A BAT SURVEY OF CARLTON SCHOOL, BARNSLEY – Proposed Turbine Location



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A SUMMARY

E^3 Ecology Ltd was commissioned by Anthony Walker and Partners to undertake a bat survey of the location of two proposed wind turbines at the proposed new Carlton School site, Barnsley.

The proposed development comprises the construction of two 15kW turbines with a hub height of 25m.

Survey work was undertaken in May 2010 and comprised a daytime inspection of the location of the proposed turbines, the erection of remote bat monitoring equipment and a dusk and dawn transect survey of the area surrounding the proposed turbine locations.

Habitats on site are dominated by former arable fields, which now support coarse grassland species. Cronkhill Lane divides the site into two sections with the hedgerows bordering the lane lying within the site. No buildings are present on site. Species poor hedgerows and standard field trees form the site boundary with open agricultural fields outwith the site to the west. To the east of the site the Barnsley canal runs north-south and is designated as a Natural Heritage Site (NHS).

Overall habitats within the site are considered to be of low ecological value for bats, comprising former arable fields of limited value, however the hedgerow and tree line running along Cronkhill Lane provides potential foraging, commuting and roost locations for bats and links the Canal to the north to the residential areas to the south.

Known bat roosts are situated approximately 0.9km and 1.2km from the site, however no buildings are present within the site and grassland habitats provide only low quality foraging habitat. The adjacent Barnsley Canal is likely to form an important commuting route for bats in the local area.

Two mature trees situated along Cronkhill Lane are considered to have a moderate risk of supporting roosting bats, being in poor condition. These trees are to be retained but are within close proximity to the location of the proposed turbines.

The activity surveys recorded moderate levels of foraging and commuting activity along Cronkhill Lane, but limited activity elsewhere within the site. There was moderate numbers of foraging common pipistrelle along the Barnsley Canal to the northeast of the site with lower numbers of soprano pipistrelle bats. In addition, one of the mature trees was found to support a common pipistrelle day roost used by an individual bat. Remote monitoring with the Anabat recorded a similar pattern of activity to that found during the dusk and dawn surveys, with only small numbers of common and soprano pipistrelle bats flying along the hedgerow.

Overall it is considered that the site is used by small numbers foraging and commuting common pipistrelle bats and one of the mature trees within the site is used as a roost site by an individual common pipistrelle.

Potential impacts of the proposed development include:

- Causing disturbance to small numbers of common and soprano pipistrelle bats that use the hedgerow running through the site, adjacent to the proposed turbine location (option 1), as commuting and potentially foraging habitat.

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- Causing harm to small numbers of common and soprano pipistrelle bats that may fly into the turbines, once erected or which may suffer from barotrauma caused by the change in pressure associated with the turbine blades.

In order to address the above impacts, the following mitigation is recommended:

- Turbines could be moved to a distance of more than 50m from features that could be used by commuting or foraging bats such as hedgerows or tree lines. This would reduce the likelihood that bats would be flying in the vicinity around the turbines, reducing collision risk;
- Or the turbines could be placed on a timer such that during the spring, summer and autumn, when bats are active, the turbines are turned off in the evenings and over night in order to minimise the risk of causing harm to bats.

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B INTRODUCTION

E^3 Ecology Ltd was commissioned by Anthony Walker and Partners to undertake a bat survey of land proposed for the new Carlton School, Barnsley in order to assess the impacts of the erection of two proposed wind turbines on bats.

As bats are small nocturnal species that are highly mobile and as such it can be very hard to demonstrate that they are absent from a site, particularly given a limited number of visits during part of the year. As a result, assessment and development approaches are based on an informed risk assessment, and where appropriate a reasonable worst-case scenario, in order to ensure that bats are not recklessly harmed by the proposals. See Appendix 1 for further details of bat ecology, and Appendix 2 for details of the relevant legislation.

B1 Background to development

The site is located at grid reference SE 368103 south of Royston, Barnsley. The site as a whole is bordered by the B6132 to the west and the Barnsley Canal to the east. The residential area of Carlton is situated to the south and west. There are two potential turbine locations, option 1 positions the turbines adjacent to the hedgerow, on the northern side of Cronkhill Lane, while the second option has the turbines situated to the south of the lane, further from the hedgerow.

The location of the site, and habitats present within the surrounding area, are shown in Figures 1 and 2 (C4 & C5). Figure 3 illustrates the proposed plans.

B2 Details of the proposed works on site

It is proposed to erect two 15Kw turbines as part of the development at the new Carlton School. The turbines will form a separate planning application to the main school development, which already has planning permission and works have commenced.

C SURVEY AND SITE ASSESSMENT

C1 Consultation, pre-existing information on protected species at survey site

The National Atlas of bat distribution holds records of whiskered, Daubenton's, noctule, Leisler's, pipistrelle and brown long eared bats within this 10km square.[1]

Consultation with the local bat recorder provided records of known roosts approximately 0.3km (unidentified species), 0.9km (pipistrelle maternity) and 1.2km (Daubenton's bats) from the site. As a local resident he also mentioned the presence of winter flocks of Lapwing and Golden Plover within the proposed site.

Barnsley Canal, which borders the site to the east, is designated as a Natural Heritage Site (NHS) and Daubenton's bats are known to forage here. Carlton Marsh (LNR) is situated within 600m east of the site.

C2 Status of protected species in the local/regional area

See Appendix 2 for details of the relevant legislation regarding bats

Both soprano and common pipistrelle bats are relatively common in the north and there are previous records for both species in the local area. Soprano pipistrelles are

[1] Distribution Atlas of Bats in Britain and Ireland, Phil Richardson 2000, Bat Conservation Trust.

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somewhat less abundant and tend to be associated with water; common pipistrelles are more likely to be present in urban areas. The brown long-eared bat is locally common where there are good woodland habitats or tree cover, and is widespread throughout most of Europe and is the third most common species in Britain[2].

Daubenton's bats are widely distributed where suitable waterbodies are found, and National Bat Monitoring Programme suggests that populations are increasing.

Whiskered/Brandt's and Natterer's bats are less abundant, and tend to be associated with better quality rural habitats. Only a small number of Natterer's maternity roosts are known in the north east of England.

C3 Objective(s) of survey

The objective of the survey was to gain a detailed picture of the bat use of the site in order to provide sufficient information to inform the proposed development.

C4 Survey area

Figure 1, an OS plan, illustrates the site location and the broad foraging habitats present within the vicinity. The red circle illustrates the approximate location of the proposed turbines.

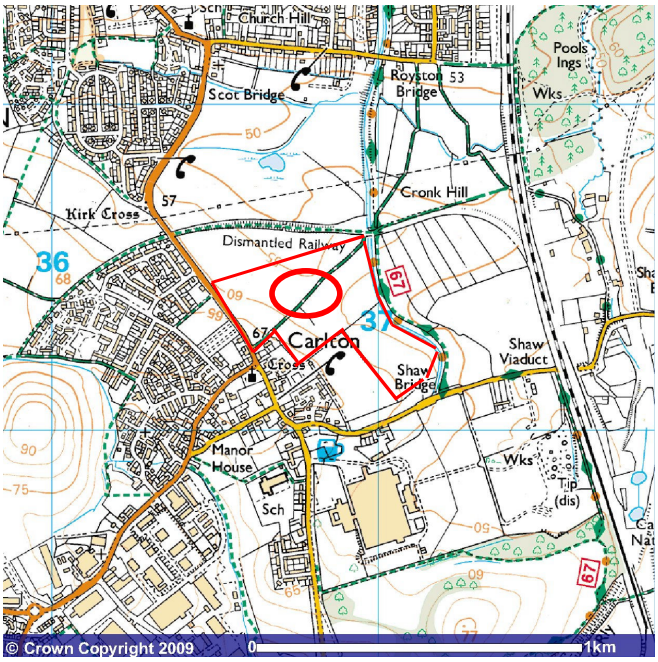


Figure 1 – Site Location
(Reproduced from the ordnance survey map with the permission of the controller of Her Majesty's stationery office. CJ Crown Copyright reserved. Licence number 100039392.)

[2] Swift, S.M. 1998. *Long-Eared Bats*. University Press, Cambridge

Figure 2 (C5) is an aerial photograph of the site illustrating habitats within a 500m radius.

Figures 4 and 5 illustrate the two options for the location of the turbines.

C5 Habitat description

The majority of the site comprises former arable fields with unmanaged coarse grassland. Barley, *Lolium perenne* perennial rye grass, *Arrhenatherum elatius* false oat grass, *Senecio vulgaris* groundsel, *Cirsium arvense* creeping thistle and *Cirsium vulgare* spear thistle, *Holcus lanatus* Yorkshire fog, *Senecio jacobaea* ragwort, *Epilobium montanum* broadleaved willow herb, *Festuca rubra* red fescue and *Tripleurospermum inodorum* mayweed.



A species poor hedgerow runs along the centre of the site form north to south, along a pathway and comprises *Crataegus monogyna* hawthorn, *Sambucus nigra* elder and *Fraxinus excelsior* ash, with an understorey of *Rubus fruticosus* agg bramble, *Urtica dioica* common nettle *Heracleum sphondylium* hogweed, *Deschampsia cespitosa* tufted hair-grass and *Hedera helix* ivy. *Quercus* sp. oak and *Acer pseudoplatanus* sycamore are present within the hedgerow towards the west. Two mature *F. excelsior* trees are present within the hedgerow.

Hedgerows are also present in the south of the site; they are species poor with occasional gaps. *C. monogyna*, *S. nigra* and *Ligustrum ovalifolium* privet are present.

Trees within the site include *A. pseudoplatanus* sycamore, *Salix* sp. willow, *F. excelsior* ash and *Quercus* sp. oak. Two mature *F. excelsior* trees, on the boundary with Cronkhill Lane, were recorded, during the site tree survey, as being of risk of supporting roosting bats being in a poor condition[3].

[3] A Whitehead Associates Ltd, 2009. Arboricultural Report, Carlton School Site. Report no. 5971 pp13

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Figure 2 – Aerial photograph centred on the site with a 500m radius illustrating the setting and the habitats it supports
(Reproduced under licence from Google Earth Pro.)

C5.1 Risk Assessment – Bats

	Risk of supporting roosting bats							
	Minimal		***Low***		***Medium***		***High***	
Setting and Habitats								
Habitats and cover within 200m	City Centre		Open, exposed arable, amenity grass or pasture		Hedges and trees linking site to wider countryside		Excellent cover with mature trees and/or good hedges	
Habitats within 1km	City Centre		Little tree cover, few hedges, arable dominated		Some semi-natural habitats, trees hedges etc		Good network of woods, wetland and hedges	
Potential roosts within 1km	City centre		Few potential roost sites		A number of suitable buildings in the local area		A large number of possible and proven roost sites	
Setting	Inner city		Urban with little green space		Build development with greenspace, wetland, trees		Rural Lowland with woodland and trees.	
Distance to water/marsh	>1km		500m-1000m		200m-500m		<200m	
Distance to woodland/scrub	>1km		500m-1000m		200m-500m		<200m	

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	Risk of supporting roosting bats							
	Minimal		***Low***		***Medium***		***High***	
Distance to species-rich grassland	>1km		500m-1000m		200m-500m		<200m	
Commuting routes	Isolated by development, major roads, large scale agriculture		No potential flyways linking site to wider countryside		Some potential commuting routes to and from site		Site is well connected to surrounding area with multiple flyways	

The site lies within an area of moderate quality habitat for bats where roosts have been recorded. The area is therefore considered to have a moderate to high risk of supporting bats.

C6 Field survey

C6.1 Methods – Bats

Dusk and dawn transect were made with direct observation being backed up by detection using an ultrasound bat-detector. In addition two remote Anabat devices were situated within the proposed development area in order to obtain data throughout the night.

Activity surveys recorded numbers of bats detected, feeding activity, flight paths, species as far as is practicable, and social calls. Bats were identified, as far as practicable, in flight using a bat detector and in certain cases by subsequent computer analysis of frequency division recordings.

In the text bats are identified as accurately as possible, within the constraints identified above. If the species name is given without qualification, the record was of good quality. If there is a degree of uncertainty this is indicated by a question mark, e.g. ?brown long-eared. If identification to species is not practicable then just the Genus or 'bats' is used.

C6.2 Timing

The survey was undertaken on the 27th/28th May 2010.

Activity surveys were undertaken on the following dates:

Activity Surveys			
Date	*Start Time*	*End Time*	*Time of Sunset/rise*
27.05.10	21.30	22.40	21.29
28.05.10	03.30	05.00	04.42

C6.3 Weather conditions

Date	*Temp.*	*Cloud Cover*	*Precipitation*	*Wind Conditions*
27.05.10	16.0	80	None	F1
28.05.10	7.1	80	None	F1

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C6.4 Personnel qualifications and experience

Survey work and reporting was undertaken by James Streets BSc MSc MIEEM and supervised by Dr. Tony Martin BSc PhD MLI MIEEM of E^3 Ecology Ltd. Details of experience and qualifications are available at www.e3ecology.co.uk.

Assistance with activity surveys was provided by Ela Shaw for E^3 Ecology Ltd.

C7 Results

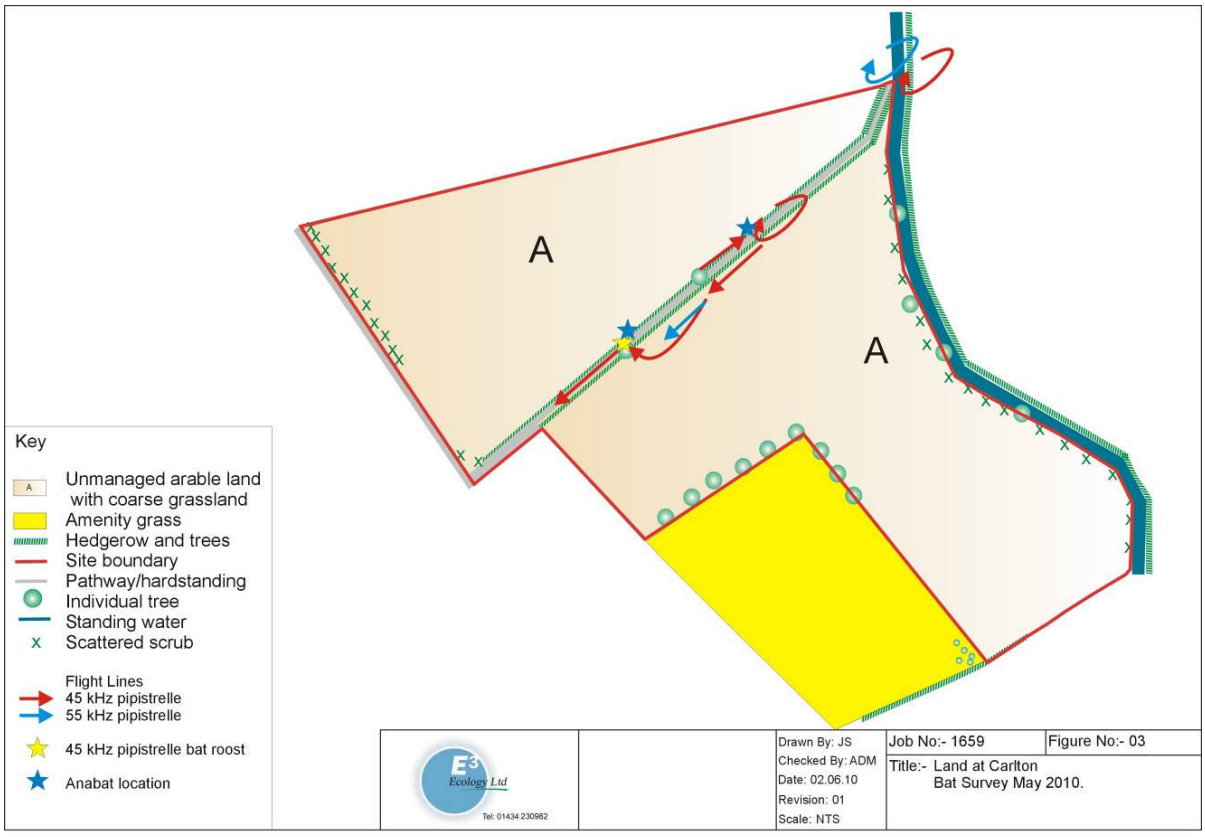
C7.1 Activity Survey

Overview of survey results
An overview of survey results including roost locations, key flight lines and access points is provided in figure 3 below with raw survey data provided within annex G1.

The dusk and dawn surveys recorded moderate levels of foraging and commuting activity along Cronkhill Lane, but limited activity elsewhere within the site. The Barnsley Canal to the northeast of the site provides good quality foraging opportunities supporting moderate numbers of foraging common pipistrelle and lower numbers of soprano pipistrelle bats. In addition, one of the mature trees was found to support a common pipistrelle day roost used by an individual bat. Remote monitoring with the Anabat recorded a similar pattern of activity to that found during the dusk and dawn surveys, with only small numbers of common and soprano pipistrelle bats flying along the hedgerow.

A summary of the survey results is shown below:

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C8 Interpretation and evaluation

C8.1 Presence/absence/density/abundance

From the survey results, it is considered that the proposed turbine locations and surrounding areas are used by a small number of common and soprano pipistrelle bats on occasion as foraging and commuting habitat, with one of the mature tree being used as an occasional day roost site by individual common pipistrelle bats.

C8.2 Population size class assessment

Given the level of activity recorded during the survey work undertaken, there is considered to be only a small population of common and soprano pipistrelles using the hedgerow along Cronkhill Lane as a foraging habitat and commuting route. The bats are likely to roost within the nearby residential area of Carlton and commute to the nearby canal to forage.

C8.3 Site status assessment

The following criteria have been used to assess the conservation status of the site:

	Species Status in the Region		
Value	**Common** *(Common pipistrelle)*	**Uncommon** *(Daubentons, Natterer's, Soprano pipistrelle, Noctule, Brown long eared, Whiskered)*	**Rare** *(Nathusius pipistrelle, Leisler's, Brandt's)*
Local	• Small numbers including individual hibernating bats but excluding maternity sites.	• Feeding perches • Individual bats	• Feeding perches
Parish	• Hibernation site for good numbers. • Small to moderate sized maternity roost. • Autumn swarming site used by small numbers.	• Small numbers excluding maternity sites.	• 1 to 4 bats, occasional roosts
District	• Large maternity sites.	• Small to moderate sized maternity roost. • Hibernation site • Autumn swarming site used by small numbers	• Small numbers, 5 plus, excluding maternity sites.
County		• Large maternity sites.	• Small to moderate sized maternity roost. • Hibernation site • Autumn swarming site used by small numbers
Regional			• Large maternity sites.
National	Sites meeting SSSI guidelines.		

Overall the proposed development site is considered to be of local value given that the only roost site recorded was that of an individual common pipistrelle, and that the area is only used by low numbers of common and soprano pipistrelle bats.

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C8.4 Constraints

There were not considered to be any constraints to the survey that would significantly alter the survey results. Temperatures were sub-optimal but bats were still flying during both the evening and morning surveys, with good numbers recorded foraging over the canal.

C9 Map(s) of survey area

Figures 1 and 2 (C4 andC5) illustrate the site location and broad habitats in the vicinity. Figure 4 and 5 (D) illustrate the proposed layout of the site while figure 3 (C7) illustrates the activity survey results.

D IMPACT ASSESSMENT

Background

Bat populations are most vulnerable to disturbance during June, July and August, when they are breeding as females need to feed on a regular basis to ensure the survival of their single offspring. The foraging resources required to support this level of feeding are generally associated with areas of water or woodland.

Proposals for the site are shown in figures 4 and 5 below:

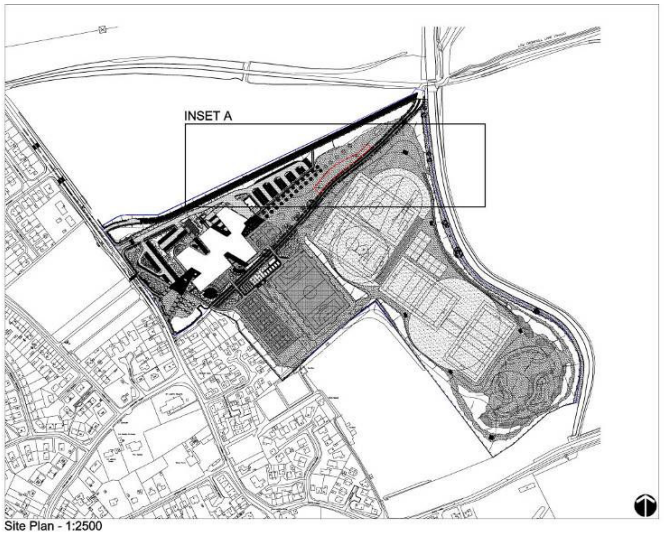
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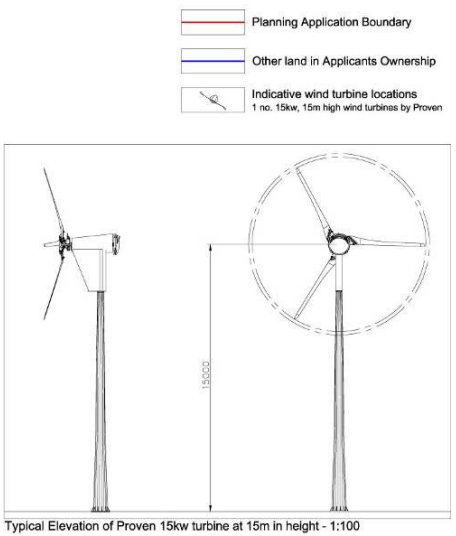
Existing Aerial View - NTS



Proposed Landscape Masterplan - NTS



Site Plan - 1:2500



Typical Elevation of Proven 15kw turbine at 15m in height - 1:100

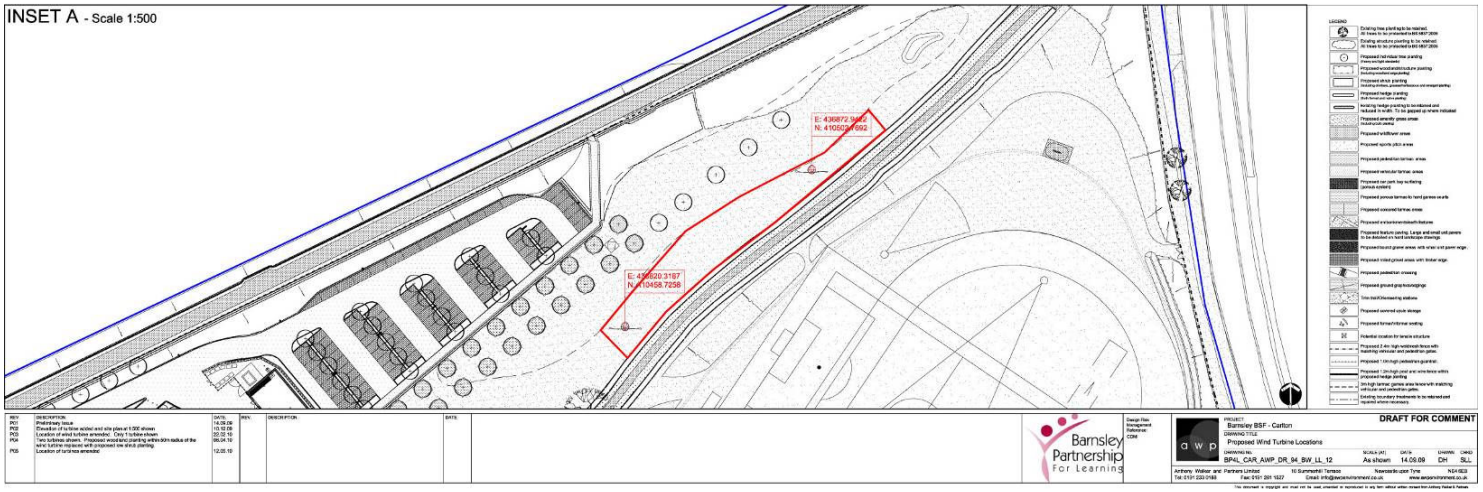


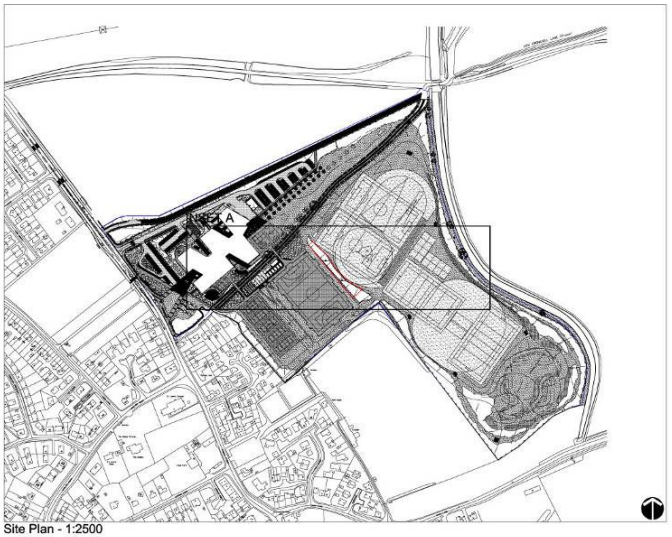
Figure 4- Turbine Location Option 1



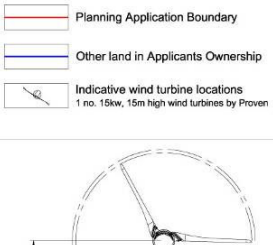
Existing Aerial View - NTS

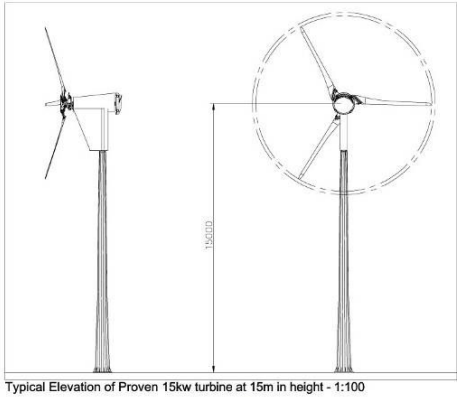


Proposed Landscape Masterplan - NTS



Site Plan - 1:2500





Typical Elevation of Proven 15kw turbine at 15m in height - 1:100

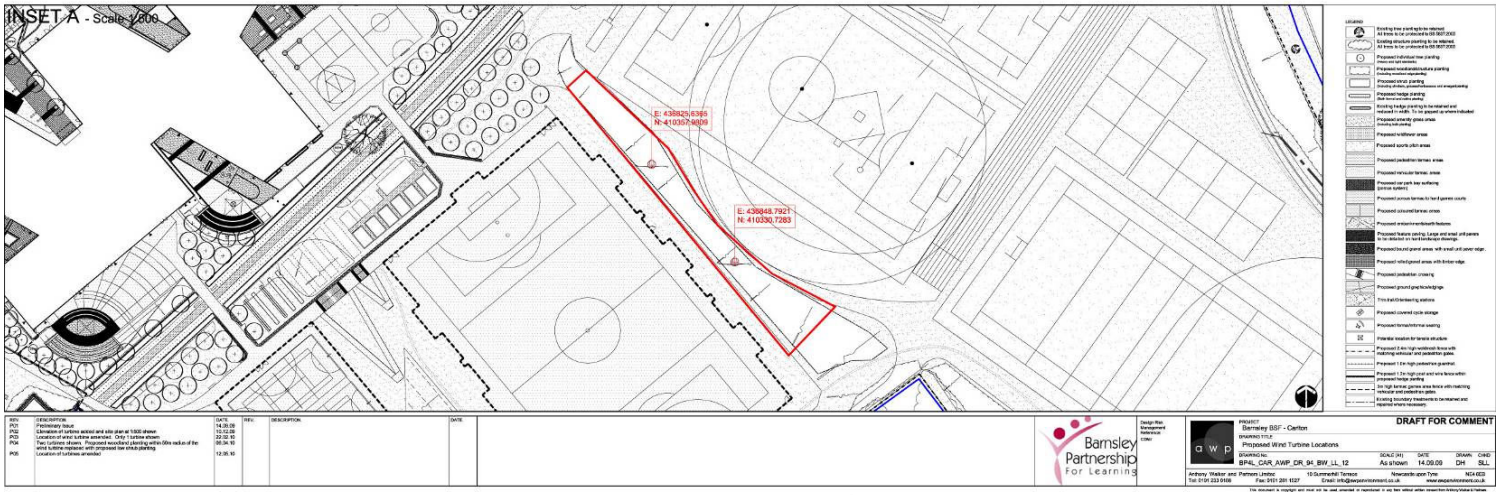


Figure 4- Turbine Location Option 2

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Overall option 1 will have the following impacts on bats:

- A moderate likelihood of causing harm to small numbers of common and soprano pipistrelle bats that use the hedgerow running through the site adjacent to the proposed turbine location as commuting and potentially foraging habitat as a result of striking the turbines or barotrauma.

Overall option 2 will have the following impacts on bats:

- A low likelihood of causing harm to small numbers of common and soprano pipistrelle bats that use the hedgerow running through the site adjacent to the proposed turbine location as commuting and potentially foraging habitat as a result of striking the turbines or barotrauma.

E MITIGATION AND COMPENSATION

E1 Mitigation strategy

Given the two options provided above, it is considered that option 2 would have a significantly lower impact on bats than option 1. The turbine locations in option 2 are further from the known bat commuting routes along Cronkhill Lane and are not associated with this feature. The turbine locations in option 1 are more closely associated with the hedgerow and are much closer to it. In addition the two turbines line the hedgerow rather than being perpendicular to it and are therefore at greater risk of causing harm to bats, which fly along this foraging habitat and commuting route.

In general,

- Turbines should be situated at least 50m from features which bats can use for roosting, commuting and foraging such as hedgerows, trees and waterbodies.
- Any planting to be undertaken within 50m of the turbines should be at a low level such that the distance between the turbine tips and the planting is minimised, to minimise the risk of bat strike.
- If this cannot be achieved, turbines should be switched off during the evening and night, at times during the year when bats are active, in order to minimise the impacts on these species.

APPENDIX 1: BAT ECOLOGY

Habitat and roost preferences

The types of building and trees that are more or less likely to support bat roosts include:

*Presence of **built structures** which appear to have a high probability of use by bats:-*

- *Properties older than 1939, with multiple roofs within 200m of woodland or water.*
- *Properties older than 1914 within 200m of woodland or water.*
- *Listed buildings or monuments.*
- *Traditional ranges of farm buildings.*

The risk of bat roosts being present will be higher where structures have:

- *Pre-20th Century construction.*
- *A lowland rural setting.*
- *Woodland, mature trees, species-rich grassland and/or water nearby.*
- *Large dimension roof timbers with cracks, joints and holes.*
- *Numerous crevices in stonework and structures.*
- *Uneven roof covering with gaps, though not too draughty.*
- *Hanging tiles or roof cladding, especially on south-facing walls.*
- *Roof warmed by the sun.*
- *Disused or little used; largely undisturbed.*

The risk of bat roosts being present will be lower where structures have:

- *Urban setting with little greenspace.*
- *Heavy disturbance.*
- *Small, cluttered roof void (particularly for brown long-eared).*
- *Modern construction with few gaps or crevices that bats can fly or crawl through (though pipistrelles may still be present).*
- *Prefabricated of steel or sheet materials*
- *Active industrial premises*

Habitats that increase the risk of bats being present include:

- *Presence of trees with a high probability of bat use, including ancient woodland or parkland, large trees with complex growth form, and trees with cavities, visible damage and loose bark (Coniferous plantation and young trees are less likely to support roosts). It can be extremely difficult to be certain of the presence or absence of bat roosts in trees meeting the above criteria.*
- *Recent or historical records of bats on the site, or bat roosts in the general area.*
- *Presence of underground structures such as abandoned mines, tunnels, kilns, cellars or fortifications which provide appropriate hibernation conditions.*
- *Where a development has a significant habitat impact on woods, hedgerows with field trees, parkland, diverse grassland and wetland habitats potential impacts on tree roosts, foraging habitats and flight-lines should be considered.*

Species information and population estimates

Pipistrelle maternity colonies generally consist of 25 to 100 individuals, but colonies numbering up to 1000 are not uncommon[4]. Adult females often form large maternity roosts, occupied between May and August, and frequently number around 300 individuals. Males are often solitary or in small groups during the summer, later congregating with the females at winter hibernation roosts [5].

[4] Roberts, G.M. & Hutson, A.M. 2000. *Pipistrelle*. British Bats No. 6. The Bat Conservation Trust, London

[5] Corbet, G.B & Southern, H.N., 1964. The handbook of British Mammals).

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Maternity colonies of brown long-eared bats are generally small, consisting of 10 to 20 adults[6,7] (although numbers are likely to be underestimated, due to present in inaccessible areas of the roost). The largest colony recorded was located in northwest England and contained 150 individuals[8].

Natterer's bats roost within crevices and cavities, typically within hollow trees, old buildings, caves and tunnels[9]. Maternity colonies comprising up to 200 adult females can be found in buildings during the summer months while bachelor roosts comprising up to 28 males have been recorded during the summer months in Scotland[10]. Maternity roosts are not exclusively females, with both adult and immature males comprising up to 25% of the colony. Male only colonies have been found with up to 30 bats[11]. Foraging individuals will perch during the night at roosts near to foraging areas, not used as day roosts. Mostly these roosts are trees or shrubs but barns will also be used[12].

Whiskered bats, the smallest of the *Myotis* species, roost in trees and buildings. Nursery roosts can number over 100 bats, and are almost exclusively female bats. This species hibernates singly in caves, hanging on the open wall or in crevices[11].

Brandt's bat is thought to have similar roosting behaviour and foraging ecology to the whiskered bat, however, further research is needed to clarify the situation[11].

Maternity roosts are critical to the long-term survival of a colony, and disturbance can lead to the young being abandoned to die. Bats that are disturbed and escape in the winter use up a lot of energy, which they cannot replace, as there are few insects about as food.

[6] Speakman, J. R. *et al.*, 1991. Minimum summer populations and densities of bats in NE Scotland, near the northern borders of their distributions. *J. Appl. Ecol.,*225: 327-345
[7] Entwistle, A.C., 1994. Roost ecology of the brown long-eared bat *Plecotus auritus* in north-east Scotland. Unpublished PhD thesis, University of Aberdeen, UK
[8] Billington, G., 1993. *Bat Groups*. No. 7. Bat Conservation Trust, London).
[9] Stebbings, R.E. 1991. Natterer's bat *Myotis nattereri*. In The handbook of British Mammals. 3rd Edition Corbet, G.B. & Harris, S. (Eds) Oxford: Blackwell Scientific.
[10] Swift, S. M. 1997 Roosting and foraging behaviour of Natterer's bats (*Myotis Nattereri*) close to the northern border of their distribution. J. Zool. (Lond) **242:** 375-384.
[11] Altringham, J.D. 2003. British Bats. The New Naturalist. Pub. Harper Collins.
[12] Smith, P.G. & Racey, P.A. 2005. The itinerant Natterer: physical and thermal characteristics of summer roosts of *Myotis nattereri* (Mammalia: Chiroptera) J. Zool. Lond. 266: 171-180.

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APPENDIX 2: LEGISLATION

Planning Policy
Government Planning Policy Statement 9: Biodiversity and Geological Conservation states the following:

- Plan policies and planning decisions should be based upon up-to-date information about the environmental characteristics of their areas (Paragraph 1(i)).
- Plan policies and planning decisions should seek to maintain, or enhance, or add to biodiversity conservation issues (Paragraph 1(ii)).
- Local planning authorities should consider whether proposed developments can be accommodated without causing harm to biodiversity conservation interests. 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 (Paragraph 1(v)).
- Where development will result in unavoidable and significant adverse impacts on biodiversity and geological conservation, planning permission for it should only be granted where adequate mitigation measures are put in place. Local planning authorities should normally seek appropriate measures to compensate for any harm which cannot be presented or mitigated (Paragraph 1(vi).
- Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. When considering proposals, local planning authorities should maximise such opportunities in and around developments, using planning obligations where appropriate (Paragraph 13).

Certain species have been identified as requiring conservation action as species of principal importance for the conservation of biodiversity in England. Local authorities should take measures to protect the habitats of these species from further decline through policies in local development documents. Planning authorities should ensure that these species are protected from the adverse effects of development, where appropriate, by using planning conditions or obligations. Planning authorities should refuse permission where harm to the species or their habitats would result unless the need for, and benefits of, the development clearly outweigh that harm (Paragraph 14).

Bats
Within England all bat species are specially protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and under Schedule 5 of the Wildlife and Countryside Act of 1981 (as amended).

As a result there is a requirement to consult with Natural England before undertaking any works that may disturb bats or their roost, and under the Conservation (Natural Habitats, &c.) Regulations (as amended) it is illegal to:

- Deliberately kill, injure or capture bats.
- Deliberately disturb bats; in particular any disturbance which is likely to impair their ability:

  (i) to survive, to breed or reproduce, or to rear or nurture their young; or

  (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or

  (b) to affect significantly the local distribution or abundance of the species to which they belong.

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- Deliberately obstruct access to a bat roost.
- Damage or destroy a bat roost.

Under the Wildlife and Countryside Act (1981) the above offence of disturbing bats includes low level disturbance and as such under this act it is also an offence to:

- Intentionally or recklessly disturb at bat while it is occupying a roost.
- Intentionally or recklessly obstruct access to a roost.

Under the above legal protection, only the offences under the Conservation (Natural Habitats, &c.) Regulations (as amended) are strict liability offences; the remaining offences, under the Wildlife and Countryside Act (1981), are offences only where they are carried out "intentionally or recklessly".

Defences previously available under the Conservation (Natural Habitats, &c.) Regulations 1994 have now been removed, specifically the 'dwelling-house' defence and the 'incidental result of a lawful operation' defence no longer apply, however the 'incidental result' defence persists within the Wildlife and Countryside Act disturbing bats or obstructing access to a roost and activities that cause low level disturbance may be able to rely on this defence.

Under the Countryside and Rights of Way Act 2000 (CROW Act) the offence in section 9(4) of the 1981 Act of disturbing bats is extended to cover reckless damage or disturbance.

The Hedgerow Regulations 1997 provide for the conservation of important hedgerows and their constituent trees. The presence of a protected species such as bats is a relevant consideration when assessing whether a hedgerow is important and may influence a local planning authority's decision on whether to approve removal of such hedges.

As of October 1 2006, public authorities have a duty to conserve biodiversity under the Natural Environment and Rural Communities (NERC) Act 2006.

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APPENDIX 3: ACTIVITY SURVEY RESULTS

Dusk Survey

Surveyor locations/ **Time**	**Surveyor walking a transect around the northern area of the site**	**Surveyor walking a transect around the southern area of the site and canal**
21.30	Survey Starts	
21.35	No activity	No activity
21.40		
21.45		
21.50		
21.55		
22.00		
22.05	22.07 – 2 x 45 kHz pipistrelle bats commuting to the north along the lane	22.06 – 45 kHz pipistrelle heard not seen 22.08 → 22.16 – 45 kHz pipistrelle foraging along the lane
22.10	22.12 – 45 kHz pipistrelle foraging at a height of 5m above the lane	No activity
22.15	22.15 – 45 kHz pipistrelle commuting north east along the lane 22.18 – 45 kHz pipistrelle commuting south west along the lane at a height of 5m	
22.20	22.22 – 45 kHz pipistrelle heard not seen	22.24 – 3 x 45 kHz pipistrelle foraging over the canal to the north
22.25	22.28 – 45 kHz pipistrelle foraging along the lane	22.26 – 45 kHz pipistrelle foraging along the lane 22.27 – 45 pipistrelle commuting along the lane to the south west
22.30	No activity	No activity
22.35		22.38 – 45 kHz pipistrelle foraging over the canal to the north
22.40		
	Sunset	
	Light levels low enough for Pipistrelle emergence/open flight	
	Light levels low enough for Myotis emergence/open flight	

Dawn Survey

Surveyor locations/ **Time**	**Surveyor walking a transect around the northern area of the site**	**Surveyor walking a transect around the southern area of the site and canal**
03.30	Start of Survey	
03.35	No activity	No activity
03.40		
03.45		03.40 – 2-4 x 45 kHz pipistrelles foraging over the canal to the north of the site
03.50		No activity
03.55		
04.00		
04.05	4.08 – 45 kHz pipistrelle entering roost within tree	
04.10	No activity	
04.15		
04.20		
04.25		
04.30		
04.35		
04.40		
04.45		
04.50		
04.55		
05.00		
	Sunrise	

The Anabat monitors recorded no additional data.

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