



Land at Wrexham Road, Abermorddu

Further Ecological Assessment

Bat Activity and Great Crested Newt

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1 Introduction

1.1 Background

Kingdom Ecology have carried out further ecological surveys of an area of agricultural land located on the western edge of the village of Abermorddu near Wrexham. The further surveys have been completed to build upon the findings of an initial Preliminary Ecological Appraisal carried out at the site in January 2016.

Further surveys have comprised of a presence/absence survey of a pond located within 500m of the site using egg search, torch, bottle trap and eDNA techniques plus a suite of bat activity surveys.

Further field surveys have been carried out from April to July 2016. Surveys were carried out by Richard Roe (BSc, MSc, MIEEM, CEnv). Richard has extensive experience of undertaking habitat and protected species surveys as a professional ecological consultant with over twelve years experience. Richard is also a licensed great crested newt and bat worker.

1.2 Purpose of Report

This report provides and outlines the findings of the additional great crested newt and bat activity surveys carried out at the site between April and July 2016.

The report evaluates the conservation importance of identified species assemblages, identifies habitat features within the site which may be of importance to the species concerned and goes on to make recommendations for further works, mitigation and ecological enhancement measures where relevant.

1.3 Study Area

The study area is located adjacent to Wrexham Road on the western edge of the village of Abermorddu, near Wrexham, LL12 9DG (Ordnance Survey Grid SJ 308568). The site measures approximately 3.5ha in area.

Wrexham Road runs along the eastern boundary of the site. The playing fields of Abermorddu CP School are located immediately to the south of the site. Further agricultural land lies to the north and west of the site. A small unnamed brook flows along part of the site's western boundary and passes through the site.

The site largely comprises of two improved pasture fields with associated boundary features. The site slopes down from the west towards Wrexham Road on the site's eastern boundary. The site is managed as grazed pastureland but is also used regularly by local dog walkers.

Wider habitats comprise of the village of Abermorddu and further pasture land. The River Alyn is located approximately 300m to the east of the study site. The site location is shown on Figure 1 in the Appendix.

Development proposals are to build new housing at the site.

1.4 Evaluation Methodology

The results of the field surveys are used to identify ecological resources that may be of relevance to the proposals. The CIEEM *Guidelines for Ecological Impact Assessment* (CIEEM, 2006) sets out the recommended approach for valuing ecological resources, and for assessing the effects of proposed activities on them. It suggests that three types of value can be attributed to ecological resources - biodiversity value, community/social value and economic value, and that these should, as far as possible, be considered separately. CIEEM (2006) also advises that legal protection should be considered separately from value, and that the value of an ecological or nature conservation resource should be determined within a defined geographical context; it recommends that the following frame of reference be used:

- International
- UK
- National
- Regional
- County or Metropolitan
- District (or Unitary Authority, City or Borough)
- Local or Parish
- Within zone of influence only (this may be the project site or a larger area)

Species may be evaluated by reference to their rarity and status in the national or local context. In addition to protected species, rare species, as defined in the Red Data Books/Red Lists/Scarce species lists and in the national and local Biodiversity Action Plans, are recognised to hold value.

1.5 Protected Species Legislation

1.5.1 Bats

All British bat species are fully protected under the Wildlife and Countryside Act 1981 (as amended) and through their inclusion in Schedule II of the Habitats Regulations 2010 which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (“EC Habitats Directive”) which defines European protected species of animals.

British bats species are afforded further protection by the Countryside and Rights of Way Act 2000; and the Natural Environment and Rural Communities Act 2006.

Taken together, this legislation makes it an offence to:

- Intentionally or deliberately kill, injure or capture bats.
- Deliberately disturb bats, whether at roost or not.
- Damage, destroy or obstruct access to bat roosts.
- Possess or transport bats, unless acquired legally.
- Sell, barter or exchange bats.

A bat roost is interpreted as “any structure or place, which any wild bat uses for shelter or protection.” (Bat Conservation Trust 2012¹). A bat roost is protected whether or not bats are present at the time.

All species of British bat are considered a European Protected Species (EPS). The Conservation of Habitat and Species Regulations (2010) provide derogation against certain offences which could potentially affect an EPS through the EPS Licensing system.

¹ Bat Conservation Trust (2012) ‘Bat Surveys: Good Practice Guidelines 2nd Edition’

1.5.2 Great Crested Newt

The great crested newt (*Triturus cristatus*) receives full protection under the Wildlife and Countryside Act 1981 (as amended) and through their inclusion in Schedule II of the Habitats Regulations 2010. This legislation makes it an offence to:

- intentionally kill, injure or take a great crested newt;
- disturb a great crested newt;
- intentionally or recklessly damage, destroy, obstruct access to a breeding site or resting place of a great crested newt;
- sell, offer for sale, possess or transport a great crested newt for the purpose of sale.

The great crested newt is listed as a priority species within the UK Biodiversity Action Plan and under the NERC Act 2006.

2 Field Survey Methods

2.1 Survey Aims and Objectives

A Preliminary Ecological Appraisal of the site completed in January 2016 had identified the site as potentially being of value to great crested newt and bats. Consequently further surveys were completed during the 2016 field season to further assess these specific ecological receptors.

The great crested newt assessment comprised of a presence/absence survey of a pond located to the west of the site.

The bat activity surveys comprised of three walked activity transects completed mid-April, mid-May and early-July 2016. Survey aimed to identify and evaluate bat assemblages present and to assess and evaluate existing habitats in terms of their importance to local bat populations.

2.2 Great Crested Newt

2.2.1 Presence/absence Survey

A single pond is located within 500m of the study site. The pond is located approximately 50m to the west of the site in an area of pasture (National Grid Reference SJ 306 566). The pond location is shown on Figure 1 in the Appendix.

The pond was visited during the Extended Phase 1 Habitat Survey completed in January 2016 and was found to support suitable great crested newt breeding habitat. Furthermore biological records provided by COFNOD included a record of a great crested newt identified adjacent to this pond. Consequently further surveys were carried out in order to fully evaluate the pond and any great crested newt population present.

The pond was assessed using a variety of survey techniques comprising of 2 x site visits to carry out egg searches, torch counts and bottle trapping exercises followed by an eDNA survey.

The two torch and bottle trapping surveys recorded dense populations of stickleback within the pond and no evidence of great crested newt.

It was therefore considered appropriate to carry out a further eDNA survey in order to categorically confirm great crested newt presence or absence.

2.2.2 Initial Great Crested Newt Surveys

The egg searches, torch counts and bottle trapping surveys followed standard techniques as described within English Nature's 'Great Crested Newt Mitigation Guidelines' (English Nature 2001²).

Surveys were undertaken on the 17th and 20th April 2016 under suitable weather conditions (weather recorded at 9°C and 10°C respectively).

2.2.3 Further eDNA Surveys

The pond was further assessed for great crested newt presence or absence using eDNA sampling techniques. This method requires the collection of water samples which are sent to a laboratory for analysis.

This technique aims to detect DNA that is present in the environment in which an animal lives. Great crested newt DNA can enter ponds via their urine, faeces, skin cells etc. Natural Resources Wales accepts eDNA test results as evidence of presence or absence of great crested newt.

The survey was undertaken on 4th May 2016 by Richard Roe, a licensed great crested newt worker.

The survey was carried out following the protocol recommended by Natural Resources Wales³. In summary, this involved taking 20 water samples from around the waterbody's margins using a sample kit provided by Surescreen Scientifics. The location of sub-samples was spaced evenly around the waterbody's margins and targeted areas where there is vegetation suitable for use as egg laying material but avoiding areas less than 50 - 100mm deep. Before each sample was taken, the water column was mixed gently to maximise the chances of detecting GCN eDNA. Once all the samples had been collected, they were vigorously shaken for ten seconds in a whirl bag to ensure any eDNA was mixed across the whole water sample. A pipette was then used to add water samples to sterile tubes containing ethanol to preserve any eDNA present. Each tube was then mixed for a further ten seconds to prevent eDNA degradation. Preserved samples were then stored at a cool ambient temperature before being returned to Surescreen Scientifics on the 4th May 2016 for analysis.

² English Nature (2001) 'Great Crested Newt Mitigation Guidelines', English Nature, Peterborough.

³ Biggs J et al (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford

2.3 Bats Activity Transects

The survey objectives were to identify and evaluate bat foraging and commuting habitat at the site and to identify and evaluate bat species assemblages present.

Surveys were based upon recommendations provided in the Bat Conservation Trust's *Bat Surveys: Good Practice Guidelines* 3rd Edition (BCT 2016)⁴.

2.3.1 Methodology

Bat activity transect surveys were targeted at identifying the type and intensity of bat activity, both spatially and temporally, as well as the bat species present. The survey also aimed to assess the relative abundance of species present and the importance of different habitat features/areas.

Surveys were carried out along a pre-determined transect route, devised to encompass a wide range of habitats within the assessment area including grassland, wet woodland, scrub, a watercourse, hedgerows and mature trees.

Transects were interspaced by six 'listening station' stops or 'point counts', where the surveyor would pause for four minutes to record levels of bat activity, including the number and species of bat, number of bat passes (discrete bursts of echolocation) of each species, and activity types i.e. commuting, foraging and/or social calling. An average of the number of the number of bat passes at each point count location was taken for the entire survey period to produce an index of activity. Where constant bat activity was recorded at a point count location, 20 bat passes were attributed. The second site visit recorded constant noctule bat foraging activity over the site. The noctule activity counts were not used to calculate the overall bat activity index calculation for each point count as they would have resulted in a bias of the results. The bat activity index was scored as follows:

- 0.1-3 passes- Low bat activity
- 3.1-7 passes- Moderate bat activity
- 7.1-12 passes- High bat activity
- 12.1-20 passes- Very high bat activity

⁴ Bat Conservation Trust (2016) Bat surveys – Good Practice Guidelines 3rd Edition. Bat Conservation Trust, London.

Information on incidental bat activity and species encountered were also target noted when walking between point counts, including direction of bat travel and bat use of features in the landscape.

Notes on weather conditions and survey times were also recorded. Surveys were undertaken during suitable weather conditions i.e. >8°C with minimal rainfall and wind.

Surveys were carried out using time expansion (Pettersen D240x) and Anabat Walkabout bat detectors combined with an Anabat Express frequency division bat detector to record calls in real time in a zero crossing format to permit further call analysis with AnalookW software.

Three transects were walked in total on the 13th April, 17th May and the 4th July 2016.

The transect surveys commenced within 10 minutes of sunset and ended approximately two hours after thus coinciding with the peak periods of bat activity.

The full transect route was walked at least once during each field visit. Where safe to do so, all or parts of the transect route were walked a second time allowing sampling of bat activity both immediately following sunset and also later in the same evening.

A second full circuit of the transect route could not be safely completed during the 1st and 2nd site visits owing to the presence of skittish bullocks within a field located at the southern half of the site. It was considered too dangerous to survey close to the bullocks once full darkness had fallen.

This meant that three of the twelve point counts were omitted from the first survey and one of the twelve point counts was omitted from the second survey. By the third survey visit the bullocks had been moved and so a full two circuits could be completed.

In spite of this, it is considered that an appropriate level of assessment has been undertaken to achieve the survey objectives with a total of 5 and ½ circuits of the transect route assessed during the full survey period.

Activity transects were carried out by Richard Roe (BSc, MSc, MCIEEM, CEnv). Richard has over fourteen years experience as a professional bat consultant and is a licensed bat worker.

2.3.2 Evaluation of Bat Habitats

Using a combination of the activity survey results and desk study results from the Preliminary Ecological Appraisal, the site was assessed in terms of its value as foraging and commuting habitat for bats.

The process for determining this evaluation is based upon a scoring system presented at the Mammal Society/CIEEM *Advances in Ecological Impact Assessment for Mammals Symposium* 2007 (Wray

et al. unpublished). This scoring system assesses the following factors when determining the value of a site for bats:-

- Rarity of species present
- Numbers of bats of each species encountered
- Presence of roosts nearby
- Landscape characteristics

Each of these factors is examined and allocated a 'point score'. The points are then totalled to produce a value for the site based upon the CIEEM *Guidelines for Ecological Impact Assessment* geographical frames of reference as described in Section 1.4 and shown in Table 1 below.

Table 1 - Bat habitat evaluation - assessment score in relation to ecological evaluation category

Score	Evaluation Category
0-10	Site only
11-20	Locally important
21-30	Important at District Level
31-40	Important at County Level
41-50	Regionally important
>50	Nationally/internationally important

Each individual factor is determined and scored as follows:-

Rarity of Species

The rarity of each species encountered on site is determined using the JNCC's UK Mammals: Species *Status and Population Trends* (Battersby 2005⁵). This document provides an estimate of population number, rarity and conservation status in Wales and the rest of the UK.

- Common species (population over 100,000) include: common pipistrelle, soprano pipistrelle, brown long-eared, Natterer's and Daubenton's bat.

⁵ Battersby, J. (Ed) & Tracking Mammals Partnership. 2005. *UK Mammals: Species Status and Population Trends. First Report by the Tracking Mammals Partnership*. JNCC/Tracking Mammals Partnership, Peterborough.

- Rarer species (population between 10,000–100,000) include; lesser horseshoe, whiskered, Brandt's, Leisler's and noctule bat
- Rarest species (population less than 10,000) include: Nathusius' pipistrelle, greater horseshoe, barbastelle, Bechstein's and serotine bat.

Scores are attributed as follows:

- Common species – 2 points
- Rarer species – 5 points
- Rarest – 20 points

The presence of bat species at the site is determined from the evening activity surveys.

Number of bats encountered

Across the three activity surveys, the highest numbers of bats recorded is used to determine the points score for the 'number of bats encountered'.

- Individual bats – 2 points
- Small numbers – 5 points
- Moderate numbers – 10 points
- Large numbers – 20 points

The number of bats present at the site is determined through the evening activity surveys.

Proximity of roosts/potential roosts

The score for the proximity of actual or potential roosts is determined as follows:-

- No roosts or suitable roosting habitat – 1 point
- Small number of roosts– 3 points
- Moderate number of roosts/unknown number of roosts- 4 points
- Large number of roosts or close to SSSI for species- 5 points
- Close to SAC for species- 20 points

Habitat Characteristics

Habitat at the study site is assessed and scored with regards to suitability for foraging or commuting bats. This assessment takes account of likely aerial insect densities, connectivity of habitats, diversity of habitats available and suitability of foraging habitat.

Where habitats do not fit in to the descriptions below, a score has been attributed based upon professional judgement. Scores are calculated as follows:-

- Limited suitable habitat e.g. industrial landscape or new housing estate with no established planting - 1 point
- Low value suitable habitat e.g. suburban or intensive agricultural landscape - 2 points
- Moderate value suitable habitat e.g. isolated patches of woodland within less intensive agricultural landscape- 3 points
- High value suitable habitat e.g. mixed agricultural landscape with small patches of woodland - 4 points
- Very high value suitable habitat e.g. complex mosaic of woodland pasture and wetland habitats - 5 points

3 Results

3.1 Great Crested Newt

3.1.1 Pond description

A single pond is located within 500m of the study site. The pond is located approximately 50m to the west of the site in an area of pasture (National Grid Reference SJ 306 566).

The pond itself is considered to support good suitability great crested newt habitat. It is large and partially shaded, with a good coverage of suitable great crested newt egg laying plants (floating sweet-grass, fool's water-cress and Canadian pondweed). However the pond is relatively isolated with no other accessible ponds in the locality.

The pond achieved a HSI score of 0.63 and so is considered to be of 'average' suitability. This relatively low score is attributable to the pond's isolated location in the landscape. The pond is shown in Photograph 4 in the Appendix.

3.1.2 Presence/absence Surveys

Egg search, torch counts and bottle trapping surveys were undertaken on the 17th and 20th April 2016 under suitable weather conditions (weather recorded at 9°C and 10°C respectively).

Torch survey conditions within the pond were considered to be suitable with low-moderate levels of water turbidity and plenty of open areas of water unobscured by vegetation.

The surveys recorded breeding toads (approximately 50 recorded during torch counts) and low numbers of palmate and smooth newts. No great crested newt were recorded.

The surveys recorded dense shoals of stickleback within the pond. Fishing tackle and fishing floats were observed near the pond and it is likely that larger coarse fish may also be present

3.1.3 eDNA Survey

A third field visit was made to the pond on the 4th May 2016 and an eDNA survey was carried out. Water samples from the pond were collected and these were analysed for great crested newt eDNA. The laboratory at Surescreen Scientifics returned a negative result for great crested newt eDNA.

Taking into account the field survey into account, it is considered very unlikely that great crested newt are present within the pond or the proposed development site.

3.2 Bat Habitat Assessment

3.2.1 Introduction

The bat habitat assessment used the findings of the activity surveys combined with the initial Phase 1 Habitat Survey and Desk study to produce an overall evaluation of habitats at the site through an assessment of the following factors:

- Rarity of species present
- Bat activity levels
- Presence of roosts nearby
- Landscape characteristics

Bat activity surveys were carried out on the 13th April, 17th May and 4th July 2016 under suitable weather conditions. Dates, weather conditions and sunset times are given in Table 3 in the Appendix.

Results of activity surveys are shown on Figure 2 in the Appendix. The figure shows the walked transect route, Point Count locations (with activity index levels) and Target Note locations overlaid on top of the Phase 1 Habitat Survey results. Summary data of the Target Note descriptions and Point Counts results are given in Tables 4 and 5 in the Appendix. The key findings of the surveys are summarised below.

3.2.2 Activity Survey Results

The activity surveys identified the site as supporting low-moderate levels of bat activity with species recorded foraging at the site including common pipistrelle, soprano pipistrelle, noctule and whiskered bat.

Common pipistrelle and soprano pipistrelle are considered to be a regionally and nationally common species whilst whiskered and noctule bats are considered to be rarer species (See Table 1 in Section 2.3.1).

Across the three surveys, small numbers of bats were recorded foraging at the site. Foraging activity was generally concentrated around the site's western and northern boundaries with bats generally feeding along the field edge where shelter offered by the woodland and scrub vegetation is likely to support high levels of aerial invertebrates.

Relatively low levels of bat activity were recorded along the site's eastern and southern boundaries and along the small vegetated watercourse that flows through the centre of the site (Point Count 2 on Figure 2).

Wrexham Road, along the site's eastern boundary supports less tall vegetation and is also brightly illuminated of an evening by street lighting.

Small numbers of common and soprano pipistrelle bat were recorded foraging at the site during all three activity surveys. Individual whiskered bat were recorded foraging along the western boundary of the site during the 2nd and 3rd survey visits. Noctule were only recorded

during the 2nd survey visit during which up to 3 individual noctule bats were recorded foraging over grassland habitats at the site at any one time with at least one noctule bat present throughout the activity survey period. This noctule bat foraging activity is likely to be attributable to bats exploiting a seasonal emergence of adult beetles from the pasture field.

The pasture land is not intensively farmed with relatively low densities of cattle and sheep recorded during field surveys. Consequently the pasture fields may support a local abundance of beetle larvae.

3.2.3 Habitat and Roost Assessment

No actual bat roosts were identified during initial walkover surveys of the proposed development site however trees were identified which offered bat roosting potential (See Section 4.5.1 of the Wrexham Road, Abermorddu, Preliminary Ecological Appraisal Report).

No bat roosts were identified within 500m of the study area during the desk study carried out as part of the original Preliminary Ecological Appraisal. However, it is considered likely that several bat roosts are present within the wider landscape within residential housing and mature trees within surrounding woodland blocks.

The site itself is considered to support habitat characteristics that are of 'high' value to bats with interlinking networks of hedgerows, scrub woodland blocks and scattered trees running around the site boundaries and through the centre of the site. The grassland habitats are not intensively farmed with relatively low densities of cattle and sheep recorded during field surveys. Photographs of habitats recorded are shown in Photographs 1-3 in the Appendix.

3.2.4 Habitat Evaluation

The value of the site has been assessed and scored following the methods described in section 2.3.1.

In summary the site was found to support rarer species of bats in low numbers with possible nearby roosts. The habitats at the site and surrounding the site are considered to be of high value for bats.

The assessment scored a total of **18 points** which equates to an assessment of '**local**' value for the site with regards to the CIEEM (2006) evaluation framework.

The assessment results and scores are given in Table 2 below.

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Table 2 - Site Results and Evaluation Score

Category	Results	Score
Species rarity?	Rarer species	5
Numbers of bats?	Low numbers	5
Nearby roosts?	Unknown/moderate	4
Landscape character?	High	4
Total Score		18

4 Summary and Recommendations

4.1 Great Crested Newt

4.1.1 Results Summary

Water samples from the only pond located within 500m of the site were collected and were analysed for great crested newt eDNA. The laboratory at Surescreen Scientifics returned a negative result for great crested newt eDNA.

Two sets of surveys comprising of bottle, trapping, torch counting and egg searches were also carried out and did not identify any great crested newt within the pond.

Consequently it is considered highly unlikely that great crested newt are present at the proposed development site.

4.2 Bats

4.2.1 Results Summary

Bat activity transects have identified four species of bat at the site comprising of two common bat species (common pipistrelle and soprano pipistrelle bat) and two rarer bat species (noctule and whiskered bat). Bats have been identified in relatively low numbers.

The site is considered to support bat assemblages that are of 'local' value in terms of their conservation importance.

The bat survey has identified the western boundary and the northern boundary of the site to be of greatest value to local bat populations.

Grassland habitats at the site have also been found to provide a seasonally valuable foraging resource to local noctule bat populations. The field is likely to support a good source of beetle larvae which provides seasonal feeding opportunities to the bats when the beetle larvae metamorphose into winged adults.

4.3 Recommendations

Recommendations for bats as previously described in the Preliminary Ecological Appraisal still stand.

Recommendations are as follows:

4.3.1 Trees

Whilst no field signs indicative of roosting bats were found, field survey identified three trees which support suitable bat roosting features (See Preliminary Ecological Appraisal Report for tree locations).

If development of the site were to impact upon these trees (either through removal or due to impacts relating to artificial lighting), further

nocturnal bat surveys should be carried out to establish likely bat presence or absence and to determine the value of any bat roosts identified.

4.3.2 Bats and Lighting

A lighting designer will be appointed during the detailed design stage of the project. The lighting designer should consult the 'Bats and Lighting Research Project' (Stone 2013) which provides recommendations for limiting the negative effects of lighting on bats.

Where possible the use of artificial lighting should be avoided. Street lighting should be limited by restricting lighting to the central spine roads where possible with no new lighting proposed along any proposed side roads within 15m of the northern and western site boundaries. The lighting within the central spine roads and along the side roads should be designed to avoid light trespass into surrounding areas by the fitting of hoods and cowls.

Lighting proposals should aim to retain dark corridors along key bat foraging and commuting routes (in this case, the northern and western boundary features). The plan should also aim to limit any light trespass from the development into the surrounding landscape.

The front and rear gardens of properties located adjacent to site boundaries should be lit with low intensity porch lights as opposed to with security flood lights. The porch lights should be fitted with screens to limit further light spill onto boundary features.

Lighting sources should be 'bat friendly' using LEDs or low wattage lamps.

4.3.3 Bat Boxes Scheme

It is recommended that a bat box scheme is produced for the site. The scheme should include the incorporation of at least 7 bat boxes which should be built into the south facing gable ends of new houses ideally adjoining the northern or western site boundary. Suitable models of bat box include the Habibat 003 or 005 which can be built into the brickwork of the new houses.

5 Appendix

Bat Activity Survey Results Tables

Table 3- Dates, sunset times and weather

Date	Sunset Time	Temp. (°C)	Rain	Wind
13/4/2016	20.11	9	Dry	Calm
17/5/16	21.08	15	Dry	Calm
4/7/16	21.41	17	Most dry, brief shower 22.17-22.25	Calm

Table 4- Target Note Results

Target Note	Description
1	Pond adjacent to site assessed during great crested newt torch count. Constant common and soprano pipistrelle bat activity recorded over pond with at least 4 bats present at any one time.
2	Constant common pipistrelle foraging activity recorded in corner of field (1 bat) during 1 st survey.
3	Up to 3 x Noctule recorded foraging over pasture at the site from 21.28 until end of survey during 2 nd (May) visit.
4	Whiskered bat recorded foraging around ash tree in hedgeline during third survey.

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Table 5- Point Count Results

Point Count	Habitat	Species	No. Passes- 13 th April		No. Passes- 17 th May		No. Passes- 4 th July		Average	Activity Index
			1st Circuit	2nd Circuit	1st Circuit	2nd Circuit	1st Circuit	2nd Circuit		
1	Hedge, pasture, bramble, roadside	P45, Noc	0	0	0	1**	0	0	0.16	Low
2	Pasture, scrub, mature trees, running water	Noc	0	n/a*	0	0**	0	0	0	Low
3	Pasture, hedge, mature trees,	P55, P45 Noc, whisk	0	n/a*	0	n/a*	3	5	2	Low
4	Pasture, woodland	P45, Whisk, Noc	20	n/a*	2**	4**	0	0	5.2	Moderate
5	Pasture, scrub, woodland	P45, Noc, whisk	0	20	0**	4**	0	2	4.33	Moderate
6	Pasture, scrub, mature trees, marsh	P45, P55, Noc	0	5	20**	5**	0	1	5.16	Moderate

P45- Common pipistrelle, P55- Soprano pipistrelle, Noc- Noctule bat, Whisk- whiskered bat

**- part of site not safe to survey owing to skittish herd of bullocks*

*** - Constant noctule bat activity recorded, not used for activity index as would bias results*

PHOTOGRAPHS

Photograph 1 - Pasture field at the Site



Photograph 2- Marshy Grassland at the Site



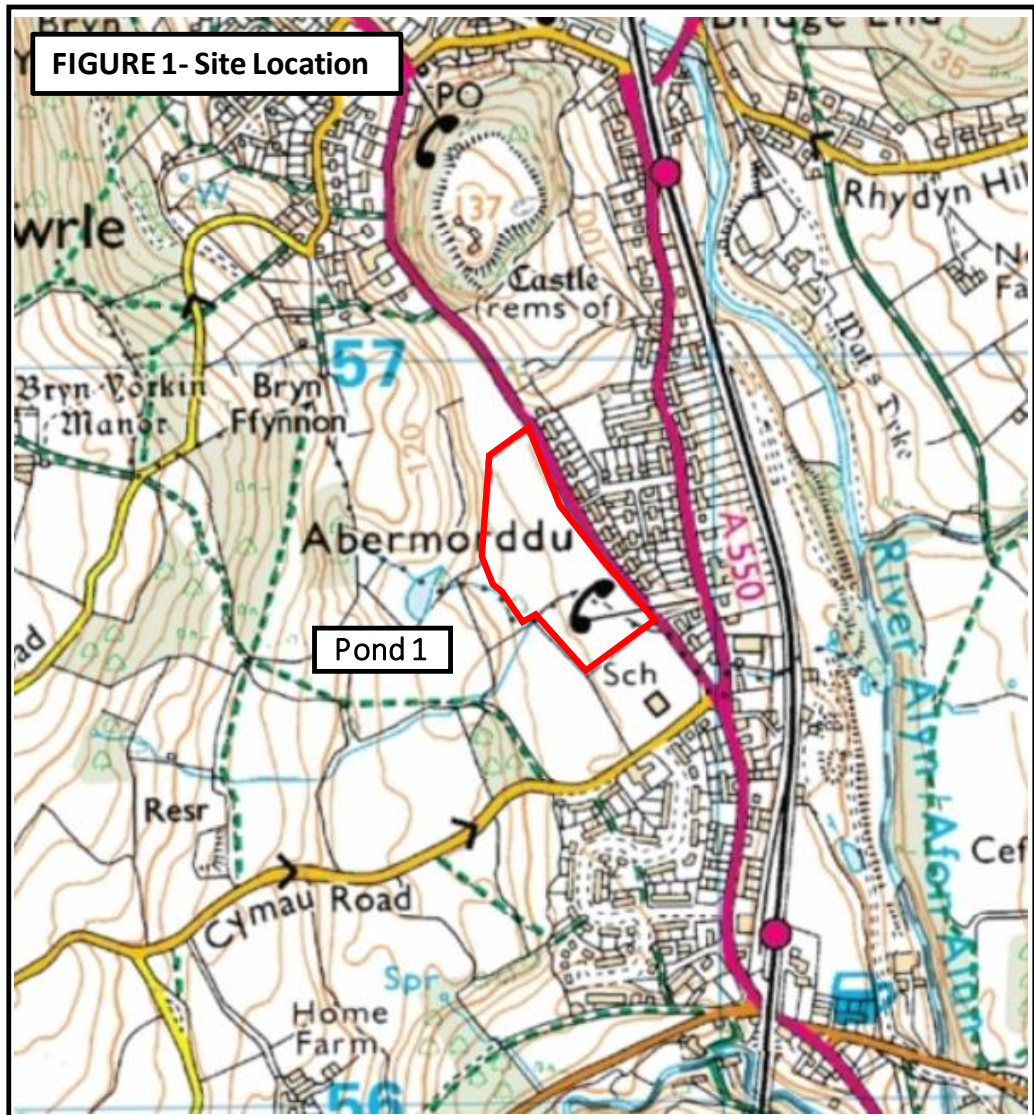
Photograph 3- Western Field boundary



Photograph 4- Pond 1



FIGURE 1- Site Location



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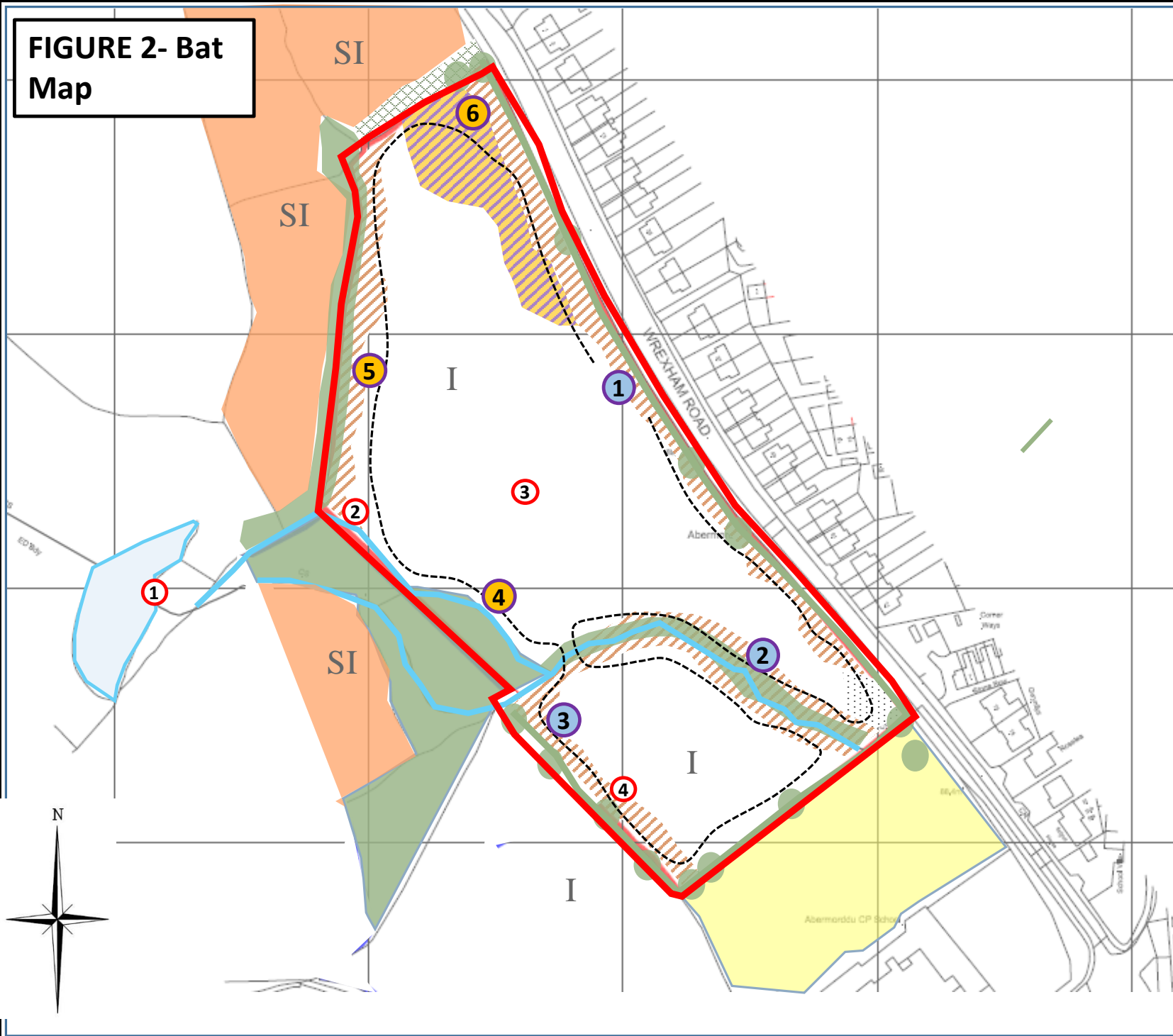
Ordnance Survey 100054686



Study Area



**FIGURE 2- Bat
Map**



KEY

Bat Activity Survey Key

- 1 Point Count- low activity
- 4 Point Count- moderate activity
- 1 Bat Target Note
- Transect route

Habitat Key

- I Improved grassland
- Marshy grassland
- Tall herb
- Dense scrub
- SI Semi-improved grassland
- Broadleaved woodland
- Water course
- Species-poor hedge
- Tree
- Pond

