HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.4.38 ES Volume D - WNDA Development App D9-5 - Bat Technical Summary Report

PINS Reference Number: EN010007

Application Reference Number: 6.4.38

June 2018

Revision 1.0

Regulation Number: 5(2)(a)

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Horizon Internal DCRM Number: WN0902-JAC-PAC-APP-00140

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Wylfa Newydd Project

Horizon Nuclear Power Wylfa Ltd

Technical Summary Report - Bats

60PO8007/TER/REP/010 | 2

WN034-JAC-PAC-REP-00020

Document history and status

Revision	Date	Description	By	Review	Approved
		Technical Summary Report - Bats	Jonathan Jackson	Dave Jones	
1	16/12/15	Minor edits following proof read	Suzanne Jenkins	Jonathan Jackson	Rob Bromley
2	17/03/16	Minor edits following HNP IC comments	Jonathan Jackson	Nick Clark	

Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments

Wylfa Newydd Project

Project no:	60PO8032
Document title:	Technical Summary Report - Bats
Document No.:	60PO8007/TER/REP/010
Revision:	2
Date:	10 June 2015
Client name:	Horizon Nuclear Power Wylfa Ltd
Client no:	WN034-JAC-PAC-REP-00020
Project manager:	Robert Bromley
Author:	Jonathan Jackson
File name:	https://collaboration.horizonnuclearpower.com/sites/160/Shared Documents/MPP3 - SP and C/STAGE 2.1 - TECHNICAL REVIEWS/SPC ES Chapter 14 - Terrestrial and Freshwater Ecology/SPC-ES-APP_14-13 [JC].docx

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Executive Summary

This technical summary report provides a single resource regarding all survey and background data available for bats in the study area that comprises the Wylfa Newydd Development Area and the surrounding 500m. Surveys of the study area for bats have taken place in consecutive years between 2009 and 2015 and have included:

- habitat assessment surveys;
- building inspection surveys;
- tree inspection surveys;
- building dusk emergence surveys;
- static activity surveys; and
- transect activity surveys.

This report collates the information from the surveys listed above and a background data search to provide an assessment of the value and sensitivity of the overall bat population in the study area. This also identifies the most important habitats for bats, including the most significant roosting structures.

The habitat assessment and activity surveys showed that the composition of bats using the study area for foraging and commuting are what would be expected for a similarly sized area anywhere in north Wales. The composition was dominated by the most common and widespread species (common and soprano pipistrelle *(Pipistrellus pipistrellus* and *P. pygmaeus* respectively) species, brown long-eared (*Plecotus auritus*) and commoner *Myotis* species), with rare occurrences of noctule (*Nyctalus noctula*) and Nathusius' pipistrelle (*Pipistrellus nathusii*). These species tended to be recorded more frequently in areas of greater habitat heterogeneity, including wooded areas and field boundaries, although it is recognised that this is partly an artefact of the transect routes used. However, bats did tend to be less frequently using marshy grassland areas, and showed an affinity to coastal interface environments.

The study area supports very small numbers of trees with features that have the potential to support roosting bats, with no tree roosts identified following surveys. The geographical location of the study area also makes it very unlikely that the study area supports any of the rarer bat species of higher conservation value and sensitivity that primarily roost in trees e.g. barbastelle (*Barbastella barbastellus*). The survey effort to date has not extended to include emergence surveys of all trees with features that have the potential to support roosting bats. This is because the number of activity surveys carried out is so extensive that the generalised use of the site can be determined for impact assessment purposes. However, surveys to determine the presence of any tree roosts would still be undertaken prior to felling of suitable trees (if required), thereby protecting bats and complying with the relevant wildlife legislation.

The emergence and internal inspection surveys have shown that bats use 36 of the 100 extant buildings for roosting in the study area. These roosts predominantly comprise low numbers of bats, with only two buildings ever having supported more than seven bats. The predominant species recorded are the same as those mentioned for the activity surveys, although whiskered (*Myotis mystacinus*)/Brandt's (*Myotis brandti*) bat roosts were confirmed. A single Nathusius pipistrelle bat was also found during demolitions of unsafe buildings in 2013. There were also no 'rarer' species or noctule bat records, indicating a population of lower value and sensitivity, unlikely to be of significance outside of the boundary of the study area. Not all building roosts were occupied by bats each year and therefore the total number of occupied roosts varied greatly between years.

The two most significant roosts in the study area are the maternity colony of pipistrelle species in the Tyn y Maes bat barn, and the Natterer's bat (*Myotis nattereri*) colony in the Lodge. The Tyn y Maes bat barn and associated habitat enhancement works were completed as compensation following the demolition of Tyn y Maes house in 2013. This building was occupied in 2015 by over 50 bats from four species and is an example

of successful mitigation. The blueprint for this mitigation strategy would therefore be useful for the displacement of the Lodge roost that will be required as part of enabling works.

The Lodge roost is considered to be the most ecologically valuable and sensitive bat feature in the study area and is of local importance for bats. Secondary in importance to the Lodge roost is the Tyn y Maes population of commoner species i.e. brown long-eared, common pipistrelle, and soprano pipistrelle. All things considered, the bat population as a whole within the study area is of local value and significance.

The next steps for the Project consenting process is to develop the impact assessment for ecological receptors (including bats) and to devise appropriate mitigation where required.

1. Introduction

This report is intended to provide a technical summary of the data related to bats collected within the Wylfa Newydd Development Area, and from sites within a 500m buffer zone around the boundary. This area combined is referred to as the "study area" in this report, and is shown in Figure 6.1 (Appendix A).

1.1 Overview

Horizon Nuclear Power Wylfa Ltd. (Horizon) is currently planning to develop a new nuclear power station on Anglesey as identified in the National Policy Statement for Nuclear Power Generation (EN-6). The Wylfa Newydd Project (the Project) comprises the proposed new nuclear power station (the Wylfa Newydd Generating Station), including the reactors, associated plant and ancillary structures and features, together with all of the development needed to support its delivery, such as highway improvements, worker accommodation and specialist training facilities. The Project will require a number of applications to be made under different legislation to different regulators. As a nationally significant infrastructure project under the Planning Act 2008, the construction and operation must be authorised by a Development Consent Order (DCO).

Jacobs UK Ltd (Jacobs) was commissioned by Horizon to undertake a full ecological survey programme within the vicinity of the Power Station Site. This work has included the gathering of baseline data to inform the various applications, assessments and permits that will be submitted for approval to construct and operate the Power Station and Associated Development[1].

1.2 Wylfa Newydd Project

The Project includes the Wylfa Newydd Generating Station and Associated Development. The Wylfa Newydd Generating Station includes two UK Advanced Boiling Water Reactors to be supplied by Hitachi-GE Nuclear Energy Ltd, associated plant and ancillary structures and features. In addition to the reactors, development on the Power Station Site (the indicative area of land and sea within which the majority of the permanent Wylfa Newydd Generating Station buildings, plant and structures would be situated) will include steam turbines, control and service buildings, operational plant, radioactive waste storage buildings, ancillary structures, offices and coastal developments. The coastal developments will include a Cooling Water System (CWS) and breakwater, and a Marine Off-Loading Facility (MOLF).

Horizon aims to be in a position to finalise the DCO submission in 2017 with the other permissions likely to be running in parallel to the DCO process.

1.3 Site Description

The Wylfa Newydd Development Area (the indicative areas of land and sea, including the Power Station Site, the Wylfa National Policy Statement Site[2] and the surrounding areas that would be used for the construction and operation of the Wylfa Newydd Generating Station) covers an area of approximately 380ha. It is bounded to the north by the coast and the existing Magnox power station (the Existing Power Station). To the east, it is separated from Cemaes by a narrow corridor of agricultural land. The A5025 and residential properties define part of the south-east boundary, with a small parcel of land spanning the road to the north-east of Tregele. To the south and west, the Wylfa Newydd Development Area abuts agricultural land, and to the west it adjoins the coastal hinterland.

The Wylfa Newydd Development Area includes the headland south of Wylfa Head candidate Wildlife Site. There is one designated site for nature conservation within the Wylfa Newydd Development Area, Tre'r Gof Site of Special Scientific Interest (SSSI). It is also within 1km of the Cae Gwyn SSSI, Cemlyn Bay Special Area of

[1] Development needed to support delivery of the Wylfa Newydd Generating Station is referred to as Associated Development. This includes highway improvements along the A5025, park and ride facilities for construction workers, Logistics Centre, Temporary Workers' Accommodation, specialist training facilities, Horizon's Visitor Centre and media briefing facilities.

[2] The site identified on Anglesey by the National Policy Statement for Energy EN-6/NPS EN-6 as potentially suitable for the deployment of a new nuclear power station.

Conservation (SAC) and SSSI, and the Ynys Feurig, the Skerries and Cemlyn Bay Special Protection Area (SPA).

None of the statutory and non-statutory designated sites listed above include bats as cited characteristics. However, bats may use habitats within these sites for foraging. This is discussed in greater detail in Section 3.

1.4 Aims and Objectives

The purpose of this technical summary is to provide a single resource regarding all survey and background data available for bats to inform and support the Ecological Chapter of the Environmental Impact Assessment (EIA) for the development of the Wylfa Newydd Generating Station.

The specific aims of the studies completed to date were to:

- review background data from local records centres to contextualise the survey findings from the study area;
- identify commuting routes and foraging habitats suitable for bats within the study area;
- determine the presence of roosts and availability of potential roosts within the study area;
- identify the bat species present; and
- identify where lessons learned from previous mitigation implementation can be applied in the future.

1.5 Summary of Work

Bat surveys have been completed in the study area every year between 2009 and 2015. The scope of the surveys that have taken place each year has varied and is summarised in Table 1.1. The justification for the survey effort is discussed in Section 2.

Table 1.1 Summary of bat surveys completed to date

	2009 (Arup, 2012a)	2010 (Arup, 2012b)	2011 (Arup, 2012b)	2012 (Arup, 2013)	2013 (Jacobs, 2014)	2014 (Jacobs, 2015a)	2015 (Jacobs, 2015b)
Internal building inspections	Yes	Yes	Yes	Yes	Yes	Yes	No
Building emergence surveys	No	Yes	Yes	Yes	Yes	Yes	Yes
Tree assessment surveys	No	Yes	Yes	Yes	Yes	No	No
Transect activity surveys	Yes	No	No	No	Yes	Yes	No
Static activity surveys	Yes	No	No	No	Yes	Yes	No
Mitigation monitoring	-[3]	-	-	-	Yes	Yes	Yes

[3] Compensation roosts were built in 2013.

1.6 Legal Status

In the UK, bats are afforded protection under Section 9 of the Wildlife and Countryside Act 1981 (as amended) (HMSO, 2015a) and Regulation 41 of The Conservation of Habitats and Species Regulations 2010 (as amended) (HMSO, 2015b). In conjunction, legislation makes it an offence to undertake any of the following acts with regards to bats:

- deliberately capture, injure or kill bats;
- damage or destroy a breeding site or resting place used by bats;
- deliberately disturb bats in a way which is likely to:
  - impair their ability to survive, breed, rear or nurture their young, hibernate or migrate; or
  - affect significantly the local distribution or abundance of the species to which they belong.

2. Methodology

2.1 Desk Survey

A background data search was requested in order to inform the scope of surveys required to inform future EIA and Habitats Regulations Assessments (HRA). This was requested from Cofnod (North Wales Environmental Information Service) and included all legally protected and notable species records, including bats, within 2.5km of the study area. This data was then analysed, and mapped where required.

2.2 Personnel

Field surveys for bats have generally been completed by Cambrian Ecology Limited (CEL) (formerly the Cambrian Ecological Partnership) as sub-contractors to Arup (2009-2013), and then Jacobs (2013-2015). CEL comprises a team of three ecologists who are all licenced bat workers. All internal building inspection surveys were led by at least one of these bat workers. Where survey assistants were required to cover larger buildings during emergence surveys or during activity surveys, only experienced assistants were used, and under supervision from CEL at all times.

2.3 Building Surveys

The number of buildings that have been surveyed in the study area has varied between survey years. This has been caused by expansions of the study area as the Project design has developed. The most significant change was between 2012 and 2013 when the study area was increased to include a 500m buffer zone around the boundary of the Wylfa Newydd Development Area. This area was added to the scope of surveys to enable ecologists to understand the context of bat populations in the Wylfa Newydd Development Area within the wider environment. Although the number of buildings that were surveyed in the 500m buffer zone was limited by access constraints (see Section 2.8), a number of additional bat roosts were still identified in 2013 and 2014.

Building surveys have also varied as demolition works have taken place in the Wylfa Newydd Development Area. These demolitions were carried out by Horizon on health and safety grounds with a view to removing any hazardous buildings on land in their possession. Some of these buildings did have bat roosts present, and, where necessary, European Protected Species Mitigation Licences were obtained to legalise the works. This has caused the pattern of bat use of buildings in the study area to vary. This is described in greater detail in Section 3.

Demolition of buildings containing bat roosts required Horizon to provide alternative roosting locations for bats in order to maintain the favourable conservation status of the species, as set out in the method statements that accompany the European Protected Species Mitigation Licences. Horizon therefore constructed two buildings specifically to act as alternative roosts for bats in areas that would be unaffected by the Project. Since construction, these buildings have also been monitored to gauge their success. Horizon also installed bat boxes in an area of woodland to the east of the Existing Power Station, and carried out habitat enhancement works including construction of a pond. The results from checks of these bat boxes are also included in this report.

2.3.1 Preliminary roost assessment

Preliminary roost assessment surveys form the first stage in determining the potential for a building to support roosting bats. Typically surveys consist of an external inspection to identify access points for bats, followed by an internal inspection focussing on the search for field signs of bats. These were completed in line with the Bat Conservation Trust (BCT) Bat Surveys - Good Practice Guidelines (Hundt, 2012).

Access points for bats identified during the external inspection could include:

- broken or missing tiles or slates;
- lead flashing;

- weather boarding; and/or
- cracks and crevices in render/stone/brickwork.

Internal inspections involved systematically searching all roof spaces, crevices and other likely roosting areas of buildings for signs of bat occupation, such as droppings, staining and feeding remains, as well as for the animals themselves.

The buildings were then categorised according to their potential as roosts prior to the emergence surveys taking place. The buildings were placed in one of four categories: high, medium, low and no potential. These assessments were made with a view to determining the scope of further surveys required for each building.

The preliminary roost assessment surveys were not repeated on buildings previously surveyed unless there was reason to do so. Reasons for a reassessment could include a significant change in the structure of the building e.g. damage to the roof allowing access to a previously sealed roof void, or evidence from incidental sightings suggesting that the roost status in a particular building had changed.

2.3.2 Emergence surveys

Emergence surveys of buildings have taken place between 2010 and 2015, as shown in Table 1.1. These surveys were completed to gather survey data to establish the baseline conditions, and to inform European Protected Species Mitigation Licence applications where demolition was required (see Section 2.3).

Following the building assessments, the emergence survey schedules consisted of:

- three emergence surveys of known roost buildings;
- three emergence surveys of high potential buildings;
- two emergence surveys of medium potential buildings; and
- one emergence survey of low potential buildings.

All emergence surveys were carried out in appropriate weather conditions with dusk temperatures in excess of 10°C and avoided periods of heavy rain or strong wind[4].

Each surveyor used an Anabat SD1 or SD2 unit in conjunction with a 'Bat Box Duet' frequency division bat detector. Confirmation of field identifications were completed via computer analysis of sonogram traces recorded on the Anabats using Analook software.

The emergence surveys commenced 15 minutes before sunset and continued until 90 minutes after sunset to allow for the possible presence of late emerging species, such as brown long-eared or Natterer's bats. Where required, Yukon head-mounted night vision monoculars, Sony Nightshot camcorders with infra-red floodlighting and a Flir E50 thermal imaging camera were used to look for later emerging species against darker backgrounds.

Where possible, identified roosts were categorised into the following:

- maternity roost;
- day roost – regular;
- day roost – occasional;
- night roost; or
- hibernation roost.

[4] The survey conditions during each emergence survey between 2010 and 2015 have not been included in this report as they do not aid an understanding of the bat population within the study area.

2.4 Tree Assessment Surveys

Tree surveys were first completed in December 2010 (Arup, 2012a). This involved ground level assessment of trees in the Wylfa Newydd Development Area only, with follow up dusk emergence surveys and dawn re-entry surveys of trees that were identified as having features with the potential to support roosting bats.

The ground level assessments were completed during the winter months when trunks and branches are not obscured by leaves (in deciduous trees). Surveyors used binoculars to record any trees with features that had the potential to support roosting bats. These features would include rot-holes, woodpecker holes, cracks, splits, dense epicormic growth, tear-outs or significant areas of lifted bark. Trees were then categorised as either having features with the potential to support roosting bats which would require further survey, or were scoped out. The follow up surveys were completed using the same approach used for building emergence surveys as described in Section 2.3.2.

Tree surveys within the Wylfa Newydd Development Area were also completed in 2012 and used the same methods as in the 2010-2011 surveys. The scope of the 2012 surveys was to identify those trees that had not been surveyed in 2010, and so only included nine trees. Although the survey methods were the same, the categorisation of potential roosts followed those of the BCT guidelines (Hundt, 2012), as shown in Table 2.1.

Table 2.1 Criteria for assessment of trees with the potential to support roosting bats

Category	Criteria
Confirmed roost	Trees with known bat roosts or evidence of bat presence.
1*	Trees with multiple highly suitable features capable of supporting larger bat roosts.
1	Trees with definite bat potential, and features capable of supporting small number of bats.
2	Trees with no obvious potential, although the tree is of a size and age that potential roost features could be present.
3	Trees with no potential to support roosting bats.

The 2013 surveys re-assessed all trees surveyed in previous years and also included a small number of trees around Cafnan House, Cafnan Barns and the nearby stream corridor that had not been included in previous years of survey data. The methods used in 2013 were the same as those used in 2012.

The surveys did include those trees which were outside of the Wylfa Newydd Development Area but that were within the 500m buffer zone of the boundary. These were scoped out from surveys in 2014 as they were considered to be of limited value to informing the baseline.

2.5 Transect Activity Surveys

Transect surveys were first completed in 2009 and involved dividing the Wylfa Newydd Development Area into five transects. In 2013, transect surveys were repeated and the Wylfa Newydd Development Area was divided into eight transects. In 2014, transect surveys were extended to cover the whole study area, and comprised 10 transects. The routes taken during these transects is shown in Figure 6.2 and Figure 6.3, and the frequency of surveys is summarised in Table 2.2.

Transect activity surveys were not completed in 2015 due to the similarity of results between 2013 and 2014 as it was considered unlikely that further survey data would significantly change the baseline condition. The data to support this approach is presented in Section 3 and discussed further in Section 3.3.

Table 2.2 Summary of frequency of bat transect activity surveys

Year	No. of transects	Month of survey	Frequency
2009	5	September	Once
2013	8	May to October	Monthly
2014	10	April to October	Monthly

Each transect was walked by two surveyors using Anabat SD2 units connected to GPS units. This created geo-referenced call files which were analysed using Analook. A 'Bat Box Duet' frequency division bat detector was used at all times to listen for quieter species, which may not be detected when using an Anabat.

Each transect started approximately 40 minutes after sunset and lasted approximately two hours to account for peak foraging times for the range of species which could feasibly be on site based on records across the region of north Wales. Guidance from Hundt (2012) suggest that these surveys should start at 15 minutes before sunset but this was not followed. The reason this was not followed was that the aim was to record bat commuting and foraging activity only, and not activity associated close to their roosts.

Transect routes were planned to minimise retracing areas in the same survey, making an assessment of activity more accurate. The chance of duplicate recordings was reduced with this approach and avoided making an area appear more significant than may be the case.

2.6 Static Activity Surveys

Static Anabat SD2 units were used in 2009, 2013 and 2014 to automatically monitor bat activity in locations throughout the study area as summarised in Table 2.3, with locations given in Figure 6.3.

Static activity surveys were not completed in 2015 due to the similarity of results between 2013 and 2014 making it unlikely that further baseline information would be obtained from repeat surveys. The data to support this approach is presented in Section 3 and discussed further in Section 3.3.

Table 2.3 Static activity surveys summary

Year	No. of locations	Months monitored	No. of nights per month
2009	10	September	1
2013	16	Each month between May and September	4
2014	22	Each month between May and October	3

The Anabats were programmed to switch on 15 minutes before sunset and switch off 15-minutes after sunrise and were suitably camouflaged to discourage theft. Microphones were protected from water ingress using a single sheet of cling-film. External batteries were used to ensure recording for the entire duration. Call files were analysed using Analook software.

This longer-term monitoring of fixed points should allow a seasonal assessment of key area usage to be carried out and create a baseline data set identifying areas which may be positively enhanced as part of the mitigation/compensation strategy. The monitoring locations were therefore carefully selected to take into account the initial site layout. This method should also increase the probability of encountering species not recorded within emergence surveys, due to the extended time periods and locations that the detectors were deployed.

2.7 Demolition supervision records

In addition to the results from the surveys listed above, bats have been recorded by licensed ecologists supervising the demolition of unsafe buildings in the study area under European Protected Species Licences. These records are also provided in this report for reference.

2.8 Limitations

Bats are highly mobile animals and some species move their roosting sites on a regular basis. It is possible that bats could move into any building after the survey had taken place.

The Anabat bat detection system uses computerised analysis of recorded bat calls. However, compiled data must be interpreted with care. The system cannot give an accurate picture of bat numbers as multiple recordings can be made of an individual bat. These will therefore only give an indication of the level of bat activity along with precise timing of bat calls and in most cases accurate species identification.

The echo-location calls of *Myotis* bats have not been separated for the purposes of the static monitoring and transect survey results sections. This is due to the very close similarity and characteristic crossovers between *Myotis* bat species.

During static monitoring the microphone must be protected from water ingress as noted in Section 2.6 above. The commonly used solution to this is to wrap the detector's microphone in cling-film. However, this inevitably reduces sensitivity and may limit the detection of quieter species, such as brown long-eared bats.

Access restrictions to buildings and areas of land in the 500m buffer zone of the study area throughout the study period does mean that there may be roosts present that have not been found, and/or that there are areas of habitats that are hot-spots for foraging or commuting bats that are not known about.

3. Results

3.1 Desk Survey

The data from the 2013 Cofnod background data search is summarised in Table 3.1.

Table 3.1 : Summary of background data search from Cofnod records

Species	Years	Live bat records	Dead bat records	Roosts recorded
Unknown	1989-2006	11	1	2
Myotis species	1986-1992	9	0	0
Whiskered bat	1994	0	1	0
Noctule bat	1998	1	0	0
Pipistrelle species	1986-2005	3	0	0
Common pipistrelle bat	1990-2008	20	0	0
Brown long-eared bat	1990	15	0	1

3.2 Building Surveys

As described in Section 2.3, the building surveys that have taken place in the study area have varied significantly between years due to the extent of the study area changing and building demolitions. Therefore to simplify the survey results, each of the buildings has been placed into one of the following categories with results tables provided in Appendix B:

1. Buildings in the study area that have been demolished (see Table 6.1) – these have been included as they give context to the bat population baseline.
2. Buildings in the study area that have been surveyed that are unlikely to be affected by the Project but were included in the scope of surveys because they give context to the bat population baseline (including bat mitigation buildings) (see Table 6.2).
3. Buildings in the study area that would be demolished as part of the Project construction phase (Table 6.3).
4. Mitigation buildings and bat boxes (Table 6.4).

A summary of the results is provided in Table 3.2 that provides the peak number of bats recorded in each building across all years of survey data within each of the four categories above. This therefore provides an indication of the upper limit of the population of roosting bats of the study area. This measure is then used in Section 4.1.1 to discuss the success of mitigation already put in place, and future targets for provision of compensation roosts.

Table 3.2 Summary of building roost survey results[5]

Category	Description	BLE	P45	P55	P45/55	WH/BR	MYO	NATS	Total
A	Combined peak count of roosting bats recorded in all buildings since 2009 (Category A=B+D+E)	30	51	67	1	6	8	41	**204**
B	Combined peak count of roosting bats recorded in buildings demolished prior to 2015	12	36	25	0	3	1	1	**78**
C	Combined peak count of roosting bats recorded in mitigation buildings	1	26	21	0	8	0	0	**56**
D	Combined peak count of roosting bats recorded in buildings that would be demolished as part of the Project	15	10	25	1	2	5	40	**98**
E	Combined peak count of roosting bats recorded in roosts unlikely to be affected by the Project	3	5	17	0	1	2	0	**28**
F	Target for mitigation following enabling works (F=A–C–E)	26	20	29	1	-3	6	41	**120**

[5] The results tables use the following key to provide the names for the species recorded during the surveys, these are: BLE – Brown long-eared bat; P45 – Common pipistrelle; P55 – Soprano pipistrelle; P45/55 Common or soprano pipistrelle; WH/BR – whiskered or Brandt's bat; MYO – Myotis species; NATS – Natterer's bat

3.3 Tree Assessment Surveys

3.3.1 2010/2011 tree assessment surveys

The tree survey in 2010/2011 recorded 41 individual trees and four stands of pine (*Pinus spp.*) trees that had the potential to support roosting bats, as shown in Figure 3.1. Follow-up dusk surveys were then carried out of eight trees, all of which were negative for emerging bats.

The recommendations from this first tranche of surveys were that supervised felling would be required for all identified trees and the stands of pine, should they be removed. The report also recommended that as a minimum, dawn re-entry surveys would be required for 18 of those trees, should felling be required in the future. These recommendations are discussed further in Section 3.6.

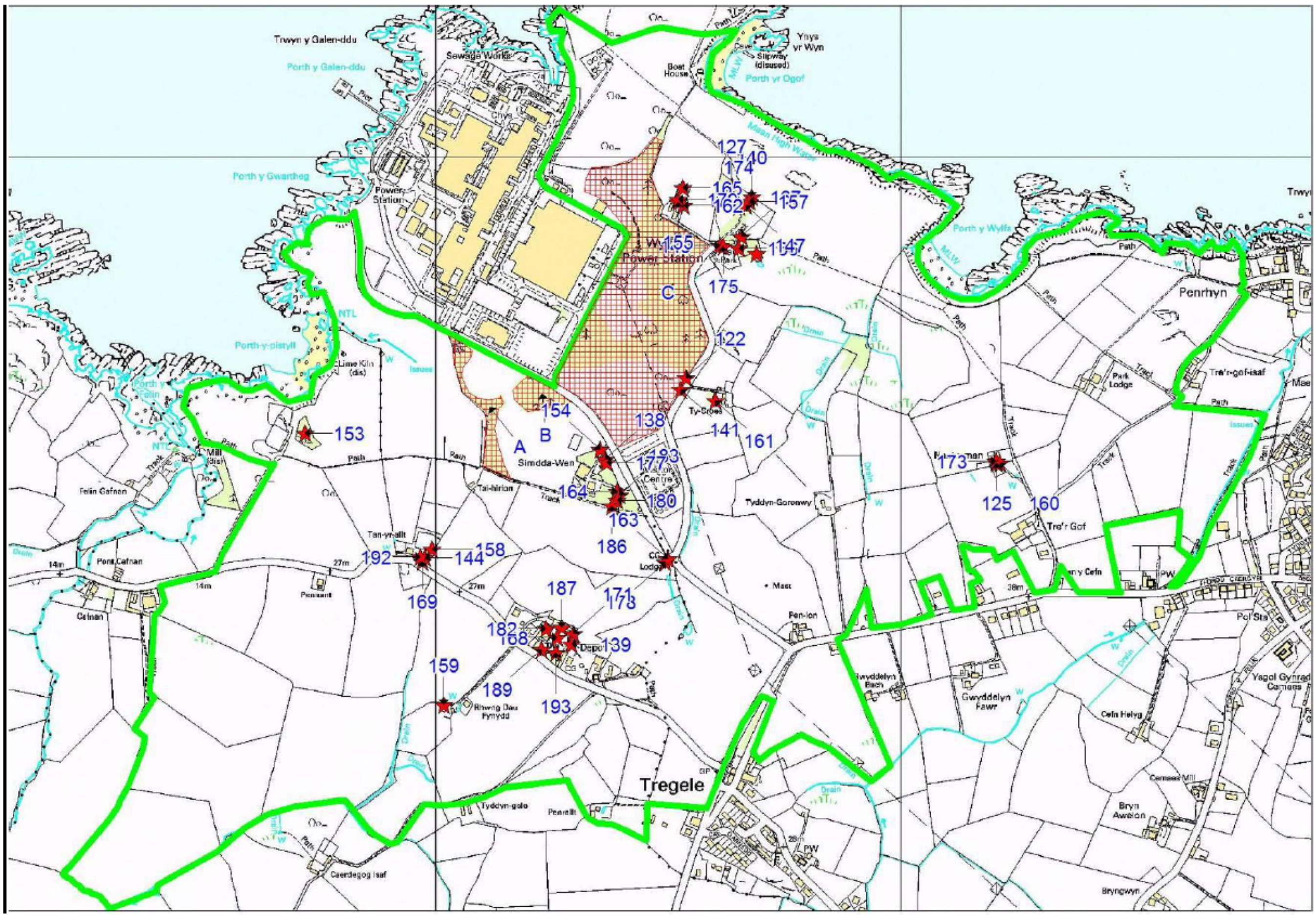

Figure 3.1 Location of surveyed trees during the 2010/2011 surveys (*Pinus spp.* stands identified by areas of cross-hatching)

3.3.2 2012 tree assessment surveys

As described in Section 2.4 the scope of the 2012 survey was much reduced and only covered areas that had not previously been surveyed. The survey identified 10 additional trees with features that have the potential to support roosting bats as shown in Figure 3.2. These were four ash (*Fraxinus excelsior*) and six sycamore (*Acer pseudoplatanus*) that were all Category 2 as described in the BCT guidelines (Hundt, 2012). There were no features identified where follow-up dusk emergence or dawn re-entry surveys were considered necessary. However, supervised felling was also recommended for these trees should they be removed. This is also discussed further in Section 3.6.

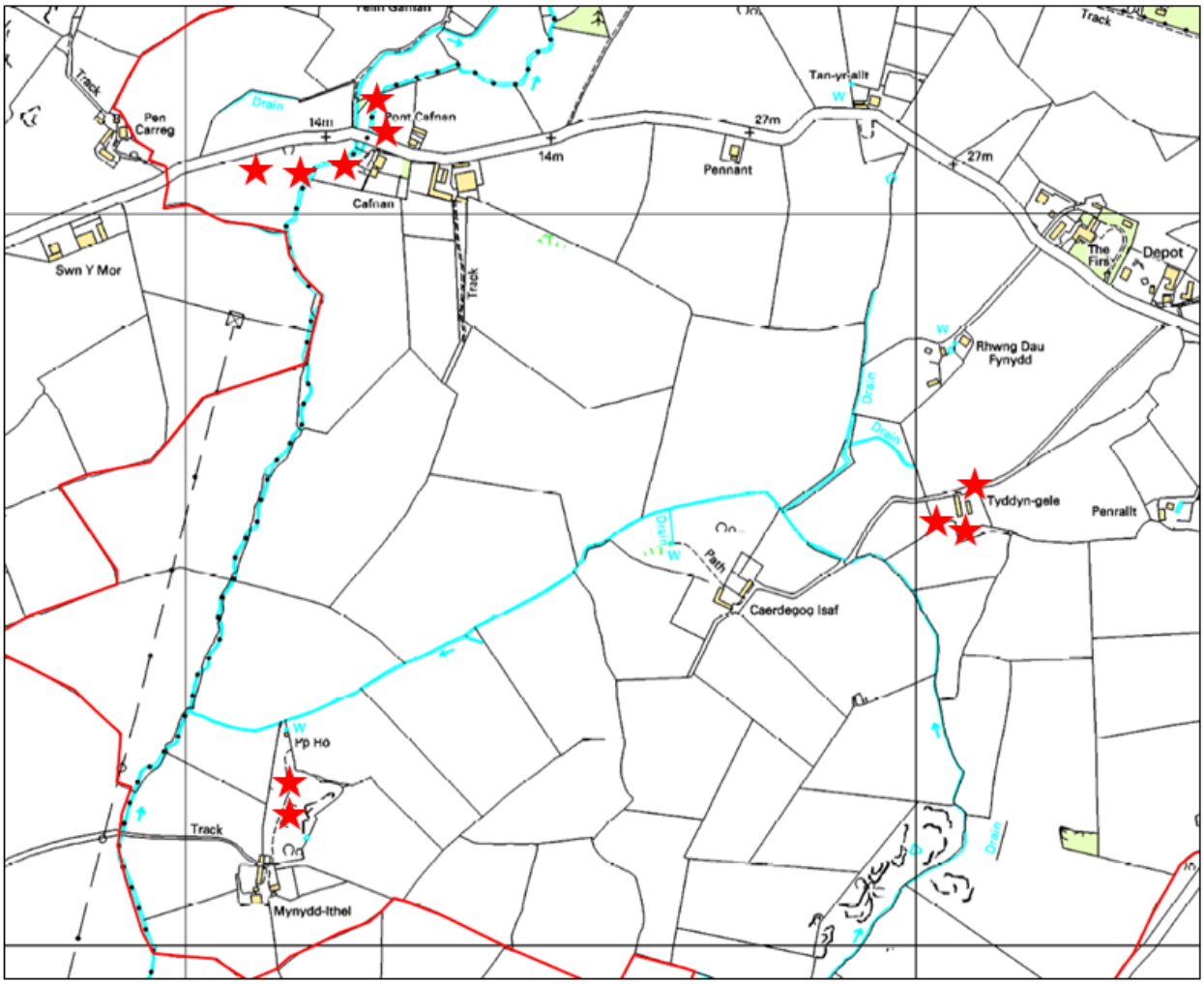

Figure 3.2 Location of surveyed trees during the 2012 surveys (from Arup, 2012b)

3.3.3 2013 tree assessment surveys

The 2013 surveys re-assessed all trees surveyed between 2010 and 2012 and recorded any changes in potential to support roosting bats. However, an additional area of trees was assessed in the vicinity of Pont Cafnan in the western half of the study area, as shown in Figure 3.3. The re-assessed trees were found to be in the same condition as was suggested by the previous reports. In the additional areas, the survey recorded six individual trees with the potential to support roosting bats, and a line of trees that were assessed collectively. The features of these trees were described in a qualitative way only, which identified them as Category 2 trees according to BCT guidelines.

In 2013, emergence surveys were also carried out of a single mature ash located at the Firs Hotel, and other ash trees within the grounds of the Leisure Centre with the results all negative for bat roosts. The 2013 surveys therefore provide relatively limited additional data to inform the baseline. This is discussed further in Section 3.6.

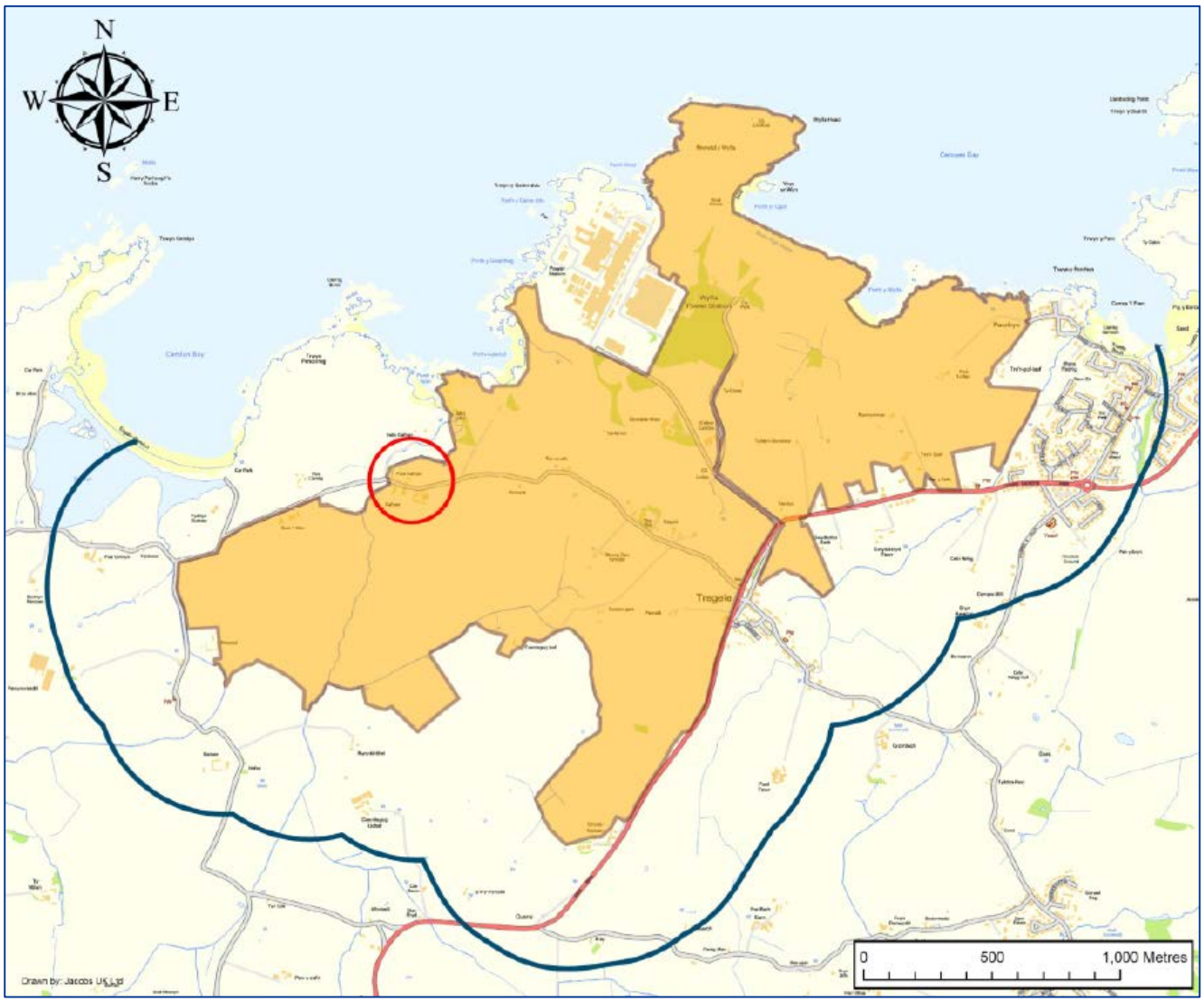

Figure 3.3 Location of additional trees surveyed in 2013 (from Jacobs, 2014)

3.4 Transect Activity Surveys

The transect survey data from 2009 is shown in Figure 3.4 and is taken directly from the Arup report (2012a). The figure shows that, in general, the highest levels of activity were from the following areas: around the Fisherman's car park north-west of Tre'r Gof on the boundary of the plantation woodland; the area south of Tre'r Gof; and around the Firs Depot on Cemlyn Road. Also identified were three smaller areas of increased activity: around Porth y Wylfa; east of Caerdegog Isaf; and on Cafnan Stream on the western boundary of the 2009 study area. These data in general are of limited use as they only show bat activity from one month, and there was a gap of four years before activity surveys were repeated. This is discussed further in Section 3.6.

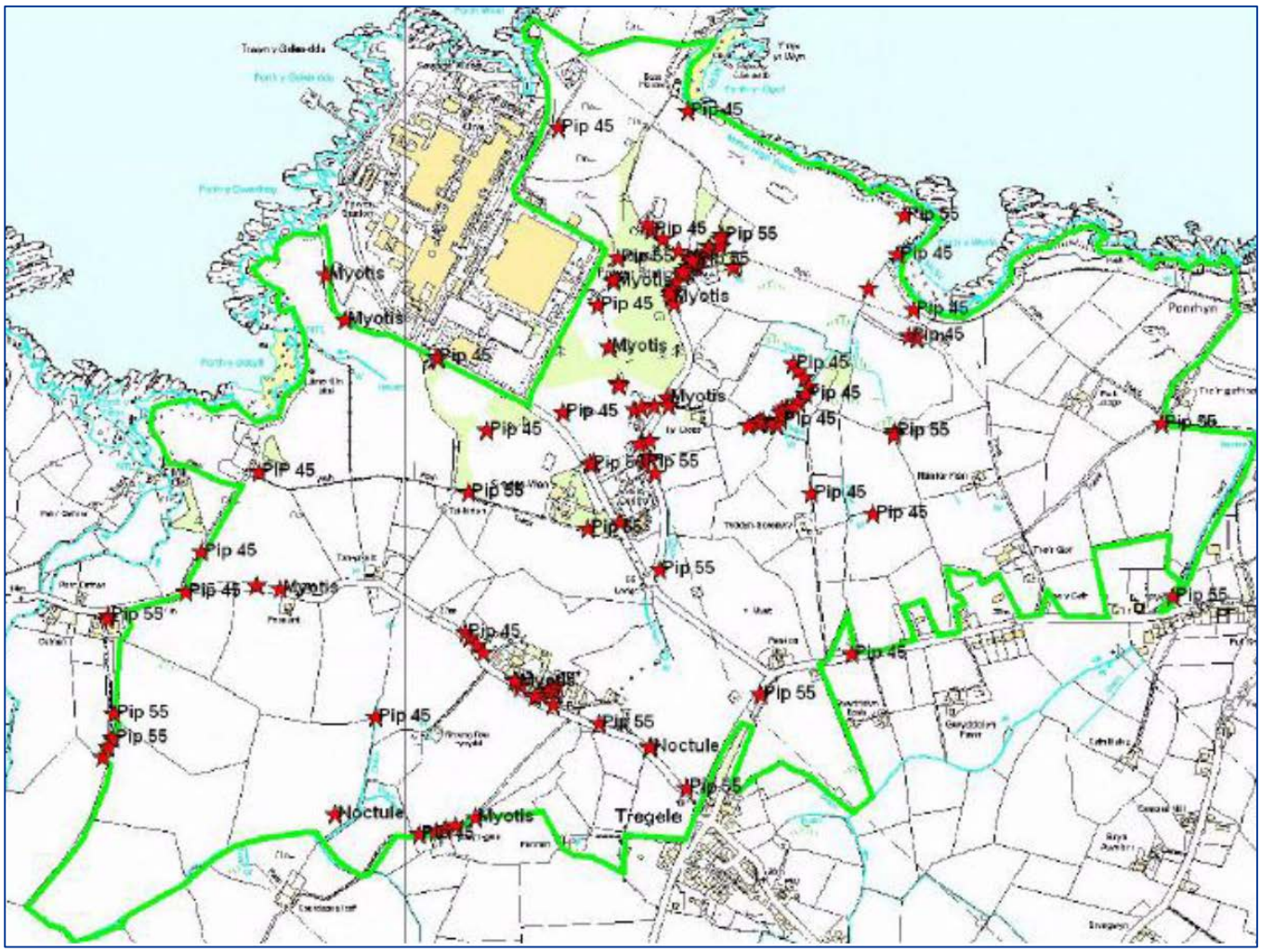

Figure 3.4 Transect activity survey data from 2009, all species (from Arup, 2012a)

The transect area used in 2013 are shown in Figure 3.5 and the data collected are shown in Figure 3.6. This figure combines all records of all species from all months of survey. For the purposes of this report it is not considered necessary to separate out the results from each survey month for comparison. This is because the identification of hot spots of activity is made clearer when the results are combined.

The results from 2013 also show clear hot spots of activity to the east of the Tre'r Gof SSSI and around the Firs Depot on Cemlyn Road. However, the survey shows that bat activity is much more widespread than in 2009, with areas of denser activity on Wylfa Head; in the fields to the east of the study area adjacent to Cemaes; west of Tregele; around Cafnan Farm; towards Cemlyn Lagoon; and around Felin Gafnan and Cestyll Gardens

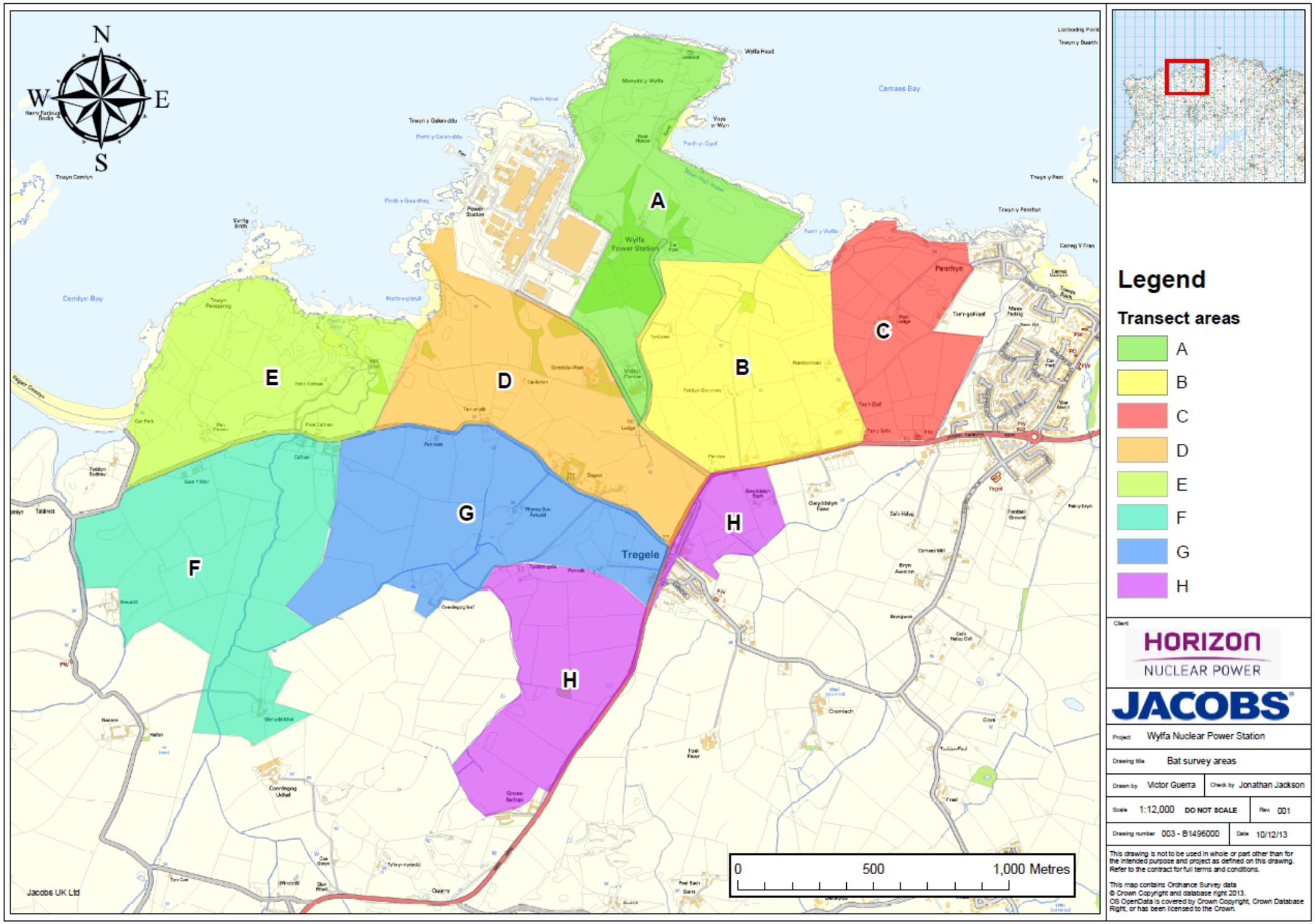

Figure 3.5: Areas covered by transects in 2013

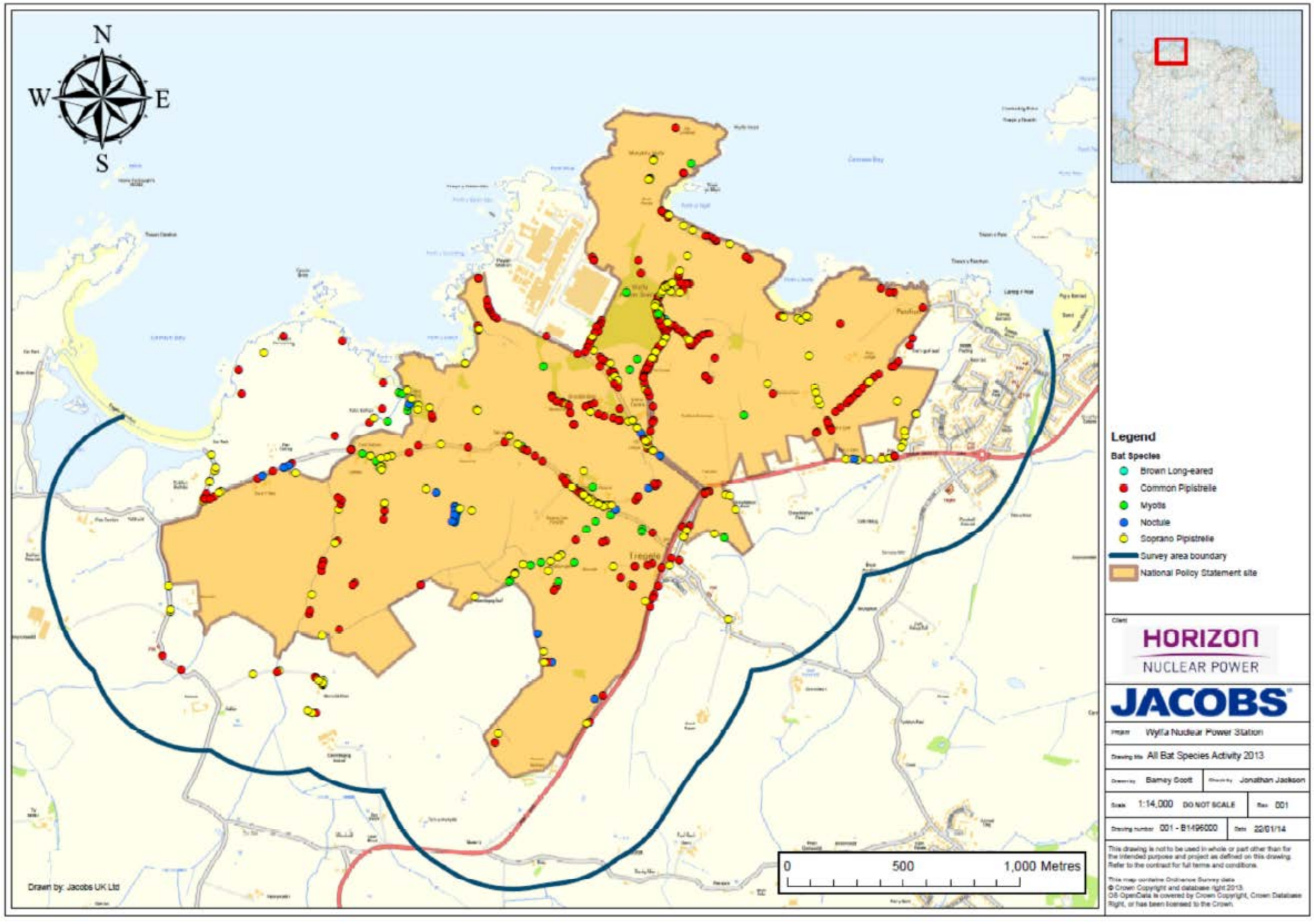

Figure 3.6 Transect activity survey data from 2013, all species (from Jacobs, 2014)

The transect data from 2014 is shown in Figure 3.7, which like Figure 3.6 does not show the results from individual survey months. The results from the 2014 surveys show that the same hot spots to the north and west of Tre'r Gof were present. The results also show that Cemlyn Road provides an important corridor across the centre of the study area. The additional transect routes recorded mainly soprano pipistrelle activity east of Cemaes in the river corridor, and south and east of the A5025 in the buffer zone around the boundary of the Wylfa Newydd Development Area.

The three years of survey data show that there are five types of bat that use the study area:

- brown long-eared bats;
- common pipistrelle bats;
- *Myotis* species (likely to be Natterer's bats, Daubenton's bats (*Myotis daubentonii*) or whiskered/Brandt's bats);
- noctule bats; and
- soprano pipistrelle bats.

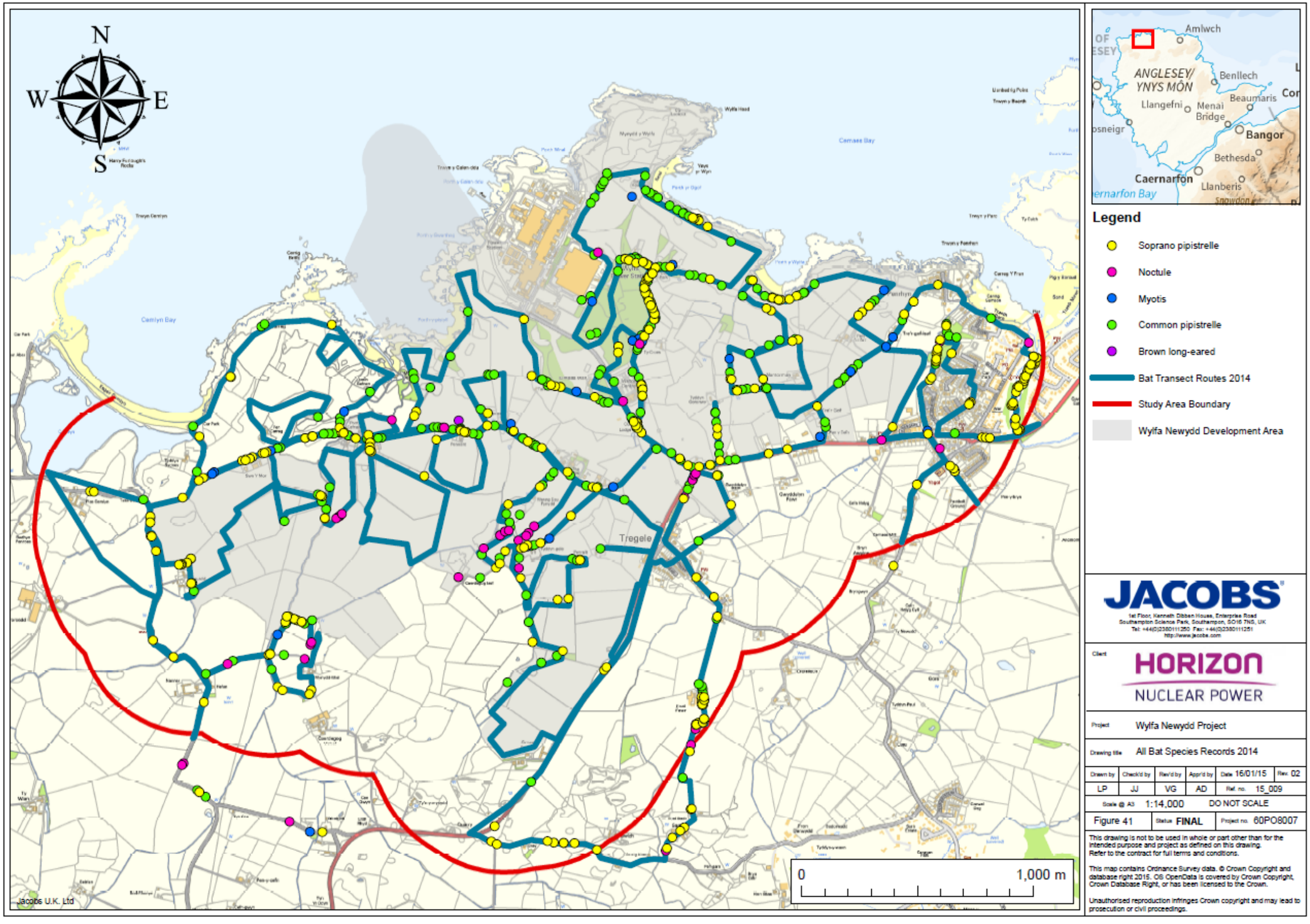

Figure 3.7 Transect activity survey data from 2014, all species (from Jacobs, 2015a)

3.5 Static Activity Surveys

There were a total of 27 static activity survey locations within the study area, as shown in Figure 6.3. The average numbers of passes per night by each species is shown in each of these locations in Table 3.3. These results are discussed in greater detail on a species-by-species basis, and based on a site-by-site comparison.

Table 3.3 Combined static activity survey results

Anabat location	Brown long-eared[6]			Common pipistrelle			Soprano pipistrelle			Noctule			*Myotis* species			Nathusius' pipistrelle		
	2009	2013	2014	2009	2013	2014	2009	2013	2014	2009	2013	2014	2009	2013	2014	2009	2013	2014
1	0	0	0	35	49	20	388	84	121	3	1	1	19	10	4	0	0	0
2	0	0	0	-	33	9	-	10	5	-	0	0	-	7	2	-	0	0
3	0	0	0	-	63	154	-	14	1	-	1	0	-	1	1	-	0	0
4	0	0	0	-	56.5	47	-	2	4	-	1	0	-	2	1	-	0	0
5	0	0	0	-	2	4	-	2	3	-	1	1	-	1	0	-	0	0
6	0	0	0	-	9	5	-	35	4	-	1	0	-	1	1	-	0	0
7	0	3	0	12	128	270	1026	36	219	2	1	1	19	1	16	0	0	0
8	0	1	0	516	35	21	26	29	1	0	0	0	2	3	1	0	0	0
9	0	1	0	4	67	22	38	54	35	0	1	1	4	83	31	0	0	0
10	0	1	0	9	4	4	53	3	2	0	1	1	12	2	1	0	1	0
11	0	0	0	-	10	18	-	21	17	-	0	0	-	3	4	-	0	0
12	0	1	0	-	3	54	-	19	23	-	0	1	-	5	2	-	0	1
13	0	0	0	-	5	9	-	3	10	-	1	1	-	1	1	-	0	0
14	0	1	0	-	31	29	-	28	5	-	1	1	-	5	8	-	0	0
15	0	1	0	-	10	27	-	11	19	-	1	1	-	1	4	-	0	0
16	0	0	0	-	5	13	-	7	13	-	1	1	-	14	2	-	0	0
17	0	-	0	-	-	2	-	-	11	-	-	1	-	-	1	-	-	1
18	0	-	0	-	-	1	-	-	13	-	-	1	-	-	1	-	-	0

[6] No brown long-eared bats were recorded during transect surveys in 2009.

Anabat location	Brown long-eared[6]			Common pipistrelle			Soprano pipistrelle			Noctule			*Myotis* species			Nathusius' pipistrelle		
	2009	2013	2014	2009	2013	2014	2009	2013	2014	2009	2013	2014	2009	2013	2014	2009	2013	2014
19	0	-	0	-	-	4	-	-	26	-	-	1	-	-	9	-	-	1
20	0	-	0	-	-	2	-	-	5	-	-	1	-	-	1	-	-	0
21	0	-	0	-	-	9	-	-	5	-	-	1	-	-	2	-	-	0
22	0	-	0	-	-	15	-	-	146	-	-	0	-	-	141	-	-	0
23	0	-	0	4	-	-	2	-	-	0	-	-	0	-	-	0	-	0
24	0	-	0	9	-	-	574	-	-	3	-	-	5	-	-	2	-	0
25	0	-	0	2	-	-	0	-	-	0	-	-	6	-	-	0	-	0
26	0	-	0	6	-	-	1	-	-	0	-	-	22	-	-	0	-	0
27	0	-	0	38	-	-	5	-	-	0	-	-	0	-	-	0	-	0

3.6 Demolition supervision records

All bats found during the supervision of demolition of unsafe buildings in the study area between 2013 and 2015 are provided in Table 3.4.

Table 3.4 Records of bats found during supervision of demolition of unsafe buildings in the study area

Species	Date	Life stage	Number/Sex	Location	Grid Ref.
Brown long-eared bat	April 2013	Adult	1 X Male	Penralt	SH35336 92588
Nathusius pipistrelle	April 2013	Adult	1 X Male	Firs Hotel	SH35237 92971
Soprano pipistrelle	April 2013	Adult	1 X Male	Ty Croes	SH35618 93479
Soprano pipistrelle	April 2013	Adult	1 X Male 1 X Female	Tyn y Maes	SH35504 93829
Soprano pipistrelle	April 2013	Adult	2 X Male 1 X Female	Haul y Gwynt	SH35516 93877
Common pipistrelle	April 2013	Adult	1 X Male	Cafnan Farm (B5)	SH34360 93069
Brown long-eared bat	October 2014	Adult	3 X Male	Bronydd Garage	SH35186 92999
Brown long-eared bat	October 2014	Adult	1 X Male	Cafnan Farm (B8)	SH34360 93069
Brown long-eared bat	April 2015	Adult	1 X Female	Cafnan Farm (B1)	SH34360 93069

4. Discussion

The interpretation of the bat survey results has been split into two sections in this report. The first section includes a description of the current status of the bat roosts in the study area compared to the situation in the study area in 2010, including tree assessment survey results and building survey results. The second section in the discussion concerns the use of the site by bats when foraging and commuting as identified by transect and static surveys; this section also identifies those areas used most frequently by bats, and can therefore determine which habitat types and locations are of greatest value.

4.1 Interpretation of Roost Survey Results

4.1.1 Interpretation of Building Roost Surveys

Currently there are 36 buildings identified in the study area that support roosting bats. Twenty-one of these buildings would be demolished as part of enabling works, and 15 would not be affected by the Project.

The results show that the study area has buildings that support roosting bats from five individual species. The data also shows that in a small number of instances, bats that were recorded exiting buildings could not be identified to species level i.e. common and soprano pipistrelle bats, and whiskered and Brandt's bats. These results are not considered to be significant in the context of determining the overall population of bats in the study area. The species recorded are considered to be typical of a very sparsely wooded landscape with roosting opportunities generally limited to scattered anthropogenic structures. The lack of rarer species is also indicative of an area of limited value to bats. However, this can be explained largely by the geographical location of Anglesey making it highly unlikely that bats with a more southerly distribution would be present. The individual ecology of these five species is not discussed here, as the foraging behaviour (as a primary driver in determining the ecology) is discussed in greater detail in Section 4.2.

The numbers of individuals in each building was generally low and mostly only supported one or two bats, although there were several exceptions. The building at Tyn y Maes had a peak count of 27 bats roosting at any one time prior to demolition and was a maternity roost for pipistrelle bat species, and the Lodge supports a maternity roost of Natterer's bats. All other buildings supported less than seven bats. With the exception of the maternity roosts the counts in buildings between years have been highly variable and indicate that roosts are transitory, with negative results in some years in roosts that have been occupied in the past. This tentatively suggests that the number of bats roosting in the study area is much lower than the number of recorded roosts suggest, and that the numbers of roosts are more likely to be a product of bats regularly switching between roosts. This is supported by the data that shows buildings which were not roosts became occupied following the first round of building demolitions. However, this highlights that the bats in the study area require a variety of roosting opportunities to be available to sustain the requirements of the population. This potentially has implications for compensation design for the remaining roosts, and suggests that mitigation should not only be limited to a low number of larger structures, but a network of different opportunities throughout the study area.

As described above, Tyn y Maes supported a maternity roost of pipistrelle species and a low number of whiskered/Brandt's bats before it was demolished. This represented 15% of the peak count of bats roosting in the study area. Prior to demolition a "bat barn" was built with the purpose of acting as compensation for the loss of the roost. In the area around Tyn y Maes habitat works were also carried out including the clearance of an area of pines, replanting of broadleaved trees, and the construction of a pond. The monitoring of this structure in 2015 found that the building was supporting a peak of 56 bats, representing over 20% of the peak count of roosting bats found in the study area. The Lodge that supports a maternity colony of Natterer's bats will also require the construction of a bat barn and potentially habitat enhancement works, and the lessons learned from Tyn y Maes should be applied. This would maximise the chances of ensuring that the Natterer's bat roost relocates to a building nearby (ideally in the study area), and is not displaced outside of the study area or is permanently lost.

4.1.2 Interpretation of Tree Survey Results

The tree surveys in the study area have recorded a total of 57 trees with features that have the potential to support roosting bats, and five areas of trees where a holistic assessment has also determined that they might support roosting bats. However, emergence surveys have not proved presence of a bat roost in any tree. This is not considered to be unusual as roosts in trees are used differently by bats than building roosts.

The main difference is that tree roosts tend to be used for a much shorter period of time, and so are only occupied for a small number of days before being abandoned. The primary driver for this behaviour is parasite loading caused by humid conditions in tree roosts. Bats will use tree roosts for longer periods when breeding, although breeding roosts are most often found in trees much larger than those found in the study area. Therefore, while the likelihood of maternity roosts should not be discounted, none have been found. The roost types in the study area are likely to be of the lowest significance rating compared to those that support breeding bats (Hundt, 2012), which supports the assertion that there are no bat roosts in trees that could alter the overall assessment for the value and sensitivity of the bat population in the study area.

In the study area, the potential presence of species that exclusively roost in trees is limited as many of the UK tree roosting specialist species are outside their natural range in Wales and are extremely rarely recorded e.g. barbastelle, Bechstein's (*Myotis bechsteinii*), serotines (*Eptesicus serotinus*), and Leisler's (*Nyctalus leisleri*). These species have therefore been scoped out of this report. Furthermore, no evidence of species such as greater horseshoe bats (*Rhinolophus ferrumequinum*) and lesser horseshoe bats (*Rhinolophus hipposideros*) has ever been record in the study area. The risk of finding a tree roost of either horseshoe species has therefore also been scoped out.

Bat species most likely to use trees in the study area for roosting would be common and soprano pipistrelles, brown long-eared, noctules, whiskered/Brandt's and Natterer's. These species are classed as the most common in the UK and, even with regular occupancy of all potential roost features, the species composition would make it unlikely that bats roosting in trees would be an ecological receptor of more than local significance.

Prior to this report there has been no attempt to quantify the number of bat roosts in trees found in the study area that could be affected by the Project. This report suggests that there are a maximum of 57 trees and five groups of trees with collective capacity, and represents a potential density of one feature per 5ha. This value is similar to the roosting opportunities offered by the buildings in the study area. The results from the building surveys combined with the activity surveys suggest a total bat population that is not unusual or exceptional in terms of species composition or density, and there is nothing to suggest that the bats using trees for roosting would alter that assessment. It is considered that the habitats present are the limiting factor for the bat population in the study area rather than the number of roosts. This is supported by the evidence from the emergence surveys that shows low occupancy rates for many buildings that have the potential to support many more bats.

Proving the presence or likely absence of roosts can be extremely difficult. In tree holes evidence of usage degrades quickly and is often consumed by detritivores. This can mean that the only way of proving a roost is being used, is by seeing bats in features, or recording them exiting/entering features during activity surveys. For the number of trees present it has therefore not been attempted to establish whether each feature has been used. The value of knowing the number of roosts at any one time is also of limited value in itself for this Project because it is highly likely that the exact number would fluctuate, while the overall assessment would not be affected. It is therefore considered that overall the species accounts produced following analysis of the activity surveys (Section 4.2) are more useful to the determination of the value and sensitivity of bats than the data from the tree roost surveys.

The Project would require the majority of trees identified in Section 3.3 to be removed as part of the site preparations and construction phases. In line with the relevant wildlife legislation, this would require appropriate measures to be in place to protect bats during works. This may include obtaining European Protected Species Mitigation Licences to legalise situations where roosts will be destroyed, or precautionary measures of works where the chances of bats or their roosts being disturbed is sufficiently low. It is not the intention of this report

to establish where each approach will be adopted, but does introduce the decision-making process with regard to the need for further surveys. This is expanded on in Section 5.

4.2 Interpretation of Activity Survey Results

Activity hot spots are indicated by the collated activity maps (Figure 3.4, Figure 3.6 and Figure 3.7). These hot spots were identified in 2013 and include around the edges of the Tre'r Gof SSSI and plantation, areas around the visitor centre, Cemlyn Road, Cestyll Gardens and Cafnan Farm area. Following the results of 2014 surveys, further hotspots have been identified, including the area around Tyddyn Gele, the two Community woodlands within Cemaes and the farm known as Foel Fawr. These hot-spots were loosely associated with the presence of trees.

Across the study area, the collated records clearly showed linear features as having the highest levels of activity. This reflects the tendency of many species of bat to commute and forage along linear features. However, this was also a reflection of the transect route as footpaths and gateways tend to be located along such linear features. Where transects cross more open habitat, the data showed that bats were encountered in these areas but at a far lower frequency. Open habitats should therefore not be dismissed as unused, but they are clearly not as significant.

There was an absence of bats recorded in the larger blocks of agricultural land across the site. In some instances this reflected the transect routes. However, in many cases it clearly showed bat preference for landscape features of value i.e. features providing connectivity with areas of higher-quality foraging potential, or those that are of sufficient value in themselves to offer foraging. This is seen across the agricultural land to the south of Cafnan Farm where bats were recorded following a watercourse despite it being within a large block of agricultural grassland. The records indicated that pipistrelle and *Myotis* bats were still using the Tre'r Gof SSSI for foraging as was the case in 2013. The majority of bats probably entered the area from the west although several bats were noted commuting towards the SSSI from the south-east. This suggests that there could be bats roosting within the houses along the A5025 that have not been included in the scope of surveys. It is notable that very few bats were recorded foraging over marshy areas near Cafnan Farm and the Lower Farm wetland, which could be expected to offer higher foraging potential. The numbers of airborne invertebrates in these wetland habitats would be expected to be high, as they were relatively sheltered and well-connected. The reasons for this unexpected result are unknown.

Coastal habitats on the northern side of the study area remain heavily used by foraging bats, particularly pipistrelle species; typically this type of habitat would not be expected to experience high levels or regular bat activity (although there are examples from elsewhere in the UK of bat species using coastal areas e.g. Beer Quarry Caves in Devon that support eight species of hibernating bat (Natural England, 2015), or activity in coastal areas as a result of migrations (BSG Ecology, 20014)). It is considered that in this study area the high use of the area by foraging bats is likely to be due to the number of invertebrates in this area, and that the invertebrate populations may be higher due to the presence of the strand lines, and the topography of the land offering shelter from the prevailing westerly winds.

4.2.1 Brown long-eared bats

The static activity survey results show that brown long-eared bats were only recorded at seven of the Anabat locations. The results also show that the average number of passes in any survey period was only one for six of these sites, and that Site 7 was the only location where the average number of passes was any higher (three). These results suggest that the site is used sparingly by brown long-eared bats. This is most likely to be a product of the lack of woodland in the study area, which is the habitat that the species prefers for foraging. However, long-eared bat species are also notoriously difficult to detect using recording equipment alone (Hundt, 2012). It is therefore possible that brown long-eared bats are under-represented in the static activity survey data. This is supported by the evidence from building surveys that have found several, albeit small, brown long-eared bat roosts.

It is therefore considered that the evidence from the static activity surveys alone are of limited value in determining the baseline use of the study area by brown long-eared bats, and that determining the baseline

conditions is more likely to be established using the combined data from all survey methods i.e. including building surveys and transect activity survey results.

Overall the value of the population of brown long-eared bats in the study area would be low as there are no roosts of any significant size, or evidence to suggest that the study area is used by large numbers of brown long-eared bats for foraging or commuting. The Welsh population is also estimated to be 17,500 making brown long-eared bats among the most common in Wales (Harris et al., 1995).

4.2.2 *Myotis*/Natterer's bats

The activity surveys recorded *Myotis* bats to genus level only due to the difficulty in differentiating between the calls to individual species level. However, many of the recorded calls are likely to belong to Natterer's bats as they are the most numerous in terms of *Myotis* species roosting in the area. The other potential species with a distribution that includes north Wales would be Daubenton's bat *Myotis daubentonii*, for which there are records within 10km of the study area (Arup, 2012). Whiskered/brandt's bats are *Myotis* species that have been reported in background data searches and from roost surveys in two buildings in the study area i.e. the Lodge and mitigation barn at Tyn y maes (see 5.2). It is therefore probable that some *Myotis* recordings belonged to Whiskered/brandt's bats.

Daubenton's bat is affiliated with water that it uses to trawl its prey. The species has never been recorded as roosting in the study area as there are no suitable structures but Static Monitoring Locations 9 and 22 (see Figure 6.3) are within close proximity to water (Cestyll Garden and Afron Gwry). This potentially indicates that Daubenton's bats are using the watercourses for foraging and commuting, but as a common and widespread species that is increasing its range, this is not surprising or significant.

The transect activity survey results from 2009, 2013 and 2014 do little to show what habitats are preferred by the population of Natterer's bats in the study area. This is because *Myotis* in general have been recorded throughout the study area in all habitat types. The static monitoring locations (excluding the potential Daubenton's bat records described above) are also of limited value for the same reasons as above. However, there is some evidence to suggest that *Myotis* species have a stronger affiliation to wooded areas e.g. Static Monitoring Location 1, 7 and 26 around Dame Sylvia Crow's Mound and the Magnox Depot on Cemlyn Road. This fits with their ecology and high aspect wing ratio that gives them greater manoeuvrability for hunting in tight and cluttered places.

The activity survey data gathered from within the study area has therefore not conclusively proved where the bats from the Lodge (in particular) are foraging. There are two hypotheses proposed to overcome this constraint on the understanding of the species. Either, the species could be commuting to foraging areas outside of the study area, in which case maintaining commuting routes is important, or the bats disperse and forage across the study area without any specific area being of particular importance over another. This issue is not without precedent and the feeding habitat requirements are poorly known (BCT, 2015).

The Welsh abundance and distribution of all *Myotis* species has not been provided here as it would add little to the understanding of the bat population that the study area supports. However, it is useful to understand the Welsh population of Natterer's bats as they are confirmed as breeding in the study area. In Wales the latest estimate is that there are 12,500 Natterer's bats distributed throughout all of Wales, although it is described as being relatively scarce (Harris et al., 1995). The maternity roost in the Lodge building is the most significant in the study area and is also the highest value feature of the species. The value assessment for the species is therefore medium, and is based on the highest value feature.

4.2.3 Nathusius' pipistrelle bats

There have been a total of six recordings of Nathusius' pipistrelle bats from five locations in the study area, and a single Nathusius was found during the building demolitions in 2013. The evidence therefore shows that the species does use the study area but not in numbers consistent with a population of anything other than local significance. The potential for Nathusius pipistrelle to be found in other buildings in the future in the study area should therefore not be discounted.

4.2.4 Noctule bats

The static activity survey results show that noctule bats were recorded in 19 locations. The average number of passes in these locations was between one and three times per survey period. At eight locations noctule bats have never been recorded. These surveys are therefore suggestive of infrequent use of the study area. Furthermore, usage is probably limited to occasional passage, rather than using the study area for foraging. It is therefore very unlikely that noctule bats will be significantly affected by the Project. This is supported by the lack of evidence from the roost surveys that have not recorded any roosting noctule bats in the study area. It is recognised that this may change following the results of the tree roost surveys, but activity surveys would not suggest that there is a significant roost that would be affected by the Project.

The UK population of noctule bats is relatively poorly understood with estimates based on limited population data. In Wales the estimate is 4,750 making the species uncommon (Harris et al., 1995). The number of records of the species in the study area would therefore make it unlikely that the value of the population would be anything other than low.

4.2.5 Pipistrelle species

The two species of bat recorded with the greatest frequency are the common and soprano pipistrelle. These are the most common and widespread species in the UK and are fairly eclectic in their habitat requirements using woodland, grassland, hedgerows, farmland and suburban environments. To put the population data in context there are estimated to be 2.4 million common pipistrelles and 1.3 million soprano pipistrelles in the UK (Harris et al., 1995). Their diet consists of invertebrates caught on the wing by aerial hawking, and their only limitation is their adaptation for reliance on buildings for roosting, thereby making them vulnerable to disturbance. In virtually any development in the UK on the scale of a Nationally Significant Infrastructure Project (NSIP) pipistrelle bats are likely to be the most frequently encountered and potentially affected species. The Wylfa Newydd Project study area is no exception, and both building and activity surveys suggest that there is a population present that is not exceptional.

4.3 Interpretation of the Building Demolition Supervision Results

With the exception of the Nathusius pipistrelle which is a rarely recorded species (see 4.2.3), the results from the building demolition supervision results were as predicted. The buildings were not supporting maternity roosts, and only contained low numbers of mostly male bats. The data are therefore useful in terms of providing evidence to suggest that previous impact assessments have been accurate, and that protection measures have been appropriate. However, the data do not aid the determination of the bat population in the study area and are not discussed further in this report.

5. Conclusions and Recommendations

5.1 Desk Study

The desk study data has been of limited value compared to the site specific survey data. It is therefore considered that there is not a requirement to update this data search to inform any assessment of the value and sensitivity of the bat population in the study area for the purposes of the EIA.

5.2 Building Surveys

The building survey results show that the number of buildings in the study area that support roosting bats is 36 and that these generally comprised roosts containing only one or two bats at a time. The species present were generally common and widespread and typical for a site in north Wales. The survey data also show that bats had some fidelity towards certain buildings, but that occupancy was often irregular. This was highlighted following the start of demolition in 2012 whereby previously unoccupied buildings became bat roosts. These roosts are of the lowest value and sensitivity rating in the context of the study area (Hundt, 2012).

There is also one building in the study area that supports a maternity roost of Natterer's bats (The Lodge) that has not been demolished, and Tyn y Maes which supported a maternity roost of pipistrelle bats. The Lodge is the most significant roost of bats in the study area and supports a population of around 40 individuals as well as low numbers of brown long-eared and whiskered/Brandt's bats.

Tyn y Maes was demolished in 2013 and as part of the mitigation a compensation roost was built in the form of a bat barn. In 2015 this building was found to support 50 individual bats, and it is likely that these are the same bats previously roosting in Tyn y Maes. The bat barn was also found to be supporting higher numbers of whiskered/Brandt's bats than the original building. While this clearly demonstrates the adaptability of bats to new roosts, and is supported by the evidence of transitory roosts that are swapped frequently, this is not evidence to suggest that the Natterer's bats in The Lodge will relocate successfully. However, the design of the bat barn was successful and should be used to contribute towards the design of other bat barns that will be built as compensation in the future.

Overall the number of roosts is not considered to be exceptional in terms of density for an area the size of the study area. Similarly, the numbers and composition of species that are supported is also not beyond what would be expected for a site with the range of buildings and habitats present. However, there are two roosts of greater significance: the Tyn y Maes bat barn and the population of Natterer's bats in the Lodge. Both these roosts are of a value and sensitivity above a site-only level, and with at least local significance, and would be of primary concern when devising mitigation for the Project.

5.3 Tree Roosts

The survey results show that there have been 57 individual trees identified in the study area that have features with the potential to support roosting bats, and five areas of trees with combined low potential, but no roosts have been confirmed.

The activity surveys show that the study area does not support rarer woodland specialist species (with the occasional exception of Nathusius' pipistrelle bats as discussed in Section 4.2.3). It therefore follows that the potential roosts in trees are also unlikely to support rare species. This suggests that the bats which may use the potential tree roost features form part of a study area total population dominated by common and widespread species. These species are also found in abundances typical for similar habitats in that geographical area. If there are any tree roosts, these would also be highly unlikely to be exceptional and alter the value and sensitivity rating of the study area. However, the legal protection afforded to bats and their roosts requires each potential roost to be assessed individually. Should any potential roost be disturbed or damaged then further survey and/or mitigation will be required, as described below.

At this stage it is not considered that further surveys would be required to inform any impact assessment for the Project. This is because the data available from activity surveys is such that the bat population using the study

area is very well understood. However, pre-works surveys would be required to protect bats using tree roosting features immediately prior to being felled. These surveys would include:

- dawn re-entry surveys sufficiently in advance of works to inform appropriate licensing to be in place before felling i.e. no longer than 12 months before (this is likely to be for the most high-risk trees only, i.e. if any trees are known roosts, or are classified as Category 1 or 1* prior to being felled); and/or

- inspections immediately prior to felling potentially using mobile operating platforms or tree climbers.

For the majority of trees in the study area there is a low likelihood of the features supporting bats roosts. This would mean that provided pre-works surveys confirmed the absence of bats, they could be removed immediately without licences being required. However, soft-felling techniques may still be required where surveys have been unable to definitively prove absence, as per best practice guidelines (Hundt, 2012). This involves felling trees in sections and then inspecting them on the ground.

If pre-works surveys do find bats then licences would need to be in place before felling commences. The planning of felling works should therefore include flexibility to allow for the time that it would take to obtain European Protected Species Mitigation Licences to legalise the works. This would include details of the mitigation that would be needed i.e. protection measures and compensation. It is understood that for the purposes of planning, the competent authority in granting licences (Natural Resources Wales) have issued licences in the past for the Wylfa Newydd Project that covered the demolition of a number of buildings. This negated the need for multiple licence applications. This approach would also be adopted for potential tree roosts as it would achieve cost-effective adherence to the legislation protecting bats, without disproportionate delays to work schedules.

5.4 Activity Surveys

Activity surveys identified several hot-spots of foraging and commuting behaviour in 2013 including: around the edges of the Tre'r Gof SSSI and plantation; areas around the visitor centre; Cemlyn Road; Cestyll Gardens; and Cafnan Farm area. Following the results of 2014 surveys, further hotspots were added to this list, including the area around Tyddyn Gele, the two Community woodlands within Cemaes and the farm known as Foel Fawr.

The areas given above offer higher levels of habitat heterogeneity compared to the large blocks of heavily grazed pasture, and include wooded areas. Field boundaries and streams were also used with greater frequency by bats. However, it is acknowledged that there is the potential for bias in the method to skew the results as many of the transect routes followed paths using topographical features as navigation aids i.e. hedges, rather than routes through the centres of fields. Despite the limitations of the data, it is considered that the use of linear features for foraging and commuting bats, and habitat heterogeneity, would still be of primary importance in preparing habitat reinstatement designs as mitigation for the Project.

The survey data also show that the usage of the study area by bats does not necessary conform to what might be expected for a broadly agricultural area. This includes a lower level of usage by bats of marshy grassland areas and an increased usage of coastal areas. This would be important for influencing the determination of habitat enhancement measures for the study area, and maintaining habitat connectivity in particular.

The species composition of the bat population recorded during the activity surveys is not considered to be exceptional and mainly comprised the most common and widespread species in the UK. This compares favourably with the building roost survey results that give pipistrelle bat species, commoner *Myotis* species, and brown long-eared as being the most abundant. However, the activity surveys did record low numbers of noctule bats and Nathusius' pipistrelle bats that were not recorded roosting in the study area. The presence of either species is not considered to be significant as they are within their known ranges, and do not occur in a frequency suggestive of an exceptional population of anything other than an importance at a site level.

6. References

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Appendix A. Figures

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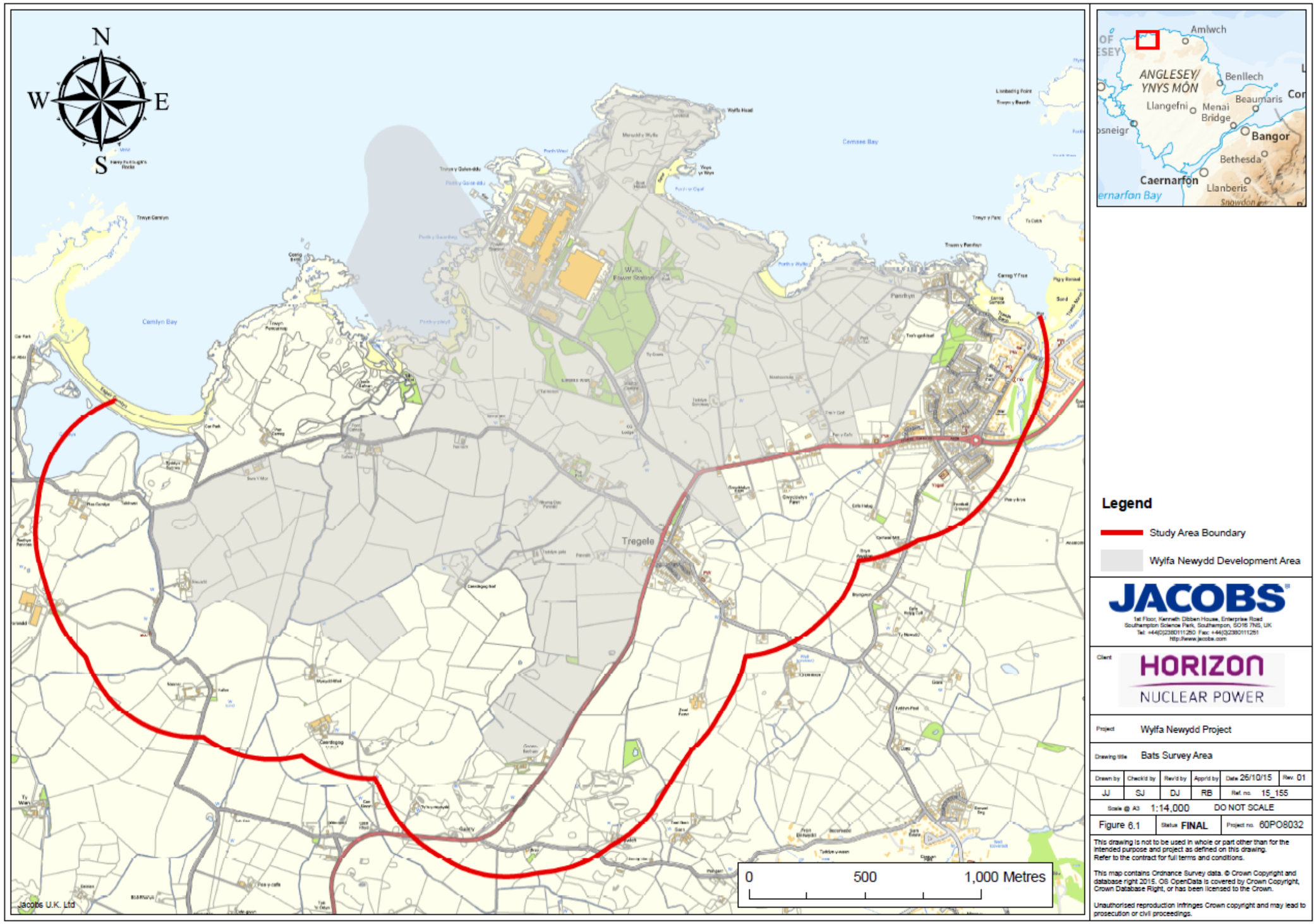

Figure 6.1 The study area

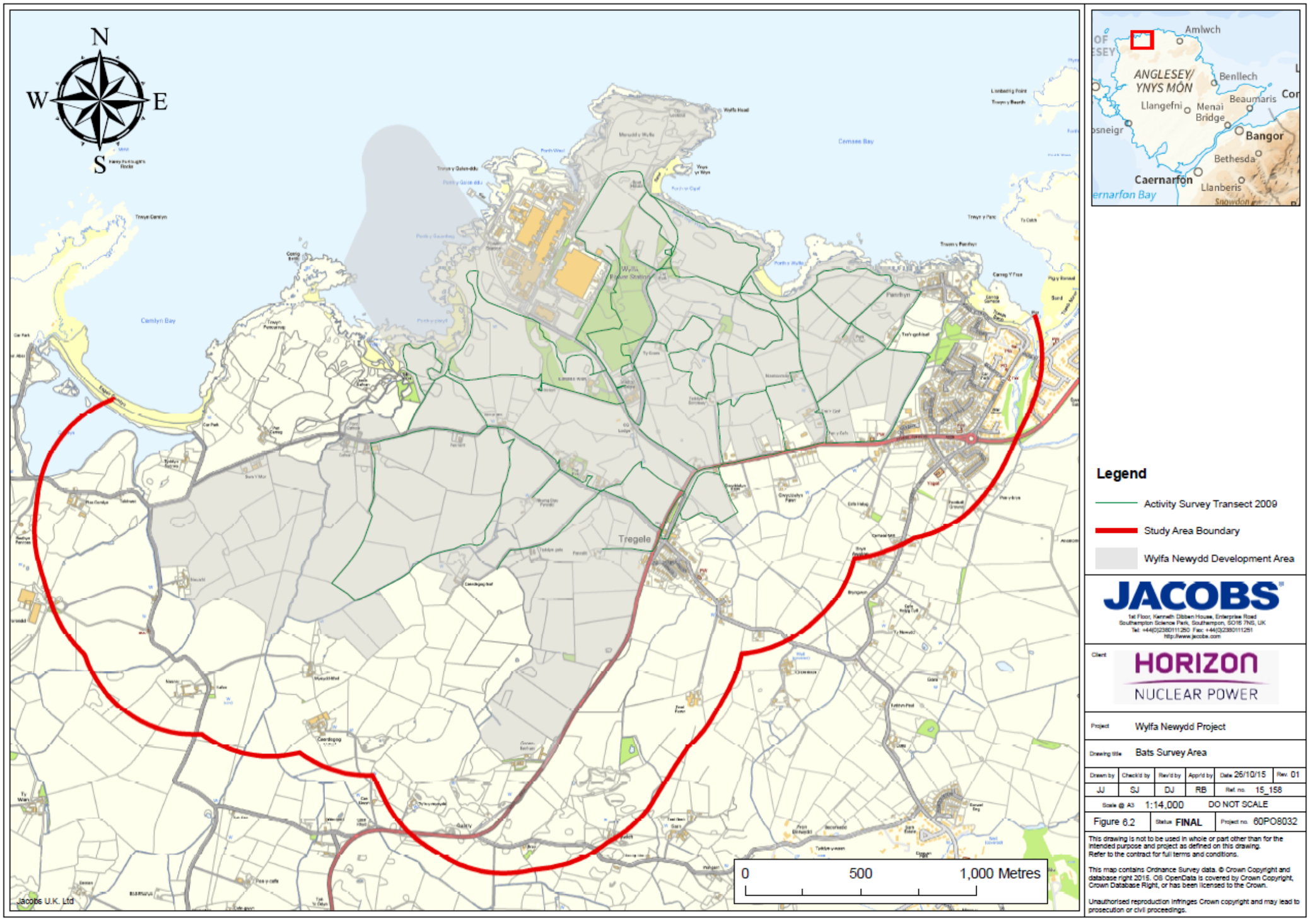

Figure 6.2 Activity survey transect routes 2009

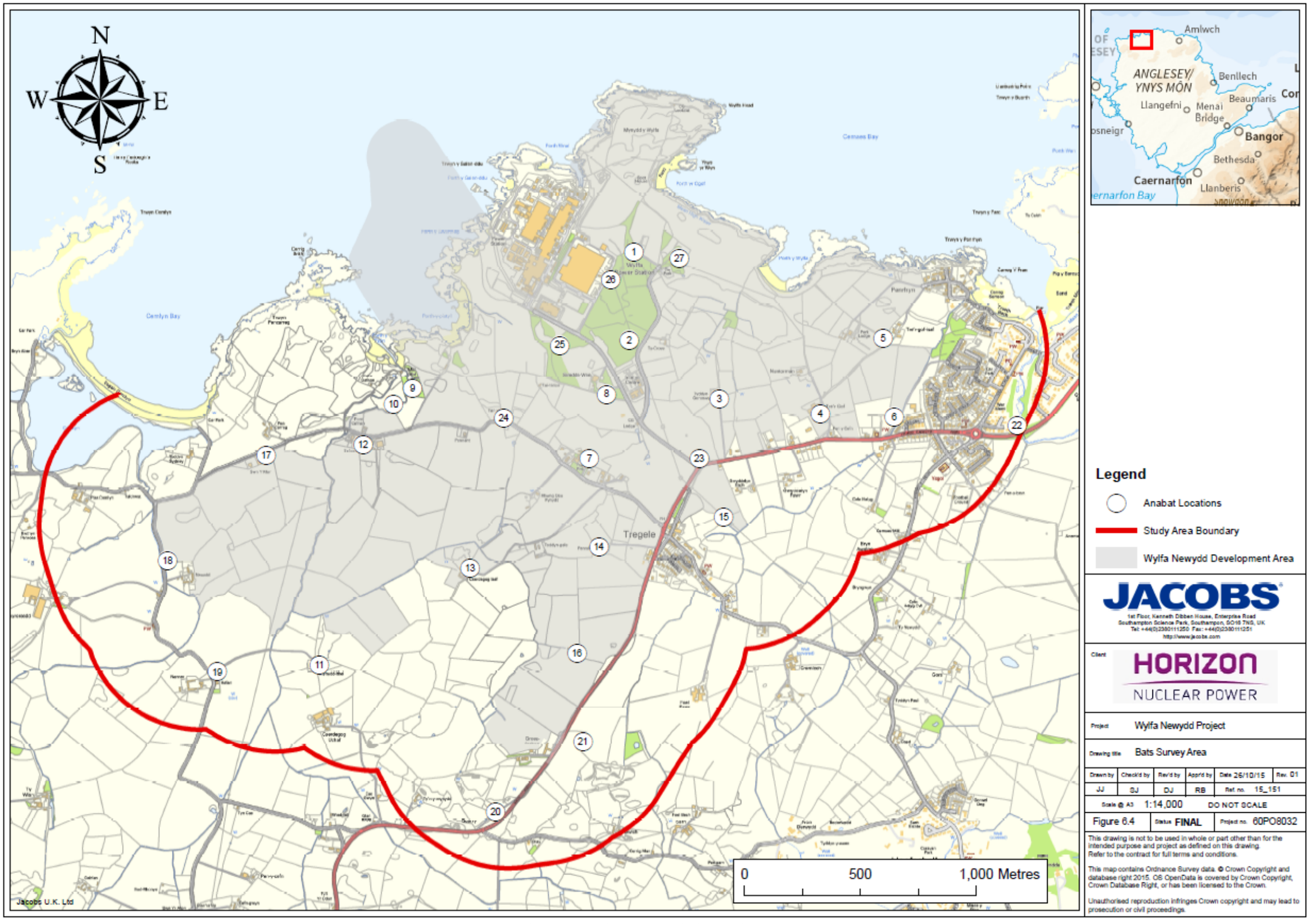

Figure 6.3 Activity survey static detector locations

Appendix B. Building Survey Summary Tables

The results tables (Table 6.1, Table 6.2, Table 6.3 and Table 6.4) all use the same key to provide the names for the species recorded during the surveys, these are:

- BLE – Brown long-eared bat
- LE – Long-eared bat species (almost certainly brown long-eared based on the southerly distribution of grey long-eared)
- MYO – *Myotis* bat species
- NAT – Natterer's bat
- P45 – Common pipistrelle bat
- P55 – Soprano pipistrelle bat
- Pip – Common or soprano pipistrelle bat
- Uk – Unknown bat species
- WH/BR – Whiskered or Brandt's bat

Table 6.1 Survey results prior to demolition of buildings in the study area

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014	2015
Bronydd Garage	Garage	Known roost	BLE x 1	BLE x 1	BLE x 1	BLE x 2 P45 x 1	BLE x 2	Demolished
Bronydd House	Main house	Medium	No bats	No bats	No bats	Demolished	-	-
Bryn Tirion Farm	1	Known roost	-	-	-	-	BLE x 1	Demolished
	2	High	-	-	-	-	No bats	Demolished
	3	Known roost	-	-	-	-	BLE x 1	Demolished
	4	Low	-	-	-	-	No bats	Demolished
	5	Negligible	-	-	-	-	No bats	Demolished
	6	Negligible	-	-	-	-	No bats	Demolished
	7	Negligible	-	-	-	-	No bats	Demolished
Cafnan Farm buildings	1	Known roost	-	BLE x 2	BLE x 2 P45 x 1	BLE x 5	No bats	Demolished
	2	Unknown	-	-	P45 x 1	Demolished	-	-
	3	Unknown	-	-	No bats	Demolished	-	-
	4	Unknown	-	-	No bats	Demolished	-	-
	5	Known roost	-	-	P45 x 1	Demolished	-	-
	6	Unknown	-	-	No bats	Demolished	-	-
	7	Unknown	-	-	No bats	Demolished	-	-
	8	Known roost	-	-	P45 x 1	P55 x 1	No bats	Demolished
	9	Unknown	-	-	No bats	No bats	No bats	Demolished
	10	Known roost	-	-	P55 x 2	P55 x 1	P55 x 1	Demolished

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014	2015
	11	Unknown	-	-	No bats	Demolished	Demolished	-
	12	Medium	-	-	No bats	No bats	No bats	Demolished
Chequers and Carina	1	Low	-	No bats	Demolished	-	-	-
Clonomel	Main Building	High	-	No bats	Demolished	-	-	-
	Garage	Low	-	No bats	Demolished	-	-	-
Haul Y Gwynt	Main House	Known roost	P45 x 1	No bats	No bats	Demolished	-	-
	Outbuilding	Low	No bats	-	No bats	Demolished	-	-
Park Lodge	1	Unknown	-	No bats	No bats	No bats	No bats	Demolished
	2	Known roost	-	P45 x 1	No bats	P55 x 1	No bats	Demolished
	3	Unknown	-	No bats	No bats	No bats	No bats	Demolished
	4	Unknown	-	No bats	No bats	No bats	No bats	Demolished
	5	Unknown	-	No bats	No bats	No bats	No bats	Demolished
	6	Unknown	-	No bats	No bats	No bats	No bats	Demolished
	7	Unknown	-	No bats	No bats	No bats	No bats	Demolished
	8	Unknown	-	No bats	No bats	No bats	No bats	Demolished
	9	Unknown	-	No bats	No bats	No bats	No bats	Demolished
	10	Known roost	-	No bats	No bats	No bats	P55 x 1	Demolished
Penrallt corrugated tin sheds	House	Medium	No bats	No bats	No bats	Demolished	-	-
	Outbuilding 1	Known roost	LE x 1	LE x 1	BLE x 1	Demolished	-	-
	Outbuilding 2	Medium	No bats	No bats	No bats	Demolished	-	-
Pen Lon	Main building	Low	No bats	Demolished	-	-	-	-

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014	2015
	Outbuilding A	Low	No bats	Demolished	-	-	-	-
	Outbuilding B	Low	No bats	Demolished	-	-	-	-
Pennant House & garage	House	Medium	No bats LE and Pip droppings only	No bats LE and Pip droppings only	No bats	Demolished	-	-
	Garage	Medium	No bats	No bats	No bats	Demolished	-	-
Rhwng Dau Fynydd	House	Unknown	No bats	Demolished	-	-	-	-
	Outbuilding 1	Unknown	No bats	Demolished	-	-	-	-
	Outbuilding 2	Unknown	No bats	Demolished	-	-	-	-
	Outbuilding 3	Unknown	No bats	Demolished	-	-	-	-
Tai-Hirion Barn	Barn	Known roost	MYO x 1	MYO x 1	No bats	Demolished	-	-
Tan-yr-Allt	House	Known roost	P45 x 4 P55 x 1 MYO x 1 BLE x 1	P55 x 1 MYO x 1 LE x 1	P55 x 1	Demolished	-	-
	Barn 1	High	No bats	No bats	No bats	Demolished	-	-
	Barn 2	Medium	No bats	No bats	No bats	Demolished	-	-
	Pig sty	Medium	No bats	No bats	No bats	Demolished	-	-
	Garage	Low	No bats	No bats	No bats	Demolished	-	-
The Boat House	1	Known roost	P45 x 1 NAT x 1	P45 x 2	P45 x 1	Demolished	-	-
The Firs Cottage	House	Low	No bats	Demolished	-	-	-	-
	Garage	Low	No bats	Demolished	-	-	-	-

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014	2015
The Firs Hotel	Hotel	Known roost	P55 x 1	-	No bats	Demolished	-	-
Tre'r Gof Uchaf farm buildings	1	Known roost	-	P45 x 3	No bats	Demolished	-	-
	3	Known roost	-	P45 x 1	No bats	Demolished	-	-
Ty Banner	1	Medium	-	-	No bats	No bats	Demolished	-
	Outbuilding 1	Low	-	-	No bats	-	Demolished	-
	Outbuilding 2	Low	-	-	No bats	-	Demolished	-
Ty Croes	1	Known roost	P45 x 1 P55 x 2 LE x 1	P45 x 1 P55 x 1	P55 x 1	Demolished	-	-
	2	Medium	No bats	No bats	No bats	Demolished	-	-
	3	Low	No bats	No bats	No bats	Demolished	-	-
	4	Known roost	No bats	No bats	P55 x 2	Demolished	-	-
	5	Low	No bats	No bats	No bats	Demolished	-	-
Tyddyn Ddu & The Cottage	1	Known roost	P55 x 4	P45 x 1	No bats	Demolished	-	-
Tyn y Maes	House	Known roost	Uk x 1	P45 x 17 P55 x 4 WH/BR x 2	P45 x 10 P55 x 10 WH/BR x 3	Demolished	-	-
	Outbuilding	Low	-	-	-	Demolished	-	-

Table 6.2 Survey results of buildings in the study area unlikely to be affected by the Project

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014
Cafnan Barns	1	Known roost	-	-	P55 x 1	P55 x 1	No bats
	2	High	-	-	No bats	No bats	No bats
	3	High	-	-	No bats	No bats	No bats
Cafnan House	1	Known roost	-	-	No bats	P55 x 4 WH/BR x 1	P45 x 1 P55 x 5 WH/BR x 1
	2	Known roost	-	-	No bats	BLE x 1	No bats
	3	Known roost	-	-	BLE x 1	BLE x 1	No bats
	4	Low	-	-	No bats	No bats	No bats
	5	Known roost	-	-	No bats	No bats	P55 x 1
	6	Low	-	-	No bats	No bats	No bats
	7	High	-	-	No bats	No bats	No bats
	8	Low	-	-	No bats	No bats	No bats
	9	Medium	-	-	No bats	No bats	No bats
Cestyll Gardens Pump House	1	Known roost	-	BLE x 1	No bats	P55 x 2	No bats
	2	Low	-	No bats	No bats	No bats	No bats
Cestyll Mill	1	Known roost	-	MYO x 2 P45 x 1 P55 x 1	P45 x 1	P45 x 1 Uk x 2	P45 x 2 P55 x 1
Felin Cafnan	House	Low	-	-	No bats	-	-
	Barn	High	-	-	No bats	-	-
Morlais	1	Negligible	-	No bats	No bats	No bats	-

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014
Mynydd Ithel	1	Medium	-	-	No bats	No bats	No bats
	2	High	-	-	No bats	No bats	No bats
	3	Known roost	-	-	No bats	P55 x 1	No bats
	4	Known roost	-	-	No bats	P55 x 1	No bats
	5	Low	-	-	No bats	No bats	No bats
	6	Medium	-	-	No bats	No bats	No bats
	7	Low	-	-	No bats	No bats	No bats
	8	High	-	-	No bats	No bats	No bats
	9	Negligible	-	-	No bats	No bats	No bats
	10	Known roost	-	-	P45 x 1	P55 x 1	P55 x 1
Pen Lon	Main building	Low	No bats	Demolished	-	-	-
	Outbuilding A	Low	No bats	Demolished	-	-	-
	Outbuilding B	Low	No bats	Demolished	-	-	-
Ruined Barn (2014)	1	Low	-	-	-	-	No bats
Swn y Mor, House and Farm (2014)	1	Low	-	-	-	-	No bats
	2	Low	-	-	-	-	No bats
	3	Low	-	-	-	-	No bats
	4	Low	-	-	-	-	No bats
	5	Low	-	-	-	-	No bats
	6	Low	-	-	-	-	No bats
	7	Low	-	-	-	-	No bats
	8	Negligible	-	-	-	-	No bats

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014
	9	Negligible	-	-	-	-	No bats
	10	Known roost	-	-	-	-	P55 x 2
	11	Known roost	-	-	-	-	P55 x 1
Tre'r Gof Isaf (2014)	1	Medium-high	-	-	-	-	No bats
	2	Low	-	-	-	-	No bats
	3	Low	-	-	-	-	No bats
	4	-	-	-	-	-	No bats
	5	-	-	-	-	-	No bats
	6	Known roost	-	-	-	-	P55 x 1
	7	Low	-	-	-	-	No bats
Ysgubor Ddegwn	1	Known roost	-	-	No bats	P45 x 1	No bats

Table 6.3 Buildings in the study area that would be demolished as part of the Project

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014	2015
Back up Office Facility/Back up Auxiliary Facility	1	Negligible	-	No bats	No bats	No bats	-	No Access
	2	Known roost	-	BLE x 3	BLE x 1	BLE x 2	BLE x 2	No Access
	3	Unknown	-	No bats	No bats	No bats	-	No Access
Caerdegog Isaf	1	Known roost	-	-	No bats	P45 x 1 P55 x 2	P55 x 2	No bats
	2	High	-	-	No bats	No bats	No bats	No bats

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014	2015
Coast Guard Lookout	1	Low	-	-	-	-	No bats	No bats
Gardener's cottage outbuildings and wall	House	Known roost	BLE x 2 NAT x 1	LE x 1	No bats	-	-	No bats
	Outbuilding A	Low	No bats	No bats	No bats	-	-	No bats
	Outbuilding B	Low	No bats	No bats	No bats	-	-	No bats
	Outbuilding C	Negligible	No bats	No bats	No bats	-	-	No bats
Leisure Centre	1	Known roost	-	P45 x 1	No bats	No bats	No bats	No bats
	2	Known roost	-	No bats	No bats	No bats	Uk x 1	No bats
	Outbuilding	Low	-	-	No bats	-	-	-
Lower Farm	1	High	-	-	No bats	No bats	No bats	No bats
	2	Known roost	-	-	P55 x 1	P55 x 2	P55 x 1	No bats
	3	Known roost	-	-	No bats	P55 x 1	P55 x 1	P55 x 1
Magnox Depots on Cemlyn Rd	1	Negligible	No bats	No bats	No bats	No bats	No bats	No bats
	2	Known roost	BLE x 3	BLE x 1	No bats	BLE x 2	BLE x 3	BLE x 1 MYO x 1
	3	Medium	No bats	No bats	No bats	No bats	No bats	No bats
Nant Orman	1	Known roost	-	No bats	No bats	P55 x 1	No bats	P55 x 1
	2	High	-	No bats	LE droppings only	No bats	No bats	No bats

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014	2015
	3	Known roost	-	No bats	No bats	P55 x 2	No bats	No bats
	4	Negligible	-	-	-	-	-	-
Penralt	Outbuilding 2	Medium	No bats	No bats	No bats	-	No bats	No bats
Pont Cafnan	1	Known roost	-	No bats	No bats	P45/55 x 1	No bats	-
The Firs Hotel	Outbuilding	Known roost	No bats	-	-	NAT x 1	No bats	No bats
The Lodge	The Lodge	Known maternity roost	BLE x 2 MYO x 2 P55 x 1	BLE x 2 MYO x 8 P55 x 2	BLE x 5 NAT x 12	BLE x 5 NAT x 26 (+ young)	BLE x 3 NAT x 38 (+ young) WH X 1	BLE x 4 NAT x 34 (+ young)
The Petrol Station	1	Low	-	-	No bats	No bats	No bats	-
	2	Negligible	-	-	No bats	No bats	No bats	-
	Pump shelter	Negligible	-	-	No bats	No bats	No bats	-
Tre'r Gof Uchaf farm buildings	2 and 4 (buildings are joined)	Known roost	-	P45 x 1 BLE x 1	No bats	P45 x 2 P55 x 2	P45 x 1	No bats
	5	Low	-	No bats	No bats	-	-	No bats
	6	Negligible	-	No bats	No bats	-	-	No bats
Tyddyn Gele	1	Known roost	-	-	P55 x 1 WH/BR x 1	P55 x 2 WH/BR x 1	P45 x 1 P55 x 6	No bats
	2	High	-	-	No bats	No bats	No bats	No bats

Property name	Buildings	Potential rating	2010	2011	2012	2013	2014	2015
	3	Known roost	-	-	No bats	P45 x 1 P55 x 1	BLE x 1	No bats
	4	Known roost	-	-	No bats	No bats	P55 x 1	No bats
	5	Negligible	-	-	No bats	No bats	No bats	No bats
	6	Known roost	-	-	No bats	No bats	P55 x 2	No bats
	7	Low	-	-	No bats	No bats	No bats	No bats
	Containers	Negligible	-	-	No bats	No bats	No bats	-
Tyddyn Grononwy Farm	1	Known roost	-	No bats	No bats	P55 x 1	P45 x 1	P45 x 1
	2	Medium	-	No bats	No bats	No bats	No bats	No bats
	3	Known roost	-	No bats	No bats	No bats	P45 x 1	No bats
	4	Low	-	No bats	No bats	No bats	No bats	No bats
	5	Negligible	-	No bats	No bats	No bats	No bats	No bats
Wylfa Visitor Centre	1	Known roost	P45 x 1	P45 x 1	P55 x 2	P45 x 1	MYO x 4	-
	2	Negligible	No bats	No bats	No bats	No bats	No bats	-
	3	Negligible	No bats	No bats	No bats	No bats	No bats	-

Table 6.4 Mitigation buildings and bat boxes

Mitigation building	2013	2014	2015
Tyn y Maes Bat Barn	P55 X 3	P55 X 9, WH/BR X 8	BLE X 1, P45 X 26, P55 X 31, WH/BR X 8
Tyn y Maes Bat Boxes	No bats	P55 X 2	P55 X 4
Cafnan Farm Wildlife Tower	No bats	No bats	No bats
Caedegog Isaf Wildlife Barn	No bats (three visits)	No bats (two visits)	No bats (two visits)