

ECOLOGICAL SURVEY
KNOLTON FARMHOUSE CHEESE, WREXHAM, WALES

carried out by



commissioned by

PEGASUS GROUP

on behalf of

ACTIVE RENEWABLES

MARCH 2015

ECOLOGICAL SURVEY

KNOLTON FARMHOUSE CHEESE, WREXHAM, WALES

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EXECUTIVE SUMMARY

- Michael Woods Associates was commissioned by Pegasus Group on behalf of Active Renewables to carry out an ecological survey of land adjacent to the Knolton Farmhouse Cheese plant near Erbistock in Wrexham, Wales.
- This report aims to identify any ecological constraints and opportunities associated with the installation of a solar array.
- The report comprises a description of the ecological features within and adjacent to the site and assesses potential impacts of protected and notable species. It outlines requirements for further survey, if required, as well as mitigation which may be necessary during construction or operation.
- The site comprised a single poor semi-improved grassland field which was managed on an occasional basis. An area of spoil and agricultural waste was present in the south of the site, woodland to the west and industrial structures to the north and east.
- The southern part of the site was suitable for reptiles, however, this area is to be retained and so no impacts on reptiles, if present, are anticipated.
- A disused badger hole was identified in the west of the site, however, no active setts were present. Should more than 6 months elapse between the date of this survey and the commencement of construction, it is recommended that a pre-construction badger survey is carried out in order to ensure the sett does not come into use or new setts excavated which may be affected by the development.

- An ephemeral pond was identified on the site, however, given the distance of other ponds and isolated nature of the site with rivers to the north and west and industrial buildings to the north and east, it is considered highly unlikely that great crested newts or substantial populations or more widespread species would be present.
- The adjacent woodland and species therein should be protected by providing an 8m buffer between the security fencing and woodland habitat.
- Various enhancements have been suggested for the site. The implementation of some or all of these measures would result in significant ecological benefits for a range of local wildlife. This includes the creation of new habitats such as hedgerows, installation of bird, bat and dormouse boxes and creation of hibernacula and log piles.
- A Landscape and Ecological Management Plan should be prepared for the site which would outline protection of habitats and species during construction, creation of new habitats within the site and future management of the operational site to ensure that benefits to local wildlife are optimised.

1 INTRODUCTION

- 1.1.1 Michael Woods Associates was commissioned by Pegasus Group on behalf of Active Renewables to carry out an ecological survey of land at Knolton Farmhouse Cheese near Erbistock in Wales.
- 1.1.2 The survey was carried out on 4th March 2015 by an experienced ecologist, who is a full member of the Chartered Institute of Ecology and Environmental Management. At the time of survey, the weather conditions were cloudy and dry, and the air temperature was 8°C.
- 1.1.3 Unless the client indicates to the contrary, information on the presence of species will be passed to the county biological records centre in order to augment their records for the area.
- 1.1.4 The objective of this report is to present the results of a baseline walkover survey and outline the presence or potential presence of protected or notable species. Recommendations are given for further survey work which may be required as well as mitigation measures to be employed during the construction and operation of the array. Suggestions for enhancement of the site are also given.
- 1.1.5 A planning application has not yet been submitted for development of the site and this report seeks to inform a forthcoming application. Layout plans have not yet been issued for the site; once these plans are complete this report will be revisited and updated if required.

2 SITE DESCRIPTION

- 2.1.1 The site was located in Overton-on-Dee, Wrexham Borough County in Wales. The site is situated south west of Overton and west of the A528. The site consisted of a single poor semi-improved grassland field with an area of tipped agricultural spoil and waste in the southern part of the site. The Western boundary consisted of deciduous woodland, and the River Dee lies 460m to the north. The northern and eastern boundaries consist of Knowlton Farm and factory buildings associated with cheese production. The surrounding landscape consisted of arable and grazed improved grassland fields.
- 2.1.2 The development site is approximately 3.2 hectares (ha) in size, and the approximate centre of the site was at OS Grid Ref. SJ 363 406. The site location is shown in Figure 1 and an aerial photograph of the site is shown in Figure 2.
- 2.1.3 The proposals consist of the installation of a solar array, as shown in Figure 3. A new hedgerow with standard trees will be planted on the eastern boundary and a small woodland copse in the south west.



Figure 1: Ordnance Survey Map Showing Location of Survey Area with Red Line (OS Licence 100050456)

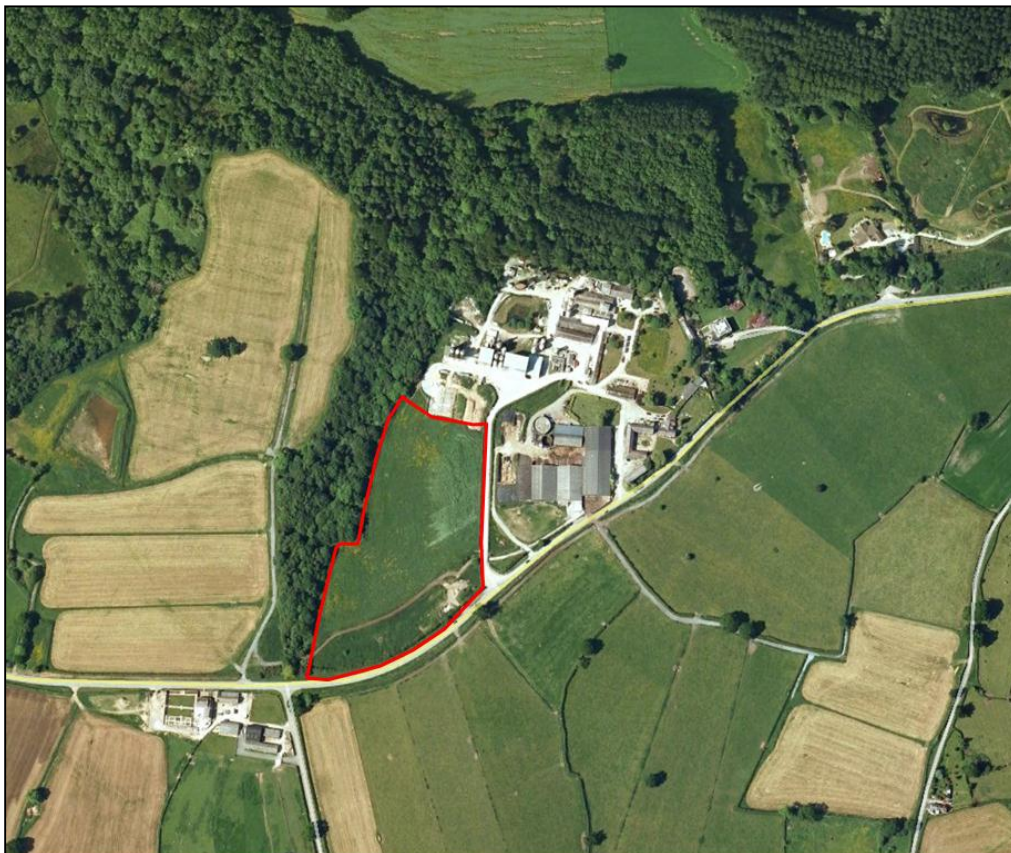


Figure 2: Aerial Photograph Showing the Site (Red Line) and Adjacent Habitats



3 SURVEY AND ASSESSMENT METHODOLOGY

3.1 Data Search

- 3.1.1 Statutory designated sites within proximity of the Site were identified using the Natural England/DEFRA web-based MAGIC database (www.MAGIC.gov.uk).
- 3.1.2 The North Wales Environmental Information Service was consulted for records of protected and notable species within 1km of the Site. The records centre was also asked to provide details of locally designated sites within 1km of the site.
- 3.1.3 Ordnance Survey maps (1:25,000) and aerial images of the Site were examined online (bing.com/maps and maps.google.co.uk).
- 3.1.4 The Wrexham Unitary Development Plan 2005-2011 (a new plan is currently in consultation but is not yet adopted) was consulted for details of planning policies relevant to designated sites, protected species and habitats, and general ecological and environmental protection.

3.2 Field Survey

Personnel

- 3.2.1 The field survey was undertaken by Hannah Montag, MCIEEM. Hannah has seven years experience undertaking ecological surveys and has a BSc and MSc in relevant subjects. Hannah has been assessed under the MWA QA processes as competent to complete the survey and holds a Natural England class licence for the survey of bats and a licence for the survey of dormice (ref: CL502403).

Habitats

- 3.2.2 A habitat survey was carried out based on standard field methodology set out in the *Handbook for Phase 1 Habitat Survey* (2003 edition)¹.
- 3.2.3 The hedgerows were surveyed for their native species-richness. Particular attention was paid to the status of each hedgerow with regards to the Hedgerow Regulations (1997).
- 3.2.4 Botanical names follow Stace (1997)² for higher plants and Edwards (1999)³ for bryophytes.
- 3.2.5 Habitats are mapped following the codes and conventions described by described within the Phase 1 Habitat Survey Handbook and Target Notes are used to describe habitats not readily conforming to recognised types and evidence of or potential for protected species and species of conservation concern.

¹ Nature Conservancy Council. (1990 - 2003 edition). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*, Joint Nature Conservation Committee

² Stace, C. (1997). *New Flora of the British Isles Second Edition*. Cambridge University Press

³ Edwards, S.R. (1999). *English Names for British Bryophytes*. BBS, Cardiff

3.3 Protected and Notable Species

- 3.3.1 Details of the legislative protection afforded to those protected species which have been identified as occurring or potentially occurring on the site are detailed in Appendix A.

Badgers

- 3.3.2 A search was made for badger setts, and sett entrances were checked for signs of use by badgers or other mammals. Setts were classified into the following categories; Main, Subsidiary, Annexe or Outlying. Main setts are typically large structures which constitute the principal shelter and breeding location for a single social group. Subsidiary setts are significant setts which receive regular or sporadic usage but are not the focal sett for a social group. Annexe setts are smaller structures closely associated with Main setts but are not connected by underground tunnels. Outlying setts are located away from other setts and usually comprise no more than two, infrequently used sett entrances.
- 3.3.3 Sett entrances are counted and mapped to record tunnel direction and their relative level of usage according to the categories well used, partially used and disused. Well used entrances show signs of having been used regularly or probably within the preceding 48hrs; partially used entrances may contain debris in the entrance indicating a lack of recent activity, but the tunnel and entranceway could be easily be cleared and brought back in to use, while disused entrances are largely or completely blocked and have not been in use for at least the previous year.
- 3.3.4 Field signs such as 'snuffle holes' (holes dug by badgers when searching for invertebrates), pathways through vegetation, 'latrines' (small pits in which badgers deposit their faeces) and 'day nests' (nests of bedding material made by badgers for sleeping above ground) were also mapped.

Bats

- 3.3.5 The assessment of the suitability of the site for foraging and roosting bats was based on current guidance set out by the Bat Conservation Trust⁴.
- 3.3.6 *Trees*: an inspection of trees on site was carried out from the ground, using binoculars, to record any signs of use of the tree by bat species. A ladder, powerful torch and a video fibrescope were available. Features such as frost cracks, rot cavities, flush cuts, split or decaying limbs (including hazard beams), loose bark and dense plates of ivy were inspected and recorded. Any signs of staining (from urine or fur rubbing) and scratch marks below potential access points were noted, and a search was made for droppings underneath these features.
- 3.3.7 *Habitat*: the habitats within the site were appraised for their suitability for use by foraging and commuting bats. In particular, the connectivity of the habitats on site to those lying beyond was taken into account. Vegetated linear features are typically important for many species to navigate around the landscape, while the presence of woodland, scrub, gardens, grassland

⁴ Hundt. L. (2012) *Bat Surveys: Good Practice Guidelines, 2nd Edition*. The Bat Conservation Trust, London.

and wetland features increases a site's foraging resource value to bats. The potential for noise or lighting disturbance which may affect commuting links was also recorded.

Amphibians

- 3.3.8 Ponds within 500m of the Site were identified using Ordnance Survey maps and aerial imagery, and were assessed during the field survey for their suitability to support amphibian species where access was possible.
- 3.3.9 Where suitable water bodies were identified on accessible land a Habitat Suitability Index (HSI) score was calculated for each one following the methodology described by Oldham et al⁵. HSI scores give a relative indication of the likelihood that a water body would support breeding great crested newts. Factors which increase these scores include the presence of other ponds nearby, water quality, pond size, absence of fish/waterfowl, vegetation cover and shading.
- 3.3.10 Terrestrial habitats were also assessed for their suitability for foraging and sheltering amphibians. Amphibians require habitats such as grassland, scrub, woodland and hedgerows for dispersal and hibernation. Further hibernation features include buried rubble and logs, or mammal burrows.

Reptiles

- 3.3.11 Features on site were assessed for their potential to provide suitable habitats for use by reptile species. These include rough, tussocky grassland, scrub, disturbed land or refugia such as wood piles, rubble or compost heaps.

Birds

- 3.3.12 Any buildings and vegetation were surveyed for signs of use by nesting birds and any birds seen or heard during the survey were noted. The site's potential to support bird species of particular conservation concern (i.e. NERC S42 and Red List species) was assessed, taking into consideration the bird species assemblage observed during the survey, the habitats present on and around the site, the context of the site in the wider landscape and the results of the desk study.

Dormice

- 3.3.13 Any hedgerows, scrub and woodlands were assessed during the walkover for their suitability to support dormice *Muscardinus avellanarius*. Particular consideration was paid to the abundance of food sources within them, density for nesting and overnight shelter and the strength of connectivity to other suitable habitats leading off site. In addition, any direct sightings, nests or feeding signs observed during the site visit were also recorded. Where hazel *Corylus avellana* was recorded on site, a search for gnawed hazelnuts was conducted.

⁵ Oldham, R.S., Keeble L., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.

Invasive Species

- 3.3.14 Invasive species, such as Japanese knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera* were searched for and recorded.

Other Notable Species and Species of Conservation Concern

- 3.3.15 Field signs indicating the presence of other species of conservation concern, such as hares *Lepus europaeus* and hedgehogs *Erinaceus europaeus* (Species of Principal Importance under the NERC Act (2006)) were recorded. Habitats were also assessed for their potential to support such species.

3.4 Quality Assurance

- 3.4.1 All ecologists employed by Michael Woods Associates are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Institute's Code of Professional Conduct⁶ when undertaking ecological work.
- 3.4.2 The competence of all field surveyors has been assessed by Michael Woods Associates with respect to the CIEEM Competencies for Species Survey (CSS)⁷.
- 3.4.3 This report has been prepared in accordance with the relevant British Standard: BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development⁸.

3.5 Ecological Evaluation

- 3.5.1 The evaluation of ecological value builds upon the criteria provided within the CIEEM guidelines for Ecological Impact Assessment (2006)⁹ and the Criteria for Nature Conservation Evaluation described by Ratcliffe (1977)¹⁰. These criteria are described further in Appendix B. With due consideration to the evaluation criteria ecological receptor value is then classified on a scale between 'International' and 'Site' value with an additional Negligible category included for those features which are of no intrinsic ecological value. Where further information is required to determine the true value of a species or habitat present the value of the receptor is marked as 'unknown'.

⁶ CIEEM (2013). Code of Professional Conduct. www.cieem.net/professional-conduct.

⁷ CIEEM (2013). Competencies for Species Survey (CSS). www.cieem.net/competencies-for-species-survey-css.

⁸ The British Standards Institution (2013). BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development. BSI Standards Ltd.

⁹ IEEM (2006). Guidelines for Ecological Impact Assessment in the United Kingdom. www.cieem.net

¹⁰ Ratcliffe, D.A. (1977). A Nature Conservation Review, Cambridge University Press

4 SURVEY LIMITATIONS

4.1 Desk Study

4.1.1 The data presented within the report should not be seen as exhaustive. Data obtained from within the search area is highly unlikely to constitute a complete record of habitats and species present within the search area. It is therefore possible that protected species may occur within the vicinity of the proposed development site that have not been identified within the desk study.

4.1.2 The data presented within the desk study section of this report constitutes a summary of the data obtained from the local records centre. Should additional detail be required on any of the records described within this report Michael Woods Associates should be contacted.

4.2 Badgers

4.2.1 Areas with dense ground cover (hedges, scrub, woodland etc.) were examined closely. If impenetrable vegetation prevented entry then the perimeter was examined in order to detect badger paths suggesting a hidden sett within the area. It cannot be guaranteed that all the entrances have been located, especially if a small sett is currently inactive or used seasonally and concealed in an area of thick scrub. Badgers may dig new holes and create new setts in a very short space of time.

4.3 Bats

4.3.1 Bats are very small creatures, capable of roosting within extremely small spaces and it is possible that these animals, or their signs, might have been missed during the survey if they are normally present opportunistically or in small numbers for a short period of time each year.

4.3.2 Not all features in trees suitable for use by bats are visible from the ground and there may be no external evidence of use of features by bats; consequently it is only possible to make a best effort when carrying out such a survey.

4.4 General

4.4.1 This survey offers only a single 'snapshot' of the Site and takes no account of seasonal differences, or of any species which might choose to take up residence subsequently. At the same time a lack of signs of any particular species does not confirm its absence, merely that there was no indication of its presence during this survey.

4.4.2 The site visit was undertaken during the winter months, which is a suboptimal time to survey for many plants, invertebrates and migratory species. However, an assessment of the suitability of habitats within the site could be made and vegetative plants were identified, which can indicate the presence of important habitats.

4.4.3 If no action or development of this land takes place within twelve months of the date of this report, then the findings of this survey should be reviewed and may need to be updated. After three years the findings will be out of date and the full survey should be repeated.

5 RESULTS

5.1 Data Search – Designated Sites

International Designations within 5km of the Site

- 5.1.1 River Dee and Bala Lake Special Area of Conservation (SAC) is 480m to the northwest of the site at its closest point. Qualifying features for the selection of this site are the presence of migratory fish species particularly Atlantic salmon *Salmo salar*, river lamprey *Lampetra fluviatilis*, sea lamprey *Petromyzon marinus* and non-migratory species such as bullhead *Cottus gobio* and brook lamprey *Lampetra planeri*. Otter *Lutra lutra* is of special interest and is found throughout the SAC. Important habitat types include areas of floating vegetation often dominated by water-crowfoot *Ranunculus spp.*, and the nationally and internationally rare floating water-plantain *Luronium natans* occurs here.

National Designations within 2km of the Site

- 5.1.2 The River Dee Site of Special Scientific Interest (SSSI) forms part of the above SAC and is notified for the same species and habitats as the SAC listed above, with the addition of several species of aquatic invertebrate.
- 5.1.3 Shell Brook Pastures SSSI, approximately 1.2km south of the site, is notified for botanically rich unimproved neutral grassland.

Local Designations within 1km of the Site

- 5.1.4 The woodland adjacent to the site boundary along the west, Llan-y-Cefn, is designated a Local Wildlife Site and comprises mostly ash *Fraxinus excelsior* – oak *Quercus robur* – sycamore *Acer pseudoplatanus*, becoming mixed beech *Fagus sylvatica* and pine *Pinus spp.* plantation towards the western end.

5.2 Data Search – Protected and Notable Species

- 5.2.1 There are numerous records of otters along the River Dee, the closest is of a potential holt within the woodland/river edge 540m northwest from the nearest point of the proposed site.
- 5.2.2 The data search revealed two badger setts within 1km of the proposed development, one to the northwest and one to the southwest.
- 5.2.3 There were three bat flight records within 1km comprising a pipistrelle species *Pipistrellus sp.* (900m southwest), brown long eared *Plecotus auritus* and pipistrelle sp approx 1km west. There was one recorded roost of an unknown species in the porch of a building in Erbistock, 1km northwest.
- 5.2.4 Water voles *Arvicola amphibious* appear in one record approx 900m to the north of the site.
- 5.2.5 There were no records of dormice or great crested newts within 1km of the site.

5.2.6 The following birds shown in Table 1 have been recorded within 1km of the Site and are listed under the Local Biodiversity Action Plan, Species of Principal Importance (SPI)¹¹ or BTO Birds of Conservation Concern red/amber lists¹²:

Table 1: Bird Species Recorded within 1km Since 2000,

Species	Latin	Designation	Distance and Direction from the Site
Curlew	<i>Numenius arquata</i>	BTO Amber list, SPI	Within 1km W
Cormorant	<i>Phalacrocorax carbo</i>	BTO Amber list	Within 1km W
Dunnock	<i>Prunella modularis</i>	BTO Amber list, SPI	Within 1km W
Fieldfare	<i>Turdus pilaris</i>	BTO Red list	Within 1km W
Goldcrest	<i>Regulus regulus</i>	BTO Amber list	Within 1km W
Grasshopper warbler	<i>Locustella naevia</i>	BTO Red list, SPI	Within 1km W and NE
Grey wagtail	<i>Motacilla cinerea</i>	BTO Amber list	Within 1km W
House sparrow	<i>Passer domesticus</i>	BTO Red list, SPI	Within 1km W
House martin	<i>Delichon urbicum</i>	BTO Amber list	Within 1km W
Kingfisher	<i>Alcedo atthis</i>	BTO Amber list	Within 1km W
Mistle thrush	<i>Turdus viscivorus</i>	BTO Amber list	Within 1km W
Mallard	<i>Anas platyrhynchos</i>	BTO Amber list	Within 1km W
Mute swan	<i>Cygnus olor</i>	BTO Amber list	Within 1km W
Redwing	<i>Turdus iliacus</i>	BTO Red list	Within 1km W
Sand martin	<i>Riparia riparia</i>	BTO Amber list	Within 1km W
Song thrush	<i>Turdus philomelos</i>	BTO Red list, Local BAP Priority Species, SPI	Within 1km W
Starling	<i>Sturnus vulgaris</i>	BTO Red list, SPI	Within 1km W
Stock dove	<i>Columba oenas</i>	BTO Amber list	Within 1km W
Swallow	<i>Hirundo rustica</i>	BTO Amber list	Within 1km W
Swift	<i>Apus apus</i>	BTO Amber list	Within 1km W
Barn owl*	<i>Tyto alba</i>	BTO Amber list, Local BAP Priority Species	Within 2km N and W

* The local records centre has included records of some mobile species outside the 1km zone.

¹¹ Species of Principal Importance (SPI) are listed in Schedule 41 of the Natural Environment and Rural Communities (NERC) Act as requiring action under the UK Biodiversity Action Plan

¹² Red list species are those that are globally threatened, whose population or range has declined rapidly in recent years (i.e. >50% in 25 years), or which have declined historically and not recovered. Amber list species are those whose population or range has declined moderately in recent years (>25% but <50% in 25 years) declined historically but recovered recently, rare breeders (fewer than 300 pairs), internationally important populations in the UK, localised populations and those with an unfavourable conservation status in Europe.

5.3 Planning Policy

- 5.3.1 The following policies have been identified within The Wrexham Unitary Development Plan 2005-2011, which are considered relevant to the site.

Policy GDP1 All new development should:-

... h) Safeguard sites and areas of nature conservation and wildlife interest, and to provide new habitats where there is an unavoidable loss of existing habitats and areas of wildlife interest...

Policy EC4

Development proposals should provide for the conservation and management of hedgerows, trees, orchards, woodland, wildlife and other natural landscape and water features, and include new planting in order to enhance the character of the landscape and townscape. Development which results in the loss or significant damage to valuable trees, important hedgerows or ancient woodland sites will not be permitted.

Policy EC6

Development either within or close to sites of biodiversity interest will only be permitted where it can be clearly demonstrated that the need for the development outweighs the need to safeguard the intrinsic nature conservation value of the site. Where such development is permitted, damage should be kept to a minimum, and compensatory measures should be provided. Measures to improve the biodiversity value of sites and enhance their natural conservation interest and landscape quality including the establishment of local nature reserves, will be supported.

5.4 Data Search – Local Conservation Priorities

- 5.4.1 The following relevant species and habitats are listed on the Wrexham Biodiversity Action Plan:

Habitats

- Ponds
- Woodland

Species

- Great crested newt
- Barn owl
- Song thrush
- Badger
- Lesser horseshoe

- 5.4.2 These habitats and species have been identified as local conservation priorities and therefore will be given appropriate additional weight within the site ecological evaluation.

5.5 Survey Results

General Description

- 5.5.1 The site comprised a single poor semi-improved grassland field adjacent to Knolton Farmhouse Cheese factory buildings. A strip of woodland ran adjacent to the western boundary of the site with industrial buildings to the north and east. The southern part of the site comprised agricultural spoil, with rubble and tyres piled within this area.
- 5.5.2 The surrounding landscape was characterised by agricultural land and strips of woodland associated with river corridors.
- 5.5.3 The results of the ecological survey are included in map form on Figure 5 at the end of this Section. Habitats are mapped following the codes and conventions described by described within the Phase 1 Habitat Survey Handbook and Target Notes (Table 3) are used to describe habitats not readily conforming to recognised types and evidence of or potential for protected species and species of conservation concern. Photographs of the site are provided in Appendix C at the end of this report.

5.6 Habitats

Poor Semi-Improved Grassland

- 5.6.1 The majority of the site comprised poor semi-improved grassland which was managed by cutting on an annual basis.
- 5.6.2 The northern section of the field showed signs of improvement, with dominant perennial ryegrass *Lolium perenne*, frequent white clover *Trifolium repens* and occasional broad-leaved dock *Rumex obtusifolius* and creeping buttercup *Ranunculus repens*. The southern part of the field had a higher diversity of species with abundant cocksfoot *Dactylis glomerata*, frequent willowherb *Epilobium* sp., creeping thistle *Cirsium arvense*, common chickweed *Stellaria media* and cleavers *Galium aparine* and occasional broadleaved dock, groundsel *Senecio vulgaris*, creeping buttercup, common couch *Elytrigia repens*, dandelion *Taraxacum officinale* and hard rush *Juncus inflexus*. A photograph of the grassland is given in Appendix C (Photograph 1).

Tall Ruderal Vegetation/Scattered Scrub

- 5.6.3 The southern part of the site comprised tipped waste such as rubble, soil and tyres (Photograph 2, Appendix C). Most of the area had been colonised by grasses, ruderals and scrub. This included nettle *Urtica dioica*, bramble *Rubus fruticosus* agg., mosses, butterfly bush *Buddleja davidii*, willowherb *Epilobium* sp., lesser celandine *Ranunculus ficaria*, cow parsley *Anthriscus sylvestris*, lords and ladies *Arum maculatum*, daffodil *Narcissus* sp., willow *Salix* sp., elder *Sambucus nigra* and ash *Fraxinus excelsior*.

Dense Scrub

- 5.6.4 Areas of dense scrub were recorded along the western boundary adjacent to the woodland. This was dominated by bramble.

Mixed Plantation Woodland

- 5.6.5 Woodland was present on the western boundary of the site which formed part of Llan-y-Cefn Local Wildlife Site (Photograph 4, Appendix C). The woodland formed a steep valley with a river present, although it appeared that this river was dry or below ground within the woodland adjacent to the site.
- 5.6.6 Species recorded within the woodland comprised beech *Fagus sylvatica*, cherry *Prunus avium*, elder, horse chestnut *Aesculus hippocastanum*, conifer species, sycamore *Acer pseudoplatanus*, goat willow *Salix caprea*, oak *Quercus robur* and ash *Fraxinus excelsior*.
- 5.6.7 A small amount of bramble was present as understory in the woodland and no ground flora was noted.

Broadleaved Trees

- 5.6.8 A single mature horse chestnut was situated on the southern boundary of the site adjacent to the road.

Hedgerows

- 5.6.9 Hedgerows were present on the southern and western boundary of the site. These were species poor and consisted solely of hawthorn *Crataegus monogyna*. These were well managed to a height of approximately 2m on the western boundary; the hedgerow was sparse and gappy at this location. On the southern boundary the hedgerow was more mature and dense and managed to a height of approximately 3m. A strip of well managed improved grassland was present on the southern boundary adjacent to the road.

Bare Ground

- 5.6.10 A track was present in the south of the site leading from the road to the west and joining the metalled track to the east. A strip of recently formed bare ground was also located running through the grassland field and appeared to be a result of trenching work, possibly to install underground services.

Pond

- 5.6.11 A small area of standing water was present in the south west of the site (Photograph 3, Appendix C). This measured approximately 1.5 x 5m and appeared to have been created by vehicles turning in the mud. The water depth was approximately 30cm at the deepest point. Flote grass *Glyceria fluitans* and filamentous algae were present within the water and rushes were situated at the margin and elsewhere in the area. It is assumed that the pond is ephemeral due to the small size and the fact that it was not identified on Ordnance Survey maps.

5.7 Protected Species and Species of Conservation Concern**Badgers**

- 5.7.1 A disused badger sett was identified in the west of the site (Target Note 2, Figure 5) which comprised one disused entrance. This was extremely overgrown and obscured with bramble so had probably not been used for at least a year.

- 5.7.2 Fresh badger footprints were observed within an area of mud in the south of the site (Target Note 6, Figure 5).
- 5.7.3 No well used badger paths were identified within the site and no active setts found, however, it is likely that badgers utilise the site on an occasional basis for foraging and moving around the landscape.

Bats

- 5.7.4 No mature trees or buildings were present within the site, therefore, no potential bat roosts were identified. A single mature horse chestnut was situated to the south of the site, however, no potential roosting features were present within this tree.
- 5.7.5 The woodland on the western boundary of the site was not searched extensively, but it is likely that trees are present within this habitat which have suitability for roosting bats. The woodland is also likely to be a valuable resource for foraging bats.
- 5.7.6 The grassland habitat and spoil area in the south may offer some limited habitat for foraging bats, as small numbers of prey species are likely to be present within this area.
- 5.7.7 Only the woodland edge in the west of the site and the hedgerow on the southern boundary are likely to be utilised by commuting bats, as the remainder of the site lacked intact linear habitats.

Dormice

- 5.7.8 The woodland to the west of the site offered suitable habitat for dormice, however, the understory was limited and so the habitat lacked the structure which this species favours. The hedgerow on the southern boundary of the site was intact and connected to the adjacent woodland. However the hedgerow was species poor and so would not provide a variety of food sources for dormice during the active season.
- 5.7.9 The remainder of the site comprised scattered scrub, grassland and fragmented hedgerows and so did not offer any suitable habitat for dormice.

Amphibians

- 5.7.10 A small pond was present in the south west of the site, however, this was not thought to offer suitability for amphibians such as great crested newts. A Habitat Suitability Index assessment was carried out and the pond was determined to be of 'Poor' suitability for breeding great crested newts as the pond was small and ephemeral in nature.
- 5.7.11 Several ponds were identified within 500m of the site; these are shown in Figure 4.

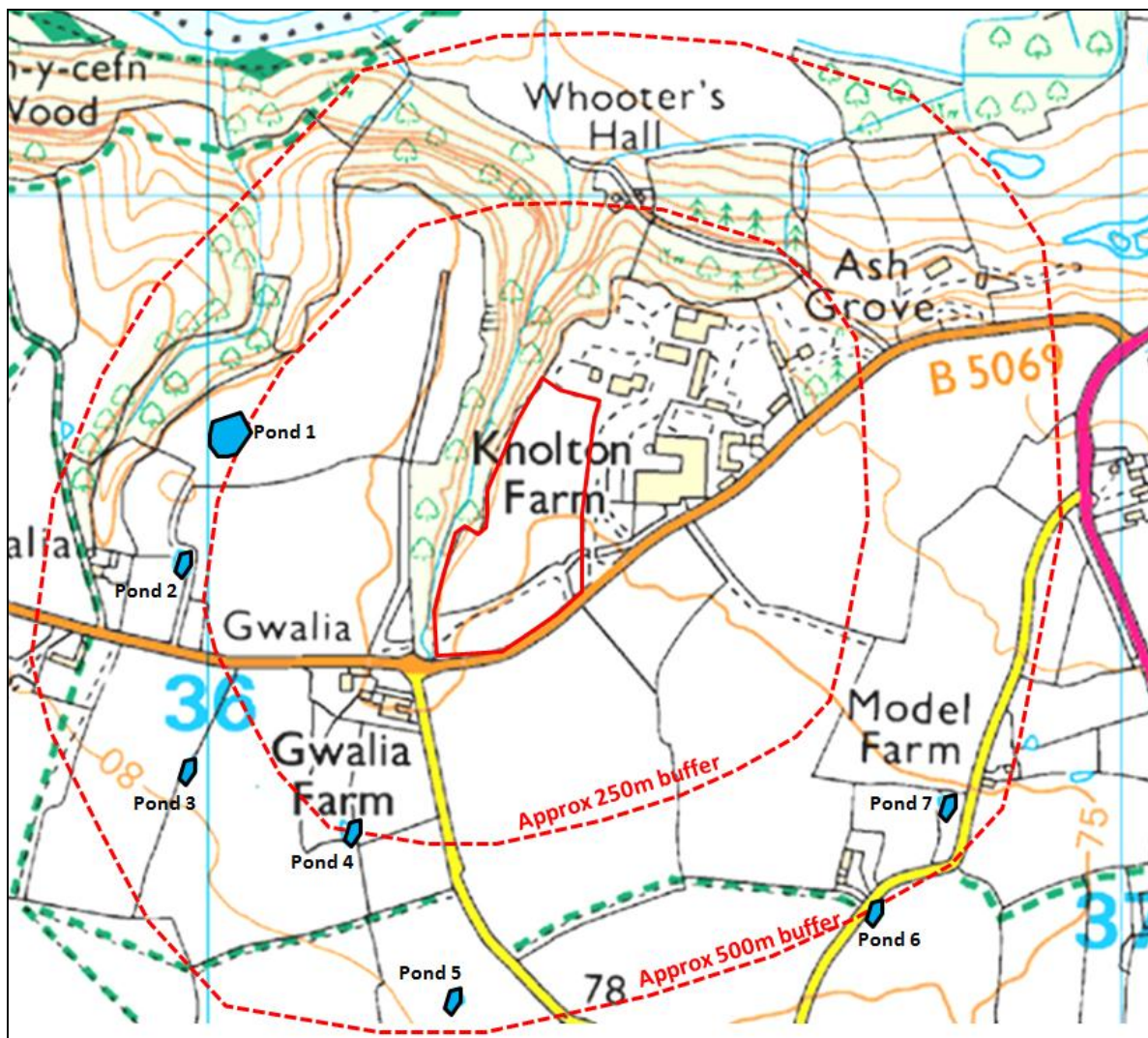


Figure 4: Map Showing Ponds within a 250m and 500m Buffer of the Site

- 5.7.12 All ponds were on private property and so were not accessed in order to assess their suitability for breeding great crested newts. Pond 6 could be viewed from the road and was determined to be of 'Poor' suitability for breeding great crested newts as it was small and heavily shaded with very little aquatic vegetation.
- 5.7.13 Only Ponds 1 and 4 lay within 250m of the site; Pond 1 was not present on OS maps, but aerial photographs showed a square structure possibly utilised as a small agricultural reservoir. Pond 4 could not be seen on aerial photographs and it is possible that this water feature is no longer present.
- 5.7.14 Pond 1 and Pond 2 were separated from the site by a river, which may prove a barrier to amphibian dispersal, however, this river was dry at the southern section. Ponds 3, 4, 5, and 7 were separated from the site by roads, including the B5069 which is a relatively busy transport route and may deter amphibians from crossing

Reptiles

- 5.7.15 The grassland within the site is cut on an annual basis and did not provide the tussocks that reptiles might utilise for shelter.

- 5.7.16 The area in the south of the site comprised piles of spoil, rubble, tyres etc with encroaching scrub and grass. This habitat would provide shelter and basking areas for reptiles such as slow worm *Anguis fragilis* or grass snake *Natrix natrix*. The woodland edge on the western boundary of the site may also be suitable for reptile species such as grass snake.

Birds

- 5.7.17 It is likely that the area supports small numbers of breeding and overwintering birds typical of farmland habitats. The grassland did not offer the structure to be utilised by ground nesting birds and the field is small and surrounded with woodland and industrial buildings so would not offer nesting habitat for species such as skylark *Alauda arvensis* which require long unbroken sightlines.
- 5.7.18 The woodland habitat to the west was suitable for a range of nesting birds and the patchy areas of scrub in the south of the site also offered nesting habitat.
- 5.7.19 The hedgerow on the southern boundary of the site adjacent to the road may be utilised for nesting by species tolerant of traffic.
- 5.7.20 Species recorded on site during the survey are shown in Table 2. The majority of birds were recorded within the woodland area, with a few sightings in the south of the site. No birds were observed utilising the grassland habitat.

Table 2: Bird Species Recorded During the Field Survey

Species	Latin	Behaviour
Blue tit	<i>Cyanistes caeruleus</i>	Singing in woodland
Dunnock	<i>Prunella modularis</i>	Foraging in scrub in south of site
Blackbird	<i>Turdus merula</i>	Calling in south of site
Crow	<i>Corvus corone</i>	Flying overhead and calling from woodland
Great tit	<i>Parus major</i>	Calling from woodland
Goldfinch	<i>Carduelis carduelis</i>	Calling from woodland
Wren	<i>Troglodytes troglodytes</i>	Singing in woodland
Chaffinch	<i>Fringilla coelebs</i>	Singing in woodland
House sparrow	<i>Passer domesticus</i>	Foraging in hedgerow in north of site

- 5.7.21 Dunnock is an amber listed species and house sparrow is a red listed species on the Birds of Conservation Concern register.

Invertebrates

- 5.7.22 The site is likely to support a low diversity of common invertebrates, with the most suitable habitats comprising the adjacent woodland and scattered scrub in the south, to a lesser extent. No notable invertebrates were observed during the walkover survey.

Other Protected Species, Species of Conservation Concern and Invasive Species

- 5.7.23 No invasive species were noted. The site may offer some suitability for hedgehogs, particularly the woodland edge and scrub habitat within the south of the site.

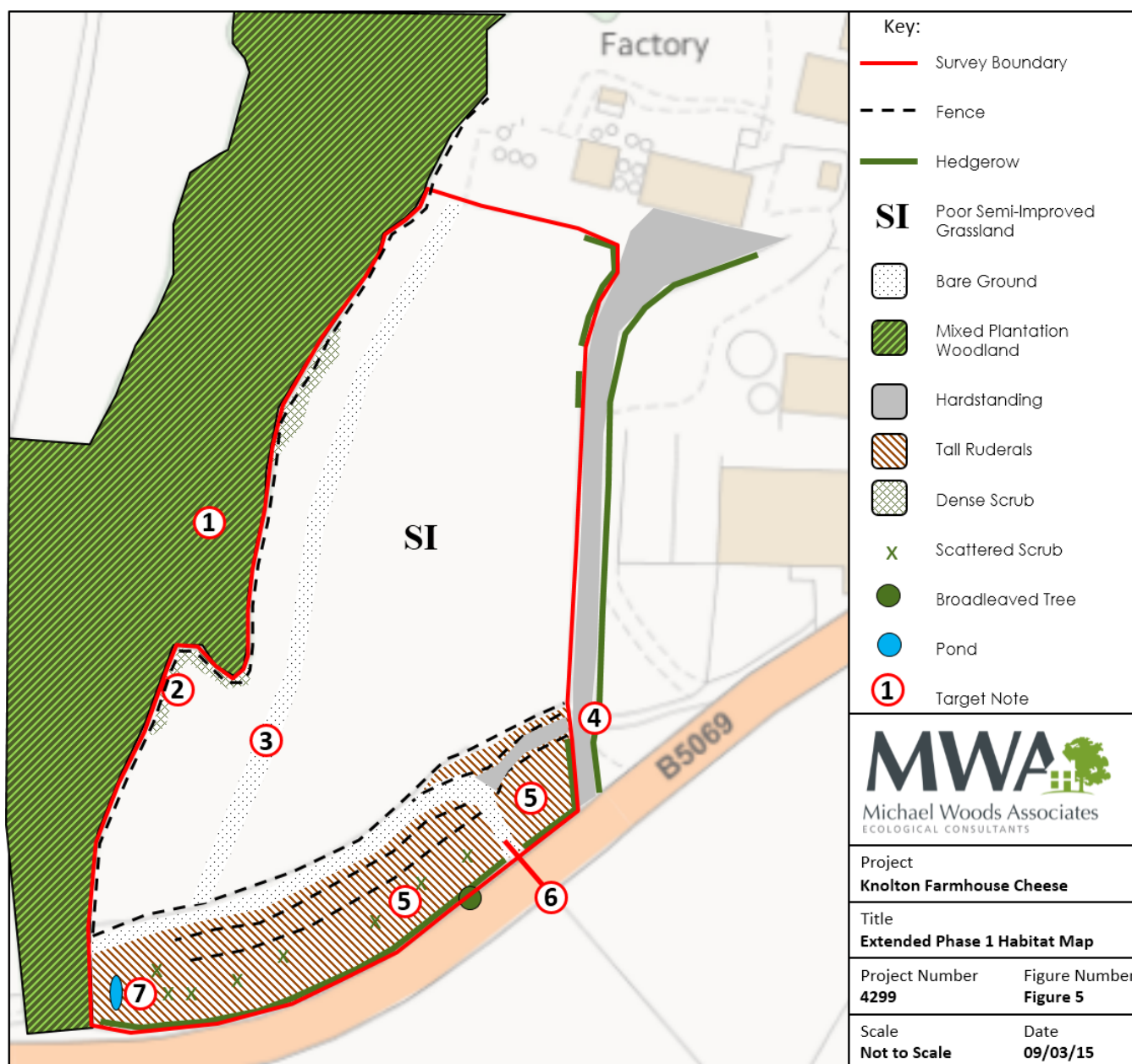


Figure 5: Phase 1 Map Showing Habitats within the Survey Area

Table 3: Target Notes

No.	Description
TN1	Mixed plantation woodland forming part of the Llan-y-Cefn Local Wildlife Site
TN2	Single disused badger hole overgrown with bramble at woodland edge
TN3	Newly excavated line of soil possibly resulting from recent trenching work
TN4	Small bridge where access to the factory site passes over a smaller metal track beneath
TN5	Area of spoil, rubble and tyres with encroaching tall ruderals, scrub, grasses and mosses
TN6	Badger footprints identified in mud within a dirt track leading from the road into the site
TN7	Small ephemeral pond with fescue grass and filamentous algae formed within ruts caused by turning vehicles

6 ECOLOGICAL EVALUATION

6.1.1 This section provides an analysis of the value of ecological receptors (the designated sites, habitats and protected species) identified as actually or potentially occurring within or in proximity of the site. The valuation of the receptor reflects its legal protection, rarity and conservation status as well as its relative abundance on site and whether it is identified as a local or national conservation priority. Where appropriate the social and economic value of ecological receptors has also been considered.

Table 4: Ecological Evaluation

Ecological Receptor	Description/Comments	Ecological Evaluation
Designated Sites		
River Dee and Bala Lake Special Area of Conservation	480m northwest. Designated for fish, otters and notable aquatic plants	International
River Dee Site of Special Scientific Interest	Part of the above site and designated for the same features with the inclusion of notable aquatic invertebrates	National
Shell Brook Pastures Site of Special Scientific Interest	1.2km south. Comprises botanically rich grassland	National
Llan-y-Cefn Local Wildlife Site	Adjacent to the west of the site. Mixed plantation woodland	County
Habitats		
Poor semi-improved grassland	Covered the majority of the site. No notable species.	Site
Tall Ruderal Vegetation/Scattered Scrub	Southern part of the site comprised spoil with encroaching species	Site
Dense scrub	Small patches of bramble adjacent to the woodland	Site
Mixed plantation woodland	Broadleaved and conifer woodland adjacent to site also part of a Local Wildlife Site	County
Broadleaved trees	Single mature horse chestnut tree	Site
Species poor hedgerows	Hedgerows comprising solely hawthorn	Local

Ecological Receptor	Description/Comments	Ecological Evaluation
Bare ground	Newly excavated trench running through site	Site
Pond	Ephemeral pond in south west of site	Site
Species		
Badgers	Disused badger sett comprising a single entrance in west of site and footprints in south	Site
Bats	Woodland in west and hedgerow in south suitable foraging and commuting habitat.	Unknown as no surveys have been conducted. Local Value (assuming they are present)
Dormice	Woodland suitable for this species. Hedgerow on southern boundary low suitability.	Unknown as no surveys have been conducted. District Value (assuming they are present)
Amphibians	7 ponds within 500m and one ephemeral pond on the site, however, the two ponds surveyed of Poor suitability for great crested newts	Unknown as no surveys have been conducted. Local Value (assuming they are present)
Reptiles	Area of spoil in south of site suitable for reptiles	Unknown as no surveys have been conducted. Local Value (assuming they are present)
Birds	Site suitable for range of common species. Woodland, scrub and hedgerows suitable for nesting	Local
Invertebrates	Likely to support a low diversity of common species	Site
Hedgehogs	Woodland edge and scrub suitable habitat for this species	Unknown as no surveys have been conducted. Local Value (assuming they are present)

7 ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION AND ENHANCEMENT

7.1 Introduction

- 7.1.1 This section considers the effects of the proposed development upon the ecological receptors identified in Section 6. Avoidance, mitigation and compensatory measures are then described to ensure adverse effects associated with the construction and operation of the proposed development can be eliminated or reduced as far as possible. Recommendations are also provided for any further work that might be required as well as suggestions for ecological enhancement measures that would be appropriate within the development in line with the National Planning Policy Framework.

7.2 Details of Proposed Development

- 7.2.1 Layout plans for the site are shown in Figure 3. The array will be situated within the grassland area of the site with a new native hedgerow planted on the eastern boundary. 2m high deer fencing will be installed surrounding the site, allowing a buffer of at least 8m between the woodland and the fencing.

7.3 Designated Sites

- 7.3.1 The SAC and SSSI associated with the River Dee is 480m northwest at its closest point. This site is designated for aquatic fish, mammals and flora and given that no aquatic habitats exist within the survey area, the species within these designated sites are unlikely to be present within the proposed development area.
- 7.3.2 Shell Brook Pastures SSSI is located 1.2km from the site and is thought to be outside the zone of influence due to its distance.
- 7.3.3 Llan-y-Cefn Local Wildlife Site is partly located adjacent to the western boundary of the survey area. This site is designated due to the presence of mature mixed plantation woodland. Potential impacts on this locally designated site may include dust and mud deposition during construction works, damage to trees by construction vehicles and noise disturbance to species located within the woodland area.
- 7.3.4 A buffer of 8m will be instated adjacent to the woodland area. This buffer should be delineated by installing security fencing prior to construction commencing. The fencing will act as tree protection fencing and no vehicles should be driven within this area or materials stored here. This fencing and the woodland edge should be periodically monitored throughout construction to ensure that the fencing remains intact and there are no adverse effects upon the woodland.
- 7.3.5 The buffer should be managed as rough grassland to provide transitional habitat between the woodland habitat and the development area.

7.4 Habitats

- 7.4.1 The construction zone comprises solely poor semi-improved grassland and the installation of the array will lead to temporary disturbance of this habitat, however, the land beneath the array will be managed as grassland during the operation of the site, so no habitat loss is anticipated.

- 7.4.2 The species composition of the grassland may vary due to differences in shading and moisture, however, the grassland was of site value and a slight modification of species composition is not thought to be significant.
- 7.4.3 Any bare areas within the grassland should be seeded with a diverse grass and wildflower mix (a seed mix such as Habitat Aids Wildflowers for Solar Farms would be appropriate). The grassland can then be managed through sensitive cutting or grazing late in the season in order to allow plants to flower and set seed. This will lead to an increase in the diversity of the sward and will attract a wider diversity of invertebrates, birds and bats.
- 7.4.4 The hedgerows are to be retained and the site will be enhanced through the planting of a new hedgerow on the eastern boundary of the site. This hedgerow comprises a mixture of native species with standard trees planted along its length.
- 7.4.5 The woodland should be protected from damage through the installation of security fencing prior to construction commencing.
- 7.4.6 Additional woodland copse planting is planned for the south western corner of the site. This comprises a range of species and will extend the woodland habitat.
- 7.4.7 The spoil, scrub and tall ruderals habitat in the south of the site will be retained and the habitat within this area will be protected through the installation of the security fencing.
- 7.4.8 A Landscape and Environmental Management Plan (LEMP) should be prepared for the operational site that will cover how retained habitats and newly planted areas should be managed so as to maximise their biodiversity value and achieve the objectives of ecological mitigation and compensation. The LEMP should also set out any measures necessary to ensure protected species are appropriately accommodated within the operational site.

7.5 Protected Species and Species of Conservation Concern

Badgers

- 7.5.1 A disused sett was identified in the west of the site and footprints in the south. No active setts were identified, so damage to setts is not anticipated.
- 7.5.2 It is recommended that if more than 6 months elapses between the time of the survey and the onset of construction that a badger survey is conducted to ensure no new setts have been excavated or the disused sett has not come back into use.
- 7.5.3 Security fencing around the site should incorporate gaps of at least 100mm high to allow badgers and other mammals to utilise the site post construction. Gaps should be incorporated along all boundaries of the site to ensure that the site does not fragment wider badger territories.

Bats

- 7.5.4 The woodland and hedgerow habitat offered the most suitable bat foraging and commuting habitat and these features will be retained within the development. The provision of a buffer between the woodland and the development will ensure that this habitat is protected for use by bats.

- 7.5.5 It is assumed that minimal artificial lighting will be used during the construction of the solar array and as such disturbance of nocturnal animals will be minor. Typically such lighting is only associated with construction site compound areas which, if sensitively designed, such as by using motion sensitive, downward facing lights will help to minimise any impact upon foraging and commuting bats. As construction works will not proceed at night it is not anticipated that significant artificial lighting will be required. In the event that significant levels of artificial lighting are required a lighting strategy should be prepared in consultation with an appropriately experienced ecologist to ensure that the lighting does not have an adverse effect upon bats. Such a strategy may need to be informed by further surveys for bats to allow the impact of artificial lighting to be fully assessed.

Dormice

- 7.5.6 The woodland habitat offered suitable habitat for dormice; this habitat is to be retained and protected through the incorporation of a buffer.
- 7.5.7 The hedgerow on the southern boundary was deemed to offer limited suitability for dormice and this habitat will also be retained.
- 7.5.8 Subject to the precautions described above for bats with respect of artificial lighting, it is not anticipated that the development will have any adverse effects upon dormice, should they be present within the area.
- 7.5.9 In the event any hedgerow clearance or widening of existing gaps in hedgerows is required an appropriate strategy to safeguard species, such as dormice, which may occupy the hedgerow will be required. Small amounts of clearance are likely to be possible provided that an appropriate precautionary approach is adopted to avoid the killing or injury of animals. However should large scale clearance of hedgerows be required it will almost certainly be necessary to undertake further surveys for dormice to confirm the presence or absence of this species to allow for an appropriate mitigation strategy to be developed. It seems likely that if present, large scale hedgerow clearance would require a licence from National Resources Wales (NRW) and appropriate mitigation planting at a ratio of approximately 2:1 (new planting: habitat lost) will be required.

Amphibians

- 7.5.10 An ephemeral pond was identified in the southwest of the site which was assessed as having 'Poor' suitability for breeding great crested newts. The data search did not reveal any records of great crested newts within 1km of the site, however, this species is known to be present in the wider area.
- 7.5.11 The pond within the site was situated 300m from the nearest pond to the west and was separated by a steep valley with a river at the bottom. Although the river did not present a significant barrier to newt dispersal as it was dry or underground in the southern area, the distance of the pond and partial separation by a river makes it unlikely that newts would disperse into the site.
- 7.5.12 The site is relatively isolated, with rivers to the west and north and industrial buildings to the east and so is unlikely to form part of an important commuting route for newts. There may be meta-

populations in the area where clusters of ponds are present, however, these clusters are over 500m from each other and so newts are unlikely to regularly commute between clusters. Great crested newts may be found up to 250m from ponds (and up to 500m from ponds in exceptional circumstances¹³), however, studies by Jehle¹⁴ and Cresswell & Whitworth¹⁵ have demonstrated that the habitat within 50m of the pond is the most important to great crested newts and supports the majority of a great crested newt population within its terrestrial phase.

- 7.5.13 Although it is considered highly unlikely that great crested newts are present within the site, as a precautionary approach, a toolbox talk should be conducted by an ecologist to contractors working on the site to ensure they are familiar with the identification of great crested newts and steps to take in the unlikely event that they are encountered during construction works.
- 7.5.14 Post construction, the site is likely to provide suitable habitat for amphibians and enhancements have been suggested in Section 7.6 to provide further habitat for this taxon.

Reptiles

- 7.5.15 The area of spoil, rubble and tyres in the south of the site was considered suitable for reptiles as areas for shelter and basking were present. This habitat will be retained and so no impacts on reptile species are anticipated, should they be present.
- 7.5.16 Enhancements for reptiles have been given in Section 7.6.
- 7.5.17 Should any of the habitat within the south of the site require clearance, reptile surveys would be required prior to this work in order to identify presence/absence, species and likely population size. The mitigation required would be dependent on the results of the survey and the amount of habitat which requires clearance.

Birds

- 7.5.18 The woodland, hedgerows and scrub were identified as being suitable for nesting birds. The woodland is to be retained and protected through the installation of security fencing at least 8m from the woodland edge.
- 7.5.19 The hedgerows and scrub habitat in the south of the site are to be retained, therefore, no impacts on nesting birds are anticipated.
- 7.5.20 Should any hedgerow or scrub habitat require removal, this should be discussed with an ecologist as protected species may be impacted. If the vegetation is to be removed during the main nesting season (March to August inclusive), a nesting bird check would be required no more than 48 hours prior to removal. This would be conducted by an ecologist and should a nest be found clearance would need to be postponed until the nest fledges.

¹³ Great Crested Newt Mitigation Guidelines. 2001. Natural England

¹⁴ Jehle R (2000) The terrestrial summer habitat of radio- tracked great crested newts (*Triturus cristatus*) and marbled newts (*T. marmoratus*). Herpetological Journal 10: 137-142

¹⁵ Cresswell W and Whitworth R (2004) An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt *Triturus cristatus*. English Nature Research Report 576. English Nature, Peterborough.

7.5.21 Suggestions for enhancements for birds have been provided in Section 7.6 below.

Other Protected Species and Species of Conservation Concern

7.5.22 The site was considered suitable for a low diversity of common invertebrates. By seeding bare areas and carefully managing the grassland, its suitability for invertebrates may be improved. Recent research has shown that grassland beneath solar farms, particularly when seeded with a diverse wildflower mix, can attract a greater diversity of invertebrates than adjacent similar habitats which have not been developed¹⁶. Additional enhancements have also been given in Section 7.6 below.

7.5.23 The woodland edge and scrub area in the south of the site was considered suitable habitat for hedgehogs. This habitat is to be retained and so no impacts are anticipated, should this species be present. The gaps provided in the security fencing for badgers will also allow small mammals such as hedgehogs access into the site.

7.6 Ecological Enhancements

7.6.1 Technical Advice Note 5 on Nature Conservation and Planning (2009) states that the planning system should “look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally”, and “adopt a step-wise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation”.

7.6.2 Enhancements for biodiversity, such as the following, are additional to specific mitigation measures mentioned above and are not expressly required. Any adopted enhancements would however, make a positive, permanent contribution to local biodiversity.

Habitats

7.6.3 A new hedgerow will be planted on the eastern boundary of the site, between the proposed array and access road to the factory buildings. The hedgerow will comprise 7 native species with standard trees. This additional planting will provide further habitat connectivity and will benefit a range of birds, small mammals and invertebrates.

7.6.4 The hedgerows should be managed to a height of at least 2m as this is considered to be particularly important for encouraging use by native British wildlife.

Bats

7.6.5 The installation of bat boxes within the woodland adjacent to the site would provide additional roosting opportunities for bats. Permission would be required in order to install these boxes in the adjacent woodland. Suitable box designs and numbers are set out in Table 5 below:

¹⁶ Can Solar Farms Deliver Significant Benefits for Biodiversity? Preliminary Study July-August 2013. GE Parker & C McQueen

Table 5: Suitable Bat Boxes for the Site

Box Type	Description	Number
Schwegler 2F Bat Box 	Nail onto the main trunk of mature trees 4 to 5m high, on south, south west or south eastern aspects, ideally in a sunny location. Does not require maintenance. Suitable for a range of crevice dwelling bat species.	3
Schwegler 1FW Bat Hibernation Box 	Nail onto the main trunk of mature trees 4 to 5m high, on south, south west or south eastern aspects, ideally in a sunny location. Thick cavity walls so provides a stable temperature for both summer and winter roosting. Large size so will accommodate a colony of bats. Should be cleaned by a licenced bat surveyor periodically.	1

Dormice

- 7.6.6 Although no records of dormice were identified within 1km of the site, they are known to occur in the Wych Valley 10km to the east of the site. Dormouse boxes could be installed within the adjacent woodland and the checking of these boxes by a licenced ecologist could form part of the monitoring required under the Landscape and Ecological Management Plan.
- 7.6.7 A total of 10 wooden FSC heavy duty dormouse boxes (or Schwegler dormouse dreys) could be installed in the woodland area.

Reptiles and Amphibians

- 7.6.8 A hibernacula could be constructed within the perimeter of the site. This would comprise a partially buried pile of logs, rubble and brash topped with soil or turf. A suitable location would be adjacent to the woodland edge. This type of structure would provide shelter for a range of species including reptiles, amphibians, small mammals and invertebrates.
- 7.6.9 Log piles could also be created at the periphery of the site where logs or brash is available.

Birds

- 7.6.10 A range of bird boxes could be provided within and adjacent to the site. These would provide additional nesting opportunities for a variety of bird species.
- 7.6.11 The most suitable habitat to install these bird boxes would be within the woodland adjacent to the site but permission would be required to carry this out.
- 7.6.12 Suitable box designs and numbers are shown in Table 6 below:

Table 6: Suitable Bird Boxes for the Site

Box Type	Description	Number
Barn Owl Trust Barn Owl Box 	To be purchased from Barn Owl Trust or homemade using specifications (http://www.barnowltrust.org.uk/infopage.html?id=42) To be placed on a large mature tree on the woodland edge, with unobstructed access to the entrance. The creation of a rough grassland buffer in the west of the site would provide suitable hunting habitat for this species.	1
Schwegler 1B Bird Box (32mm entrance) 	To be placed at least 2m above the ground in a quiet and sheltered area of site on mature trees. Ensure the boxes are protected from the rain by facing the entrance down slightly in order to prevent rain seeping in and so encourage use and increase the longevity of the box. Ensure there is clear access to the box entrance at all times. Best placed on a north or easterly aspect.	4

7.7 Summary of Recommended Further Work

7.7.1 Below is a summary of the recommended further work which should be carried out, with the appropriate timing for this work.

Receptor	Scope of work	Timescale
General	Landscape and Ecological Management Plan written for the site.	Prior to construction commencing.
General	Toolbox talk conducted to all personnel working on site to outline identification of protected species and steps to take should they be encountered.	At onset of construction.
Llan-y-Cefn Local Wildlife Site	8m buffer instated between array and woodland.	Security fencing installed prior to construction commencing to safeguard this buffer.
Grassland	Bare areas created within the grassland seeded with a diverse seed mix on completion of construction.	At suitable time of year, as soon as possible after completion of construction.

Receptor	Scope of work	Timescale
Badgers	A pre-construction badger survey conducted.	If more than 6 months elapses between date of this survey and onset of construction.
Birds	If any scrub, tree or hedgerow is to be directly affected by construction activities (including site clearance) during the months of March to August inclusive, a check of suitable habitat for nesting birds prior to site activity in that area should be carried out by a suitably qualified ecologist.	Nesting bird checks should take place no more than 48hrs prior to site clearance activities commencing

8 CONCLUSIONS

- 8.1.1 The proposed development is small in scale and is to be situated on poor semi-improved grassland with low botanical interest. However, potential impacts on a number of ecological receptors were identified. Possible impacts on the adjacent Local Wildlife Site during construction included direct damage and disturbance and so it has been recommended that an ecological buffer is instated to protect this habitat. This is in line with Policy GDP1, EC4 and EC6 in the Local Plan.
- 8.1.2 Other retained habitats such as the hedgerows and scrub will be retained and protected, thereby avoiding negative impacts.
- 8.1.3 It is recommended that a Landscape and Ecological Management Plan is written for the site which should outline the protection of retained habitats in more detail as well as the creation and management of new habitats.
- 8.1.4 A number of enhancements have been suggested and the inclusion of some or all of these measures would result in an overall positive impact of the development on the ecology of the area.

APPENDIX A: WILDLIFE LEGISLATION & SPECIES INFORMATION

BADGERS

Badgers and their setts are protected under the Protection of Badgers Act 1992 (as amended) against damage or destruction of a sett, or disturbance, death or injury to the badgers. The Act defines a sett as "any structure or place which displays signs indicating current use by a badger". The definition of current use is subject to considerable debate. Natural England have produced guidance on the definition of current use. (*Badgers and Development – A guide to best practice and development* . Natural England 2011). Given the ambiguity surrounding the definition in all circumstances we would recommend an assessment of current use is always undertaken by a qualified ecologist. Natural Resources Wales (NRW) have a slightly different definition of current use. Please see the NRW website for further information. Penalties for offences against badgers or their setts include fines of up to £5,000 and/or up to six months in prison.

Disturbance of badgers could be caused by any digging activity or scrub clearance within 30 metres of an occupied sett and therefore every case needs to be assessed individually. Felling of trees close to a badger sett may also cause disturbance in some situations. Some activities such as pile driving may cause disturbance at even greater distances, and should be discussed with Natural England or NRW.

Licences are issued by Natural England (or NRW in Wales) to allow the disturbance of badgers, and the destruction of their setts in certain circumstances, in relation to development. Full planning permission must be obtained before a licence application will be considered. Although licences can be applied for at any time of year, disturbance of badgers or exclusion of badgers from a sett can only take place between 1 July and 30 November, to avoid the breeding season when dependant young may be underground. This restriction may be relaxed in some cases where a sett is seasonal and badgers can be shown to be absent from a sett at that time of year.

This report contains information of a confidential nature relating to the location of badger setts. Public access to this data should be restricted to those who have a legitimate need to assess the information and to know the exact situation of the setts rather than simply that badgers are present.

BATS

All 17 species of bat known to breed in England and Wales, and their roost sites, are protected under the Conservation of Habitats and Species Regulations 2010 (as amended), known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a bat, or to deliberately disturb a bat such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of bats in their resting places, and damage to or obstruction of resting places are also offences under the Wildlife and Countryside Act 1981 (as amended). Under UK law a bat roost is "any structure or place which any wild [bat]...uses for shelter or protection". As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time. Penalties for offences against bats or their roosts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of or alteration to roost sites, or which could result in killing of or injury to bats, need to take place under licence. Works which could disturb bats may also be licensable, though this needs to be assessed on a case by case basis, as bats' sensitivity to disturbance varies depending on normal background levels, and the definition of disturbance offences under the Habitats Regulations is complex. In practice this means that works involving modification or loss of roosts (typically in buildings, trees or underground sites) or significant disturbance to bats in roosts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of bats in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

DORMICE

Dormice and their nests are protected in England and Wales under the Conservation of Habitats and Species Regulations 2010 (as amended), known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a dormouse, or to deliberately disturb a dormouse such that its ability to hibernate, breed or rear young, or such

that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of dormice in their nests, and damage to or obstruction of nests are also offences under the Wildlife and Countryside Act 1981 (as amended). Penalties for offences against dormice or their nests include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of nest sites, or which could result in killing of or injury to dormice, need to take place under licence. Works which could disturb dormice may also be licensable, though this is rarely the case unless loss of dormouse habitat is also proposed, and should be assessed on a case by case basis. In practice this means that works involving any removal of habitat (typically woodland, hedgerows, and scrub) supporting dormice are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of dormice in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

AMPHIBIANS

Great Britain supports seven native amphibian species. The four most widespread species; smooth and palmate newts, common frog, and common toad, receive partial protection under the Wildlife and Countryside Act 1981 (as amended) which prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy. The great crested newt, pool frog and natterjack toad are also fully protected in England and Wales under the Conservation of Habitats and Species Regulations 2010 (as amended). Penalties for offences against amphibian species include fines of up to £5,000 and/or up to six months in prison.

Four amphibian species (great crested newt, pool frog, common toad, natterjack toad) are listed as priority species under the UK Biodiversity Action Plan, and are therefore considered to be Species of Principal Importance in England and Wales (excluding the pool frog, which does not occur in Wales) under the Natural Environment and Rural Communities (NERC) Act 2006. All public bodies including local and regional authorities have a duty under this legislation to have regard for the conservation of biodiversity.

GREAT CRESTED NEWTS

Great crested newts are protected in England and Wales under the Conservation of Habitats and Species Regulations 2010 (as amended), known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a great crested newt, or to deliberately disturb a great crested newt such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place for great crested newts. Intentional or reckless disturbance of great crested newts in places of shelter (ponds or terrestrial refuges), and damage to or obstruction of places of shelter are also offences under the Wildlife and Countryside Act 1981 (as amended). Penalties for offences against great crested newts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of ponds or terrestrial habitat, or which could result in killing of or injury to great crested newts, need to take place under licence. Works which could disturb great crested newts may also be licensable, though this is rarely the case unless loss of great crested newt habitat is also proposed, and should be assessed on a case by case basis. In practice this means that works involving any removal of or significant modification to ponds or terrestrial habitats (typically rough grassland, scrub, hedgerow bases and woodland) supporting great crested newts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of great crested newts in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

REPTILES

All six native reptile species receive protection under the Wildlife and Countryside Act 1981 (as amended). The four more common species (common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix*) receive partial protection which makes it an offence to intentionally kill or injure a reptile. The two other reptile species (smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*), both of which are rare with

very restricted UK ranges receive full protection under the Conservation of Habitats and Species Regulations 2010 (as amended). Penalties for offences against reptile species include fines of up to £5,000 and/or up to six months in prison.

Works such as site clearance or topsoil stripping which could result in killing or injury of reptiles could be considered result in an offence unless measures are taken to minimise the risk of this occurring. Any inadvertent impacts on common reptile species despite these mitigation measures being in place would be considered an 'incidental result of an otherwise lawful operation' which 'could not reasonably have been avoided' and therefore not an offence. Works which could affect smooth snakes or sand lizards, or their habitats, would need to take place under licence from Natural England or Natural Resources Wales. However sites supporting smooth snakes or sand lizards are very rarely affected by development proposals.

In practice, mitigation for impacts of development on common reptiles generally comprise one or more of the following techniques: displacement, in which reptiles are encouraged to move to suitable retained habitat by changing the management of areas affected by development; exclusion, where reptile-resistant fencing is provided between a development site and suitable retained habitat allowing reptiles to be trapped from the development footprint and released elsewhere on the site; and translocation, where animals are trapped from a development site and released on another suitable site nearby. Reptile mitigation proposals, particularly those involving translocation of animals, should be agreed in advance with the local planning authority.

BIRDS

All British birds, their nests and eggs (with certain exceptions) are protected under the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to: intentionally kill, injure or take a wild bird; intentionally take, damage or destroy nests which are in use or being built; intentionally take or destroy birds' eggs; or possess live or dead wild birds or eggs. A number of species receive additional protection through inclusion on Schedule 1 of the Wildlife and Countryside Act; for these it is also an offence to intentionally or recklessly disturb birds while nest building, or at a nest containing eggs or young, or to disturb the dependant young of such a bird. Penalties for offences against bird species include fines of up to £5,000 and/or up to six months in prison.

General licences for control of some bird species are issued by Natural England and Natural Resources Wales in order to prevent damage or disease, or to preserve public health or public safety, but it is not possible to obtain a licence for control of birds or removal of eggs/nests for development purposes. Consequently if nesting birds are present on a development site when works are programmed to start it is usually necessary to delay works, at least in the areas supporting nests, until any chicks have fledged and left the nest. It is usually possible, once chicks have hatched, for an experienced ecologist to predict approximately when they are likely to fledge, in order to inform programming of works on site.

PLANNING POLICY IN RELATION TO BIODIVERSITY

In Wales, Technical Advice Note 5 on Nature Conservation and Planning (2009) provides guidance on consideration of biodiversity in the planning process. The guidance states that the planning system in Wales should:

- work to achieve nature conservation objectives through a partnership between local planning authorities, CCW, the Environment Agency Wales [both now part of Natural Resources Wales], voluntary organisations, developers, landowners and other key stakeholders;
- integrate nature conservation into all planning decisions looking for development to deliver social, economic and environmental objectives together over time;
- ensure that the UK's international and national obligations for site, species and habitat protection are fully met in all planning decisions;
- look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally;
- help to ensure that development does not damage, or restrict access to, or the study of, geological sites and features or impede the evolution of natural processes and systems especially on rivers and the coast;
- forge and strengthen links between the town and country planning system and biodiversity action planning particularly through policies in local development plans and the preparation of supplementary planning guidance that adds value to Local Biodiversity Action Plans (LBAPs) by highlighting the ways in which the planning system can help to deliver the objectives of LBAPs in practical ways;
- plan to accommodate and reduce the effects of climate change by encouraging development that will reduce damaging emissions and energy consumption and that help habitats and species to respond to climate change.

When considering policies and proposals in local development plans and when deciding planning applications that may affect nature conservation, local planning authorities should:

- pay particular attention to the principles of sustainable development, including respect for environmental limits, applying the precautionary principle, using scientific knowledge to aid decision making and taking account of the full range of costs and benefits in a long term perspective;
- contribute to the protection and improvement of the environment, so as to improve the quality of life and protect local and global ecosystems, seeking to avoid irreversible harmful effects on the natural environment;
- promote the conservation and enhancement of statutorily designated areas and undeveloped coast;
- ensure that appropriate weight is attached to designated sites of international, national and local importance;
- protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans;
- ensure that all material considerations are taken into account and decisions are informed by adequate information about the potential effects of development on nature conservation;
- ensure that the range and population of protected species is sustained;
- adopt a step-wise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local planning authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered.

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

ECOLOGICAL ENHANCEMENTS

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

In England, the National Planning Policy Framework (NPPF), issued in March 2012, states that the planning system should contribute to "*minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*". It also states that "*opportunities to incorporate biodiversity in and around developments should be encouraged*".

In Wales, Technical Advice Note 5 on Nature Conservation and Planning (2009) states that the planning system should "look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally", and that when making planning decisions, local authorities should "promote the conservation and enhancement of statutorily designated areas and undeveloped coast" and "adopt a step-wise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation".

UK BIODIVERSITY ACTION PLANS

The UK Biodiversity Action Plan (UK BAP) 2011 is a policy first published in 1994 to protect biodiversity and stems from the 1992 Rio Biodiversity Earth Summit. The policy is continuously revised to combine new and existing conservation initiatives to conserve and enhance species and habitats, promote public awareness and contribute to international conservation efforts. Each plan details the status, threats and unique conservation strategies for the species or habitat concerned, to encourage spread and promote population numbers.

Species or habitats identified as priorities under the UK Biodiversity Action Plan receive some status in the planning process through their identification as Species/Habitats of Principal Importance in England and Wales, under the Natural Environment and Rural Communities (NERC) Act 2006 (as amended).

Current planning guidance in England, the National Planning Policy Framework, does not specifically refer to Species or Habitats of Principal Importance, though it includes guidance for conservation of biodiversity in general. Supplementary guidance is available online at <http://planningguidance.planningportal.gov.uk/blog/guidance/> and

this guidance indicates that it is '*useful to consider*' the potential effects of a development on the habitats or species on the Natural Environment and Rural Communities Act 2006 section 41 list.

Current planning guidance in Wales, TAN 5 (2009) states that when making planning decisions, local authorities should "protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans".

APPENDIX B: ECOLOGICAL EVALUATION CRITERIA

It is important to appreciate that the level of protection given to a particular species or habitat through national or international legislation does not necessarily relate to the evaluated level of importance of that receptor to nature conservation. Whilst species may be widespread or common nationally, but of scarce occurrence in a particular county (for example, it might be at the limit of its geographical range), a species may also be considered to be rare nationally or internationally but be abundant within particular areas.

The Ratcliffe Criteria (Ratcliffe, 1977) provide a long established and widely accepted method of determining the nature conservation value of a particular site and have been used to aid the evaluation of the habitats associated with the Scheme. The attributes of the Ratcliffe Criteria are described below.

Ratcliffe Criteria for Nature Conservation Evaluation	
Criteria	Description
Size	Large, continuous areas of habitat are considered to be of greater importance than small or fragmented areas.
Diversity	Species and habitat diversity, including variations in topography and wetness, increase the wildlife value.
Naturalness	This reflects man's intervention or management of the habitat. Most habitats of this survey are semi-natural. Naturalness indicates the amount of modification of the land by man. Generally a less modified area results in an increase in the nature conservation value.
Rarity	The scarceness of a habitat, and the presence of rare/uncommon species, relates to its importance and priority for nature conservation. Rarity is related to the frequency of occurrence at national or county level.
Fragility	Fragile habitats are those where changes due to man's intervention, environmental factors or natural succession can directly threaten it. Scrub invasion, agricultural improvement, fire and changes in hydrological regime are the most common threats.
Typicalness	This relates to the quality of the habitat in terms of how good an example it is of a recognised type.
Position in an ecological/geographical unit	The relationship of a site to adjacent areas of nature conservation value. It is important to recognise the important and characteristic formations, communities and species of a district.
Recorded history	The extent to which a site has been used for scientific study and research is a factor of some importance.
Potential wildlife value	The likely quality of the habitat for birds, mammals, reptiles, amphibians and invertebrates if it is managed for wildlife. If appropriate habitat management is undertaken, it is possible for an increase in the diversity and nature conservation value of an area.
Intrinsic appeal	The knowledge of the distribution and numbers of popular groups of species such as birds, is greater than for obscure groups. Similarly, colourful wild flowers and rare orchids arouse more enthusiasm than liverworts. It is pragmatic to give more weight to some groups than to others.
Criteria are based on Ratcliffe, D.A. (1977). A Nature Conservation Review, Cambridge University Press	

Following the CIEEM Guidelines for Ecological Impact Assessment in the UK, when determining the biodiversity value of natural features found on or in proximity to the site the following characteristics will be considered:

- Animal or plant species which are rare or uncommon, either internationally, nationally or more locally;
- Endemic or locally distinct sub-populations of a species;
- Habitat diversity, connectivity and/ or other synergistic associations (e.g. networks of hedges);
- Priority Biodiversity Action Plan (BAP) habitat or species;
- Notably large populations or concentrations of animals considered uncommon or threatened in a wider context; plant communities that are considered to be typical of valued natural/ semi-natural vegetation types;
- Species at the edge of their range; and
- Species-rich assemblages of plants or animals.

The criteria described by Ratcliffe and CIEEM will then be used to ascribe a value to each receptor according to its value in a geographic context. This is described in the table overleaf.

Level of Value	Ecological Features
International	A habitat or species cited as a reason for the designation or proposed designation of a World Heritage Site, Biosphere Reserve, Biogenetic Reserve, Ramsar Site, Special Protection Area (SPA) or Special Area of Conservation (SAC). A large extent of habitat that is listed as a Priority Habitat Type in Annex 1 of the EC Habitats Directive in good condition with typical species diversity. A large and viable population of a regularly occurring species that is rare within an international context.
National	A habitat or species cited as a reason for the designation or proposed designation of a National Nature Reserve (NNR), Marine Nature Reserve (MNR), National Park, Site of Special Scientific Interest (SSSI) or Area of Special Scientific Interest (ASSI). Any area of habitat listed as a Priority Habitat Type in Annex 1 of the EC Habitats Directive that has potential to support typical species diversity. A large extent of habitat listed as a Priority Habitat in the UK BAP in good condition that supports an abundance of typical species. A large and viable population of a regularly occurring species that is scarce within an international context. A very large and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP. A large and viable population of a regularly occurring rare species that occurs in 15 or fewer 10km squares of the National Grid (e.g. a species that is listed in UK Red Data Books). A bird species with a British breeding population of <1,000 pairs.
Regional	A large extent of habitat listed as a Priority Habitat in the UK BAP that supports typical species diversity and is in good condition. A large and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP. A large and viable population of a regularly occurring plant species that is known to occur in 16 to 100 10km squares of National Grid (Stewart, Preston and Pearman 1994). A large and viable population of a regularly occurring insect species (Nationally Notable categories Na and Nb) that is known to occur in 16 to 100 10km squares of the National Grid [Ball, 1986]. A bird species with a British breeding population of 1,000 to 10,000 pairs.
County	A habitat or species cited as a reason for the designation or proposed designation of a Local Site (known locally as a County Wildlife Site (CWS), Site of Importance for Nature Conservation (SINC), Ecology Database Site (EDS) etc.), a Local Nature Reserve (LNR), a Nature Reserve (owned or managed by: The Wildlife Trusts, The Woodland Trust or equivalent body etc) or an Ancient Woodland. A habitat listed as a Priority Habitat in the UK BAP which is large in extent and supports typical species diversity. A medium and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP. A viable population of a regularly occurring species listed in a County Red Data Book, County Flora or found in less than 10% of 1km squares of the National Grid within the count. A small population of a plant species that is known to occur in 16 to 100 10km squares of National Grid. A small population of an insect species (Nationally Notable categories Na and Nb) that is known to occur in 16 to 100 10km squares of the National Grid. A bird species with a British breeding population of 10,000 to 100,000 pair
District	A habitat or species cited as a reason for the designation or proposed designation of a Local Site (known locally as a Local Wildlife Site (LWS), Site of Importance for Nature Conservation (SINC), Ecology Database Site (EDS) etc.), a Local Nature Reserve (LNR), a Nature Reserve (owned or managed by: The Wildlife Trusts, The Woodland Trust or equivalent body etc) or an Ancient Woodland. A habitat listed as a Priority Habitat in the UK BAP which is small in extent, supports typical species diversity or is in an unfavourable condition. A small and viable population of a species that is listed in the UK BAP or LBAP. A bird species with a British breeding population of 100,000 to 500,000 pairs.
Local	A habitat or species cited as a reason for the designation or proposed designation of a site which is officially listed e.g. on a Parish Register. A semi-natural habitat that is listed in the UK BAP or LBAP, which is either small in extent and/or is in an unfavourable condition. A species which occurs occasionally that is listed in the UK BAP or LBAP. A bird species with a British breeding population of >500,000 pairs.
Site	An artificial habitat or habitat that has readily established e.g. amenity grassland. A species which is common and not listed on the UK BAP or LBAP e.g. Badger.
Negligible	A habitat or species common within the Application Site, offering little benefit to British wildlife and biodiversity.

APPENDIX C: PHOTOGRAPHS OF SITE FEATURES



Photograph 1: Poor Semi-Improved Grassland with Factory Buildings and Woodland in Background



Photograph 2: Rubble, Soil and Tire Piles in South of Site with Encroaching Ruderals and Scrub



Photograph 3: Small Area of Standing Water in South West of Site



Photograph 4: Woodland on Western Boundary of Site on Steep Valley

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