Report of Bat survey

Grindleton Chapel and Sunday School, Lower Chapel Lane, Grindleton, Clitheroe, Lancashire BB7 4RN

Provided for:

Mr. D. Hartley
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22nd April 2012

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Summary

This report has been produced on behalf of Mr. D. Hartley as part of a planning proposal for a development at Grindleton Chapel and Sunday School at Lower Chapel Lane, Grindleton, Lancashire.

The survey work followed the discovery of a roost during a site investigation in April 2010. Further surveys, as detailed in the current report, comprised daytime building inspections, use of remote detectors and a data logger, as well as emergence surveys of the building.

Bat surveys of the Chapel and Sunday School and their surroundings were initially carried out between 24th April and 26th June 2010. Unattended recording of the roof voids in the building was carried out between 21st May 2010 and 29th June 2010. A data search was also undertaken. Further surveys and DNA analysis of bat droppings were carried out between November 2011 and April 2012.

A total of 5 species of bat were recorded on site; Common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, Daubenton's *Myotis daubentonii* and an unidentified myotis species (most likely whiskered/Brandt's *Myotis mystacinus/brandtii*).

Three unidentified myotis and a single Daubenton's bat were seen roosting inside one roof void in April 2010.

Bats emerged from the building during all emergence surveys. A maximum number of 54 myotis bats and a single common pipistrelle bat were recorded emerging from the building on any one occasion. The bats primarily emerged from beneath the soffits and ridge tiles in the eastern section of the building.

Fresh bat droppings were found scattered and clustered within the roof voids of the building throughout the surveys.

The evidence confirms that there is a series of bat roosting points and potential bat roost features within all of the three roof voids. The evidence strongly suggests that there is a maternity roost of myotis bats using the building and that bats fly through all of the roof voids.

As the proposed development requires that some areas used as bat roosts are to be disturbed and reduced in size, affecting the continued ecological functionality of the building as regards bats, measures will have to be taken to ensure that illegal activities are avoided; this work will require a mitigation licence. When the licence application is to be made, it will need to be supported partly by the information provided in this report. The licence application will also require an assessment of the impact of the proposed changes to roost areas, as well as a mitigation plan.

The buildings on site are also used by nesting birds, including blue tits and blackbirds.

Report contents

Appendices

1 Introduction

This report has been produced on behalf of Mr. D. Hartley as part of the preparations for a development at Grindleton Chapel and Sunday School, Grindleton, Lancashire, national grid reference SD 4755 6104.

Further to surveys undertaken in April 2010, Ecology Services UK Limited was commissioned to carry out bat surveys in May to June 2010 and November 2011.

The proposed works involve replacement of all roof coverings and soffits, replacement of roof void floors and the structural modification of roof voids (including a decrease in the extent and volume of roof void space).

The information contained within this report comprises:

- The methodology employed to survey for bats at the proposed development site
- A brief description of the survey site
- The results from the bat surveys
- An assessment of the importance of the survey site for bats
- Conclusions drawn from the results of the surveys
- Advice and recommendations for further action in relation to bats at this site

The assessment of potential and advice in this report comply with national best practice guidance as outlined in:

Bat Conservation Trust (2012) *Bat Surveys, Good practice Guidelines*. BCT, London

Personnel

Pat Waring carried out the surveys. Pat is a licensed bat worker (Roost Visitor licence, Science and Education licence and Trainers licence), a Chartered Environmentalist and a full member of the Institute of Ecology and Environmental Management, with a Bachelor of Science degree in Biology.

Pat has been working as an ecological consultant for over fourteen years, most recently as Director of Ecology Services UK Limited. This work includes provision of expert advice and guidance to bodies such as Statutory Nature Conservation Organisations, Local Planning Authorities, National Park Authorities and Lancashire and Yorkshire Police Authorities.

Pat has recognised and extensive experience and knowledge of bat ecology relating to buildings, including the requirements and conditions necessary for bat roosting. Pat also has recognised skills relating to bat surveys and assessments, including use of a range of bat detector models and sound analysis, as well as qualitative and quantitative assessment of the ecological functionality of roost features.

Pat has extensive experience of designing mitigation, compensation and enhancement for a range of bat species. He provides professional training in mitigation design, compliance audits for mitigation and in measuring success of mitigation schemes. He has acted as the Project Ecologist for over 25 licensed mitigation schemes for bats in England.

Pat was accompanied by three other bat surveyors during surveys at Grindleton Chapel and Sunday School:

Tabatha Boniface – licensed bat worker (Roost Visitor licence, Science and Education licence) and professional Ecologist with extensive experience of emergence survey techniques, including use of bat detectors, data recording and sound analysis.

Ben Deed – trainee Ecologist with experience of emergence survey techniques, including use of bat detectors, data recording and sound analysis.

Mike Murfin – trainee Ecologist with experience of emergence survey techniques, including use of bat detectors, data recording and sound analysis.

The survey work was carried out under Natural England licence numbers 20091486, 20101373 and 20114730.

2 Objectives, methodology and rationale

2.1 General background

The brief for this work was to investigate the use of the building by bats, as identified during surveys in April 2010; this was to be done by carrying out building inspections and bat emergence surveys of the building. Activity surveys were also undertaken to supplement the emergence surveys and to help assess the value of the site for bats.

Objectives – building surveys

a) To identify any potential bat roosting habitat.

b) To identify whether bats were present on the site at the time of survey

c) To identify whether bats had used the site prior to survey

d) To provide an assessment of the likely importance of the site for bats and bat conservation

e) To provide advice and recommendations accordingly

Objectives – emergence surveys

a) To identify whether bats were emerging from the target building at the time of survey and, if so, to identify bat numbers and species

b) To provide an assessment of the likely importance of the target building for bats and bat conservation

Objectives – activity surveys

a) To identify which bats were present on the site at the time of survey

b) To identify which areas of the site were being used by bats at the time of survey

c) To provide an assessment of the likely importance of the site for bats and bat conservation

d) To enable informed decisions to be made about site management, in relation to bats and bat conservation

Objectives – lighting survey

a) To identify light levels in the vicinity of the known bat roost building

b) To assess the likely impact of light levels on bat activity

c) To enable informed decisions to be made about mitigation for bats

Information gathering involved two phases; a desk-based study and field-based surveys.

2.2 Desk-based study

A data search was requested from the Biological Records Centre at Towneley Park Museum, Burnley, Lancashire. Information was sought from both East Lancashire Bat Group and North Lancashire Bat Groups as regards the sizes of myotis bat roosts in the county.

Records from other surveys by Ecology Services UK Ltd in the vicinity were also reviewed.

2.3 Methodology for surveys

The assessment of potential and advice in this report comply with national best practice guidance as outlined in:

Bat Conservation Trust (2012) *Bat Surveys; Good practice Guidelines*. BCT, London

2.3.1 Building surveys

Daytime inspections of the building were carried out on 24th April, 21st May, 3rd June, 30th June 2010 and also 24th November and 5th December 2011.

- Internal parts of the building were subjected to examination for signs of bats, including droppings, urine staining, grease marks, feeding remains and areas clear of cobwebs. A search was also made for live and dead bats.
- An endoscope was used to investigate areas out of reach for hand searching, such as narrow gaps and other confined spaces.
- Previously identified potential access/egress points and roosting features for bats were examined in detail where accessible.
- A range of torches including a Nightsearcher one million candlepower torch and Pentax Papilio 8.5x21 close-focussing binoculars were used as aids to visibility.
- Observations were made from ground level and surrounding vantage points, as well as from telescopic 3.8 metre ladders.
- Notes were made of potential disturbance factors for bats.
- Bat droppings were collected in November 2011 from two locations in the western and eastern roof voids, for use in DNA analysis.

- Measurements of various dimensions were also collected, in order to help characterise the roosting area, and to assist in the planning of mitigation. All measurements were taken with a Leica Disto A5 Laser Distance Meter.

Anabat bat detectors were used to supplement daytime inspections of buildings, as follows:

Building	Anabat location	Dates
East building	North end of roof void by interior gable	21st May – 29th June 2010
West building	East end of roof void, below fly-through point	21st May – 29th June 2010

- The Anabats were set to function every night from at least 30 mins before sunset to at least 30 mins after sunrise the following morning (the time period when bats, if present, were expected to be active).

- In the western roof void, a cluster of droppings beneath a roosting point was covered over with a piece of wood after the second building inspection in May 2010. This was done to enable fresh droppings to be caught and observed easily. The wood was checked on all subsequent site visits

- In all of the roof voids, droppings were cleaned from the roof support timbers after the June 2010 survey.

- A Lascar EL-USB2 datalogger was placed in the western roof void on 21st May 2010 below the known bat roosting point which was discovered on 24th April 2010. The datalogger was checked during subsequent building inspections and then was left to run until 22nd April 2011 (collected in November 2011) to provide long term data to inform the bat mitigation. Temperature and humidity data was logged throughout the survey period.

2.3.2 Emergence surveys

Emergence surveys were carried out on 24th April, 31st May, 3rd June and 26th June 2010.

- At the start and end of each survey, a range of environmental readings, including temperature, humidity and wind speed, were taken using a Kestrel 3000 Weather Meter.

- Each survey started approximately 30 minutes prior to sunset and continued until at least 60 minutes after sunset (i.e. until it was no longer possible to see all potential emergence sites clearly or until the bats began to return to the roost). This timing was chosen as it was judged to provide the best opportunity for observing emergence in myotis, pipistrelle and Daubenton's bats (the use of the target building by these species had been determined from evidence found during the April 2010 survey).

Petersson D240x and D230 bat detectors were used with headphones. In addition, an Anabat with attached PDA was used during all emergence surveys, to supplement the Pettersson detectors.

- Bat echolocation was recorded using Petersson D240x and D230 bat detectors (using frequency division and time expansion systems) and Edirol R-09 24 bit linear PCM recording devices. Data was also recorded using an Anabat during all emergence surveys.

- During emergence surveys, observers stood close to locations that were judged most likely to act as access points for bats, as determined during the building surveys

- A Sony HDR-XR 520VE camcorder (set on 0 lux Nightshot) and two IRlight6 infra-red illuminators were used during the emergence surveys to assist with observations under low light conditions and to confirm the specific access features used by bats on the north gable of the building All activity was recorded onto the internal hard drive of the camcorder for further analysis.

2.3.3 Bat identification

The identification of bat species was confirmed by a combination of droppings analysis, location and type of roost features, direct observation (e.g. the behaviour of bats when seen flying), use of bat detectors and analysis of bat recordings using computer software (Batsound v3.31 and AnalookW). Analysis of bat recordings involved a series of measurements, including inter pulse interval, pulse duration, characteristic slope and frequency of maximum energy; all of these were compared to a number of known references in order to arrive at an identification of each bat species.

A DNA analysis of two samples of bat droppings was commissioned from the Department of Chemical & Life Science, Waterford Institute of Technology, in April 2012.

2.3.4 Lighting survey

Measurements of light levels within and around the development site were undertaken at various stages of the bat surveys.

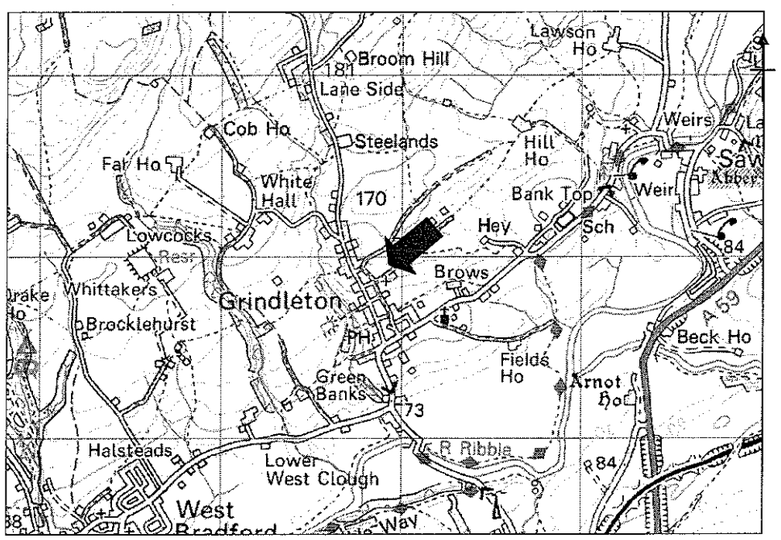
Light levels were recorded in lux using a Konica-Minolta T10 Illuminance Meter at 10 stations. The light sampling points were chosen to give a comprehensive coverage of the area within and around the roost building. Light levels were also measured at the time of the appearance of the first bat and the first emerging bat during each emergence survey.

The illuminance meter was held perpendicular to the most obvious sources of light at all sample points and the highest reading was taken at each point

3 Site description

3.1 The site subject to survey

The site location (SD 7588 4583) and context are shown below



1:25 000 scale map showing Grindleton Chapel and Sunday School marked with an arrow to centre of image

Building 1 – Grindleton Chapel and Sunday School

The building housing the former Chapel and Sunday School is a large, detached, disused single storey structure with cellars. The building has both brick and stone walls which are partly rendered, and a series of dual pitched, slated roof areas. The roof edges have a mixture of wooden fascias and soffits. The roof coverings are intact and in reasonable condition, although there are a number of lifted slates and occasional gaps in the mortar beneath ridge tiles.

The building has three discrete, accessible and connected roof voids, running throughout the structure. The roof voids have internal brick walls and timber roof supports, which provide potential roost features for bats. Some of the roof areas are lined with bituminous felt, and other areas have torching and no other form of lining. There are many gaps along roof edges and along the ridges. In the western roof void there are occasional rips in the underfelt, giving direct access to the void beneath the ridge tiles. In the eastern roof void the tile battens run up to the ridge beam, effectively sealing the void beneath the ridge tiles from access inside the roof void.

External and internal walls are in a good condition, with no obvious gaps apart from those below soffits on the south and north gables. All windows and doors are intact.

There are potential access features for birds and bats throughout the building, including gaps between soffits and the wall on the north and south gables, access points to roof voids via lead flashing, gaps in wall top stones and gaps beneath ridge tiles. Potential sheltering sites for bats occur throughout the cellars and the roof voids, as well as beneath ridge tiles.

Internal and external areas where bat signs were likely to accumulate had not been disturbed for a number of months up to and including surveys in 2010. This suggests that if signs of bats had been left inside or outside of the building, they would have remained undisturbed up to and during the 2010 surveys.

Building 2 – outhouse

The outhouse lies to the east of the Methodist Hall and is a small, detached, disused single storey structure. The building has brick walls and a single pitched roof area with both slates and corrugated asbestos coverings. The roof coverings are in a poor condition.

The building has no roof voids and the roof areas are unlined.

External and internal walls are in a good condition, with no obvious gaps; however, doorways are uncovered.

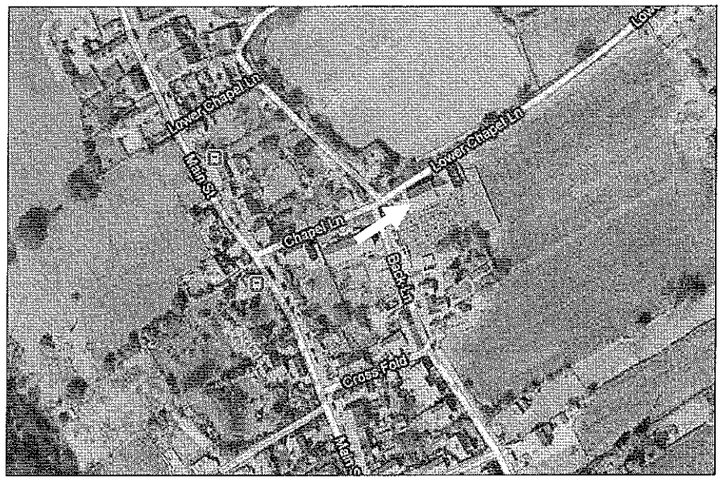
Building 2 is accessible to birds and bats, although it does not contain features suitable for use by roosting bats during daylight hours.

Internal and external areas where bat signs were likely to accumulate had not been disturbed for a number of months. This suggests that if signs of bats had been left inside or outside of the building, they would have remained undisturbed up to and during the survey.

3.2 The site surroundings

The immediate building surroundings are dominated by the churchyard to the west and south, farm fields to the east and a lane with a mature broadleaved hedgerow to the north. The immediate surroundings offer a significant resource suitable for use by commuting and foraging bats.

The wider surroundings are dominated by open countryside, including farm fields, hedgerows and woodland, and the village of Grindleton. Other features within the wider landscape include Grindleton Brook to the west and the River Ribble to the south. The wider surroundings therefore offer significant resources suitable for use by commuting, foraging and possibly roosting bats



Aerial image of survey site, with Grindleton Chapel and Sunday School marked by white arrow

Artificial lighting in the surroundings of the survey site presents a localised potential constraint to bat activity and movement through the landscape. Whilst species such as common pipistrelle and soprano pipistrelle have a wide tolerance to artificial lighting, a number of other species including Daubenton's are known to have a much more limited tolerance to light levels. In addition, lighting around roost features is known to be a constraint to bat emergence. There is a substantial difference between artificial light spillage around the survey site and the very limited light spillage falling onto the survey site.

4 Results of surveys

The weather during the evening surveys was as follows.

Date (2010)	Temperature (min)	Humidity (min)	Cloud cover (min)	Rain	Wind (max)
24th April	14.4^{0}C	51.5%	0%	None	1.7 mph
31st May	14.0^{0}C	68.2%	100%	None	2.3 mph
3rd June	15.4^{0}C	66.5%	30%	None	3.1 mph
26th June	21.4^{0}C	62.6%	90%	None	0.6 mph

A graph of datalogger results is included in the appendices. The datalogger recorded the following results between 23rd May 2010 and 22nd April 2011:

Highest temperature = 39.5°C
Lowest temperature = minus 4.0°C

There was a high degree of temperature fluctuation within each 24 hour period

Highest humidity = 97%
Lowest temperature = 28.5%

There was a high degree of humidity fluctuation within each 24 hour period

4.1 Pre-existing information on bats at Grindleton Chapel and Sunday School

Data provided by the Biological Records Centre at Towneley Hall in Burnley provided 2 records of pipistrelle bats (i.e. without distinguishing between the known pipistrelle species) within 2km of the site. One record was for a maternity roost and the other was for a single grounded bat. Both records were from within approximately 100 metres of the site at Grindleton Chapel and Sunday School.

East Lancashire Bat Group and North Lancashire Bat Group confirmed that very few myotis (other than Daubenton's and Natterer's) roosts were known in the county, and that known roosts were almost all less than 30 animals in size. The myotis roost at Grindleton Chapel and Sunday School is therefore one of the largest roosts recorded in the county and the largest currently known roost.

Past surveys by Ecology Services UK Ltd showed that there was a Daubenton's roost (2010 and 2011) in a bridge within 900 metres to the south of the site.

4.2 Results and interpretation of field-based surveys

4.2.1 Building surveys

Date	Signs of bats and other relevant information
24th April 2010 (initial visit)	Four myotis bats (3 not identified to species and 1 Daubenton's) were roosting in the roof void above the Methodist Chapel together between a piece of hanging roofing felt and a rafter towards the centre of the roof void in the western part of the building. Evidence of bat presence, in the form of bat droppings, was found attached to internal gable walls and other walls within the roof void of the Methodist Chapel, as well as on the floor and roof support timbers within central and east roof voids. Droppings were also found below an uncovered roof void hatch in the eastern part of the ground floor of the Methodist Chapel, scattered around the room below the roof void and also stuck to the wall beneath the external north gable apex. The droppings included older and much more recent material. No bats or droppings were found in the cellars of the main building. No bats or bat droppings were found associated with the small detached building to the east.
3rd June 2010	Noticeably greater number of fresh droppings in eastern roof void than on previous visit, particularly beneath ridge and at north and south gable interiors. Scattered fresh droppings throughout western roof void. Also noticeable amount of staining associated with ridge beam in east and west roof voids, with areas clear of cobwebs. No bats visible. Fresh droppings on top of strategically-placed covering below previous roost point in the west roof void. Datalogger readings = 23.5^{0}C (during survey), 39.5^{0}C (highest previous to survey), 11.5^{0}C (lowest previous to survey) Humidity readings = 57% (during survey), 71% (highest previous to survey), 31% (lowest previous to survey)
30th June 2010	Fresh bat droppings on the floor of the east roof void have increased since the last visit. Bat droppings were found spilling out from beneath the ridge at the south end of east roof void (inside the roof void).

Date	Signs of bats and other relevant information
30th June 2010	Datalogger temperature readings = 36.5^{0}C (during survey), 39.5^{0}C (highest previous to survey), 11.0^{0}C (lowest previous to survey) Humidity readings = 53% (during survey), 71% (highest previous to survey), 31% (lowest previous to survey) Data logger in west roof void – temp between 39.2^{0}C and 11^{0}C. There was a very significant increase in fresh droppings above the roof void hatch in the middle of the building (former kitchen area) between the rafter and wall which lie beside the connection between west and central roof voids. This visit was the first time that any droppings were found on the ground floor below the open hatch; no droppings had been recorded here previously.
24th November 2011	West roof void - there was an increase in bat droppings below the known roosting point since the June 2010 survey. East roof void - droppings had appeared on the roof support timbers since the June 2010 survey Central roof void – two droppings had appeared on the south side of the ridge beam since the June 2010 survey.

The internal dimensions for the roof voids are as follows:

East roof void
L = 11.83m
W = 4.89m
Height (floor to apex) = 2.54 metres (also floor to roost height)

Central roof void
L = 7.94m
W = 8.69m
Height (floor to apex) = 3.34m

West roof void
L = 14.46m
W = 5.52m
Height (floor to apex) = 1.85m

Anabat records from roost areas

Anabat 1 – east roof void

The results of Anabat recordings clearly show that bats were active within the building throughout each night of recording, often from shortly before sunset until shortly after dawn.

Anabat 2 – west roof void

The results of Anabat recordings clearly show that bats were active within the building throughout each night of recording, often from shortly before sunset until shortly after dawn.

Interpretation

- The droppings found on the ground floor beneath the eastern roof void and within the eastern and western roof voids suggest that bats had been present within the roof voids prior to 2010, in 2010 and between 2010 and 2011.

- The arrangement of bat droppings is typical of both crevice-dwelling and void-roosting bats which have made extensive use of the three roof void areas. The droppings are characteristic of those produced by at least one small or medium-sized bat species.

- The arrangement of scattered droppings shows that bats have been flying throughout the roof voids of the Chapel and Sunday School. This behaviour is typical of both adult and juvenile bats and is likely to be an important functional feature of the roost (for example, it provides a safe environment in which juvenile bats can learn to fly).

- The bat activity inside the building appears to be limited to the three roof voids and the ground floor in the eastern part of the property.

- The roof and associated structures clearly provide a number of discrete actual and potential roosting places for bats; these include ridge beams, underfelt, soffit boxes and ridge tiles. The roosting places have been identified by the presence of bats and signs of bats such as droppings and staining.

- The Chapel and Sunday School provide both a number and a range of features which are suitable for use as bat roosts. Some of the features provide conditions which are suitable for use by bats throughout the year. There is currently at least moderate potential for the building to support bats as a cool roost (e.g. in hibernation).

- Environmental conditions, as regards temperature and humidity, were suitable for bat occupation throughout the 2010 survey period.

4.2.2 Emergence surveys

Date	Signs of bats
24th April	A total of 4 myotis bats emerged from features associated with the north gable
31st May	A total of 42 myotis bats emerged from features associated with the north and south gables
3rd June	A total of 54 myotis bats emerged from features associated with the north and south gables 1 pipistrelle emerged from the north gable
26th June	A total of 42 myotis bats emerged from features associated with the north and south gables

Interpretation

- Bat numbers during emergence surveys showed a characteristic build up during the spring and summer; this type of behaviour is typical of (but not restricted to) bats gathering at a maternity roost.
- The number of bats observed during emergence surveys strongly suggests that the building supports at least one maternity roost.

4.2.3 Lighting survey

Light meter readings showed that there is a limited amount of artificial illuminance, which is restricted to the western side of the site as a result of low-pressure sodium streetlights along the adjacent lane. There is also occasional illumination from white security lighting along the lane to the north.

Interpretation

- The site plays an important role in enabling bats to cross unlit, sheltered ground immediately after emergence from roosts
- The survey site is an important part of an extensive area not subject to artificial illumination. The survey site provides a dark area in comparison to part of its immediate surroundings.

4.2.4 Bat identification

Bat species recorded during surveys were confirmed as common pipistrelle, soprano pipistrelle, Daubenton's, Myotis and noctule. Sonograms are presented in the appendices.

The results of the DNA analysis were not available at the time of report writing.

4.3 Other species

- A blackbird was found nesting in building 2 during the April 2010 survey.
- A blue tit was found nesting in the north elevation roof edge of building 1 during the May 2010 survey.

5 Limitations of survey

Surveys took place on several occasions in April, May and June 2010 and in November and December 2011. Limiting the survey period to visits in these months does not take account of bat activity on the site through the whole of the active season (March/April to October) or at other times of the year.

5.1 Building surveys

5.1.1 Some bat species, such as pipistrelles and some myotis species are typically crevice dwellers. Droppings and other field signs of the presence of such species are often not visible, as they accumulate in hidden areas which may not be found during routine, non-invasive surveys. This is a frequent limitation when surveying buildings.

5.1.2 The recording system employed by Anabats can only respond to the signal with the highest intensity. As the signal from some bat species (such as common pipistrelles) will nearly always be more intense than that of other bat species (such as brown long eared bats), it is possible that some bat signals were not recorded. As a result, some bat activity is likely to have been under-recorded.

5.1.3 As with most buildings, the roof coverings could not be examined in detail due to limits on access and concerns about the safety of surveyors. However, most of the roof coverings were visible from ground level and from other vantage points; this enabled an assessment to be made in relation to potential for roosting areas for bats.

5.2 Emergence surveys

5.2.1 The echolocation used by some bats is very quiet and difficult to detect; species such as brown long eared bat may have been present without registering on the bat detectors used during the emergence surveys.

5.2.2 The bat survey was restricted by the height of the buildings and limited visibility of roof structures. Some bats emerged and flew at a distance from surveyors that prevented them from being heard or recorded via bat detectors.

5.3 Anabat survey

5.3.1 The recording system employed by Anabats can only respond to signals with sufficient intensity. As some signals emitted by bat species are of low intensity, it is possible that some of the bat activity was greater than that suggested by the Anabat recordings.

5.4 Datalogger

5.4.1 A single datalogger was used to gather temperature and humidity information. As the datalogger was in a fixed position, and as the roof voids differ in volume, construction and environmental conditions, the information gathered is not necessarily representative of all the roof voids.

5.4.2 The datalogger was stationed inside one roof void and the data gathered does not, therefore, relate to other roost features such as soffits or ridge tiles.

6 Conclusions

6.1 Building surveys

6.1.1 The evidence confirms that at least three species of bats (unidentified myotis, Daubenton's and common pipistrelle) roosted at the site in 2010.

6.1.2 The evidence suggests that bats have roosted in the roof voids of the building prior to 2010, during 2010 and between summer 2010 and winter 2011.

6.2 Emergence surveys

6.2.1 The key emergence points for bats are the soffits and roof edge on the north gable, the soffits on the south gable and the ridge above the south gable.

6.2.2 The lack of artificial light spillage onto all known and potential emergence points means that this is not currently a limiting factor to bat emergence and re-entry to roosts.

6.2.3 The myotis roost at Grindleton Chapel and Sunday School is the largest currently known roost of its type in Lancashire.

6.3 Use by roosting bats

6.3.1 The Chapel and Sunday School provide suitable conditions for at least three bat species to roost throughout the year.

6.3.2 The evidence strongly suggests that the Chapel and Sunday School support a maternity roost of at least one bat species.

6.3.3 The outbuilding provides suitable conditions for small numbers of bats to roost throughout the year.

6.3.4 There is no evidence or reason to believe that the outbuilding supports a maternity roost of any bat species.

6.4 Landscape and lighting

6.4.1 The proposed development site and its immediate surroundings support a number of habitats and physical features known to be of value to bats, including trees and a hedgerow.

6.4.2 Artificial lighting is not regarded as a limiting factor to bat activity at the proposed development site at the current time

6.4.3 The survey site is significantly less affected by artificial light spillage than some of its surroundings; this is a significant factor in its value for bats.

6.5 Mitigation, compensation and enhancement

6.5.1 As the proposed development affects a number of features used by roosting bats, there will be a need for mitigation and/or compensation and enhancement

7 Advice and recommendations

7.1 Advice

7.1.1 It is advised that all bat species are afforded full protection under UK and European legislation, including the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and the Conservation of Habitats and Species Regulations 2010.

Together, this legislation makes it illegal to:

- Intentionally or deliberately take, kill or injure a bat
- Damage, destroy or obstruct access to bat roosts
- Deliberately disturb bats.

Prosecution could result in imprisonment, fines of £5,000 per offence and confiscation of vehicles and equipment used.

A bat roost is defined in the legislation as "any structure or place which a bat uses for shelter or protection". Roosts are protected whether or not bats are present.

If a development activity is likely to result in disturbance or killing of a bat, damage to its habitat or any of the other activities listed above, then a mitigation licence will usually be required from Natural England.

In order to minimise the risk of breaking the law it is essential to work with care to avoid harming bats, to be aware of the procedures to be followed if bats are found during works, and to commission surveys and expert advice as required to minimise the risk of reckless harm to bats.

7.1.2 It is advised that the roof voids have supported roosting bats prior to 2010, in 2010 and between summer 2010 and winter 2011

As bat roosts, the roof voids are subject to strict legal protection at all times; this protection includes disturbance and demolition, as well as covering of the roost or other changes to the roost environment.

7.1.3 It is advised that the roof coverings and soffits supported roosting bats in 2010. The roof coverings and soffits were judged as still being suitable for use by roosting bats in 2011.

As bat roosts, the roof coverings and soffits are subject to strict legal protection at all times; this protection includes disturbance and demolition, as well as covering of the roost or other changes to the roost environment.

7.1.4 It is advised that any works which might affect the bat roost features and their immediate surroundings should be carried out under the guidance of an appropriately experienced and licensed Ecologist. Prior to any works taking place, an approach should be adopted which will ensure that activities can be undertaken lawfully and with full regard for the welfare of bats and the provision of suitable roost features.

7.1.5 It is advised that the proposed works are expected to affect bat access to roost features, the extent of roost features and the environmental condition of roost features (i.e. the continued ecological functionality of roost features). Proposed works are also expected to involve the loss of some roost features, as well as risks to roosting bats. As offences under legislation will be triggered by these actions (particularly the Conservation of Habitats and Species Regulations 2010), it will be necessary to carry out the activities under a mitigation licence. In these circumstances, the following will be necessary:

- Engagement of an appropriately experienced and licensed Ecologist to oversee all bat-related aspects of the process
- Application for a mitigation licence to Natural England (note that the results of DNA analysis, when available, will form a key part of the licence application).
- Adoption of appropriate working practices, usually by following a method statement prepared by the Project Ecologist
- Carrying out of disturbing activities carefully by hand
- Provision of roosting and access features to replicate the functionality of, and opportunities afforded by, existing roost and access features.

7.2 Recommendations

7.2.1 It is recommended that site development in the vicinity of bat roosting features to be retained and/or created incorporates carefully designed artificial lighting and vegetation management where possible. These measures are necessary to ensure that access points for bats remain unaffected by artificial lighting and that dark, sheltered commuting routes and foraging areas for bats are provided across the site at all times during the active season.

Rationale for the advice and recommendations

- There are bat roosts within the roof structures and associated features of the Grindleton Chapel and Sunday School.
- Bats and their roosts are protected under UK and European legislation. Roost sites are protected even if bats are not present at the time of survey or development.
- The careful management of artificial lighting and vegetation is regarded as essential to the continued use of the site by bats.

- If bats are present on a site to be affected by development, it is the developer's responsibility to show how bats will be accommodated within the proposed change of land use. Work will have to be programmed around the bats' lifecycle to minimise disturbance.

The adoption of the most appropriate approach outlined above will help to demonstrate that reasonable safeguards have been put in place to avoid illegal activities.

7.3 Other species

The following procedures are recommended:

7.3.1 Avoid actions which could kill or injure any wild bird or damage or destroy its nest, whilst the nest is in use or being built, or destroy its eggs. If possible, time works affecting the building so as to avoid the main period when birds are likely to utilise the property.

7.3.2 If work is to take place during the nesting season, ensure that the building is checked carefully for the presence of nesting birds prior to work commencing and throughout the development.

7.3.3 It is advised that if birds are found to be nesting in the building structures during development works, it will be necessary to seek advice as to whether or not any development can proceed lawfully at that time. Under these circumstances, work must stop until advice has been sought from Natural England directly, or through an appropriately experienced Ecologist.

Rationale for the recommendations

- Surveys have identified the potential for birds to nest in the buildings during the nesting season.

- It is generally an offence intentionally to kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built or take or destroy its eggs. Some species, e.g. those classed as pests, are exempt in certain circumstances.

- If nesting birds are present, plans will need to show how offences will be avoided during the proposed development. Work will have to be programmed around the nesting season to minimise disturbance.

The adoption of the approaches outlined above will help to demonstrate that reasonable safeguards have been put in place to avoid illegal activities.

8 Bibliography

Bat Conservation Trust (2012) *Bat Surveys, Good practice Guidelines*. BCT, London

Mitchell-Jones, A. J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.

Mitchell-Jones, A. J. & McLeish, A. P. (1999). *The Bat Workers' Manual (2nd Ed)*. JNCC, Peterborough. ISBN 1-86107-462-X. [3rd edition in 2004].

Bat Survey
-
Grindleton Chapel and Sunday School, Grindleton, Lancashire
-
Appendices

Map 1 – Bat Activity at Grindleton Chapel and Sunday School

Map 2 – Bat Roost Locations (Ground Floor) at Grindleton Chapel and Sunday School

Map 3 - Bat Roost Locations (Roof voids) at Grindleton Chapel and Sunday School

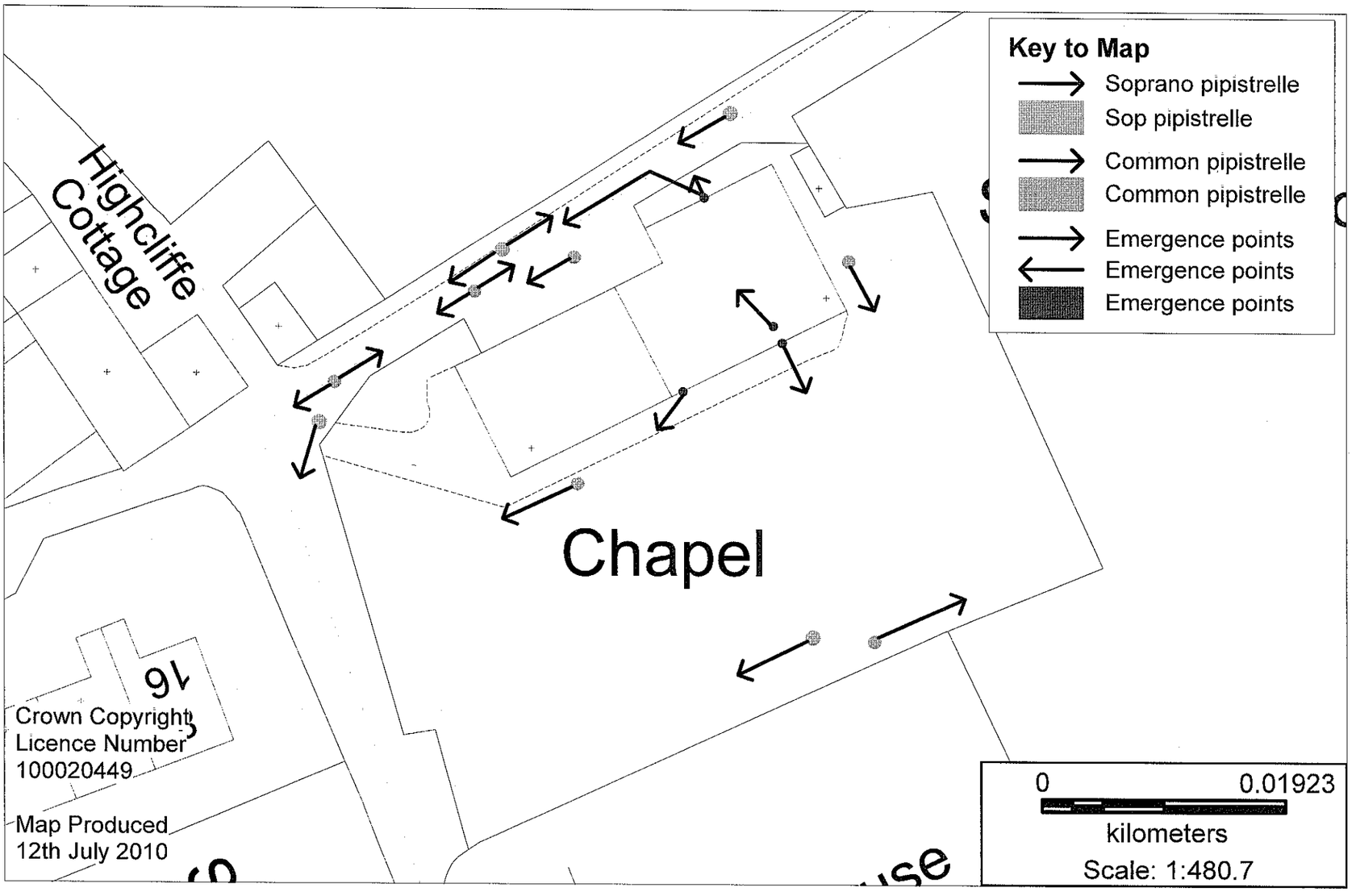
Bat activity survey forms

Weather survey forms

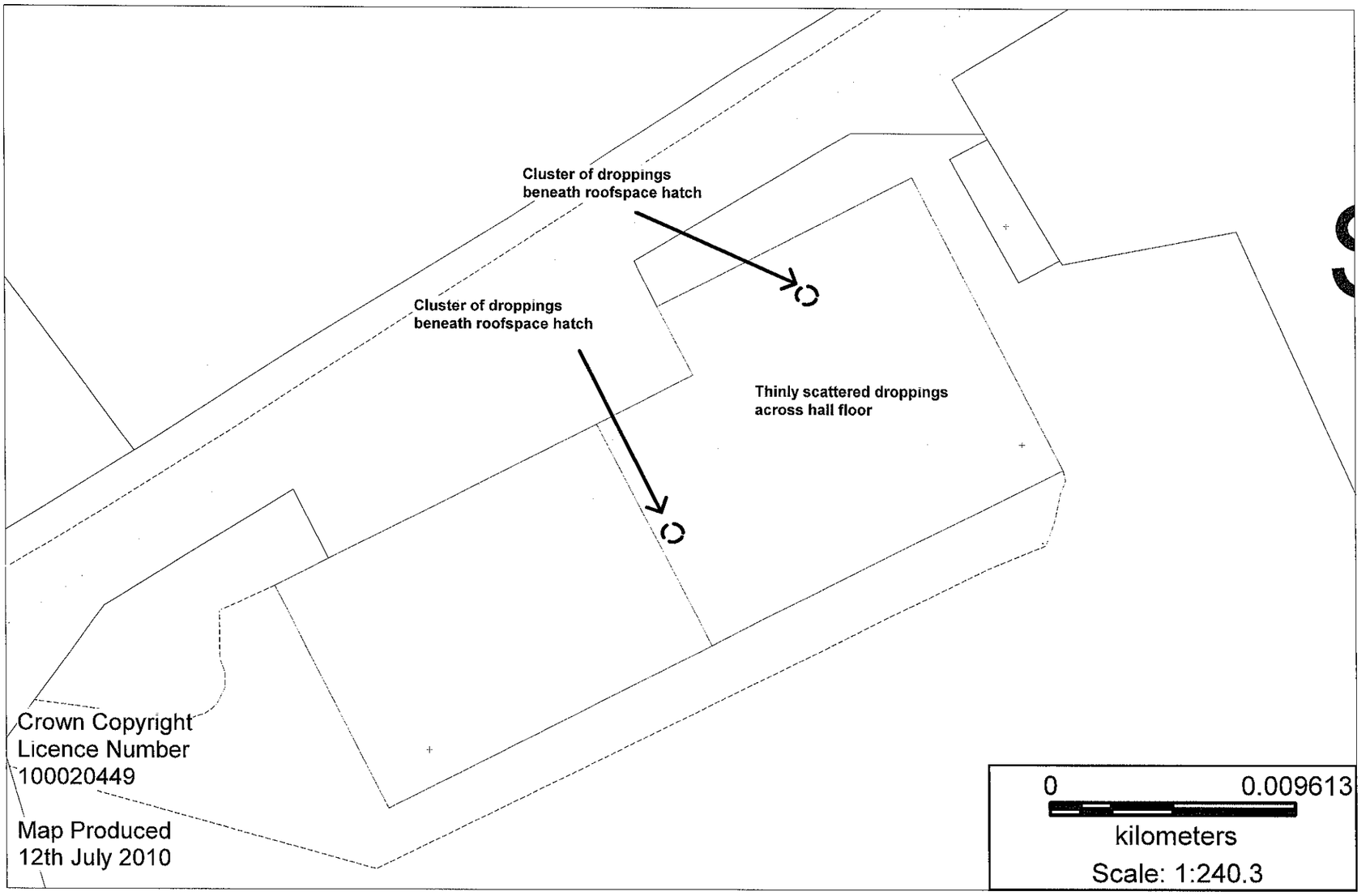
Datalogger results

Sonograms

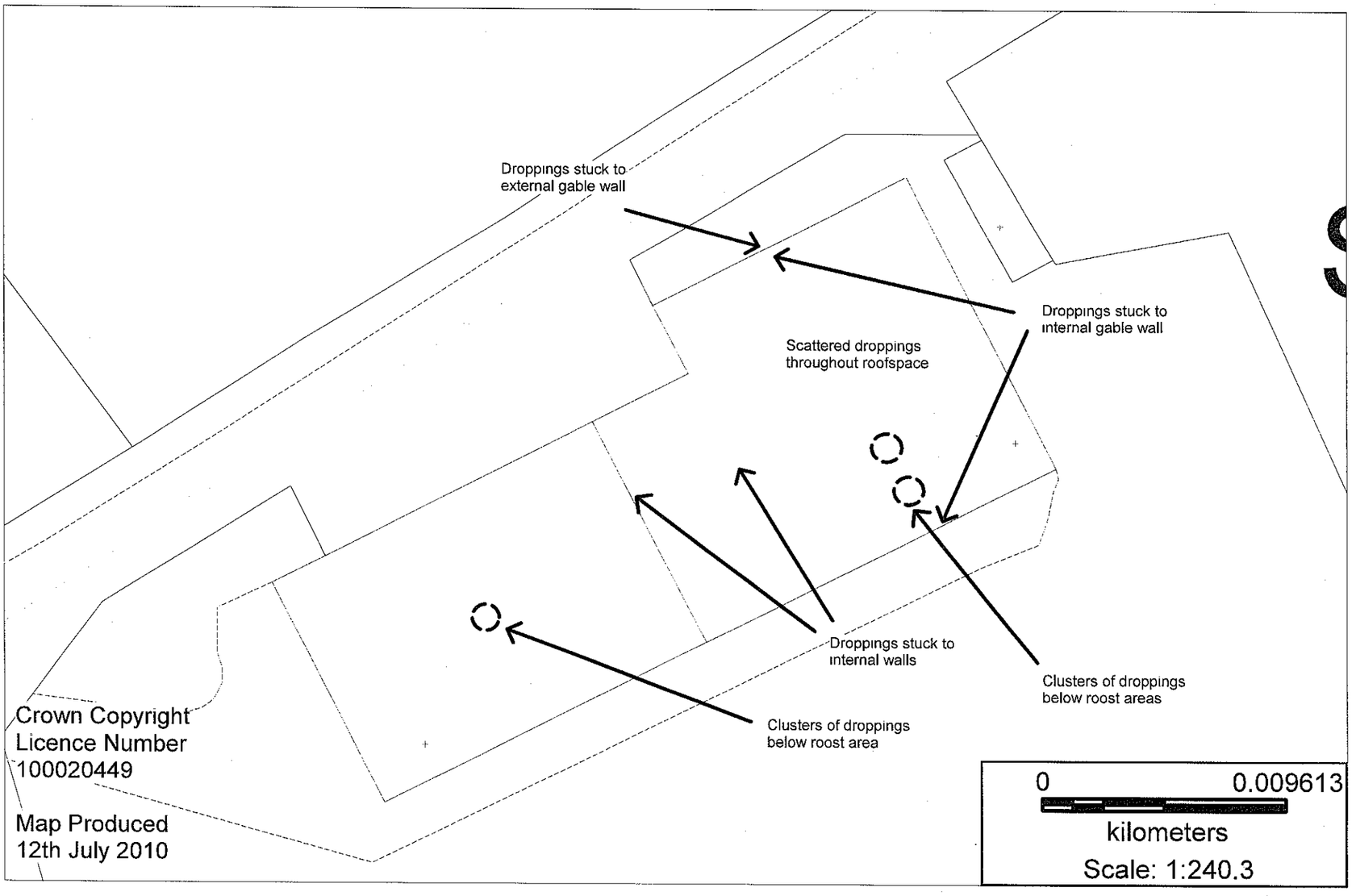
Photographs of buildings and site



Map 1 - Bat Activity at Grindleton Methodist Chapel



Map 2 - Location of Bat Signs - (Ground Floor) of Grindleton Methodist Chapel



Map 3 - Location of Bat Signs - (Roofspaces) of Grindleton Methodist Chapel

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Grindleton Methodist Chapel, Grindleton, Clitheroe
Survey Date(s)	24th April 2010
Timing of survey	2000-2140
Notes	Emergence survey of building – surveyors stationed at north and south elevations of eastern building Sunset at 2028 Total bats emerging = 4 myotis

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Pipistrelle	2052	C	E-W along lane to north of chapel	Detector + sight
Common pipistrelle	2053	C	Horse field to north	Detector + sight + recording
Common pipistrelle	2055	C	NW area beyond site	Detector + sight + recording
Soprano pipistrelle	2101	C	S boundary of churchyard	Detector + sight + recording
Common pipistrelle	2102	C	S boundary of churchyard	Detector + sight + recording
Myotis	2108	E	North gable apex	Detector + sight + recording
Myotis x 2	2111	E	North gable apex	Detector + sight + recording
Myotis (0 40 lux)	2112	E	North gable apex	Detector + sight + recording
Common pipistrelle	2118	C	Lane to N of chapel	Detector + sight + recording
Myotis	2126	C	Lane to N of chapel	Detector + sight + recording

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Grindleton Methodist Chapel, Grindleton, Clitheroe
Survey Date(s)	31st May 2010
Timing of survey	2045 - 2235
Notes	Emergence survey of building – surveyors stationed at north and south elevations of building Sunset at 2125 Total bats emerging = 42 myotis

Bat species	Time of observation	Behaviour (E - emerging C - commuting F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Unidentified	2146	Unknown	Heard in vicinity of north gable (possibly inside building)	Sight + detector
Common pipistrelle	2150	C	N elevation	Detector + sight + recording
Myotis	2154	E	Ridge above south gable	Detector + sight + recording
Myotis	2156	E	Apex soffits on S gable	Detector + sight + recording
Myotis	2158	E	Ridge above south gable	Detector + sight + recording
Common pipistrelle	2159	C	S elevation	Detector + sight + recording
Myotis	2200	E	Ridge above south gable	Detector + sight + recording
Myotis	2201	E	Apex soffits on S gable	Detector + sight + recording
Myotis	2202	E	Ridge above south gable	Detector + sight + recording
Myotis	2203	E	Ridge above south gable	Detector + sight + recording
Myotis	2204	E	Apex soffits on S gable	Detector + sight + recording
Myotis	2211	E	Lower corner of soffits on S gable	Detector + sight + recording

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Soprano pipistrelle	2226	C	S elevation	Sight + detector
Common pipistrelle	2227	C	S elevation	Detector + sight + recording
Myotis x 32	2150 - 2214	E	North gable soffits	Detector + sight + recording

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Grindleton Methodist Chapel, Grindleton, Clitheroe
Survey Date(s)	3rd June 2010
Timing of survey	2100 - 2250
Notes	Emergence survey of building – surveyors stationed at north and south gables of eastern building, as well as along eastern elevation. Sunset at 2132 Total bats emerging = 54 myotis + 1 pipistrelle

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Unknown	2144	Circling	Inside ground floor of building	Detector
Pipistrelle	2147	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x3	2158	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis	2201	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis	2202	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x6	2203	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis	2203	E	South gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x2	2204	E	South gable of building, ridge tile above E roofspace	Detector + sight + recording
Myotis	2204	E	South gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x2	2205	E	South gable of building, beneath soffits at apex	Detector + sight + recording

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Myotis	2206	E	South gable of building, from ridge end	Detector + sight + recording
Myotis	2207	E	South gable of building, ridge tile above E roofspace	Detector + sight + recording
Myotis x2	2208	E	North gable of building, beneath soffits	Detector + sight + recording
Myotis	2209	E	South gable of building, ridge tile above E roofspace	Detector + sight + recording
Myotis x7	2210	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x3	2210	E	South gable of building, from ridge end	Detector + sight + recording
Myotis x6	2211	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis	2212	E	South gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x5	2213	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x2	2214	E	South gable of building, beneath soffits at apex and from ridge tile	Detector + sight + recording
Myotis x2	2215	E	South gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x2	2215	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis	2220	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis x2	2224	E	North gable of building, beneath soffits at apex	Detector + sight + recording
Myotis	2225	E	South gable of building, bottom end of roof	Detector + sight + recording
Unidentified (quiet)	2225	E	South gable of building, bottom end of roof	Detector + sight + recording

BAT ACTIVITY SURVEY FORM	
LOCATION AND PHYSICAL CHARACTERISTICS OF BAT SITE	
Recorder Name(s)	Pat Waring
Site Name	Grindleton Methodist Chapel, Grindleton, Clitheroe
Survey Date(s)	26th June 2010
Timing of survey	2100 - 2300
Notes	Emergence survey of building – surveyors stationed at north and south gables of eastern building, as well as along eastern elevation Sunset at 2143 Total bats emerging = 14 myotis (south gable) + 30 myotis (north gable) Common and soprano pipistrelles active along the lane to north of building between 2226 and end of survey

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Common pipistrelle	2201	C	Into graveyard from east	Detector + sight
Myotis	2206	E	Below south gable soffit	Detector + sight + recording
Myotis	2209	Inside roost	North gable	Detector + recording
Myotis	2211	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2211	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis	2211	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2212	E	From missing mortar on north gable roof edge	Detector + sight + recording
Noctule	2213	C	Flying over	Detector + sight + recording
Myotis	2213	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis x4	2214	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2215	Re-entry	Below soffits (E) on north gable	Detector + sight + recording

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Myotis x2	2215	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis	2215	E	Below soffits (W) on north gable	Detector + sight + recording
Myotis	2216	E	Below soffits (W) on north gable	Detector + sight + recording
Myotis	2218	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis x6	Up to 2218	E	South gable of building, beneath soffits at apex	Detector + sight + recording
Myotis	2219	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis x2	2219	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis x3	2220	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2220	E	Below soffits (W) on north gable	Detector + sight + recording
Myotis	2220	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis x2	2221	E	Below soffits (W) on north gable	Detector + sight + recording
Myotis	2221	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2222	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis	2223	E	Below soffits (W) on north gable	Detector + sight + recording
Myotis	2223	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2224	E	Below soffits (E) on north gable	Detector + sight + recording

Bat species	Time of observation	Behaviour (E - emerging C - commuting, F – feeding R - roosting)	Direction of flight	Method of ID (detector, sight)
Myotis	2227	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2227	E	Below soffits on south gable	Detector + sight + recording
Myotis	2227	E	Below soffits (W) on north gable	Detector + sight + recording
Myotis x3	2228	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis	2228	E	Below soffits (W) on north gable	Detector + sight + recording
Myotis x2	2229	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis	2230	E	From missing mortar on north gable roof edge	Detector + sight + recording
Myotis	2233	E	Below soffits (W) on north gable	Detector + sight + recording
Myotis x2	2235	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2235	E	Below soffits (E) on north gable	Detector + sight + recording
Myotis	2246	Re-entry	Below soffits on south gable	Detector + sight + recording
Myotis	2248	E	Below soffits on south gable	Detector + sight + recording
Myotis	2255	Swarming	Around north gable	Detector + sight + recording
Myotis	2259	Re-entry	Below soffits (W) on north gable	Detector + sight + recording

Emergence and Activity Survey

Site name – Grindleton Methodist Chapel, Clitheroe

Site Grid Reference: SD 7588 4583

Date: 24th April 2010

Natural England Licence Holder: P. Waring

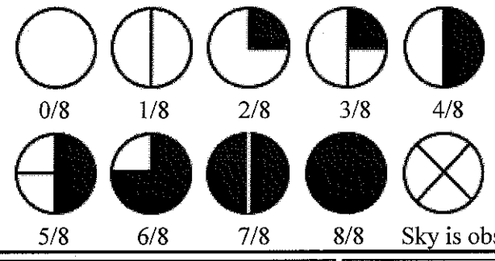
Natural England Licence Number: 20094011

Surveyors:
P. Waring, I. Boniface

Environmental Data

Time of survey	Start: 2000	End: 2140
Solar cycle	Sunrise:	Sunset: 2028
Temperature	Start: 15.2	End: 14.4
Cloud cover (Oktas)	Start: 0/8	End: 2/8

Cloud cover measurement in Oktas.



Wind Speed	Start: 1.7 mph	End: 0.0 mph
Humidity (%) relative humidity	Start: 51.5%	End: 54.5%
Precipitation (descriptive)	None	

Emergence and Activity Survey

Site name – Grindleton Methodist Chapel, Clitheroe

Site Grid Reference: SD 7588 4583

Date: 31st May 2010

Natural England Licence Holder: P. Waring

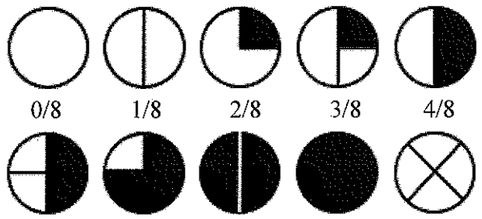
Natural England Licence Number: 20094011

Surveyors:
P. Waring, T. Boniface, M. Murfin, B. Deed

Environmental Data

Time of survey	Start: 2045	End: 2235
Solar cycle	Sunrise:	Sunset: 2125
Temperature	Start: 14.7	End: 14.0
Cloud cover (Oktas)	Start: 8/8	End: 8/8

Cloud cover measurement in Oktas.



Wind Speed	Start: 2.3 mph	End: 2.0 mph
Humidity (%) relative humidity	Start: 71.6%	End: 68.2%
Precipitation (descriptive)	None	

Emergence and Activity Survey

Site name – Grindleton Methodist Chapel, Clitheroe

Site Grid Reference: SD 7588 4583

Date: 3rd June 2010

Natural England Licence Holder: P. Waring

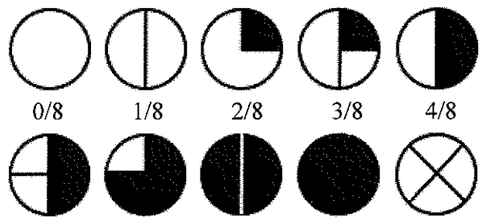
Natural England Licence Number: 20094011

Surveyors:
P. Waring, T. Boniface, B. Deed, S. Ashworth

Environmental Data

Time of survey	Start: 2100	End: 2250
Solar cycle	Sunrise:	Sunset: 2132
Temperature	Start: 18.0	End: 15.4
Cloud cover (Oktas)	Start: 3/8	End: 8/8

Cloud cover measurement in Oktas.



Wind Speed	Start: 3.1 mph	End: 2.5 mph
Humidity (%) relative humidity	Start: 66.8%	End: 66.5%
Precipitation (descriptive)	None	

Emergence and Activity Survey

Site name – Grindleton Methodist Chapel, Clitheroe

Site Grid Reference: SD 7588 4583

Date: 26th June 2010

Natural England Licence Holder: P. Waring

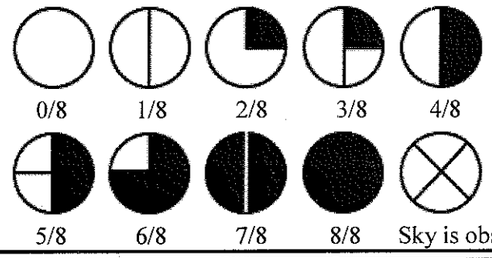
Natural England Licence Number: 20094011

Surveyors:
P. Waring, T. Boniface, M. Murfin, B. Deed

Environmental Data

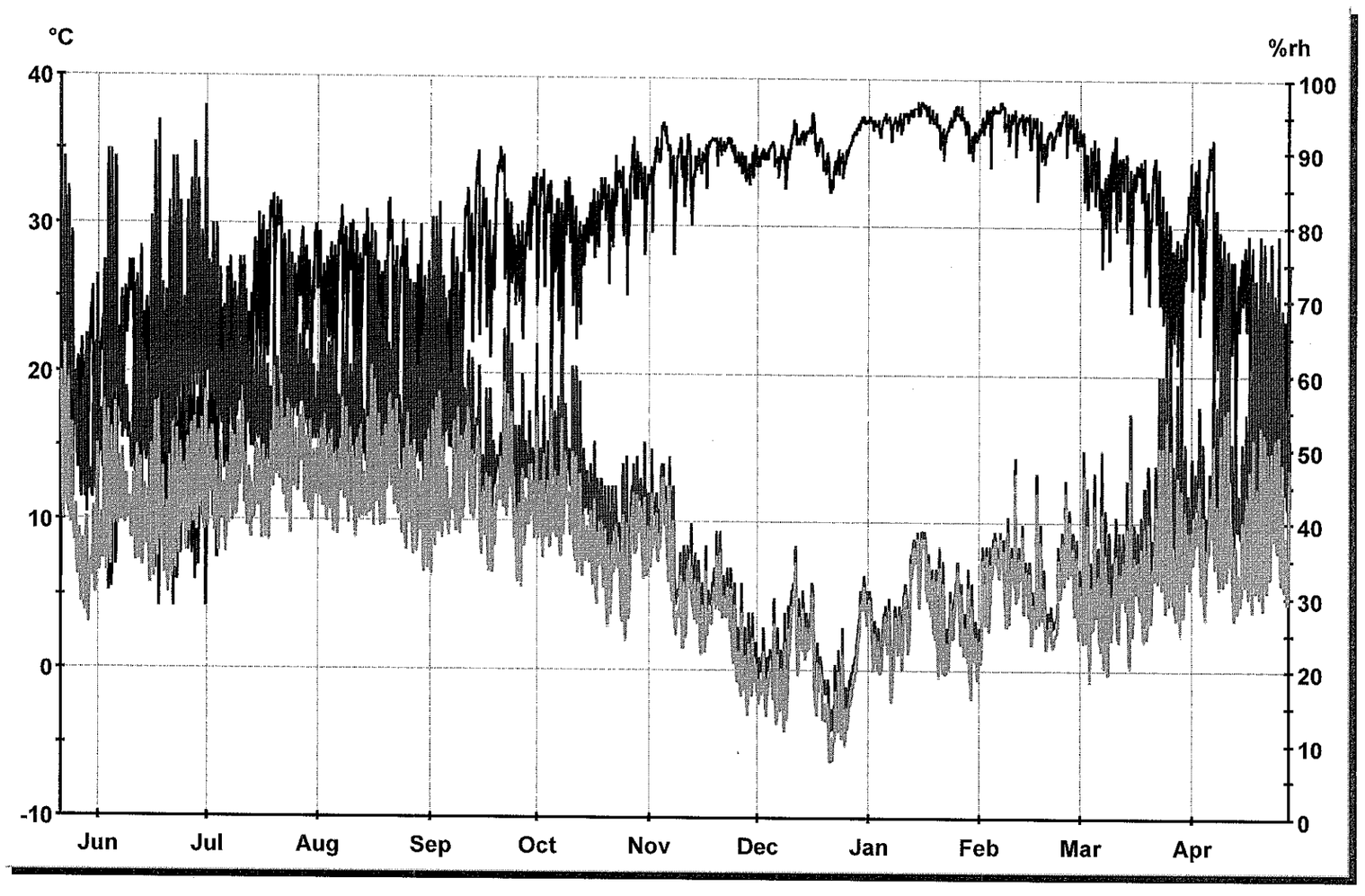
Time of survey	Start: 2100	End: 2300
Solar cycle	Sunrise:	Sunset: 2143
Temperature	Start: 22.5	End: 21.4
Cloud cover (Oktas)	Start: 7/8	End: 7/8

Cloud cover measurement in Oktas.



Wind Speed	Start:0.6 mph	End: 0.0 mph
Humidity (%) relative humidity	Start: 63.6%	End: 62.6%
Precipitation (descriptive)	None	

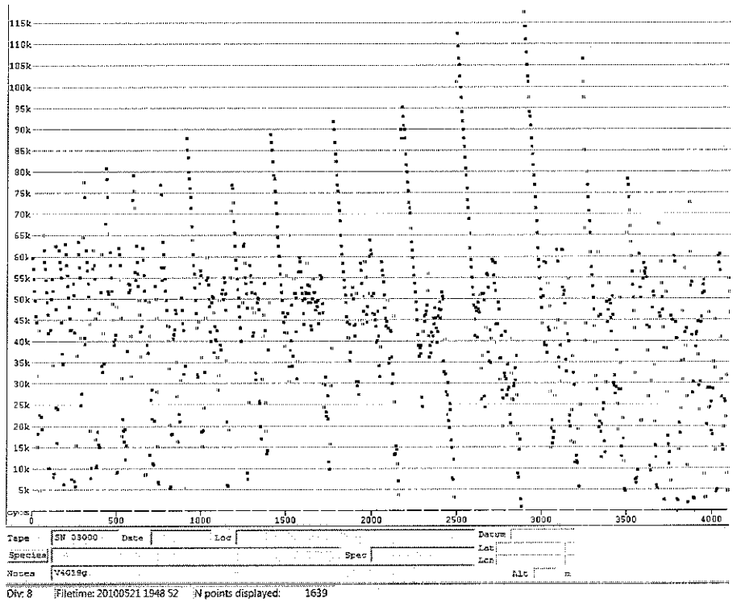
EasyLog USB



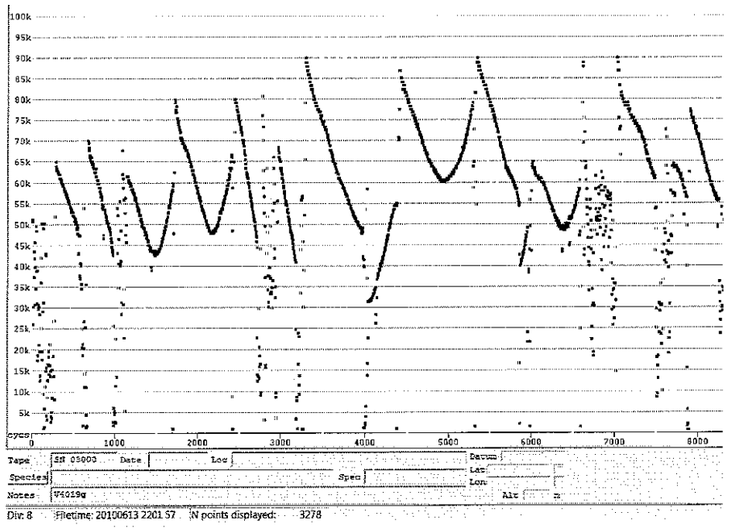
From:- 21 May 2010 12:00:51 To:- 27 April 2011 17:00:51

Sonograms of bat ultrasound – Grindleton Chapel and Sunday School

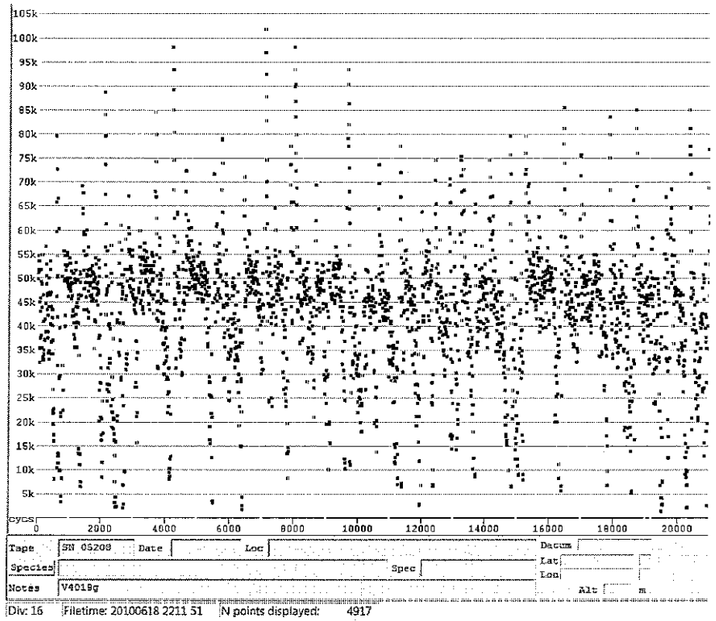
Myotis bat calls, recorded on Anabat inside western roof void – 21st May 2010



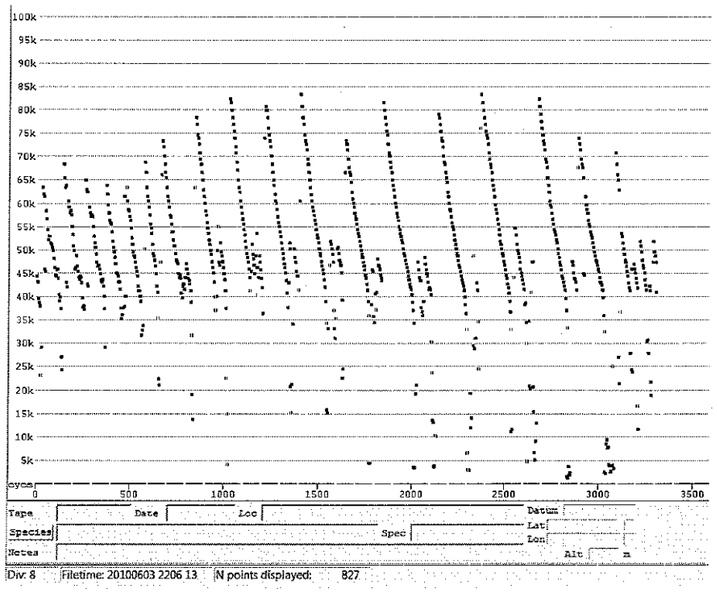
Myotis social calls, recorded on Anabat inside western roof void – 13th June 2010



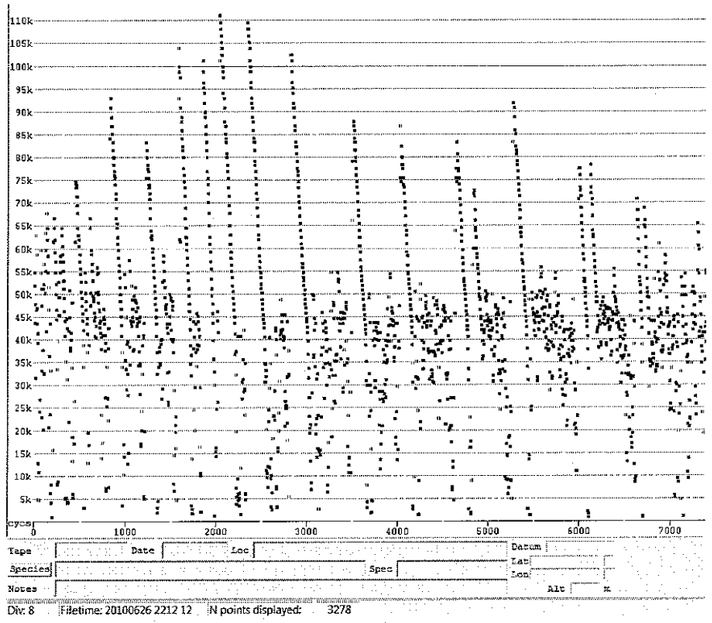
Myotis bat calls, recorded on Anabat inside eastern roof void – 18th June 2010



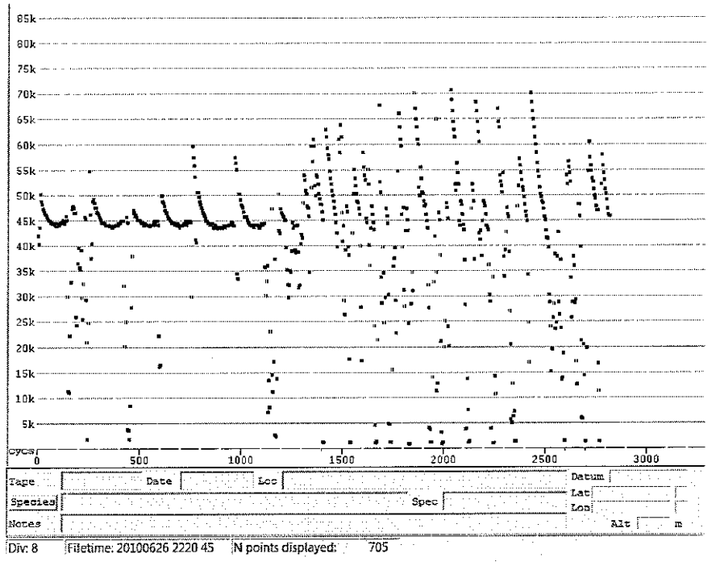
Myotis bat emergence from south gable, recorded on Anabat– 3rd June 2010



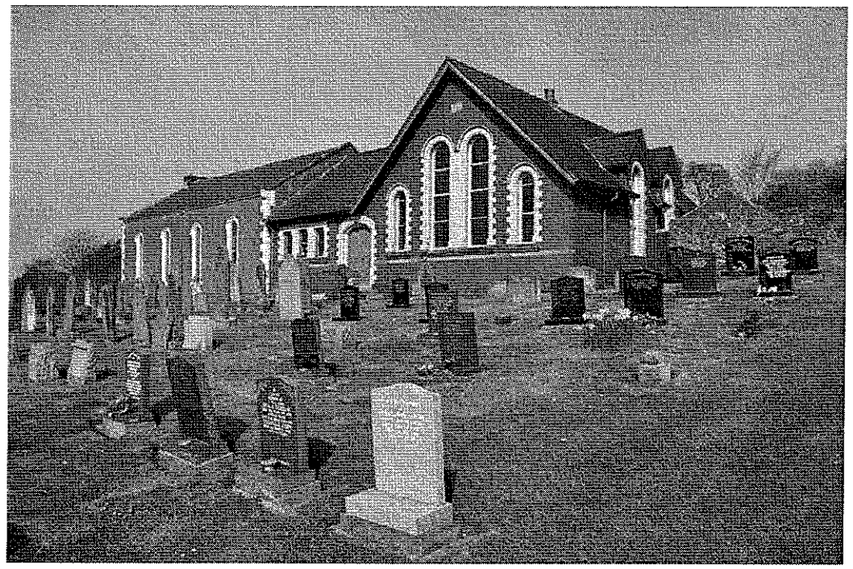
Myotis bat emergence from north gable, recorded on Anabat– 26th June 2010



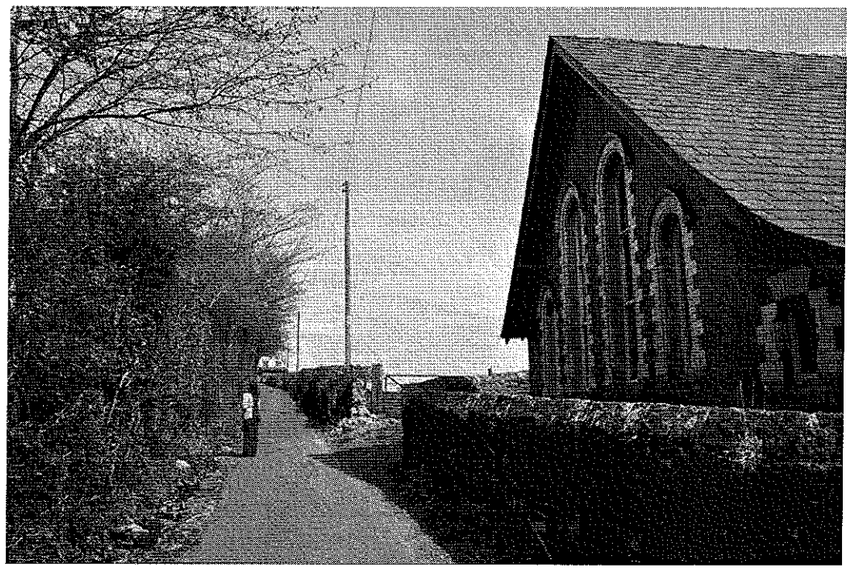
Common pipistrelle and myotis bat calls, recorded on Anabat– 26th June 2010



Photographs of Grindleton Methodist Chapel, Grindleton

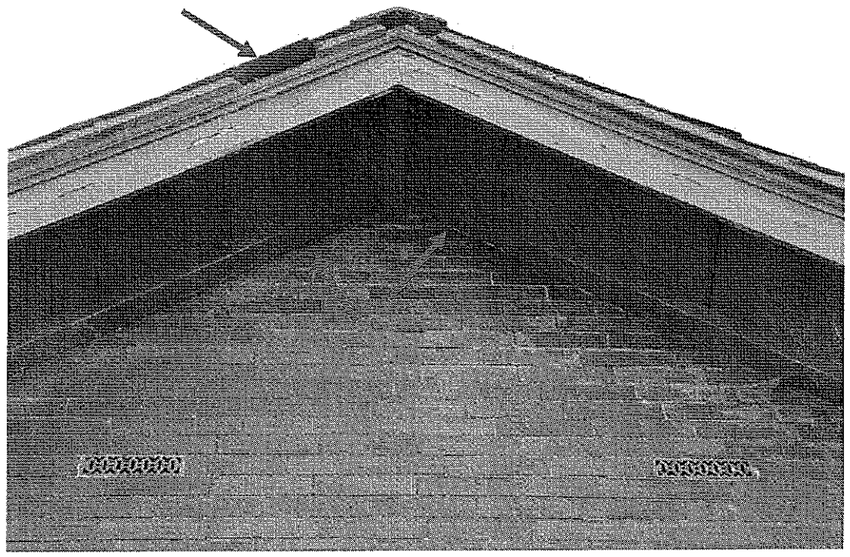


South and east elevation of Methodist Chapel. April 2010.



North gable of Methodist Chapel with hedge adjacent to lane. April 2010.

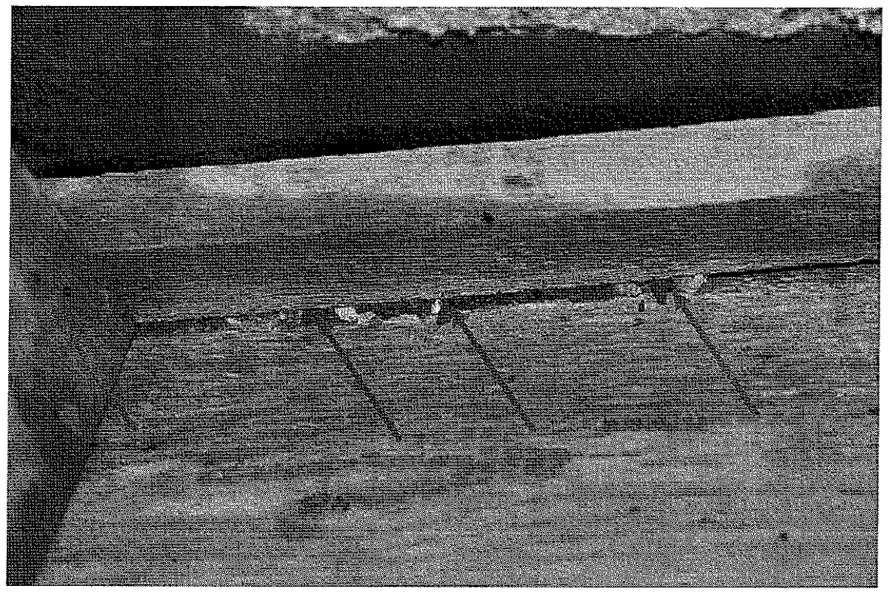
Photographs of Grindleton Methodist Chapel, Grindleton



Detail of north gable elevation showing gaps between soffit and wall and gap along top edge of roof. April 2010.

Ridge tile emergence point above south elevation. May 2010.

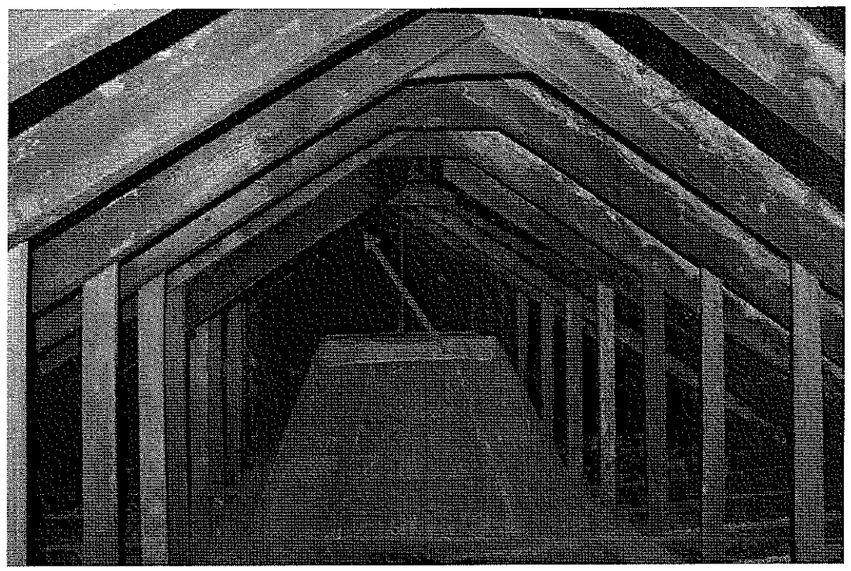
Photographs of Grindleton Methodist Chapel, Grindleton



Droppings spilling into roofspace from beneath ridge tile. April 2010

View of east roofspace. April 2010.

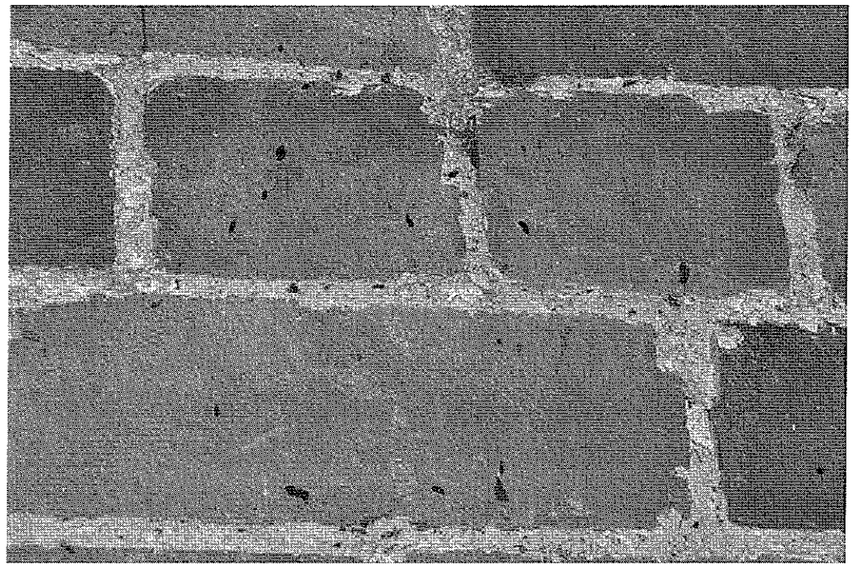
Photographs of Grindleton Methodist Chapel, Grindleton



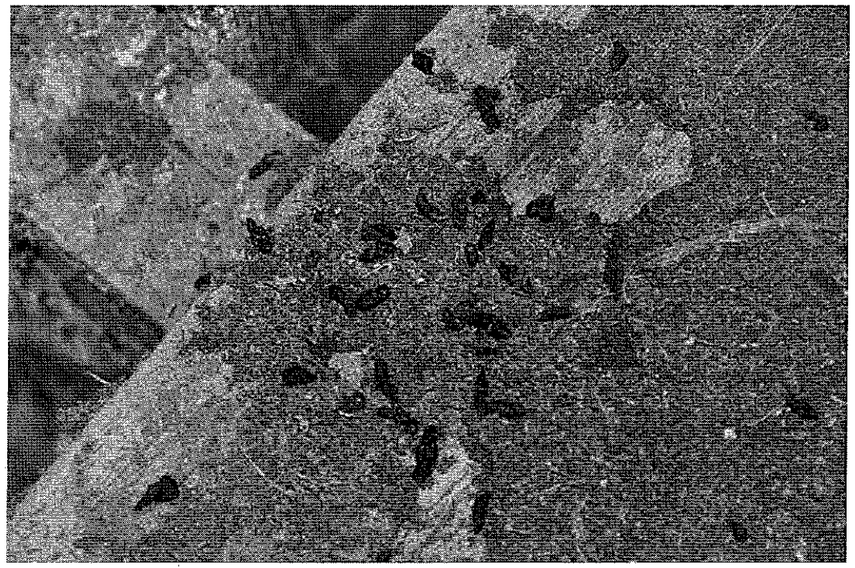
View of west roofspace – bat roost marked with red arrow. April 2010

South interior gable – potential roost site and droppings. April 2010

Photographs of Grindleton Methodist Chapel, Grindleton



Internal wall showing bat droppings. April 2010



Droppings beneath confirmed roosting point in west roofspace. April 2010

Photographs of Grindleton Methodist Chapel, Grindleton

Graveyard to south of Methodist Chapel. April 2010

View of surrounding landscape from graveyard. April 2010

PROPOSED DEVELOPMENT AT GRINDLETON CHAPEL AND SUNDAY SCHOOL, GRINDLETON, CLITHEROE, LANCASHIRE BB7 4RN

METHOD STATEMENT FOR EPS (BAT) LICENCE APPLICATION

Document 1 – Background and Supporting Information

on behalf of

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April 2012

This method statement complies with Natural England guidance document WML-A13.2 (01/11)

ANNEX 1

METHOD STATEMENT FOR EPS LICENCE APPLICATION

A Executive summary

Mr. D. Hartley wishes to undertake refurbishment works at Grindleton Chapel and Sunday School in Grindleton, Lancashire. The works include alterations to the building to enable its use as two dwelling houses, comprising changes to roof coverings, roof voids, soffits and lighting. It is intended that refurbishment will take place between September 2012 and April 2013.

Planning permission is required for the work to take place.

The presence of roosting bats on the site has been known since April 2010.

The building subject to the proposed works was used as a bat roost prior to 2010, then by common pipistrelles, Daubenton's and an as yet unidentified myotis species in 2010 and by bats between 2010 and winter 2011. Based on the evidence available, the building is used by a large maternity roost of myotis bats. Bats have been observed within one roof void of the building, and emerging from roof edges, soffits and a ridge tile.

The proposed development involves disturbance and potential damage to bats and disturbance and damage their roosting and access features; the work will also reduce the size of some areas used by bats and change the condition and functionality of the roost features. The proposed work will take place within and adjacent to roost features and access points for bats.

Mitigation will include:

- Supervision by an appropriately experienced Ecologist
- Retention of the bat roost features within the roof voids of the building
- Replacement of the bat roost features within the roof structures
- The addition of roost features to the roof voids (including squeeze boxes)
- The addition of bat access points to roof void compartments
- The addition of roost features to the building exterior
- The careful management of lighting in the vicinity of the bat access points
- Annual monitoring for five years following the provision of mitigation

Mr. D. Hartley will continue to have ownership of and responsibility for Grindleton Chapel and Sunday School after completion of refurbishment works.

B Introduction

B.1 Background to activity/development

Mr. D. Hartley wishes to undertake refurbishment works at Grindleton Chapel and Sunday School in Grindleton, Lancashire. It is proposed to alter the building to enable its use as two dwelling houses; this includes changes to roof coverings, roof voids, soffits and lighting. It is intended that refurbishment will take place between September 2012 and April 2013.

The development site is located at SD 4702 3134.

Grindleton Chapel and Sunday School is in the ownership of Mr. D. Hartley.

The presence of bats on the site has been known since April 2010.

The building to be refurbished was surveyed for bats in April, May and June 2010 and again in November and December 2011. DNA analysis of bat droppings was carried out in April 2012. A total of 5 species of bat were recorded on site; Common pipistrelle *Pipistrellus pipistrellus* (emerging and flying across the site), soprano pipistrelle *Pipistrellus pygmaeus* (flying across the site), noctule *Nyctalus noctula* (flying across the site), Daubenton's *Myotis daubentonii* (roosting), and an unidentified myotis species (most likely whiskered/Brandt's *Myotis mystacinus/brandtii*) which was recorded roosting, emerging and flying across the site.

A single common pipistrelle bat emerged from one point during one emergence survey. Myotis bats (most likely whiskered/Brandt's *Myotis mystacinus/brandtii*) emerged from multiple points during all emergence surveys. The maximum emergence count was 54 myotis bats. Signs and recordings of bats were obtained from a number of places inside the roof voids of the building. Signs of bat activity were also found in a ground floor room.

The survey findings confirm that Grindleton Chapel and Sunday School is used as a bat roost during spring and summer months. It is very likely that bats occupy the building throughout their active season (April to October). It is unlikely that bats would use parts of the building during the hibernation season.

The proposed works involve replacement of all roof coverings and soffits, replacement of roof void floors and the structural modification of roof voids (including a decrease in the extent and volume of roof void space from approximately 349m^3 to approximately 74m^3). As a result of the proposed works, there will be a change in the condition and functionality of the roost features. The proposed work will affect all known roost features and access points for bats.

Without appropriate mitigation, the actions described above will have a detrimental impact on roosting features and access points as regards bats. A mitigation licence will be required to enable the development to take place lawfully.

It is not possible to gradually exclude bats from all potential roost sites within the building. Work will start at a time of year when bats are expected to be active but present in reduced numbers, and will continue through a period when bats are unlikely to use the building.

A number of measures are necessary to ensure the long term conservation of bat species on the site; these include:

- Retention of all bat roost features in the roof voids of the building
- Retention/replacement of all bat access points
- Replacement of all roost features associated with roof coverings and adjacent features
- The addition of roost features to the roof voids (including squeeze boxes)
- The addition of roost features to the building exterior
- The careful management of lighting in the vicinity of the bat access points
- Annual monitoring for five years following the provision of mitigation

B.2 Full details of proposed works on site that are to be covered by the licence

**** Note that all works affecting known roost sites and access points will be supervised by a suitably experienced and licensed Ecologist.**

B2.1 Works requiring a licence

i) Roof stripping and removal of soffits (including use of scaffolding)

This will involve:

- Damage to and destruction of breeding sites and resting places (bat roosts)
- Deliberate disturbance to bats:
    - To the extent that it is likely to impair their ability to survive, breed and reproduce
    - To the extent that it is likely to impair their ability to rear or nurture their young, and to significantly affect their local distribution and abundance.

In addition, without mitigation measures, there is a risk of killing and injuring bats.

The work will be undertaken by hand by professional building contractors carefully supervised by the Project Ecologist. This work is expected to take place throughout September and October 2012.

ii) Structural modification of roof voids

This will involve:

- Damage to and destruction of breeding sites and resting places (bat roosts)
- Deliberate disturbance to bats:
    - To the extent that it is likely to impair their ability to survive, breed and reproduce
    - To the extent that it is likely to impair their ability to rear or nurture their young, and to significantly affect their local distribution and abundance.

In addition, without mitigation measures, there is a risk of killing and injuring bats.

The work will be undertaken by hand by professional building contractors carefully supervised by the Project Ecologist. This work is expected to take place between September 2012 and April 2013.

iii) Handling of bats during development

This will involve:

- Deliberate disturbance to bats
    - To the extent that it is likely to impair their ability to survive, breed and reproduce
    - To the extent that it is likely to impair their ability to rear or nurture their young, and to significantly affect their local distribution and abundance

In the event that bats are found during works, animals will be captured by the Ecological Consultant with gloved hands. All captured bats will be held temporarily in cotton tie-string bags or other suitable containers and will be immediately transferred to one of the integral wall bat boxes within the external walls of the building.

If any bats are injured during the course of the works, the bats will be immediately taken into care and handed over to local experienced bat carers who are members of East Lancashire Bat Group.

B2.2 Current status of planning permission

Planning permission has not yet been granted for the proposed work.

C Survey and site assessment

C.1 Pre-existing information on the bat species at the survey site

Desk-based studies involved contacting the Biological Records Centre at Towneley Park Museum, Burnley, Lancashire for records of bats in the area around Grindleton Chapel and Sunday School.

Data provided by the Biological Records Centre at Towneley Hall in Burnley provided 2 records of pipistrelle bats (i.e. without distinguishing between the known pipistrelle species) within 2km of the site. One record was for a maternity roost and the other was for a single grounded bat. Both records were from within approximately 100 metres of the site at Grindleton Chapel and Sunday School.

Past surveys by Ecology Services UK Ltd showed that there was a Daubenton's roost (2010 and 2011 – unknown numbers of bats) in a bridge within 900 metres to the south of the site.

C.2 Status of species

There are no published distribution maps specifically relating to bats in the area around Grindleton Chapel and Sunday School, in Grindleton or in Lancashire as a whole.

The known distribution of bats in Lancashire undoubtedly correlates closely with the extent of survey work to date and is very likely to underestimate the true status of all bat species

The Lancashire Biodiversity Action Plan (April 2001) in the section on bats, states:

Sixteen species of bats are known to breed in the UK and eight are resident in Lancashire. These include: brown long-eared, whiskered, Brandt's, Natterer's, Daubenton's and noctule bats. In addition, the pipistrelle, which was formerly thought to be a single species, is now recognised to be two: the 'common pipistrelle', (Pipistrellus pipistrellus) and the 'soprano pipistrelle' (Pipistrellus pygmaeus)

Populations of bats in many parts of Lancashire are comparable in size and importance to some of the best areas in the country.

The valleys of the Lune, Wyre, Hodder, Ribble and their tributaries hold substantial populations of pipistrelles and Daubenton's bats. Many colonies of the latter species roost in bridges over the rivers. There are good numbers of most of the other species also in this area

Clusters of brown long-eared colonies are known from the Silverdale area, Fylde and West Lancashire.

Whiskered and Brandt's bats are probably more common in the north of the county than in southern Lancashire.

Ponds in the Fylde, mill lodges and reservoirs in eastern Lancashire and other areas provide concentrated feeding areas for many bats.

Grindleton Chapel and Sunday School is considered to be of at least county importance for bats due to:

- The number of bat species roosting at the site
- The number of myotis bats roosting at the site
- The presence of a myotis bat maternity roost

C.3 Objectives of the survey

Objectives – building surveys

a) To identify any potential bat roosting habitat.

b) To identify whether bats were present on the site at the time of surveys

c) To identify whether bats had used the site prior to surveys

d) To provide an assessment of the likely importance of the site for bats and bat conservation

e) If bats are roosts are found, to provide advice and recommendations accordingly

Objectives – emergence surveys

a) To identify whether bats were emerging from the target building at the time of survey and, if so, to identify bat numbers and species

b) To provide an assessment of the likely importance of the target building for bats and bat conservation

Objectives – lighting survey

a) To identify light levels in the vicinity of the Grindleton Chapel and Sunday School

b) To assess the likely impact of light levels on bat activity

c) To enable informed decisions to be made about lighting with respect to bats

C.4 Scaled plan/map of survey area

Please refer to annex F 3

C.5 Site/habitat description (relevant to bats)

The site location (SD 7588 4583) and context are shown on a map in appendix F 3.

Building 1 – Grindleton Chapel and Sunday School

The building housing the former Chapel and Sunday School is a large, detached, disused single storey structure with cellars. The building has both brick and stone walls which are partly rendered, and a series of dual pitched, slated roof areas. The roof edges have a mixture of wooden fascias and soffits. The roof coverings are intact and in reasonable condition, although there are a number of lifted slates and occasional gaps in the mortar beneath ridge tiles.

The building has three discrete, accessible and connected roof voids, running throughout the structure. The roof voids have internal brick walls and timber roof supports, which provide potential roost features for bats. Some of the roof areas are lined with bituminous felt, and other areas have torching and no other form of lining. There are many gaps along roof edges and along the ridges. In the western roof void there are occasional rips in the underfelt, giving direct access to the void beneath the ridge tiles. In the eastern roof void the tile battens run up to the ridge beam, effectively sealing the void beneath the ridge tiles from access inside the roof void.

External and internal walls are in a good condition, with no obvious gaps apart from those below soffits on the south and north gables. All windows and doors are intact.

There are potential access features for birds and bats throughout the building, including gaps between soffits and the wall on the north and south gables, access points to roof voids via lead flashing, gaps in wall top stones and gaps beneath ridge tiles. Potential sheltering sites for bats occur throughout the cellars and the roof voids, as well as beneath ridge tiles.

Internal and external areas where bat signs were likely to accumulate had not been disturbed for a number of months up to and including surveys in 2010. This suggests that if signs of bats had been left inside or outside of the building, they would have remained undisturbed up to and during the 2010 surveys.

Building 2 – outhouse

The outhouse lies to the east of the Methodist Hall and is a small, detached, disused single storey structure. The building has brick walls and a single pitched roof area with both slates and corrugated asbestos coverings. The roof coverings are in a poor condition.

The building has no roof voids and the roof areas are unlined.

External and internal walls are in a good condition, with no obvious gaps; however, doorways are uncovered.

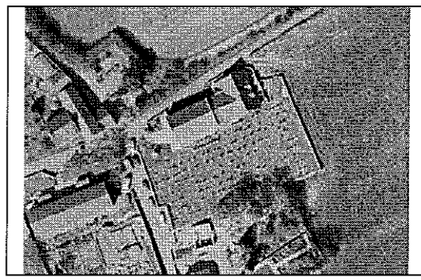
Building 2 is accessible to birds and bats, although it does not contain features suitable for use by roosting bats during daylight hours.

Internal and external areas where bat signs were likely to accumulate had not been disturbed for a number of months. This suggests that if signs of bats had been left inside or outside of the building, they would have remained undisturbed up to and during the survey.

Habitats immediately surrounding the building subject to proposed works

The immediate building surroundings are dominated by the churchyard to the west and south, farm fields to the east and a lane with a mature broadleaved hedgerow to the north. The immediate surroundings offer a significant resource suitable for use by commuting and foraging bats.

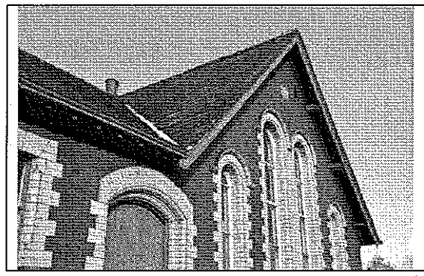
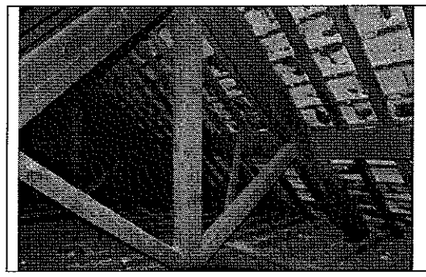
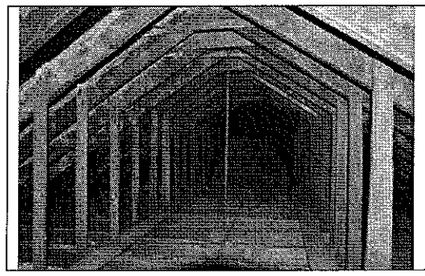
Artificial lighting in the surroundings of the survey site presents a localised potential constraint to bat activity and movement through the landscape. Whilst species such as common pipistrelle and soprano pipistrelle have a wide tolerance to artificial lighting, a number of other species including Daubenton's and other myotis bats are known to have a much more limited tolerance to light levels. In addition, lighting around roost features is known to be a constraint to bat emergence. There is a substantial difference between artificial light spillage around the survey site and the very limited light spillage falling onto the survey site.



Aerial view of the Grindleton Chapel and Sunday School and immediate surroundings.

South elevation of Grindleton Chapel and Sunday School

North elevation of Grindleton Chapel and Sunday School

	Detail of south elevation of Grindleton Chapel and Sunday School – site of bat emergence recorded during surveys
	Eastern roof void of Grindleton Chapel and Sunday School
	Western roof void of Grindleton Chapel and Sunday School
	Ridge tile roost feature

The site surroundings

The wider surroundings are dominated by open countryside, including farm fields, hedgerows and woodland, and the village of Grindleton. Other features within the wider landscape include Grindleton Brook to the west and the River Ribble to the south. The wider surroundings therefore offer significant resources suitable for use by commuting, foraging and possibly roosting bats.

Wider landscape around Grindleton Chapel and Sunday School (site marked with white dot to centre of image)

Artificial lighting in much of the wider surroundings of the survey site is limited in terms of light levels and extent, and is regarded as only a localised potential constraint to bat activity and movement through the landscape.

C.6 Field surveys

Survey methods

C6.1 Building survey

Daytime inspections of the building were carried out on 24th April, 21st May, 3rd June, 30th June 2010 and also 24th November and 5th December 2011.

- Internal parts of the building were subjected to examination for signs of bats, including droppings, urine staining, grease marks, feeding remains and areas clear of cobwebs. A search was also made for live and dead bats.
- An endoscope was used to investigate areas out of reach for hand searching, such as narrow gaps and other confined spaces.
- Previously identified potential access/egress points and roosting features for bats were examined in detail where accessible.
- A range of torches including a Nightsearcher one million candlepower torch and Pentax Papilio 8.5x21 close-focussing binoculars were used as aids to visibility.
- Observations were made from ground level and surrounding vantage points, as well as from telescopic 3.8 metre ladders.
- Notes were made of potential disturbance factors for bats.

- Bat droppings were collected in November 2011 from two locations in the western and eastern roof voids, for use in DNA analysis.

- Measurements of various dimensions were also collected, in order to help characterise the roosting area, and to assist in the planning of mitigation. All measurements were taken with a Leica Disto A5 Laser Distance Meter.

- In the western roof void, a cluster of droppings beneath a roosting point was covered over with a piece of wood after the second building inspection in May 2010. This was done to enable fresh droppings to be caught and observed easily. The wood was checked on all subsequent site visits.

- In all of the roof voids, droppings were cleaned from the roof support timbers after the June 2010 survey.

- A Lascar EL-USB2 datalogger was placed in the western roof void on 21st May 2010 below the known bat roosting point which was discovered on 24th April 2010. The datalogger was checked during subsequent building inspections and then was left to run until 22nd April 2011 (collected in November 2011) to provide long term data to inform the bat mitigation. Temperature and humidity data was logged throughout the survey period.

C6.2 Emergence surveys

Emergence surveys were carried out on 24th April, 31st May, 3rd June and 26th June 2010.

- At the start and end of each survey, a range of environmental readings, including temperature, humidity and wind speed, were taken using a Kestrel 3000 Weather Meter.

- Each survey started approximately 30 minutes prior to sunset and continued until at least 60 minutes after sunset (i.e. until it was no longer possible to see all potential emergence sites clearly or until the bats began to return to the roost). This timing was chosen as it was judged to provide the best opportunity for observing emergence in myotis, pipistrelle and Daubenton's bats (the use of the target building by these species had been determined from evidence found during the April 2010 survey).

  Petersson D240x and D230 bat detectors were used with headphones. In addition, an Anabat with attached PDA was used during all emergence surveys, to supplement the Pettersson detectors.

- Bat echolocation was recorded using Petersson D240x and D230 bat detectors (using frequency division and time expansion systems) and Edirol R-09 24 bit linear PCM recording devices. Data was also recorded using an Anabat during all emergence surveys.

- During emergence surveys, observers stood close to locations that were judged most likely to act as access points for bats, as determined during the building surveys.

- A Sony HDR-XR 520VE camcorder (set on 0 lux Nightshot) and two IRlight6 infra-red illuminators were used during the emergence surveys to assist with observations under low light conditions and to confirm the specific access features used by bats on the north gable of the building. All activity was recorded onto the internal hard drive of the camcorder for further analysis.

C6.3 Anabat surveys

Anabat bat detectors were used to supplement daytime inspections of buildings, as follows:

Building	Anabat location	Dates
East building	North end of roof void by interior gable	21st May – 29th June 2010
West building	East end of roof void, below fly-through point	21st May – 29th June 2010

- The Anabats were set to function every night from at least 30 mins before sunset to at least 30 mins after sunrise the following morning (the time period when bats, if present, were expected to be active).

C6.4 Lighting survey

Measurements of light levels within and around the development site were undertaken at various stages of the bat surveys.

Light levels were recorded in lux using a Konica-Minolta T10 Illuminance Meter at 10 stations. The light sampling points were chosen to give a comprehensive coverage of the area within and around the roost building. Light levels were also measured at the time of the appearance of the first bat and the first emerging bat during each emergence survey.

The illuminance meter was held perpendicular to the most obvious sources of light at all sample points and the highest reading was taken at each point.

The assessment of whether light levels were acceptable for bats was based on published data, past experience and observed bat activity. For example, light levels in those areas where bats were observed to spend time flying were regarded as falling within the tolerance level of the species involved; these light levels were then used as the basis for acceptable illuminance elsewhere on the site.

C6.5 Bat identification

The identification of bat species was confirmed by a combination of droppings analysis, location and type of roost features, direct observation (e.g. the behaviour of bats when seen flying), use of bat detectors and analysis of bat recordings using computer software (Batsound v3.31 and AnalookW).

Analysis of bat recordings involved a series of measurements, including inter pulse interval, pulse duration, characteristic slope and frequency of maximum energy; all of these were compared to a number of known references in order to arrive at an identification of each bat species.

A DNA analysis of two samples of bat droppings was commissioned from the Department of Chemical & Life Science, Waterford Institute of Technology, in April 2012.

C6.5 Personnel

Pat Waring carried out the surveys. Pat is a licensed bat worker (Roost Visitor licence, Science and Education licence and Trainers licence), a Chartered Environmentalist and a full member of the Institute of Ecology and Environmental Management, with a Bachelor of Science degree in Biology.

Pat has been working as an ecological consultant for over fourteen years, most recently as Director of Ecology Services UK Limited. This work includes provision of expert advice and guidance to bodies such as Statutory Nature Conservation Organisations, Local Planning Authorities, National Park Authorities and Lancashire and Yorkshire Police Authorities.

Pat has recognised and extensive experience and knowledge of bat ecology relating to buildings, including the requirements and conditions necessary for bat roosting. Pat also has recognised skills relating to bat surveys and assessments, including use of a range of bat detector models and sound analysis, as well as qualitative and quantitative assessment of the ecological functionality of roost features.

Pat has extensive experience of designing mitigation, compensation and enhancement for a range of bat species. He provides professional training in mitigation design, compliance audits for mitigation and in measuring success of mitigation schemes. He has acted as the Project Ecologist for over 25 licensed mitigation schemes for bats in England.

Pat was accompanied by three other bat surveyors during surveys at Grindleton Chapel and Sunday School:

Tabatha Boniface – licensed bat worker (Roost Visitor licence, Science and Education licence) and professional Ecologist with extensive experience of emergence survey techniques, including use of bat detectors, data recording and sound analysis.

Ben Deed – trainee Ecologist with experience of emergence survey techniques, including use of bat detectors, data recording and sound analysis.

Mike Murfin – trainee Ecologist with experience of emergence survey techniques, including use of bat detectors, data recording and sound analysis.

The survey work was carried out under Natural England licence numbers 20091486, 20101373 and 20114730.

C6.6 Weather conditions and survey summary

Date (2010)	Temp ^{0}C (start/end)	Humidity % (start/end)	Cloud cover % (start/end)	Rain	Wind mph (start/end)
24th Apr	15.2/14.4	51.5/54.5	0/25	None	1.7/0.0
31st May	14.7/14.0	71.6/68.2	100/100	None	2.3/2.0
3rd June	18.0/15.4	66.8/66.5	30/100	None	3.1/2.5
26th June	22.5/21.4	63.6/62.6	90/90	None	0.6/0.0

C7 Results

C7.1 Building surveys

Date	Signs of bats and other relevant information
24th April 2010 (initial visit)	Four myotis bats (3 not identified to species and 1 Daubenton's) were roosting in the roof void above the Methodist Chapel together between a piece of hanging roofing felt and a rafter towards the centre of the roof void in the western part of the building. Evidence of bat presence, in the form of bat droppings, was found attached to internal gable walls and other walls within the roof void of the Methodist Chapel, as well as on the floor and roof support timbers within central and east roof voids. Droppings were also found below an uncovered roof void hatch in the eastern part of the ground floor of the Methodist Chapel, scattered around the room below the roof void and also stuck to the wall beneath the external north gable apex. The droppings included older and much more recent material. No bats or droppings were found in the cellars of the main building. No bats or bat droppings were found associated with the small detached building to the east.

Date	Signs of bats and other relevant information
3rd June 2010	Noticeably greater number of fresh droppings in eastern roof void than on previous visit, particularly beneath ridge and at north and south gable interiors. Scattered fresh droppings throughout western roof void. Also noticeable amount of staining associated with ridge beam in east and west roof voids, with areas clear of cobwebs. No bats visible. Fresh droppings on top of strategically-placed covering below previous roost point in the west roof void. Datalogger readings = 23.5^{0}C (during survey), 39.5^{0}C (highest previous to survey), 11.5^{0}C (lowest previous to survey) Humidity readings = 57% (during survey), 71% (highest previous to survey), 31% (lowest previous to survey)
30th June 2010	Fresh bat droppings on the floor of the east roof void have increased since the last visit. Bat droppings were found spilling out from beneath the ridge at the south end of east roof void (inside the roof void). Datalogger temperature readings = 36.5^{0}C (during survey), 39.5^{0}C (highest previous to survey), 11.0^{0}C (lowest previous to survey) Humidity readings = 53% (during survey), 71% (highest previous to survey), 31% (lowest previous to survey) Data logger in west roof void – temp between 39.2^{0}C and 11^{0}C. There was a very significant increase in fresh droppings above the roof void hatch in the middle of the building (former kitchen area) between the rafter and wall which lie beside the connection between west and central roof voids. This visit was the first time that any droppings were found on the ground floor below the open hatch; no droppings had been recorded here previously.
24th November 2011	West roof void - there was an increase in bat droppings below the known roosting point since the June 2010 survey. East roof void - droppings had appeared on the roof support timbers since the June 2010 survey. Central roof void – two droppings had appeared on the south side of the ridge beam since the June 2010 survey.

The internal dimensions for the roof voids are as follows:

East roof void
L = 11.83m
W = 4.89m
Height (floor to apex) = 2.54 metres (also floor to roost height)

Central roof void
L = 7.94m
W = 8.69m
Height (floor to apex) = 3.34m

West roof void
L = 14.46m
W = 5.52m
Height (floor to apex) = 1.85m

C7.2 Emergence surveys

Date	Signs of bats
24th April	A total of 4 myotis bats emerged from features associated with the north gable
31st May	A total of 42 myotis bats emerged from features associated with the north and south gables
3rd June	A total of 54 myotis bats emerged from features associated with the north and south gables 1 pipistrelle emerged from the north gable
26th June	A total of 42 myotis bats emerged from features associated with the north and south gables

The number of bats counted during emergence surveys suggests that this is a maternity roost. The increase in bat numbers over the period of emergence surveys further supports the idea of a maternity roost.

C7.3 Anabat survey

Anabat records from roost areas

Anabat 1 – east roof void

The results of Anabat recordings clearly show that bats were active within the building throughout each night of recording, often from shortly before sunset until shortly after dawn.

Anabat 2 – west roof void

The results of Anabat recordings clearly show that bats were active within the building throughout each night of recording, often from shortly before sunset until shortly after dawn.

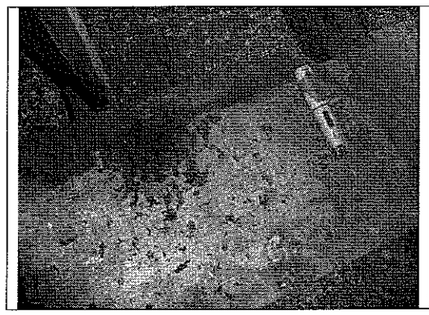
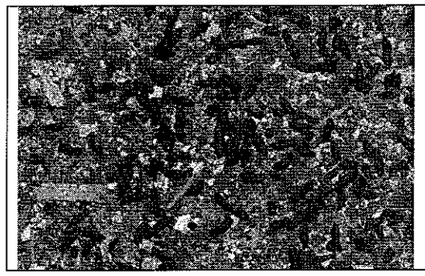
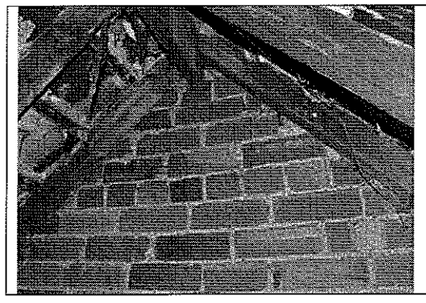
C7.4 Lighting survey

Light meter readings showed that there is a limited amount of artificial illuminance, which is restricted to the western side of the site as a result of low-pressure sodium streetlights along the adjacent lane. There is also occasional illumination from white security lighting along the lane to the north.

C7.5 Bat identification

Bat species recorded during surveys were confirmed as common pipistrelle, soprano pipistrelle, Daubenton's, Myotis and noctule. Sonograms are presented in annex F.1.

NB: The results of the DNA analysis will be presented here when available.

	Bat droppings, urine staining and datalogger on floor of western roof void.
	Bat droppings on floor of western roof void.
	Bat droppings on south internal gable of eastern roof void.

Bat droppings on roof support timbers inside eastern roof void.

C8 Interpretation/evaluation of survey results

Bat numbers

There is no definitive count of overall bat numbers, as some of the roosting features were not viewable during surveys (e.g. internal areas of ridge tiles, soffits and roof linings).

- Bats observed roosting – maximum of 4 bats in a flap of roofing felt at any one time
- Bats known to be roosting (bats emerging) – maximum 54 bats at any one time
- Bats observed emerging – maximum of 54 bats at any one time
- Adult bats – at least 42 (based on the 31st May emergence count, when juvenile bats, if present, would be pre-volant)
- Bat signs - the largest number of fresh droppings (regarded as a surrogate for bat presence and activity during the survey period) was found beneath a known roost feature in the western roof void.

It is recognised that counts of bats at any one time or any one survey period are not reflective of the true value and importance of roosts.

Status of site

Grindleton Chapel and Sunday School is likely to be used by roosting bats throughout most of the active season; bat activity has been recorded in April, May and June. It is judged to be unlikely that bats will use the roof voids or other roosting features during the hibernation season, due to the fact that:

- The datalogger records show that temperature in at least one of the roof voids consistently fell to below 3^0C and fluctuated daily by 8 degrees throughout the winter months

- The roof void in which the data logger was used was the most insulated against temperature changes

The site is therefore regarded as a spring, summer and autumn roost for common pipistrelle, Daubenton's and other myotis bats.

Roost significance

Grindleton Chapel and Sunday School is considered to be of at least county importance for bats due to:

- The number of bat species roosting at the site
- The number of myotis bats roosting at the site
- The presence of a myotis bat maternity roost

Constraints on survey

Surveys took place on several occasions in April, May and June 2010 and in November and December 2011. Limiting the survey period to visits in these months does not take account of bat activity on the site through the whole of the active season (March/April to October) or at other times of the year.

Building surveys

Some bat species, such as pipistrelles and some myotis species are typically crevice dwellers. Droppings and other field signs of the presence of such species are often not visible, as they accumulate in hidden areas which may not be found during routine, non-invasive surveys. This is a frequent limitation when surveying buildings.

The recording system employed by Anabats can only respond to the signal with the highest intensity. As the signal from some bat species (such as common pipistrelles) will nearly always be more intense than that of other bat species (such as brown long eared bats), it is possible that some bat signals were not recorded. As a result, some bat activity is likely to have been under-recorded.

As with most buildings, the roof coverings could not be examined in detail due to limits on access and concerns about the safety of surveyors. However, most of the roof coverings were visible from ground level and from other vantage points; this enabled an assessment to be made in relation to potential for roosting areas for bats.

Emergence surveys

The echolocation used by some bats is very quiet and difficult to detect; species such as brown long eared bat may have been present without registering on the bat detectors used during the emergence surveys.

The bat survey was restricted by the height of the buildings and limited visibility of roof structures. Some bats emerged and flew at a distance from surveyors that prevented them from being heard or recorded via bat detectors.

Anabat survey

The recording system employed by Anabats can only respond to signals with sufficient intensity. As some signals emitted by bat species are of low intensity, it is possible that some of the bat activity was greater than that suggested by the Anabat recordings.

Datalogger

A single datalogger was used to gather temperature and humidity information. As the datalogger was in a fixed position, and as the roof voids differ in volume, construction and environmental conditions, the information gathered is not necessarily representative of all the roof voids.

The datalogger was stationed inside one roof void and the data gathered does not, therefore, necessarily relate to other roost features such as soffits or ridge tiles.

D Impact Assessment in absence of mitigation

NB: Judgements in this section are made in relation to table 6.1 in the Bat Mitigation Guidelines

D.1 Short term impacts: disturbance

Impacts include the disturbance and destruction of a number of bat roosting features and bat access points:

- Roof coverings, including ridge tiles with gaps along the top of the eastern roof area
- Roof support timbers
- Roof lining in the western roof void
- Soffits on the gable ends of the eastern part of the building
- The western end of the western roof void

The proposed works are also likely to result in disturbance to bats, and possibly also direct harm to bats.

This is regarded as a **medium negative impact** on a county scale.

D.2 Long-term impacts: roost modification

The proposed work will permanently reduce the amount of space inside the roof voids used by bats; this will change the condition and functionality of the roost features as well as the flight space available to bats. It is very likely that the proposed work will alter the environmental conditions of all of the roof voids.

The proposed work will permanently remove the roosting features associated with external soffits and ridge tiles.

Overall, this is regarded as a **medium negative impact** on a county scale.

D.3 Long-term impacts: roost loss

The proposed work will remove most of the known and likely roost features, as well as all of the access points for bats, effectively making the roost features unusable.

This is regarded as a **high negative impact** on a county scale.

Impact at the local level

Bat species	Known roosts from 2km data search area and other data	Known roosts from data search + surveys of proposed development site	Survey building as % of known roosts
Common pipistrelle	1	2	50%
Daubenton's	1	2	50%
Myotis	0	1	100%

The proposed work will have a **high negative impact** on a local scale.

However, the available data about other roost sites is very unlikely to be a true reflection of bats in the area. It is much more likely that the loss of common pipistrelle and Daubenton's roosts would be a **low or medium negative impact**.

Impact at the regional level

Bat species	Roost sizes known from region	Roost size known from proposed development site	Size of roost from proposed development site (large, medium, small)
Myotis	1 - 70	54	Large

The proposed work will have a **low negative impact** on a regional scale as regards common pipistrelle and Daubenton's bats.

The proposed work will have a **high negative impact** on a regional scale as regards myotis bats.

Impact at the national level

In national terms, the roosts of all bat species in Grindleton Chapel and Sunday School would be regarded as of small or medium size. The proposed work will have a **low or medium negative impact** on a national scale.

D.4 Long-term impacts: fragmentation and isolation

There will be no sheltering vegetation (e.g. trees) removed as part of the development.

There will be no impact on linear features as a result of the proposed development.

A map of predicted impacts is included in appendix F.4 to this document.

D.5 Post-development interference impacts

Post-development interference impacts are expected to be limited to those associated with the use of new artificial lighting.

New artificial lighting positions will be installed over all doors and French windows at approximately first floor level.

Illuminance levels will be as follows:

- Road side car parking and building perimeter walk way = 20 lux
- Entrances and steps = 50 lux

Based on the information provided, light spillage will fall onto some of the features surrounding the building, including the hedge alongside the track to the north of the property.

This is regarded as a **medium negative impact** on a county scale.

D.6 Predicted scale of impact on species status

Status at the site

Grindleton Chapel and Sunday School provides the only known common pipistrelle, Daubenton's and myotis maternity roost location at the survey site. The impact of the proposed work on the status of all species would be **high - negative** at the site level.

Status at the local level

Bat species	Known roosts from 2km data search area and other data	Known roosts from data search + surveys of proposed development site	Survey building as % of known roosts
Common pipistrelle	1	2	50%
Daubenton's	1	2	50%
Myotis	0	1	100%

Based on the available data, Grindleton Chapel and Sunday School is clearly an important site for roosting bats, supporting a significant percentage of common pipistrelle, Daubenton's and myotis roosts at a local level. In addition, buildings supporting three species of roosting bats are rarely found in Lancashire. However, current knowledge of bat roosts of all kinds in Lancashire is incomplete and therefore a judgement can only be made with limited confidence. As a precaution, the impact of the proposed work on the status of all species would be **high - negative** at the local level.

It is, however, recognised that the available data about other roost sites is very unlikely to be a true reflection of bats in the local area. It is much more likely that the impact of the proposed work on the status of all common pipistrelle and Daubenton's would be **low/medium - negative** at the local level.

The impact of the proposed work on the status of myotis species would be **high - negative** at the local level.

Status at the county level

Bat species	Roost sizes known from county	Roost size known from proposed development site	Size of roost from proposed development site (large, medium, small)
Myotis	1 - 70	54	Large

In county terms, the common pipistrelle and Daubenton's roosts in Grindleton Chapel and Sunday School would be regarded as of small size. This type of roost is found/likely to occur frequently throughout Lancashire in a wide range of landscapes and locations. The impact of the proposed work on the status of common pipistrelle and Daubenton's bats would be **low - negative** at the county level.

In county terms, the maternity roost in the Grindleton Chapel and Sunday School would be regarded as of a large size. This type of roost (large size maternity roost of myotis bats on a county scale) is found very rarely in Lancashire. The impact of the proposed work on the status of myotis bats would be **high - negative** at the county level.

In county terms, buildings supporting three species of roosting bats are found rarely. The impact of the proposed work on the status of this type of roost would be **high - negative** at the county level.

Status at the regional level

In regional terms, the common pipistrelle and Daubenton's roosts in Grindleton Chapel and Sunday School would be regarded as of small size. This type of roost is found/likely to occur frequently throughout the region in a wide range of landscapes and locations. The impact of the proposed work on the status of common pipistrelle and Daubenton's bats would be **low - negative** at the regional level.

In regional terms, the maternity roost in the Grindleton Chapel and Sunday School would be regarded as of a large size. This type of roost (large size maternity roost of myotis bats on a regional scale) is found rarely throughout the region. The impact of the proposed work on the status of myotis bats would be **high - negative** at the regional level.

In regional terms, buildings supporting three species of roosting bats are found rarely. The impact of the proposed work on the status of this type of roost would be **high - negative** at the regional level.

E References

BCT (2012) *Bat Survey Guidelines*. Bat Conservation Trust

Ecology Services UK Ltd (2012) *Bat Survey Report – Grindleton Chapel and Sunday School, Grindleton*. Mr. D. Hartley

Mitchell-Jones, A. J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.

Mitchell-Jones, A. J. & McLeish, A. P. (1999). *The Bat Workers' Manual (2nd Ed.)*. JNCC, Peterborough. ISBN 1-86107-462-X. [3rd edition in 2004].

F Annexes

F.1 Pre-existing survey reports

F.2 Raw survey data

Please refer to F.1

F.3 Scaled plan/map of survey area (section C.4)

F.4 Scaled map of impacts (section D.4)

F.5 Sonograms (please refer to appendices in F.1)

PROPOSED DEVELOPMENT AT GRINDLETON CHAPEL AND SUNDAY SCHOOL, GRINDLETON, CLITHEROE, LANCASHIRE BB7 4RN

METHOD STATEMENT FOR EPS (BAT) LICENCE APPLICATION

Document 2 – Delivery Information

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April 2012

This method statement complies with Natural England guidance document WML-A13.2 (01/11)

METHOD STATEMENT FOR EPS LICENCE APPLICATION

A Mitigation and compensation

A.1 Summary of mitigation strategy

The mitigation strategy consists of the following main elements:

1) Overseeing of the project by a small team consisting of the site owners, Project Architect, and the Project Ecologist.

2) Programming of works to avoid the spring and summer roosting periods.

3) Putting safeguards in place before the start of proposed works

- Providing three permanent, purpose-built, integral wall bat boxes on the exterior of the building, to be used initially to house bats found during development work

4) Management of safeguards during development

- The adoption of procedures to ensure that all roost sites are carefully searched and dismantled to minimise impacts on bats, under the direct supervision of the Project Ecologist

5) Provision of positive features during development

- Avoidance of artificial light spillage around the Chapel and Sunday School and around bat flyways

6) Monitoring of bat use of the site during and after the period of development

By adopting the strategy as outlined above:

- Incidental capture and killing of bats and disturbance to bats have been given full consideration
- It is predicted that there will be no reduction in the range or population of bats at the site
- There will be no reduction in habitats used by bats
- There will be no adverse changes to connectivity at the site or between the site and the wider landscape
- The long term security of bats at this site has been safeguarded

This will ensure that **the contribution made by the site to the favourable conservation status of bats will be maintained.**

A scaled plan to enable the mitigation to be compared with the survey results is included as appendix G.1.

B Works to be undertaken by the Ecologist or suitably experienced person

B.1 Capture and exclusion

The Project Ecologist will oversee the installation of three integral wall bat boxes, prior to any other works being undertaken that might affect bats and bat roosts.

Prior to any works undertaken by contractors that might affect bats and bat roosts, all contractors will attend a toolbox talk by the Project Ecologist. In addition, the Ecologist will prepare a summary method statement specifically for contractors. Contractors will be required to read the method statement and sign to this effect. The contractor method statement will be displayed on site at all times, along with the mitigation licence. This work will take place in September 2012.

Prior to any works undertaken by contractors that might affect bats and bat roosts, parts of the building likely to provide roosting opportunities will be searched and where possible dismantled by/under the close supervision of the Project Ecologist. This work will take place in September 2012.

Following the initial building search, the roof structures of the building, including soffits and ridge tiles, will be subject to a staged strip by hand. This work will be supervised by the Project Ecologist and will take place in September and October 2012.

The timing for this phase is appropriate as:

- It will avoid disturbance to bats and loss of roosts when bats are most dependent on these resources. Based on the information available, the period between September and April is the timing with lowest risk to bats.

- Bats are expected to be active in September-October and therefore able to disperse from their roosts to alternative roosting sites.

In the event that bats are found during works, animals will be captured by the Ecological Consultant with gloved hands. All captured bats will be held temporarily in cotton tie-string bags or other suitable containers and will be immediately transferred to one of the integral wall bat boxes within the external walls of the building. The integral wall boxes will be accessible to the Project Ecologist and to bats at all times during development.

If any bats are injured during the course of the works, the bats will be immediately taken into care and handed over to local experienced bat carers who are members of East Lancashire Bat Group.

Refurbishment will continue after the staged strip, using techniques which will allow the Project Ecologist to inspect any further roosting sites that become evident for the presence of bats.

If a bat is found when the Project Ecologist is not on site, work will stop immediately and will not recommence until the Project Ecologist has given advice.

Map to show location of capture and exclusion activities.

Please refer to annex G.2

B.2 Other precautionary measures

The Project Ecologist will oversee and closely supervise all aspects of the mitigation and compensation.

A compliance audit will be undertaken throughout the mitigation and compensation process by the Project Ecologist. The audit will extend to all works associated with the mitigation licence and will be used to advise the developer about compliance with the mitigation licence. Monitoring visits will form part of the later stages of the compliance audit.

The Project Ecologist will provide letters or emails to the developer confirming satisfactory completion of mitigation activities and features at appropriate times in the project calendar.

C Works to be undertaken by the Developer/Landowner

C.1 Bat roosts

C.1.1 In-situ retention of roosts

The following aspects of the existing roost features at the Chapel and Sunday School will be retained in-situ:

- Roof support timbers – currently used by the bats for roosting, as evidenced by the presence of bat droppings and staining
- Internal roof void walls – currently used by bats for roosting, as evidenced by the presence of bat droppings and staining
- Roof void spaces (approximately 74m^3 to be retained) – regarded as essential to the continued ecological functionality of the roost

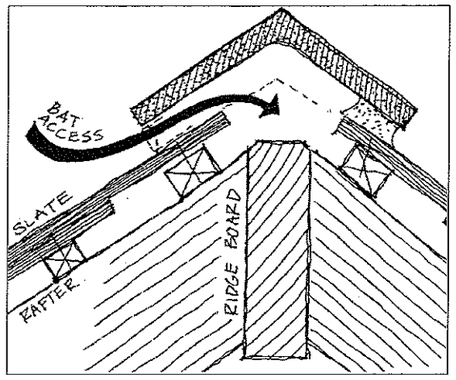
C.1.2 Modification of existing roosts

Access for bats

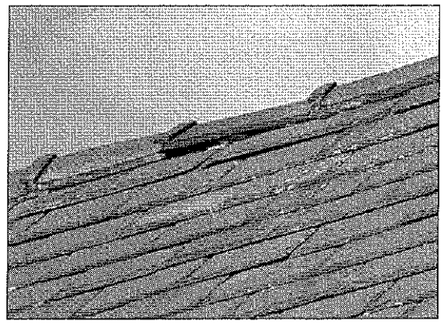
There will be a number of bat access points to the building:

Ridge access

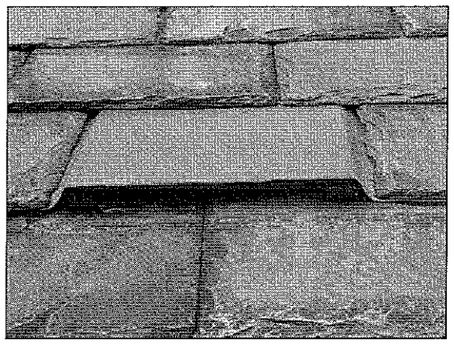
- Bat access points will be created along the ridge of the roof (western ridge = 3 access points, central ridge = 1 access point, eastern ridge = 4 access points). Each access point will be created by providing a narrow gap at the base of a ridge tile (max dimensions 20mm x 100mm). The narrow gaps will lead into an enclosed, discrete section of space below the ridge tiles.
- Lead saddles will be installed in the lower 1/3 of all roof pitches (western roof = 6 lead saddles, central roof = 2 lead saddles, eastern roof = 4 lead saddles), giving crawl-in access to the roof lining and the roof void. Half of the saddles will lead indirectly to a space between the roof covering and the roof lining and others will lead into the roof voids below. All areas associated with saddles where bats will come into contact with the roof lining will be covered in traditional bitumastic hessian felt
- Two 20mm x 100mm gaps at the base of the soffits where they lie against the wall close to the apex at the north and south gables of the eastern roof, giving a crawl-in access to the soffits. The bats will be able to enter the roof void behind the soffits, through gaps made/retained over wall tops.



Indicative example of roost feature beneath ridge tile



Indicative example of lifted ridge tile



Indicative example of lead saddle

Rationale

- The access points will reproduce and improve on existing conditions, where bats have access to the building interior through gaps in roof coverings and soffit edges.

- Ridge and soffit access are appropriate enhancement measures as they will provide permanent, maintenance-free access features for bats. These types of features are suitable for crevice-dwelling bats such as myotis and pipistrelle species; these species have been observed using gaps in roof coverings and roof edges as access points in north west England.

Roost features for bats

The building will incorporate a diverse range of bat sheltering features associated with the interior and exterior of the structure.

Internal to roof voids

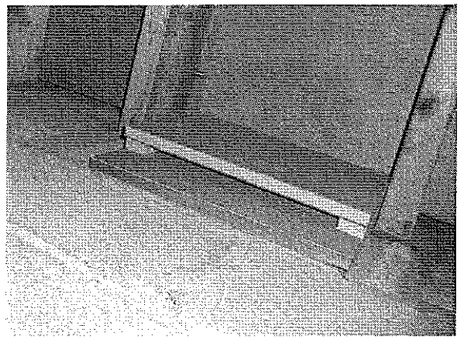
- On sheltered wall tops including all accessible gable ends – wall tops will be left accessible to bats by the provision of 20mm gaps between wall tops and roof underlinings

- Squeeze boxes (20-25mm gaps) attached to gable walls (minimum 3 boxes per wall). Each squeeze box, which will be constructed of untreated softwood, will be attached at the top of an internal wall to create a narrow enclosed space with a single access point at the base of the box. Squeeze box dimensions will be as follows:

  Width = 450mm
  Height = 450mm
  Gap = 20mm

- Exposed (i.e. uncovered) ridge beam, rafters and roof lining

- Squeeze boxes created by attaching timbers to sections of the ridge beam, to create narrow vertical and triangular cavities



Example of squeeze box to be installed in the roof void

External to roof

- The bat access points along the ridges of the roof will lead to discrete sections of space beneath the ridge tiles. These new roost features will be enclosed at either end by a mortar plug, and will have the following approximate dimensions:

  Width = 150mm
  Height = 100mm
  Length = 300mm

- The gable end walls of the north and south elevations of the building will have wooden boxed soffits. The soffits, each of which will be accessible via a 20mm x 100mm slot close to the apex against the wall, will provide linear cavities suitable for roosting on the exterior of the structure. Bats will be able to enter the soffit by landing on the wall beneath and crawling up the wall into the soffit.

Rationale

- The proposed internal roost features will reproduce and improve on conditions in the existing building, where bats are roosting against the ridge beam, on wall tops and between the roof lining and the roof covering.

- The squeeze boxes are an appropriate compensation measure as they provide crevice roost features with high thermal stability. Myotis and pipistrelle bat species are known to roost in features with similar properties throughout the UK.

- Ridge and soffit roost features are appropriate measures as they reproduce existing roost features. They will also provide permanent, maintenance-free features for bats. These types of features are suitable for crevice-dwelling bats such as myotis and pipistrelles; these species have been observed using roof coverings and roof edges as roosts in north west England.

Internal and external environmental conditions

There will be no artificial light spillage inside the roof voids or any other bat roosting features. Natural light incursion will be limited to bat access points. There will be no windows or roof lights in the roof areas covering the voids dedicated to use by bats. Artificial light spillage onto the bat access points to the new bat building will be strictly limited and will be below 0.5 lux at all times. Artificial light spillage onto bat flight lines into and out of the building (from ground floor door heights upwards) will be strictly limited and will be below 0.5 lux at all times.

The majority of the bat access points will be orientated so that they are facing directly towards either sheltering vegetation or unlit open space.

Rationale

- Bats will be able to emerge from and re-enter roost features via dark flying spaces close to sheltered flyways and known foraging areas for bats. This will reproduce conditions in the existing building, where bats can presently emerge from and re-enter the building via dark areas with sheltering vegetation nearby

Construction details

The roof of the Chapel and Sunday School building will comprise natural dark slates to form a series of dual pitched structures. The areas dedicated for use by bats will not have any windows or roof lights. The slates will be laid on 20mm softwood tanalised battens, laid on a single layer of traditional bitumastic roofing felt. If a modern breathable roof membrane is required to comply with Building Regulations, this will be of a type specified for safe use in bat roosts; in this case the area running down from either side of the ridge beam will be underlain with traditional bitumastic roofing felt and the breathable membrane will be underboarded with thin plywood where required to prevent bats coming into contact with it. The roof underlining will be laid on timber rafters and the internal roof construction will be of a traditional cut and pitch design (i.e. without trusses, hangers, braces or spars) to maximise the void space for bat flight and roosting.

Lead saddles will be formed on site from code 6 lead.

The roof void floors will be weight-bearing, to enable safe inspections after completion and during future monitoring.

Rationale

- The roof materials are appropriate as they will maximise the solar heat gain (as per the existing roost building) and will make a positive contribution to the thermal mass of the structure.

- A weight-bearing floor is necessary to enable safe access for monitoring by the Project Ecologist

Dimensions

Floor to apex western void = 1850mm
Floor to apex central void = 700mm
Floor to apex eastern void = 2000mm

The roof voids will be linked to enable free flight between all voids. The roof supports will be as in the existing building (traditional cut and pitch construction, with no use of trusses, hangers, braces or spars).

Rationale

- The dimensions and arrangement of spaces and crevices will reproduce conditions in the existing roof structure, where bats have access to a range of roof voids, as well as roof structures with crevices.

- The size of the voids and cavities will be suitable for a range of bat species, including myotis bats and pipistrelles, to fly and adopt a crevice-dwelling habit inside the building.

- The unobstructed flight area is an appropriate measure as it will enable bats, including newly-volant individuals, to practice wing stretching and flight in an area free from predators and other disturbing influences.

Other details

Architects drawings of the proposed building design are included in the annexes to this document.

The roof voids will be signed to clearly show their status as bat roosts and as protected features.

Human access to the roof voids dedicated for use by bats will be via locked loft hatches.

All wood materials used in the specification will be untreated or tanalised softwood. If wood is to be stained, chemicals used will comply with those recommended by Natural England as being suitable for use in bat roosts (as specified in TIN092 - Bat roosts and timber treatment products).

The roof voids dedicated to use by bats will be kept locked at all times except for inspections by the Project Ecologist. A key will be held by the landowner and by the Project Ecologist.

Rationale

- The restriction on usage of the roof voids is appropriate as it will provide a guarantee of bat roost provision without any form of disturbance or limit on space available to bats. Undisturbed, dedicated features for bats will increase the chances of bats re-occupying and continuing to use the roost features.

C.1.3 New roost creation (including bat houses, cotes and bat boxes)

An integral wall box will be installed within each of the external gable walls (three boxes in total). The wall boxes (specifically Ibstock eco habitats for bats range - Technical Data: B. (Warwick Texture Multi Buff)) will be installed centrally in the walls 600mm below the apex, without obscuring any other features of value to bats. The new integral wall boxes will be ready for use by bats prior to any disturbance to the existing roosts in the building and will remain unobscured by scaffolding throughout the development period.

All of the integral wall boxes will be installed immediately prior to the commencement of disturbing activities associated with the proposed development.

Rationale

The integral wall boxes are an appropriate mitigation measure for the following reasons:

- They provide a permanent, maintenance-free roosting feature to accommodate bats at the site
- They have been designed to specifically accommodate crevice dwelling bats, including myotis and common pipistrelles
- They can be placed within the walls of the Chapel and Sunday School without creating health and safety concerns, or affecting the structural integrity of the building
- The integral wall boxes are an appropriate mitigation measure as they provide crevice roost features with high thermal stability. Myotis and pipistrelle bats are known to roost in features with similar properties throughout the UK.

In addition to the above, the timing for provision of these features is appropriate, as it will ensure that bat roosting features are available on site at all times. The timing will also ensure that any bats found during the strip of the roof and associated features can be placed in a secure, permanent feature without delay.

Construction details

The integral wall boxes are constructed from fired clay and are fully frost resistant. This is appropriate as:

- The boxes will be suitable for use by bats throughout the year, possibly extending the period of use compared to existing roosts in the Chapel and Sunday School
- The wall boxes will match the construction materials of the Chapel and Sunday School in terms of colour and durability.
- The wall boxes have been designed to last for at least 50 years.

Dimensions

The dimensions of the integral wall boxes will be as follows:

215mm x 290mm

These details are appropriate as:

- They provide a suitable roost size for myotis and common pipistrelles
- They provide sufficient space for use by a colony of bats

Access for bats

Each integral wall box has a single access point at the base of the unit.

The crawl-in access points will be 25mm x 150mm.

These details are appropriate as:

- They closely resemble access features currently used by bats at the Chapel and Sunday School

Roost features for bats

The integral wall boxes incorporate three vertical chambers, behind a fascia made of a fired clay panel.

These details are appropriate as:

- Each box provides a suitable roost environment for myotis, pipistrelles and a range of other small and medium-sized bat species
- Each box provides sufficient space for use by a colony of bats

Internal and external environmental conditions

The dark and enclosed nature of the integral wall boxes reproduce and diversify conditions associated with the existing roosting features. Each integral wall box is also expected to provide a structure with higher humidity and a similar or better thermal regime than some of the existing roost features.

There will be no artificial light spillage inside the integral wall boxes. Natural light incursion will be limited to the single bat access point to each box; as the access point is both narrow and overhung by the fascia, light incursion is controlled. Artificial light spillage onto the bat access points to the wall boxes will be strictly limited.

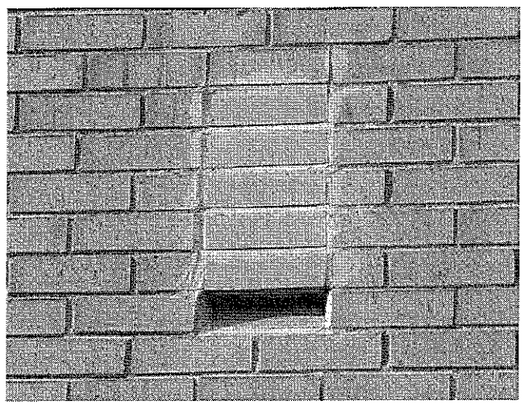
The integral wall boxes will be orientated so that they are facing north, west and south, and away from direct artificial light sources. Bats will therefore be able to emerge from and re-enter the wall boxes via flying spaces which are not directly lit, within a short distance of sheltered flyways and known foraging areas for bats. This will reproduce current conditions where bats can presently emerge from and re-enter their roosts via areas, most of which are not directly lit, with sheltering vegetation nearby.

The integral wall boxes will provide suitable environmental conditions for use by roosting bats throughout the year.

Other details

Specification sheets for integral wall boxes are included in the annexes to this document.

There will be no human access to the integral wall boxes, as disturbance is not desirable and the boxes are designed to be maintenance-free.



Example of integral wall box to be installed in the Chapel and Sunday School

C.1.4 Scaled maps/plans

A map of proposed mitigation outlined above, in relation to existing and proposed habitat features, is included in annex G.3 of this document.

C.2 Landscaping works

Lighting

Artificial lighting spillage onto all bat roosting features, access features and bat flight lines into and out of the building (from ground floor door heights upwards) will be strictly limited and will be below 0.5 lux at all times. This illuminance level is well within the tolerance range of emerging myotis and common pipistrelle bat species.

- All exterior lighting will operate on a PIR system
- The exterior lighting scheme will be limited to LED lights to avoid the presence of UV components and enable accurate management of light spillage
- No lights will be installed above ground floor door top level
- There will be no uplighting of the building

- Light spillage onto the hedgerow to the north of the site and the trees to the south boundary of the graveyard will be no more than 0.5 lux

Rationale

- The lighting specification is appropriate as it is a very significant influencing factor on bat activity, particularly of myotis species

D Post-development site safeguard

D.1 Habitat/site management and maintenance

Habitat management

A map of proposed habitat features is included in annex G.3 of this document.

Management of the mitigation and roosting features

The mitigation and compensation features will be subject to annual maintenance checks by the Project Ecologist for five years following their completion. All constructed features will be assessed on each visit, to ensure that all structures are safe and without hazards for bats or people. In particular, attention will be paid to the following:

- Temperature and humidity (as recorded using a long-term datalogger)
- Condition of bat access points (whether obstructed/unobstructed)
- Levels of artificial lighting on roosting features, access features and bat flight lines into and out of the building
- Maintenance of structures e.g. condition of construction materials
- Internal conditions (lack of water ingress, toxic substances and inappropriate ventilation)
- Operation of the access hatches

Site ownership

All mitigation features and known roosting features will be in the ownership of Mr. D. Hartley.

Responsibility for undertaking the work

Mr. D. Hartley will be responsible for management and maintenance of all mitigation features and known roosting features both throughout development and for five years after completion of the development. All monitoring inspections will be undertaken by the Project Ecologist on instruction from Mr. D. Hartley.

The bat roosting features will be covenanted so that a requirement for their maintenance and protection are included in the title deeds of the site.

Responsibility for funding

Mr. D. Hartley will be responsible for funding of all mitigation works throughout development and for five years after completion of the development.

The bat roosting features will be covenanted so that a requirement for their maintenance and protection are included in the title deeds of the site.

D.2 Population monitoring and roost usage

It is intended to monitor bats annually for years 1, 2, 3, 4 and 5 after the completion of the proposed works, in order to:

- Establish the condition of the bat population at the post works site
- Monitor the use of the mitigation features and known roost features
- Ensure that the mitigation features and known roost features are in a favourable condition.

The emphasis will be on use of consistent methods to enable comparison of trends over time. Each round of information gathering will have two elements:

- A daytime inspection of the mitigation features and known roost features
- An emergence survey or sunrise survey of the mitigation features and known roost features, incorporating a lighting assessment

A range of bat detectors, including time expansion (e.g. Petersson D240x or Griffin) will be used with headphones. A broadband detector with inbuilt recording capability (e.g. Anabat, Griffin or EM3) will also be used. This will enable heterodyne, frequency division and time expansion techniques to be employed, to survey for all bat species within detectable limits.

Bat echolocation will be recorded using time expansion (e.g. Petersson D240x with external recording device, Griffin or EM3).

In addition, a remote recording device (Anabat or similar) will be left inside the roof void for extended periods to assess usage of the feature.

D.3 Mechanism for ensuring delivery of post-development works

Mr. D. Hartley will ensure that the mitigation features and known roost features are monitored for years 1, 2, 3, 4 and 5 after the completion of development.

The monitoring of the mitigation features and known roost features will be carried out by the Project Ecologist.

Monitoring visits will form part of the later stages of the compliance audit, which will be undertaken by the Project Ecologist and used to advise the developer about compliance with the mitigation licence.

The bat roosting features will be covenanted so that a requirement for their maintenance and protection are included in the title deeds of the site.

E Land ownership – Mitigation site(s) (areas(s) where any works will be done to offset development impacts, including development plot if applicable)

Declaration statements

E.1 Mitigation site ownership

Mr. D. Hartley owns the land where the mitigation is proposed.

E.1.1 I confirm that the relevant landowner consent has been granted to accept bats into roosts onto land outside the applicant's ownership – **not applicable**

E.1.2 I confirm that landownership consent has been granted to allow the creation of the proposed habitat compensation on land outside the applicant's ownership – **not applicable**

E.1.3 I confirm that consent has been granted by the relevant landowner for monitoring and maintenance purposes on land outside the applicant's ownership – **not applicable**

F Timetable of works

A: Development activities and timing		
Activity	**Timing**	**Notes**
Submission of EPS licence application	July 2012	Submit licence with all supporting information to Natural England.
Installation of integral wall boxes	September 2012	Supervised by Project Ecologist
Toolbox talk	Immediately prior to commencement of works September 2012	Project Ecologist to give toolbox talk to contractors who will undertake proposed works
Careful staged strip of roof and associated structures by hand	September – October 2012	Supervised by Project Ecologist
Continued refurbishment of building, including installation of mitigation features including: Ridge tiles Soffit boxes Lead saddles	October 2012 – April 2013	Supervision by Project Ecologist during certain elements.

Year	May-August 2013	May-August 2014	May-August 2015
Details	Daytime survey of mitigation features and known roost areas Emergence/sunrise survey. Activity survey.	Daytime survey of mitigation features and known roost areas Emergence/sunrise survey. Activity survey.	Daytime survey of mitigation features and known roost areas Emergence/sunrise survey. Activity survey.
Year	May-August 2016	May-August 2017	
	Daytime survey of mitigation features and known roost areas Emergence/sunrise survey. Activity survey.	Daytime survey of mitigation features and known roost areas Emergence/sunrise survey. Activity survey.	

G Annexes

G.1 Summary of mitigation strategy (Section A.1)

G.2 Map to show location of capture and exclusion activities (Section B.1)

G.3 Map of proposed habitat features (Sections C.1.4, C.2 and D.1)