned. Earthworks which might accidentally result in the transfer of Schedule 9 plant material to another location or which encourages it to spread either within or off the site, for example, is forbidden. Any works on a site which might involve contamination by, and potential spread of, any of the listed species must be carried out under an approved method statement designed to prevent them being accidentally dispersed off of or within the site, and which preferably results in their complete elimination wherever this is possible.

APPENDIX 3: PLANT SPECIES RECORDED ON SITE

All species recorded by DCE 2020-2023, unless otherwise indicated:
SEWBReC : Data held by local biological records centre, various dates

Species	Common Name	Contributing Species for SINC designation							Comments
Trees & Shrubs		**AM**	**NG**	**AG**	**MG**	**CG**	**W**	**PI**	
Acer campestre	Field maple						X		
Acer pseudoplatanus	Sycamore								
Alnus glutinosa	Alder								
Alnus sp	Non-native alder								
Betula pendula	Silver birch								
Betula pubescens	Downy birch								
Budleja davidii	Buddleia								Non-native
Cornus sanguinea	Dogwood								
Corylus avellana	Hazel								
Cotoneaster ?*horizontalis*	(?wall) cotoneaster								Invasive non-native
Crataegus monogyna	Common hawthorn								
Fraxinus excelsior	Ash								
Ilex aquifolium	Holly								
Prunus avium	Wild cherry								
Prunus spinosa	Blackthorn								
Quercus robur	Pedunculate oak								
Rhamnus catharticus	Common buckthorn						X		
Rosa spp	Wild roses								
Rubus fruticosus agg	Bramble								
Salix caprea	Goat willow								
Salix cinerea	Grey willow								
Sorbus aucuparia	Rowan								
Sorbus sp	Whitebeam								
Ulex europaeus	Gorse								
Ulex gallii	Western gorse			X					
Vibernum opulus	Guelder rose								
Herbaceous Plants									
Achillea millefolium	Yarrow								
Achillea ptarmica	Sneezewort		X		X				Local
Agrostis canina	Velvet bent				X				
Agrostis capillaris	Common bent								
Agrostis stolonifera	Creeping bent-grass								
Agrostis vinealis	Brown bent			X					
Anagallis tenella	Bog pimpernel				X				Local
Anaphalis margaritacea	Pearly everlasting							X	
Angelica sylvestris	Wild angelica				X				
Anthoxanthum odoratum	Sweet vernal-grass								
Bellis perennis	Daisy								
Callitriche (*Batrachium*) sp	Water-crowfoot								
Cardamine flexuosa	Wavy bittercress								
Cardamine pratensis	Cuckooflower								
Carex flacca	Glaucous sedge		X		X	X			
Carex hirta	Hairy sedge								
Carex nigra	Common sedge		X		X				
Carex panicea	Carnation sedge		X		X	X			
Centaura nigra	Common knapweed		X			X			
Cerastium fontanum	Common mouse ear								
Chamerion angustifolium	Rosebay willowherb								
Cirsium arvense	Creeping thistle								
Cirsium palustre	Marsh thistle								

Cirsium vulgare	Spear thistle								
Cynosurus cristatus	Crested dog's-tail								
Dactylis glomerata	Cock's-foot								
Dactylorhiza praetermissa	Southern marsh-orchid		X		X				Local, CS
Deschampsia cespitosa	Tufted hair-grass			X			X		
Digitalis purpurea	Foxglove								
Dipsacus fullonum	Teasel								
Dryopteris felix-mas	Male-fern								
Eleocharis palustris	Common spike-rush				X				
Epilobium hirsutum	Great willowherb								
Epilobium palustre	Marsh willowherb								
Equisetum arvensis	Field horsetail								
Erica cinerea	Bell heather			X					SEWBReC; Local
Eupatorium cannabinum	Hemp agrimony				X				
Festuca ovina	Sheep's fescue			X		X			
Festuca rubra	Red fescue								
Ficaria verna	Lesser celandine								
Galium aparine	Cleavers								
Galium palustre	Marsh bedstraw				X				
Galium saxatile	Heath bedstraw			X					Local
Geranium dissectum	Cut-leaved cranesbill								
Geranium molle	Dove's-foot cranesbill								
Geranium robertianum	Herb-robert								
Geum urbanum	Wood avens								
Glyceria fluitans	Floating sweet-grass				X				
Hedera helix	Ivy								
Holcus lanatus	Yorkshire Fog						X		
Hyacinthoides non-scriptus	Wild bluebell						X		
Hyacinthoides x *massartiana*	Hybrid bluebell								
Hypericum perforatum	Perforate St John's-wort		X			X			
Hypochoeris radicata	Common cat's ear		X						
Juncus articulatus	Jointed rush				X				
Juncus bufonius	Toad rush								
Juncus effusus	Soft rush								
Juncus inflexus	Hard rush								
Lemna minor	Common duckweed								
Leontodon hispidus	Rough hawkbit		X			X			
Leontodon saxatilis	Lesser hawkbit		X			X			
Linum catharticum	Fairy flax		X			X		X	Local
Lolium perenne	Perennial meadow-grass								
Lotus corniculatus	Bird's foot trefoil		X			X			
Lotus pedunculatus	Greater bird's-foot trefoil				X				
Luzula campestris	Field wood-rush								
Lysimachia nemorum	Yellow pimpernel				X		X		
Medicago lupulina	Black medick					X			
Mentha aquatica	Water-mint				X				
Molinia caerulea	Purple moor-grass				X				
Ophrys apifera	Bee-orchid					X			Local, CS
Persicaria maculata	Redshank								
Phalaris arundinacea	Reed canary-grass				X				
Phleum pratense	Timothy grass								
Phyllitis scolopendrium	Hart's-tongue fern								
Pilosella offininarum	Mouse-eared hawkweed		X	X		X			
Primula vulgaris	Primrose								
Plantago lanceolata	Ribwort plantain								
Poa trivialis	Rough meadow grass								
Polypodium vulgare	Polypody								
Potamogeton natans	Common pondweed								
Potamogeton polygonifolius	Bog pondweed								Local

Potentilla erecta	Tormentil		X	X	X				Local
Potentilla reptans	Creeping cinquefoil								
Potentilla sterilis	Barren strawberry					X	X		
Primula vulgaris	Primrose						X		
Prunella vulgaris	Self-heal								
Pteridium aquilinum	Bracken								
Pulicaria dysenterica	Common fleabane				X				
Pyrola rotundifolia	Round-leaved wintergreen								Local, QS
Ranunculus flammula	Lesser spearwort				X				
Ranunculus repens	Creeping buttercup								
Rumex acetosa	Sorrel								
Rumex crispus	Curled dock								
Rumex obtusifolius	Broad-leaved dock								
Senecio jacobaea	Ragwort								
Solidago virgaurea	Goldenrod			X					
Stellaria alsine	Bog stitchwort				X				
Stellaria graminae	Lesser stitchwort		X						
Taraxacum officinale agg	Common dandelion								
Trifolium dubium	Least trefoil								
Trifolium pratense	Red clover		X						
Trifolium repens	White clover								
Tussilago farfara	Colt's-foot								
Typha latifolia	Great reedmace								
Urtica dioica	Common nettle								
Verbascus thapsus	Great mullein								
Veronica officinalis	Heath speedwell		X						
Veronica serpyllifolia	Thyme-leaved speedwell								
Vicia sativa	Common vetch								
Viola riviniana	Common dog-violet								
Contributing Species for SINC designation		**AM**	**NG**	**AG**	**MG**	**CG**	**W**	**PI**	
Totals recorded on site		***0***	***17***	***9***	***22***	***13***	***8***	***2***	
SINC threshold exceeded?			***Yes***	***Yes***	***Yes***	***Yes***			

(**Bold**) = SINC Qualifying species
SINC Indicator Species
AM = arable field margin, NG = neutral grassland, AG = acid grassland, CC = calcareous grassland, MG = marshy grassland, W = woodland, PI = Post-industrial/Disturbed ground.
QS = 'Qualifying Species'
CS = 'Contributary Species'

Additional Plant Species Recorded Within the PWR corridor

All records: DCE 3 May 2023

Species	Common Name	Comments
Aegopodium podagraria	Ground-elder	Wooded verge within RGH site
Amemone nemorosa	Wood anemone	Wooded verge within RGH site
Carex pendula	Pendulous sedge	Coedely Business Park access road verges
Circaea lutetiana	Enchanter's nightshade	Wooded verge within RGH site
Lathyrus niger	Black pea	Introduced species, frequent along Coedely Business Park access road
Picris echiodes	Bristly ox-tongue	Coedely Business Park; A4119 verges
Ranunculus acris	Meadow buttercup	Coedely Business Park access road verges

APPENDIX 4: BIRDS RECORDED ON THE SITE

Summary of Bird Fauna

All records: DCE 2021-2023

Birds	SOCC Lists		S7	Status on Site	SINC value	Notes
	UK	Wales				
Blackbird				C		5 territories, 2023
Blackcap				Pr		5 territories, 2021 & 2023
Blue tit				Pr		1-3 territories, 2021; 2023
Bullfinch	Amber	Amber	X	C	CS	4 territories, 2021; 1 in 2023
Buzzard				N		Flying over 2021; 2023
Carrion crow				C		1-2 territories, 2021; 2023
Coal tit		Amber		C		Nest in wall, 2023
Chaffinch		Amber		Pr		2 territories, 2021; 2023
Chiffchaff				Pr		4 territories, 2023
Crossbill				N		Flying over, 2021
Cuckoo	Red	Red	X	Pr	CS	2 territories, 2021
Dunnock	Amber	Amber	X	Pr		4-7 territories, 2021; 2023
Garden warbler		Amber		Po		Singing, nesting not confirmed
Goldfinch				C		2 territories, 2021; 2023
Great tit				C		Nesting in 2021, probably in 2023
Greater spotted woodpecker				N		Calling, Eastern site 2023
Green woodpecker		Amber		C	CS	1 territory, 2021
Grey heron		Amber		N		Forages on site
Herring gull	Red	Red	X	N		Flying over, 2021; 2023
Jackdaw				N		Flying over, 2023
Jay				Po		1 territory, 2021
Kestrel	Amber	Red	X	N		Hunting over Western site
Lesser black-backed gull	Amber	Red		N		Flying over, 2021; 2023
Lesser redpoll		Amber	X	N		Flying over 2021; 2023
Linnet	Red	Red	X	Pr/Po	CS	2 territories, 2021; nest near, 2023
Long-tailed tit				C		2-4 territories, 2021; 2023
Magpie		Amber		Pr		1 territory, 2021; 2023
Meadow pipit	Amber	Red		C		6-8 territories, 2021; 2023
Mistle thrush	Red	Amber		N/Po		Nesting near Western site? 2023
Nuthatch				Po		Heard on site 26 Aug 2021
Peregrine falcon				N		Flying over, 2023
Pheasant				Po		Casual on site
Pied wagtail				N		2x on dung heap, 2023
Raven				N		Flying over, 2021, 2023
Red kite				N		Flying over, 2021; 2023
Redstart	Amber			C/Pr	CS	Very near to site in 2021
Reed bunting	Amber		X	Pr	CS	1 territory in 2021
Robin				C		c.20 territories 2021; 2023
Rook	Amber	Rook		N		Flying over, 2021
Siskin				N		Casual on site
Skylark	Red	Amber	X	Pr	CS	2 territories, 2021; 3x in 2023
Snipe	Amber	Amber		N	CS	Wintering in Eastern Site, 2023
Song thrush	Amber		X	Pr	CS	3 territories, 2021; 2023
Sparrowhawk	Red			N		Flying over, 2021
Stock dove	Amber			N		Flying over, 2023
Stonechat				C	CS	1 territory 2021; nest near site 2023
Swallow				N		Flying over, 2021
Whitethroat	Amber	Red		Pr/Po		1-2 territories, 2021; 2023
Willow warbler	Amber	Red		C		16-24 territories, 2021; 2023
Woodpigeon	Amber			C		1-5 territories, 2021; 2023
Wren	Amber			C		6-9 territories, 2021; 2023

(**Bold**) = Schedule 1 – Specially protected
Red List = High conservation significance in UK/Wales (RSPB 2021; 2022)
Amber List – Moderate conservation significance in UK/Wales (RSPB 2021; 2022)
S7 = 'Species of Principal Conservation Concern in Wales (EWA 2016)
SINC Indicator Species excluding non-breeding/unlikely breeding species (WBP 2008a)
QS = 'Qualifying species'
CS = 'Contributory species'
Breeding Status on Site
C = Confirmed breeding
Pr = Probably breeding
Po = Possibly breeding
N = Not breeding

2023 Survey Results: Western & Eastern Sites

Species	Code	Date 03/04	Date 25/04	Date 19/05	Date	Approx. territories	Breeding status*	Comments
Grey Heron	H		P			0	N	Flushed from pond at east end
Red Kite	KT	P	P			0	N	Fly overs
Buzzard	BZ	P				0	N	Pair in display
Snipe	SN	P				0	N	Flushed from boggy ground
Herring Gull	HG		P			0	N	Fly overs
Lesser Black-backed Gull	LB	P				0	N	Fly overs
Stock Dove	SD	P				0	N	One flew over
Woodpigeon	WP	P	P	P		5	C	Active nest found
Great Spotted Woodpecker	GS	P				0	N	Calling at east end
Kestrel	K			P		0	N	Hunting at west end
Peregrine	PE	P				0	N	One flew over
Magpie	MG	P	P	P		1	Pr	
Jackdaw	JD	P		P		0	N	Fly overs
Carrion Crow	C	P	P	P		2	C	
Raven	RN	P		P		0	N	Fly overs
Coal Tit	CT		P			1	C	Visiting nest in wall
Blue Tit	BT	P	P	P		3	Pr	
Great Tit	GT	P	P	P		4	Pr	
Skylark	S	P	P	P		3	Pr	All at west end
Long-tailed Tit	LT	P	P	P		4	C	
Willow Warbler	WW	P	P	P		16	C	Evenly spread in suitable habitat
Chiffchaff	CC	P	P	P		4	Pr	
Blackcap	BC	P	P	P		5	Pr	
Garden Warbler	GW		P			0	N	Singing, but not subsequently
Whitethroat	WH			P		1	Po	Singing at east end
Wren	WR	P	P	P		9	C	
Blackbird	B	P	P	P		5	C	
Song Thrush	ST	P	P	P		3	C	
Mistle Thrush	M	P				0	N	At east end, breeds nearby?
Robin	R	P	P	P		19	C	The most numerous breeder
Stonechat	SC			P		0	N	Territory outside west boundary
Dunnock	D	P	P	P		7	Pr	
Pied Wagtail	PW	P				0	N	Two at dung heap
Meadow Pipit	MP	P	P	P		6	C	Bias to west end
Chaffinch	CH	P	P	P		2	Pr	
Bullfinch	BF	P				1	Po	
Linnet	LI		P	P		0	N	Local breeders visiting?
Lesser Redpoll	LR	P				0	N	One flew over calling
Goldfinch	GO	P	P	P		2	Pr	
Reed Bunting	RB	P				0	N	None lingered after visit 1

Breeding Status on Site
C = Confirmed breeding
Pr = Probably breeding
Po = Possibly breeding
N = Not breeding

Visit	Date	Time	Weather Conditions
1	03/04/23	07:00 – 10:55	E2, cloud 5/8, 9ºC
2	25/04/23	06:15 – 09:40	ENE2, cloud 0/8, 8ºC
3	19/05/23	05:35 – 09:15	N2, cloud 3/8, 12ºC
4			

2021 Survey Results: Western Site only

Species	Code	Date 22/03	Date 19/04	Date 14/05	Date 15/06	Approx. territories	Breeding status*	Comments
Pheasant	PH		P				N	
Grey Heron	H		P				N	Flew over
Sparrowhawk	SH	P					N	Flew over
Red Kite	KT	P					N	Flew over
Buzzard	BZ	P			P		N	
Herring Gull	HG				P		N	
Lesser Black-backed Gull	LB		P	P	P		N	
Woodpigeon	WP	P	P			1	Po	
Cuckoo	CK			P		2	Pr	c.5 on visit 3, incl a female
Green Woodpecker	G	P	P	P	P	1	C	Frequently registered
Jay	J	P	P		P	1	Po	
Magpie	MG	P	P	P		1	Pr	
Carrion Crow	C	P	P	P	P	1	C	
Raven	RN			P	P		N	Flew over
Coal Tit	CT	P				1	Pr	Nest built visit 1, not seen after
Blue Tit	BT	P	P	P	P	1	Pr	
Great Tit	GT	P	P	P	P	2	C	
Skylark	S	P	P	P	P	2	Pr	
Long-tailed Tit	LT	P	P	P		2	C	
Swallow	SL			P	P		N	
Willow Warbler	WW		P	P	P	24	C	Most numerous breeder on site
Chiffchaff	CC		P			1	Po	One sang visit 2, but not after
Blackcap	BC		P	P	P	5	Pr	
Garden Warbler	GW			P		2	Po	
Whitethroat	WH			P	P	2	Pr	
Wren	WR	P	P	P	P	6	Pr	
Blackbird	B	P	P	P	P	4	C	
Song Thrush	ST	P	P	P	P	3	Pr	
Robin	R	P	P	P	P	21	C	
Redstart	RT				P	1	C	Family, nested outside site
Stonechat	SC	P			P	1	C	
Dunnock	D	P	P	P	P	4	Pr	
Meadow Pipit	MP	P	P	P	P	8	C	
Chaffinch	CH	P	P	P	P	2	Pr	
Bullfinch	BF	P	P	P	P	4	C	
Linnet	LI		P		P	2	Pr	
Lesser Redpoll	LR	P					N	
Crossbill	CR				P		N	Two flew over, calling
Goldfinch	GO	P	P	P	P	2	C	
Siskin	SK		P				N	
Reed Bunting	RB	P			P	1	Pr	

Breeding Status on Site
C = Confirmed breeding
Pr = Probably breeding
Po = Possibly breeding
N = Not breeding

Visit	Date	Time	Weather Conditions
1	22/03/21	06:50 – 10:35	NE2-4, cloud 1/8, 5ºC
2	19/04/21	06:50 – 10:10	E2, cloud 0/8, 8ºC
3	14/05/21	06:30 – 10:15	NE1, cloud 5/8, 12ºC
4	15/06/21	05:45 – 08:55	E2-3, cloud 0/8, 15ºC

APPENDIX 5: OTHER VERTEBRATES RECORDED ON THE SITE

All records 22 Mar – 15 Jun 2022, unless otherwise indicated.

Other Fauna	EPS	Sch 5	S7	SINC value	Notes
Mammals					
Badger		(PBA)		QS	Occurs in the vicinity
Brown hare			X	QS	Probably breeding on site
Hedgehog			X		Droppings on site, 2022
Rabbit					
Grey squirrel					
Common pipistrelle bat	X	X	X		SEWBReC – on farm track, 2007
Soprano pipistrelle bat	X	X	X		SEWBReC – on southern boundary, 2007
Noctule bat	X	X	X		SEWBReC – on farm track, 2007
Bat species	X	X			Feeding remains
Wood mouse					In dormouse survey nesting-tubes
Bank vole					Surface runs and feeding remains
Reptiles					
Common lizard		X	X	CS	
Slow-worm		X	X	CS	
Fish					
Goldfish					Non-native

EPS : 'European Protected Species' – Protected under the Habitats Regulations 2017
Sch 5 : 'Schedule 5 species' – Protected under the Wildlife & Countryside Act 1981
(PBA) : Protection of Badgers Act 1992
S7 : Species of principal importance for conservation in Wales – Environment (Wales) Act 2016

SINC Indicator Species

QS : 'Qualifying species'
CS : 'Contributory species'

APPENDIX 6: INVERTEBRATE SURVEY RESULTS, 2020-2023

	Dates of Survey		Weather Conditions
A	=	10 Sep 2020	Warm, dry, sunny with slight breeze
B	=	13 Oct 2021	Warm, overcast, humid and still
C	=	16 Jun 2022	Hot, dry, sunny and still
D	=	03 May 2023	Warm, dry, slight breeze

CLASS (Family)	ORDER (Species)	COMMON NAME	STATUS	SINC	DATES	NOTES
MOLLUSCA	**Gastropoda**	**Slugs & Snails**				
Helicidae	*Cepaea nemoralis*	Banded snail			B	
Helicidae	*Helix aspersa*	Garden snail			A	
Helicidae	*Trochulus* sp	Hairy snail			B	
Oxychilidae	*Oxychilus cellarius*	Cellar glass-snail			C	
MYRIAPODA	**Diplopoda**	**Millipedes**				
Glomeridae	*Glomeris marginata*	Pill-millipede			C	
Julidae	*Cylindroiulus punctatus*	Millipede			B	
Julidae	*Tachpodoiulus niger*	Black millipede			C	
MYRIAPODA	**Chilopda**	**Centipedes**				
Lithobiidae	*Lithobius variegatus*	Stripe-legged centipede			B	
Polydesmidae	*Polydesmus angustatus*	Flat-backed millipede			C	
CRUSTACEA	**Isopoda**	**Woodlice**				
Armadillidiidae	*Armadillidium vulgare*	Pill-woodlouse			B	
Oniscidae	*Oniscus asellus*	Woodlouse			B	
Philosciidae	*Philoscia muscorum*	Woodlouse			B	
Porcellionidae	*Porcellio scaber*	Woodlouse			B	
ARACHNIDA	**Aranea**	**Spiders**				
Araneidae	*Larinioides cornutus*	Orb-web spider			B	
Lycosidae	*Pardosa amentata*	Wolf-spider			C	
Lycosidae	*Pardosa pullata*	Wolf-spider			C	

CLASS (Family)	ORDER (Species)	COMMON NAME	STATUS	SINC	DATES	NOTES
Lycosidae	*Pirata piraticus*	Wolf-spider			C	
Salticidae	*Heliophanus cupreus*	Jumping spider			C	
Tetragnathidae	*Pachygnatha clercki*	Long-jawed spider			B	
Tetragnathidae	*Pachygnatha degeeri*	Long-jawed spider			C	
Theridiidae	*Enoplognatha ovata* agg	Spider			C	
ARACHNIDA	**Opiliones**	**Harvestmen**				
Nemastomatidae	*Nemastoma bimaculata*	Harvestman			C	
Phalangiidae	*Mitopus morio*	Harvestman			B	
Phalangiidae	*Oligolophus tridens*	Harvestman			C	
Phalangiidae	*Paroligolophus agrestis*	Harvestman			C	
INSECTA	**Dermaptera**	**Earwigs**				
Forficulidae	*Forficula auricularia*	Earwig			B	
INSECTA	**Plecoptera**	**Stoneflies**				
Nemouridae	*Nemoura cambrica*	Stonefly			C	
INSECTA	**Ephemeroptera**	**Mayflies**				
Baetidae	*Cloeon dipterum*	Mayfly			C	
INSECTA	**Orthoptera**	**Grasshoppers, Crickets & Allies**				
Acrididae	*Chorthippus brunneus*	Common field grasshopper			A	
Acrididae	*Chorthippus parallelus*	Meadow grasshopper			C	
Acrididae	*Omocestus viridulus*	Common green grasshopper			B, C	
Tettigoniidae	*Conocephalus discolor*	Long-winged conehead cricket	Local	QS		
INSECTA	**Heteroptera**	**True Bugs**				
Beritidae	*Berytinus minor*	Stilt-bug			B, C	
Blissidae	*Ischnodemus sabuleti*	Chinch-bug			C	
Lygaeidae	*Lygus wagneri*	Ground-bug			C	
Lygaeidae	*Neolygus populi*	Ground-bug			C	
Lygaeidae	*Stygnocoris fuligineus*	Ground-bug			B, C	

CLASS (Family)	ORDER (Species)	COMMON NAME	STATUS	SINC	DATES	NOTES
Miridae	*Adelphocris lineolatus*	Capsid bug			C	
Miridae	*Calocoris roseomaculatus*	Capsid bug			B	
Miridae	*Leptopterna dolobrata*	Grass-bug			A, C	
Miridae	*Notostira elongata*	Capsid bug			B, C	
Miridae	*Orthocephalus coriaceus*	Capsid bug	Local		B	
Miridae	*Phytocoris varipes*	Capsid bug			C	
Miridae	*Stenodema calcarata*	Grass-bug			C	
Miridae	*Stenodema laevigata*	Grass-bug			B, C	
Miridae	*Stenotus binotatus*	Grass-bug			C	
Nabidae	*Nabis flavomarginata*	Capsid bug			B	
Pentatomidae	*Aelia acuminata*	Mitre-bug			C	
Pentatomidae	*Dolycoris baccarum*	Hairy shieldbug			B, C	
Pentatomidae	*Palomena prasina*	Green shieldbug			B	
Rhopalidae	*Corizus hyoscyami*	Red and black bug	Local	CS	B	
INSECTA	**Homoptera**	**Planthoppers, Leafhoppers etc**				
Aphrophoridae	*Neophilaenus lineatus*	Froghopper			A, B	
Aphrophoridae	*Philaenus spumarius*	Froghopper			A, B, C	
Cicadellidae	*Cicadella viridis*	Leafhopper			C	
INSECTA	**Odonata**	**Dragonflies & Damselflies**				
Aeshnidae	*Aeshna cyanea*	Southern hawker dragonfly			B	
Coenagrionidae	*Coenagrion puella*	Azure damselfly			C	
Coenagrionidae	*Ischnura pumilio*	Scarce blue-tailed damselfly	Local	CS	C	
Corduliidae	*Cordulegaster boltonii*	Golden-ringed dragonfly	Local	CS		
Libelluidae	*Orthetrum cancellatum*	Black-tailed skimmer	Local		C	Hatching on bog-pond
Libellulidae	*Libellula depressa*	Broad-bodied chaser			A, C	Breeding
Libellulidae	*Sympetrum danae*	Black darter	Local	CS	C	
Libellulidae	*Sympetrum striolatum*	Common darter dragonfly			B	
INSECTA	**Trichoptera**	**Caddisflies**				
Limnephilidae	*Halesus radiatus*	Caddisfly			A	
Limnephilidae	*Limnephilus marmoratus*	Caddisfly			B	

CLASS (Family)	ORDER (Species)	COMMON NAME	STATUS	SINC	DATES	NOTES
INSECTA	**Lepidoptera: 'Rhopalocera'**	**Butterflies**				
Hesperiidae	*Ochlodes sylvanus*	Large skipper			C	
Hesperidae	*Thymelicus sylvestris*	Small skipper			B	
Lycaenidae	*Lycaena phlaeas*	Small copper			B	
Lycaenidae	*Polyommatus icarus*	Common blue			A, B, C	
Nymphalidae	*Aglais urticae*	Small tortoiseshell			A, B, C	
Nymphalidae	*Aphantopus hyperantus*	Ringlet			A	
Nymphalidae	*Coenonymphus pamphilus*	Small heath	S7	QS	A, B, C	
Nymphalidae	*Inachis io*	Peacock			B, C	
Nymphalidae	*Maniola jurtina*	Meadow brown			A, B	
Nymphalidae	*Pararge aegeria*	Speckled wood			A, B, C	
Nymphalidae	*Polygonia c-album*	Comma			B	
Nymphalidae	*Pyronia tithonus*	Gatekeeper			B	
Nymphalidae	*Vanessa atalanta*	Red admiral			A, B	
Nymphalidae	*Vanessa cardui*	Painted lady			B	
Pieridae	*Anthocharis cardamines*	Orange-tip			D	
Pieridae	*Gonepteryx rhamni*	Brimstone			D	
Pieridae	*Pieris brassicae*	Large white			B	
Pieridae	*Pieris napi*	Green-veined white			A, B	
INSECTA	**Lepidoptera: 'Heterocera'**	**Larger Moths**				
Erebidae	*Arctia caja*	Garden tiger-moth	S7	QS	B	
Erebidae	*Euclidia glyphica*	Burnet companion	Local	QS	C	
Erebidae	*Tyria jacobaea*	Cinnabar moth	S7	QS	B	
Geometridae	*Chiasmia clarthrata*	Latticed heath moth	S7	QS	C	
Noctuidae	*Autographa gamma*	Silver Y			B	
Noctuidae	*Noctua pronuba*	Large yellow underwing			B	
Noctuidae	*Xestia xanthographa*	Square-spot rustic			A	
Zygaenidae	*Zygaena trifolii*	Five-spot burnet	Local		C	
INSECTA	**Lepidoptera: 'Microlepidoptera'**	**Micromoths**				
Crambidae	*Crambus pascuella*	Grass-moth			C	

CLASS (Family)	ORDER (Species)	COMMON NAME	STATUS	SINC	DATES	NOTES
Crambidae	*Crambus perlella*	Grass-moth			B, C	
Crambidae	*Crambus pratella*	Grass-moth	Local		B	
Ypsolophidae	*Ochsenheimeria taurella*	Micromoth	Local		C	
INSECTA	**Coleoptera**	**Beetles**				
Apionidae	*Apion frumentarium*	Weevil			C	
Apionidae	*Oxystoma pomonae*	Weevil	Local	CS	C	
Apionidae	*Perapion violaceum*	Weevil			C	
Cantharidae	*Cantharis pallida*	Soldier-beetle			C	
Cantharidae	*Rhagonycha fulva*	Red soldier-beetle			A, B	
Carabidae	*Amara convexior*	Ground-beetle			C	
Carabidae	*Bembidion guttula*	Ground-beetle			B	
Carabidae	*Carabus nemoralis*	Ground-beetle			C	
Carabidae	*Harpalus rufipes*	Ground-beetle			B	
Carabidae	*Poecilus cupreus*	Ground-beetle			C	
Carabidae	*Pterostichus rhaeticus*	Ground-beetle			B	
Chrysomelidae	*Neocrepidodera transversa*	Flea-beetle			C	
Chrysomelidae	*Plateumaris discolor*	Reed-beetle			C	
Coccinellidae	*Adalia bipunctata*	2-spot ladybird			A	
Coccinellidae	*Coccinella septempunctata*	7-spot ladybird			B, C	
Coccinellidae	*Coccinella undecimpunctata*	11-spot ladybird			C	
Coccinellidae	*Rhizobius litura*	Ladybird			B	
Curculionidae	*Anthonomus rubi*	Weevil			C	
Curculionidae	*Rhinoncus pericarpus*	Weevil			A	
Curculionidae	*Sitona striatellus*	Weevil			B	
Elateridae	*Agriotes obscurus*	Click-beetle			C	
Oedemeridae	*Oedemera nobilis*	Thick-kneed flower-beetle			B	
INSECTA	**Diptera**	**True Flies**				
Anispodidae	*Sylvicola punctatus*	Winter-gnat			A	
Asilidae	*Leptogaster cylindrica*	Robber-fly			A	
Bibionidae	*Dilophus femoratus*	Fever-fly			C	
Calliphoridae	*Calliphora vicina*	Bluebottle			B, C	

CLASS (Family)	ORDER (Species)	COMMON NAME	STATUS	SINC	DATES	NOTES
Conopidae	*Sicus ferrugineus*	Conopid fly			C	
Dolichopodidae	*Chrysotus gramineus*	Long-legged fly			C	
Dolichopodidae	*Dolichopus nubilus*	Long-legged fly			C	
Dolichopodidae	*Dolichopus brevipennis*	Long-legged fly	Local		C	
Dolichopodidae	*Dolichopus festivus*	Long-legged fly			C	
Dolichopodidae	*Dolichopus griseipennis*	Long-legged fly			C	
Dolichopodidae	*Dolichopus trivialis*	Long-legged fly			C	
Dolichopodidae	*Micromorphus albipes*	Long-legged fly			C	
Dolichopodidae	*Teuchophorus spinigerellus*	Long-legged fly	Local	CS	C	
Empididae	*Empis livida*	Dancefly			C	
Empididae	*Empis tessellatus*	Dancefly			C	
Empididae	*Hilara maura*	Dancefly			C	
Helomyzidae	*Suillia variegata*	Helomyzid fly			C	
Hybotidae	*Bicellaria vana*	Dancefly			C	
Hybotidae	*Hybos femoratus*	Dancefly			C	
Limoniidae	*Molophilus obscurus*	Mol cranefly			C	
Limoniidae	*Phylidorea fulvonervosa*	Cranefly			C	
Lonchopteridae	*Lonchoptera lutea*	Spear-winged fly			B	
Muscidae	*Phaonia valida*	Muscid fly			B	
Opomyzidae	*Geomyza tripunctata*	Opomyzid fly			B, C	
Opomyzidae	*Opomyza germinationis*	Opomyzid fly			B, C	
Opomyzidae	*Opomyza petrei*	Opomyzid fly			C	
Platystomatidae	*Rivellia syngenisiae*	Flutterfly			C	
Rhagionidae	*Chrysopilus cristatus*	Snipe-fly			C	
Rhagionidae	*Rhagio scolopaceus*	Snipe-fly			C	
Rhagionidae	*Rhagio tringarius*	Snipe-fly			C	
Scathophagidae	*Scathophaga steroraria*	Dungfly			C	
Scathophagidae	*Scathophaga suilla*	Dungfly			C	
Sciomyzidae	*Dichetophora obliterata*	Snail-killing fly	Local		C	
Sciomyzidae	*Ilione albiseta*	Snail-killing fly			C	
Sciomyzidae	*Limnia paludicola*	Snail-killing fly			C	
Sciomyzidae	*Tetanocera elata*	Snail-killing fly			C	
Sepsidae	*Sepsis fulgens*	Sepsid fly			B	

CLASS (Family)	ORDER (Species)	COMMON NAME	STATUS	SINC	DATES	NOTES
Sepsidae	*Sepsis orthocnemis*	Sespid fly			B	
Sepsidae	*Sepsis punctum*	Sepsid fly			C	
Sargus bipunctata	*Odontomyia ornata*	Soldierfly			C	
Syrphidae	*Chrysogaster solstitialis*	Hoverfly			C	
Syrphidae	*Episyrphus balteatus*	Marmalade hoverfly			A, B	
Syrphidae	*Eristalis arbustorum*	Hoverfly			A	
Syrphidae	*Eristalis pertinax*	Hoverfly			A, B	
Syrphidae	*Eristalis tenax*	Drone-fly			B	
Syrphidae	*Eupeodes corollae*	Hoverfly			C	
Syrphidae	*Helophilus pendulus*	Hoverfly			B, C	
Syrphidae	*Melanogaster hirtella*	Hoverfly			C	
Syrphidae	*Melanostoma scalare*	Hoverfly			C	
Syrphidae	*Neoascia tenur*	Hoverfly			C	
Syrphidae	*Pipizella viduata*	Hoverfly			C	
Syrphidae	*Platycheirus clypeatus*	Hoverfly			B	
Syrphidae	*Platycheirus granditarsus*	Hoverfly			B	
Syrphidae	*Rhingia campestris*	Hoverfly			A	
Syrphidae	*Syritta pipiens*	Hoverfly			C	
Syrphidae	*Syrphus ribesii*	Hoverfly			B	
Syrphidae	*Syrphus vitripennis*	Hoverfly			A	
Syrphidae	*Volcella bombylans*	Hoverfly			C	
Syrphidae	*Volucella pellucens*	Hoverfly			B	
Tabanidae	*Haematopota pluvialis*	Cleg-fly			C	
Tephritidae	*Tephritis vespertina*	Fruit-fly			C	
Tephritidae	*Terrelia ruficaudata*	Fruit-fly			C	
Tipulidae	*Tipula paludosa*	Cranefly			C	
Tipulidae	*Tipula vittata*	Cranefly			C	
Ulidiidae	*Herina frondescentiae*	Picture-winged fly	Local		C	
INSECTA	**Hymenoptera**	**Bees, Wasps & Ants**				
Andrenidae	*Andrena cineraria*	Ashy mining-bee			C	
Andrenidae	*Andrena haemorrhoea*	Mining-bee			C	
Apidae	*Apis mellifera*	Honeybee			C	

CLASS (Family)	ORDER (Species)	COMMON NAME	STATUS	SINC	DATES	NOTES
Apidae	*Bombus humilis*	Brown-banded carder-bee	S7	QS	C	
Apidae	*Bombus lapidarius*	Red-tailed bumblebee			B	
Apidae	*Bombus terrestris*	Buff-tailed bumblebee			A, B	
Apidae	*Bombus pascuorum*	Common carder-bee			A, B	
Halictidae	*Lasioglossum morio*	Furrow-bee			C	
Formicidae	*Lasius flavus*	Yellow meadow-ant			A	Nest mounds
Formicidae	*Lasius niger*	Common black ant			C	
Formicidae	*Myrmica ruginodis*	Red ant			C	
Vespidae	*Gymnomerus laevipes*	Mason-wasp	Local		A	
Vespidae	*Vespula germanica*	Paper-wasp			B	
Vespidae	*Vespula vulgaris*	Paper-wasp			C	

Key

S7 = Species of 'principal concern' in Wales ('Section 7 species)
RDB = Red Data Book species
NS = 'Nationally Scarce' species
QS = SINC 'Qualifying Species'
CS = SINC 'Contributory Species'

APPENDIX 8:
EXAMPLES OF SUITABLE BIRD & BAT BOXES

EXAMPLES OF NON-INTEGRATED BIRD BOXES FOR TREES AND BUILDINGS

Suspended Designs

Schwegler 1B
General box

Schwegler 2H open-front
'robin' box

Schwegler 5
'large owl' box

Schwegler 1CGA
'small owl' box

Schwegler 20
'starling' box

Schwegler 28 'kestrel' box

Schwegler 5KL 'nuthatch' box

Surface-mounted Designs

Schwegler 1MR general box

Vivara Pro open-front
'robin' box

Vivara Pro ova open-front
'robin' box

Vivara Pro 'starling' box

Vivara Pro 28/32mm
general box

Vivara Pro 28/32mm
oval general box

EXAMPLES OF SURFACE-MOUNTED BAT BOXES

Tree-mounted boxes

Schwegler 2F General Box

Schwegler 1FD Nursery Box

Schwegler 1FS Nursery Box (Large)

Schwegler 1FW Winter Box
(Very large box)

Schwegler 2FN
Noctule Box

Schwegler 2F DFP
Daubenton's Bat Box

Miramar General Box

Tree or building-mounted boxes

Schwegler 1FF General Box

Schwegler 1FQ Decorative Box

Schwegler 1FFH General Box

Schwegler 1FE

Vivara Woodstone Low Profile Box

NHBS Cavity Box
(Brown Long-Eared Bat Box)

NHBS Crevice Box

Beaumaris wall box

Photographs of the Site: Western Site, Aug-Oct 2020

Neutral grassland with rush

Neutral grasslands

Colliery Spoil Grasslands (CSG)

Colliery Spoil Grasslands

Rush-pasture of plateau

Rush-pasture of plateau

Stone-lined watercourse, typical of site

Remnant northern boundary hedge

Marshy grassland in west of site

Bog-ponds (P1 & P2)

Acid-neutral grassland mosaic, with outcrop

Main lagoon

Neutral grassland & CSG in NE, encroached by scrub

Eastern ponds (P3-P4)

Shaded pond P5

Sandstone boulder deposits

Photographs of the Site: Eastern Site - Feb-May 2023

Species-poor semi-improved pasture

Same

Species-poor semi-improved pasture

Developing rush-pasture

Large mature trees

Same

Area of developing alder scrub

Typical woodland block

Typical woodland block

Larger trees within woodland block

Marshy grassland

Wet areas in marshy grassland

Typical stone-lined watercourse

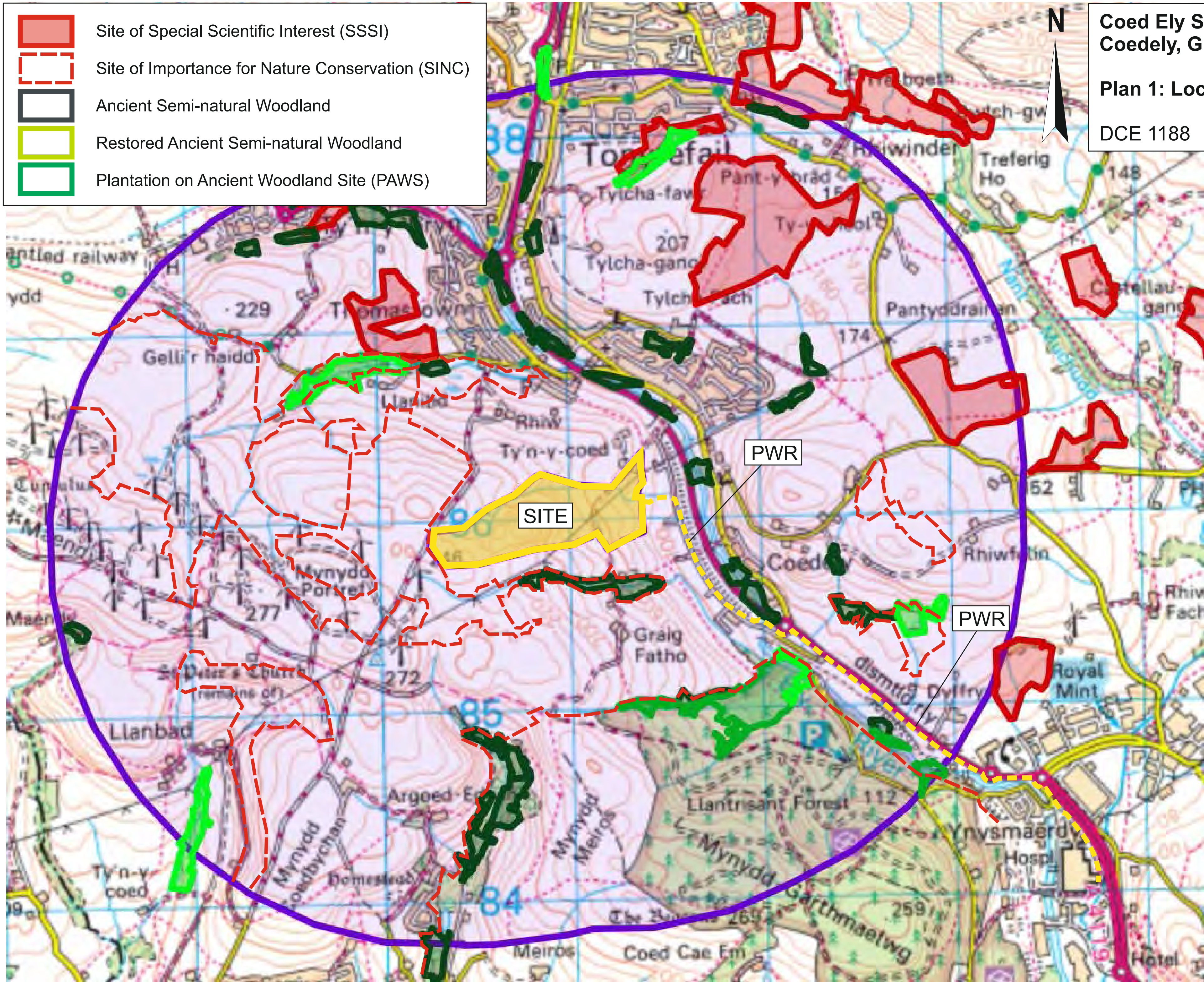
Semi-natural watercourse within woodland

Rubble field beneath scrub

Coed Ely Solar Farm, Coedely, Glam

Plan 1: Location & Context

DCE 1188 NTS May 2023



Coed Ely Solar Farm, Coedely, Glam

Plan 2: Habitats & Vegetation

DCE 1188 NTS May 2023

N

- Scrub/Developing scrub-woodland
- Semi-improved circumneutral grassland
- Rush-pasture
- Marshy grassland
- Colliery Spoil Grassland
- Outcrop/Rock dump
- Pond
- Marginal/Emergent vegetation
- Bracken & bramble mosiac
- Bracken
- Scattered scrub
- Standard trees
- Hedgerow
- Seasonal/Intermittent watercourse
- Ditch
- Track
- Fence
- W Wall
- b Bank
- Powerline
- Hard surface/Bare ground
- Badger run
- Site boundary

Lagoon

P1

P2

P3

P4

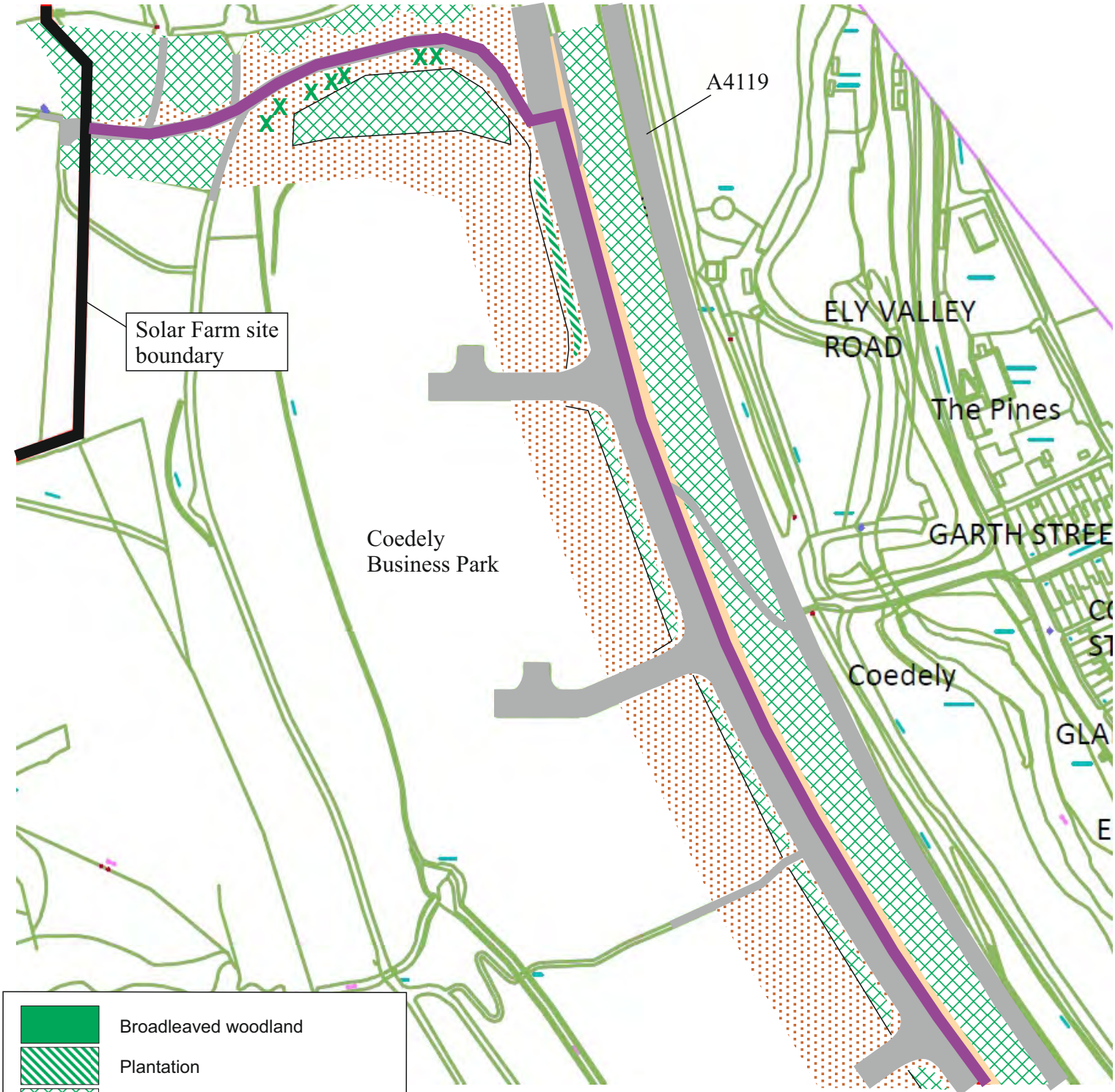
P5

Farm track

Farm track

The 'Western Site'

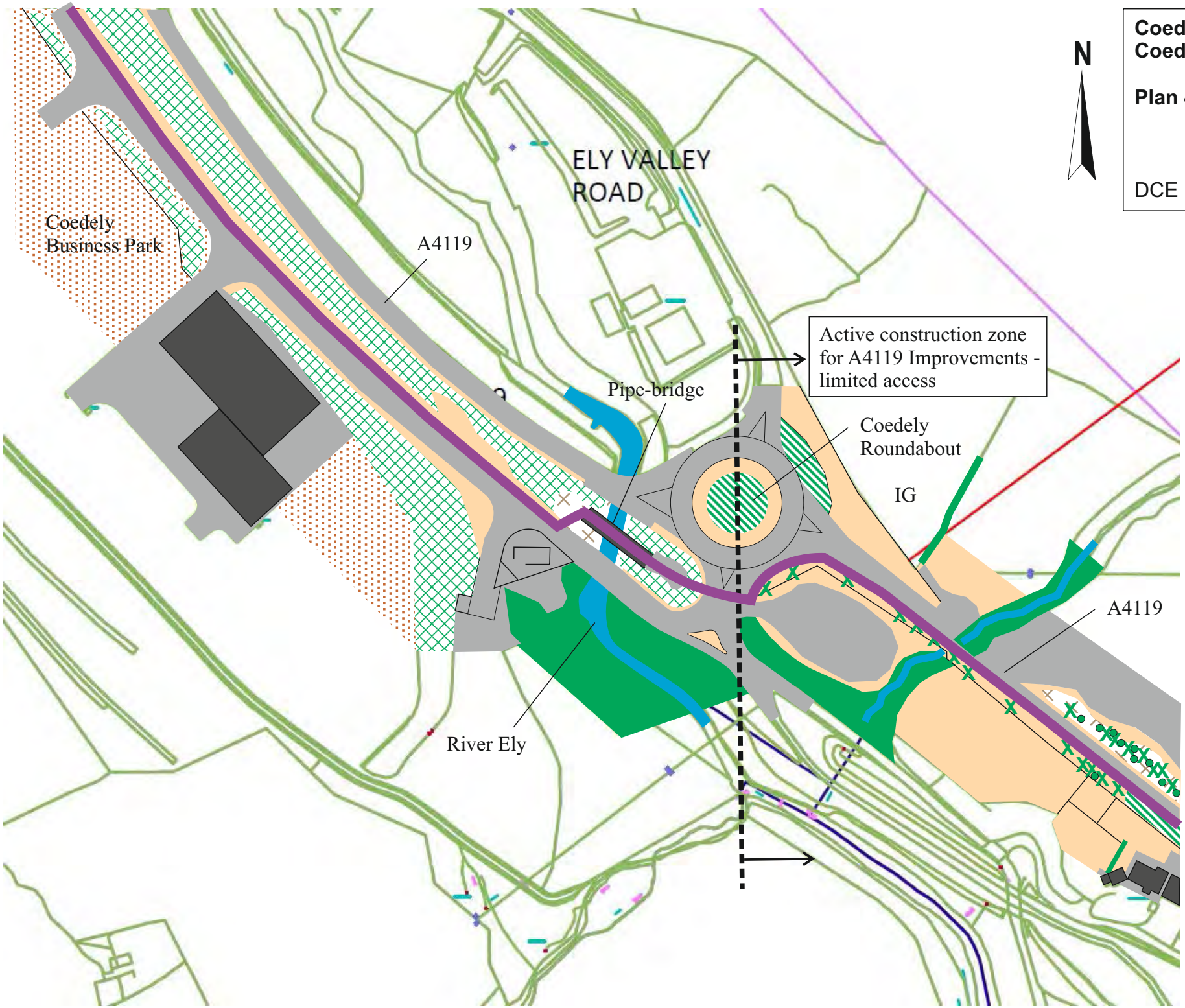
The 'Eastern Site'



Coed Ely Solar Farm, Coedely, Glam

Plan 3: Private Wire Route Habitats & Vegetation Section 1

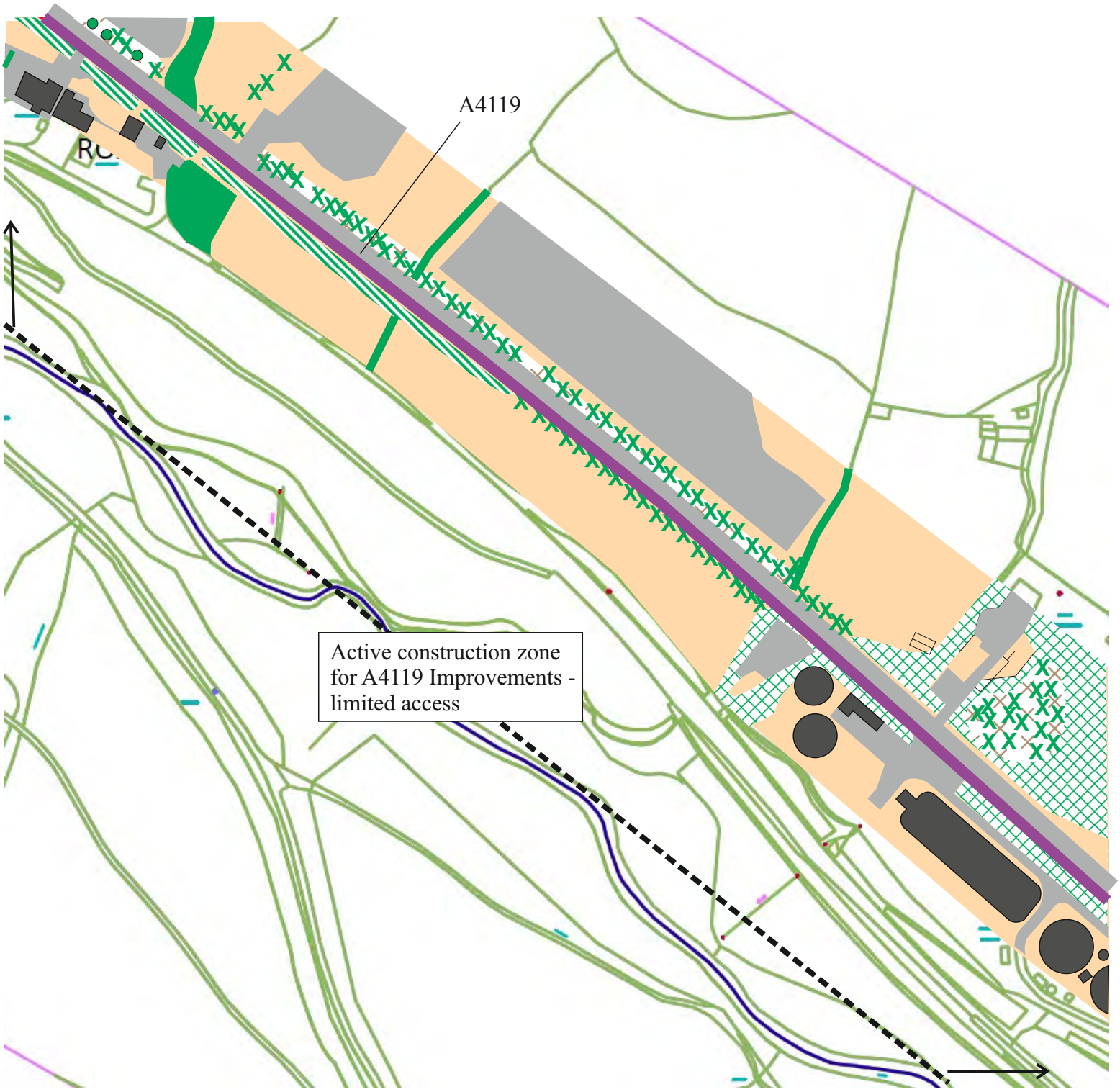
DCE 1188 NTS May 2023



Coed Ely Solar Farm,
Coedely, Glam

Plan 4: Private Wire Route
Habitats & Vegetation
Sections 1 & 2

DCE 1188 NTS May 2023



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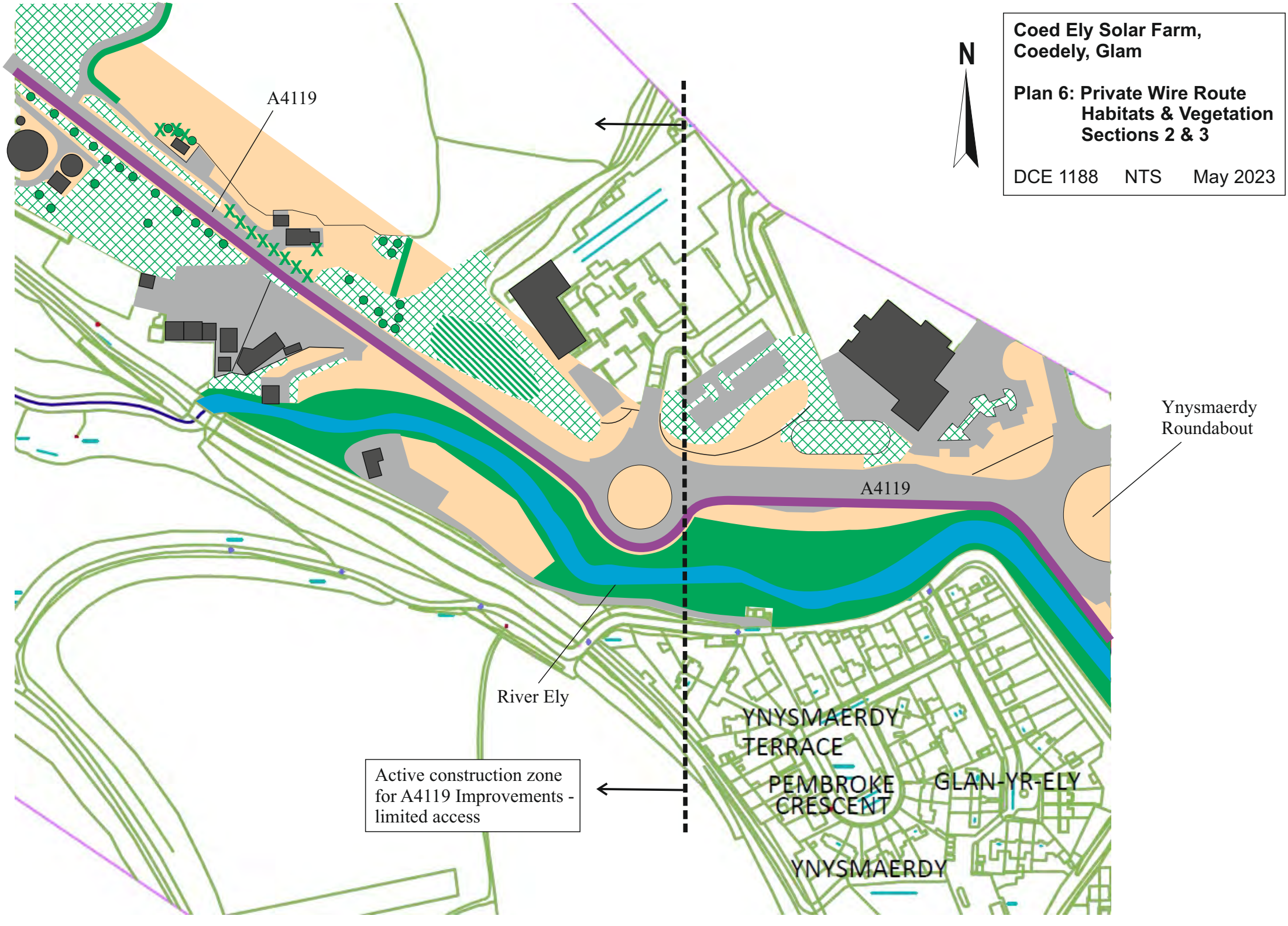
Coed Ely Solar Farm, Coedely, Glam

Plan 5: Private Wire Route Habitats & Vegetation Section 2

DCE 1188 NTS May 2023


N
Coed Ely Solar Farm,
Coedely, Glam
Plan 6: Private Wire Route
Habitats & Vegetation
Sections 2 & 3
DCE 1188 NTS May 2023
A4119
A4119
Ynysmaerdy
Roundabout
River Ely
Active construction zone
for A4119 Improvements -
limited access
YNYSMAERDY
TERRACE
PEMBROKE
CRESCENT
GLAN-YR-ELY
YNYSMAERDY

Coed Ely Solar Farm, Coedely, Glam

Plan 7: Private Wire Route Habitats & Vegetation Section 3

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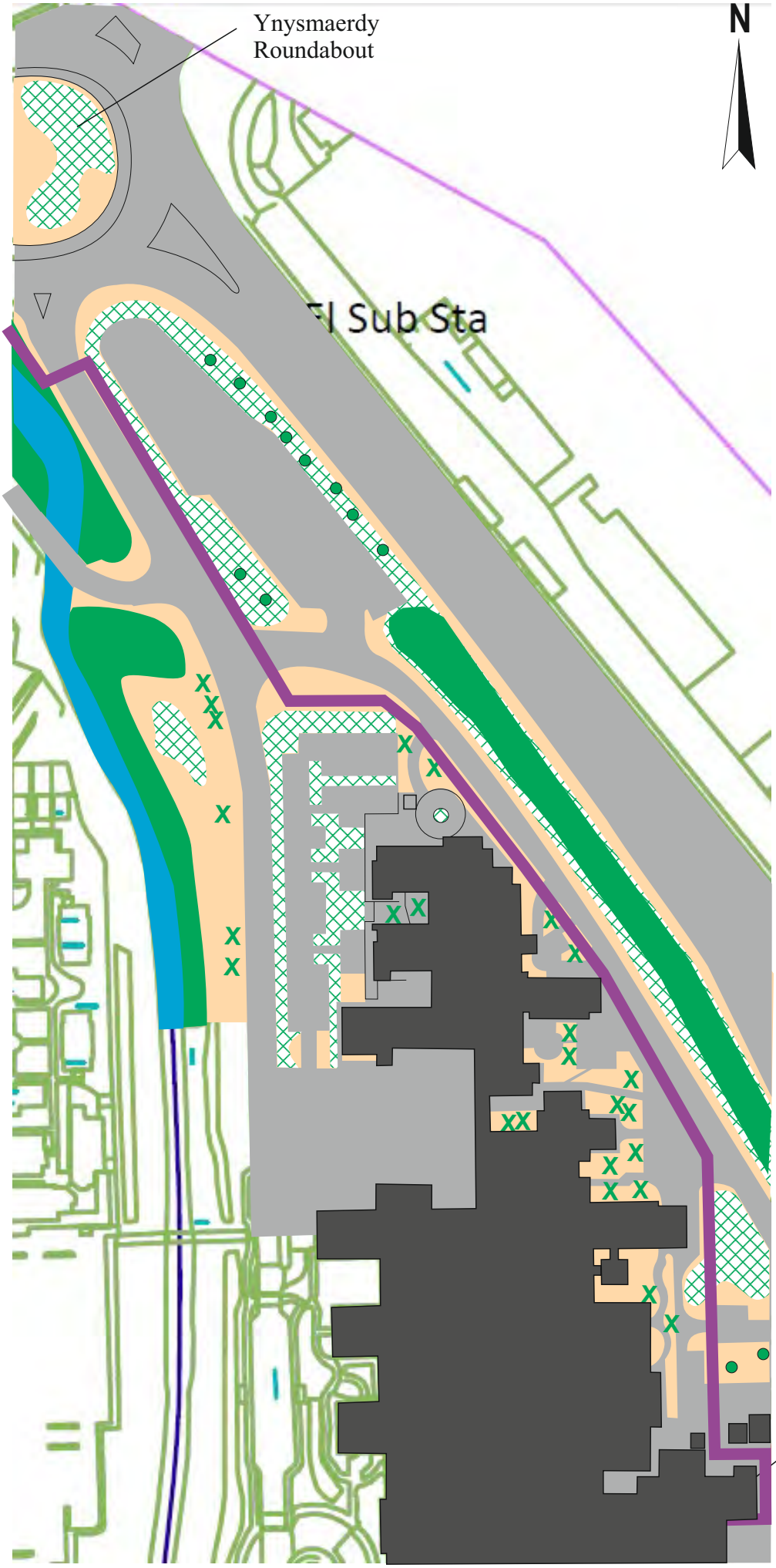

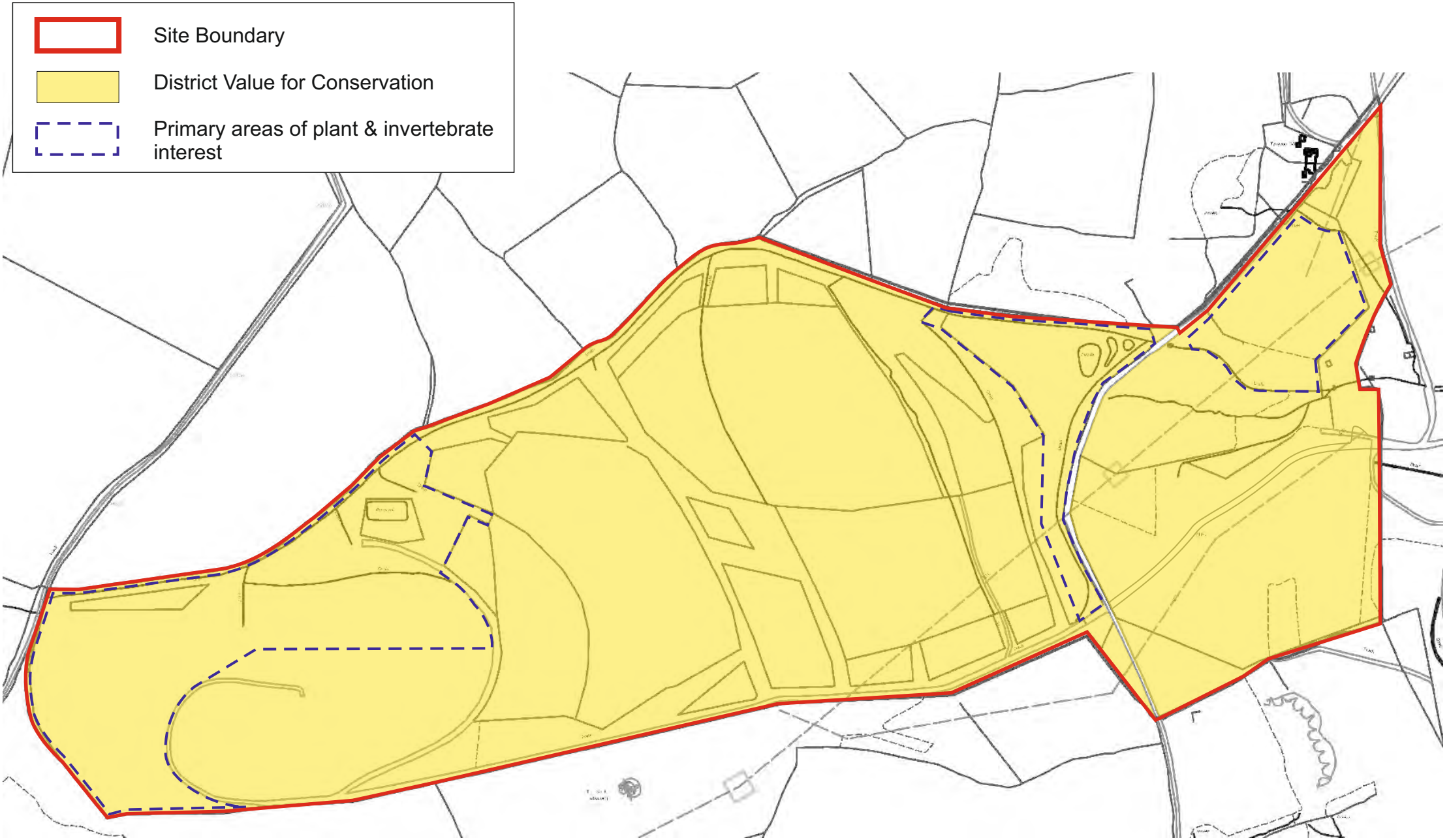

Coed Ely Solar Farm, Coedely, Glam

Plan 8: Ecological Evaluation

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