BAT SURVEY & REPORT

at

Ashbrow Road
Huddersfield
West Yorkshire
HD2 1EX

Client:
Keepmoat Limited

Client Address:
The Waterfront
Lakeside Boulevard
Doncaster
DN4 5PL

Client Contact:
01709 766000 (Tel)

JCA Ref:
13945a/JBRev1

Date of Report:
08/02/19

JCA Limited
Arboricultural & Ecological Consultants

Quality Assurance

JCA ref.	Version	Desktop Survey Completed:		Site Surveyed:		Report Completed:		Checked:	
		Date	Name	Date	Name	Date	Name	Date	Name
13945a/JB Rev1	Planning Application	25/01/18	Jenny Butler	23/01/18 24/05/18 02/07/18 24/07/18 25/07/18 21/08/18 27/09/18 26/10/18	Jenny Butler Amanda Beck	08/02/19	Jenny Butler	08/02/19	Amanda Beck

This report has been prepared and provided in accordance with the *British Standard 42020: Biodiversity – Code of practice for planning and development 2018*

Risk Assessment Completed	
Bio-security Procedure Completed	
Lone Worker Procedure Completed	

Summary

A report is required at **Ashbrow Road,** to assess the site's potential for supporting bat species, in the form of roosting sites, foraging habitat and/or commuting routes. The aim of this report is to investigate the potential impact that the proposed development may have on the local/national bat population. A residential development is proposed on this site.

All bat species and their roosts in the UK are protected under European and UK law. The main item of legislation protecting UK bats is the Conservation of Habitats and Species 2017. In addition to this, bats and their roosts are also protected in England and Wales under the Wildlife and Countryside Act 1981 and The Countryside and Rights of Way Act 2000.

A desktop study was undertaken in order to obtain any records of bats and designated conservation sites within a 2km radius of the site to determine the significance of the area for supporting these protected species. A thorough assessment of the habitat, buildings and trees on site was carried out to assess the site's potential for supporting roosting and foraging bats.

After potential for roosting bats was concluded, seven activity surveys were carried out to assess the absence/presence of roosting bats and how bats are using the site (foraging/commuting).

Recommendations:

After conducting a thorough Bat Roost Potential survey and a detailed Desktop Study, we considered **Ashbrow Road** to have a moderate potential for supporting foraging, commuting and roosting bats.

As **Ashbrow Road** has been shown to be rarely used by foraging/commuting bats, we recommend that the proposed development at **Ashbrow Road** should go ahead, and that no **Bat Mitigation Licence** is required. However, the work should be carried out with care and vigilance.

Lighting Design: Lighting should be of low-level luminance, floodlights must not be used or installed within 10m of the wooded habitats on site. All lighting on site must be LED, avoiding the use of bright white lighting. Where possible lights are to be timed to turn off after sunset and not to turn on before sunrise, unless triggered by movement/motion.

Should any bats be found during any stage of the development, all work must stop immediately, and Natural England must be contacted. Natural England will provide advice on the best course of action. It must be stated that this is a legal requirement, and that bats may only be handled, and their roost disturbed by an experienced ecologist holding an appropriate licence.

The development of any building or structure has the potential risk of removing bat roosting habitat. Therefore JCA always recommended that alternative bat roosting opportunities should be provided to replace any that are lost due to building alterations. Should you like advice on putting up bat boxes, or on increasing your site's value to bats through carefully designed planting schemes and habitat creation, JCA can provide this service.

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1. Introduction and Terms of Reference

1.1 Purpose of the Report

1.1.1 A report is required at **Ashbrow Road,** to assess the site's potential for supporting bat species, in the form of roosting sites, foraging habitat and/or commuting routes.

1.1.2 The aim of this report is to investigate the potential impact that the proposed development may have on the local/national bat population.

1.2 Terms of Reference

1.2.1 I am instructed by **Keepmoat Limited** to visit the site and prepare my findings in a report.

1.2.2 For this purpose, I have been supplied with a site map (drawing: 01191A_S_01), and brief details of the proposal.

1.3 Scope of the Report

1.3.1 This report is compiled in accordance with the Bat Conservation Trust's (BCT) '*Bat Surveys - Good Practice Guidelines*', the Joint Nature Conservation Committee's (JNCC) '*Bat Workers Manual*' (3rd Edition) and Natural England's '*Bat Mitigation Guidelines*'.

1.4 Details of Proposed Development

1.4.1 A residential development is proposed on this site comprising of flats, 3 bed houses and 2 bed houses.

1.5 Site Description

1.5.1 **Ashbrow Road** is situated 2.1km north of Huddersfield town centre, at grid reference: SE150192.

1.5.2 The site is predominantly semi-improved grassland which is managed on an infrequent basis. The site is well used by dog walkers, with distinct tracks leading around the site. There are areas of woodland and scrub on site; some of these areas are impenetrable and could not be thoroughly surveyed.

1.5.3 The site is surrounded predominantly by residential properties, including a local primary school. There is a wooded area 230m south of the site, with the River Colne 900m southeast of the site.

1.6 Bats in the UK

1.6.1 In the UK there are thought to be 18 native species of bat (17 known to be breeding) and may account for more than a quarter of mammal species present in the UK. Nearly all UK bat species have experienced serious declines over the last century and all species are protected under UK and European Law.

1.7 Bat Ecology

1.7.1 All species of bat in the UK are insectivorous and have evolved to hunt a different set of insects, present in different habitat types. Preferred bat habitats include woodland, grassland, agricultural land, wetland and rivers.

1.7.2 Bats typically roost close to foraging sites, and use linear features such as hedgerows, tree lines and rivers to navigate. Removal of these linear features is thought to have a significant negative impact on their movement, which could be contributing to their decline.

1.7.3 Bats will roost in a wide range of different sites including built structures, underground sites and mature trees. Due to bats ecology different roost sites will be used at different times of the year. Known roost types include:

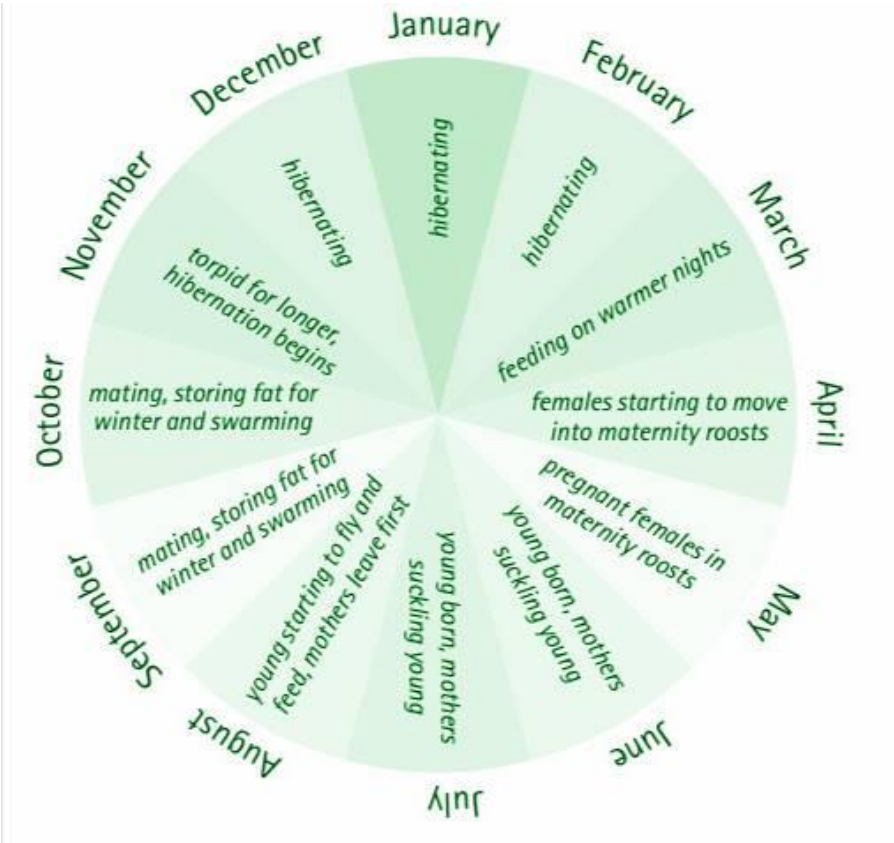
- Night Roosts: A place where individual bats, or sometimes the colony, rest or shelter in the night, but are rarely found in the day. Can be used throughout the year.
- Day Roosts: A place where individual bats, or small groups of males, rest or shelter during the day but are rarely found by night in the summer months.
- Feeding Roosts: A place where individual or a few individuals rest or feed during the night, but are rarely found in the day during the summer months.
- Transitional/Occasional Roosts: Used by a few individuals or occasionally by small groups for short periods of time on waking from hibernation, or in the period prior to hibernation. Usually found during February-April or during September to November.
- Swarming Sites: Where large numbers of males and females gather during late summer to autumn. Appear to be important mating sites. September – November.
- Mating Sites: Where mating takes place from late summer and can continue through the winter. August – March.
- Maternity Roosts: Where female bats give birth and raise their young to independence. May-September.

- Hibernation Roosts: Where bats may be found individually or together during the winter. They have a constant cool temperature and high humidity. December- February.
- Satellite Roosts: An alternative roost found in close proximity to the main nursery colony used by a few individual breeding females to small groups of breeding females throughout the breeding season. May-September.

1.7.4 The three main roosts to be considered, with respect to buildings and development, are maternity roosts, satellite and hibernation roosts. Disturbance of these roosts can have significant negative impacts on local bat populations.

1.7.5 **Figure 1** below provides a visual representation of the life cycle of a bat; showing the life cycle on a month by month basis.

Figure 1: Diagram of a bat's life-cycle (*taken from the BCT: Bat surveys for professional Ecologists, Good Practice Guidelines; 3rd Edition).*



1.8 UK Bat Species

1.8.1 Within the UK there are 17 species of bat known to be breeding, with a further one species listed as a resident, non-breeding species within the UK. **Table 1** below details the roosting preferences of the breeding species of bats currently listed as being found within the UK.

Table 1: Roosting preferences of the known UK breeding resident bat species *(taken from the BCT: Bat surveys for professional Ecologists, Good Practice Guidelines; 3rd Edition).*

Species Common Name	Species Scientific Name	Species Roosting Preferences
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	During the summer females use large, old, undisturbed buildings including coach houses, stable blocks and barns. This species prefers to fly directly into the roost and to their roosting position and bats hang freely Maternity sites are often found in large spaces at least 3–4m high, providing a sufficiently large flight area. This species generally uses night roosts to rest whilst foraging, which are found in a variety of structures, for example outbuildings, garages, stables, milking sheds, porches and trees. In winter, both male and female bats choose underground sites for hibernation, including tunnels, mines, caves or cold building basements.
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	Roost sites include attics, chimneys and boiler rooms of buildings, rural houses and outbuildings in the summer, and cellars, tunnels, disused mines and caves for hibernation. Also found in industrial buildings. This species prefers to fly directly into roost sites and into their roosting position. Maternity sites are often found in large roof spaces at least 3–4m high providing a large flight area. A range of conditions is required throughout the year but this may be found in one building with, for example, an attic for the summer and a cellar for the winter. Summer and winter roost sites are generally no more than 5–10km apart. The lesser horseshoe bat also uses alternative roost sites during the night and day.
Daubenton's Bat	*Myotis daubentonii*	Roosts are found in hollow trees, bridges or sometimes buildings and generally close to water. Nursery roosts are not exclusively female – males may make up 25% or more of the colony and large male-only colonies have also been recorded. This species selected oaks over beech trees and preferred roosts on the edges of woodlands in a study in the Netherlands. Hibernation sites are usually underground including caves, mines and suitable tunnels where bats are found both in crevices and on open walls. They may also hibernate in tree cavities.
Bandt's Bat, Whiskered Bat and Alcathoe's Bat	*Myotis Brandtii, Myotis mystacinus, Myotis alcathoe*	These species can roost in trees and a wide range of buildings in the summer. These species hibernate in caves or other underground sites, where they can be found in the open or in cracks and crevices.

Natterer's Bat	*Myotis nattereri*	Roost sites include tree holes and different types of buildings but has also been is found in bridges. Usually roost in attics between late May and mid-July and often roosts have enough space for internal flight (Swift, 1997). This species also breeds in bat boxes. Timber-framed barns built between the 12th and 19th centuries may be particularly important to this species, with roosts found in mortise joints in both the summer and winter. Hibernates in cracks and crevices in caves and mines. Other hibernation sites recorded are canal and railway tunnels, ice houses and tree cavities.
Bechstein's Bat	*Myotis bechsteinii*	Maternity roosts are found in tree holes in the canopy, generally in old trees with dead branches. May be found in woodpecker holes in old oaks. Recorded switching roosts frequently. One study recorded roosts in rot holes, woodpecker holes and in a gap behind thick ivy. A study of ten colonies across the Isle of Wight found 90% of maternity roosts in woodpecker holes in ash trees. Another study found a maternity roost in a woodpecker hole in an oak tree on a golf course. Hibernates in trees and sometimes caves or other underground sites. Chilmark Quarry is an example of Bechstein's bats using an abandoned mine for hibernation.
Noctule	*Nyctalus noctula*	Roosts almost exclusively in tree holes, but sometimes found in bat boxes or buildings. One Netherlands study found that woodpecker holes are preferred, in trees close to woodland edge. Hibernates in trees but sometimes found in buildings.
Leisler's Bat	*Nyctalus leisleri*	Roosts in trees, bat boxes and buildings such as houses; for example, around the gable end of lofts, under tiles, under soffit boards and in disused chimneys. Often uses a variety of sites in the summer. Hibernates in tree holes, buildings and sometimes underground sites.
Common Pipistrelle and Soprano Pipistrelle	*Pipistrellus pipistrellus, Pipistrellus pygmaeus*	Maternity colonies are found mainly in buildings, usually roosting out of sight in crevices. Colonies may use a number of sites through the summer but are often loyal to the same sites for many years. Maternity colonies are extremely variable in terms of numbers, from 20 to over 1,000 bats. Soprano pipistrelle colonies tended to be larger than those of the common pipistrelle. Common pipistrelle shift roosts between pregnancy and lactation. Roost selection is based on temperature for common pipistrelle and on surrounding habitats (woodland and water) for both species. Males roost singly or in small groups in the summer, in buildings or trees. Bat boxes are used by both males and females but generally only males use them during the summer. These species do not use underground sites for hibernation but are sometimes found in the cracks and crevices of buildings in the winter.
Nathusius' Pipistrelle	*Pipistrellus nathusii*	The very few known British nursery roosts are in buildings, with hibernation roosts in hollow trees and crevices in cliffs, walls and caves. One study recorded males roosting under lead flashing and roof tiles.

Serotine	*Eptesicus serotinus*	Roosts in buildings in small cavities or crevices with high access points such as gables but occasionally also found in trees. Recorded hibernation sites include cavity walls, disused chimneys and occasionally caves.
Barbastelle	*Barbastella barbastellus*	In summer, breeding females move regularly between large numbers of different tree roosts. One study found that they preferred dead trees surrounded by holly under-storey and another found them in tree crevices and cavities, between overlapping limbs and behind ivy, on average 6.9m above ground level. Tree roosts are in relatively undisturbed places and frequently in thick cover, although cracks much higher up in trees were used at the time of birth. Bat boxes are also used. Almost all roosts found in two studies were behind loose bark and in mixed locations not always surrounded by under-storey. Winter roosts include deep, hollow trees (usually dead and among holly under-storey) and sometimes buildings or underground sites. Other winter roosts recorded are flaking bark and splits less than 2m above the ground and disused railway tunnels, barns, outbuildings, church porches and lime kilns. Chilmark Quarry is an example of barbastelle bats using an abandoned mine for hibernation. 24 Spring and autumn roosts have been recorded behind loose bark, in dead tree stumps and in splits in limbs mainly less than 2m above ground level.
Brown Long-Eared Bat	*Plecotus auritus*	Maternity roosts found in trees, in the voids of large, old buildings and bat boxes in woodland. Usually roosts against wooden beams at the roof apex in attics or farm buildings. Bats often cluster at the highest part of the roof and require enough space for unobstructed, internal flight. Shows high roost fidelity. Commonly uses feeding perches and night roosts in porches or outbuildings separate from the main roost. Hibernate in underground sites, tree holes and buildings.
Grey Long-Eared Bat	*Plecotus austriacus*	Frequently roosts on ridge beam in spaces between rafters. Maternity colonies show high roost fidelity. Number of males in maternity colony increases through summer. Many males are, however, solitary.

1.8.2 Greater Mouse-eared bats *(Myotis myotis)* are extremely rare in Britain and little is known about where they roost in the summer or winter. They are listed as a resident, non-breeding species within the UK and this species is currently found at one site in Sussex.

1.9 Bats and the Law

1.9.1 All bat species and their roosts in the UK are protected under European and UK law. The main piece of legislation protecting UK bats is the Conservation of Habitats and Species Regulations 2017.

1.9.2 In addition to this, bats and their roosts are also protected in England and Wales under the Wildlife and Countryside Act 1981 and The Countryside and Rights of Way Act 2000.

1.9.3 Under these legislations, it is an offense to:

- Deliberately capture, injure or kill a bat.
- Deliberately disturb a bat in a way that would affect its ability to survive, breed or rear young (or hibernate or migrate in England, Wales and Northern Ireland) or (significantly in England, Wales and Scotland) affect the local distribution or abundance of the species.
- Damage or destroy a roost (this is an 'absolute' offence).
- Possess, control, transport, sell, exchange or offer for sale/exchange any live or dead bat or any part of a bat.
- Intentionally or recklessly disturb a bat at a roost.
- Intentionally or recklessly obstruct access to a roost.

If it is discovered that development may impact upon bat roosts (thus leading to an offence being committed) a **Mitigation Plan** should be devised and a **Bat Mitigation Licence** applied for from the relevant government department (i.e. Natural England). Gaining a licence will depend on many variables, such as the bat species present, roost type, roost size and its local/regional/national importance.

2. Methodology

2.1 Desktop Study Methodology

2.1.1 A desktop study has been undertaken in order to obtain any relevant records of bats from local bat groups and ecology units within a 2km radius of the site.

2.1.2 The Multi-Agency Geographic Information for the Countryside (MAGIC) website was used to locate any designated sites, both statutory and non-statutory, such as; Local Nature Reserves (LNRs), Ramsar Sites, Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Sites of Special Scientific Interest (SSSIs) that may be present within 2km of the survey site.

2.2 Scoping Survey Methodology

2.2.1 The site was surveyed for foraging, commuting and roosting potential. A detailed search of habitat and trees was conducted during daylight hours in order to identify potential bat roosting sites and look for evidence of bat activity. Potential roost sites and features deemed to be of value to bats were documented on the site map (please refer to **Appendix 1**) and photographic evidence was taken (please refer to **Appendix 2**).

2.2.2 All surveys are conducted by experienced surveyors using the following equipment to ensure an accurate assessment; a printed site map, camera, 1 million candlelight torch, binoculars, ladders and a duet heterodyne bat detector.

2.2.3 Signs that bats have previously or are currently using a potential roost site include:

- Scratch marks, urine and oil stains around holes in buildings or trees.
- Droppings, carcasses and/or food remains found around the site.
- Bats observed flying in/out of a hole in a building or tree.
- Bats heard ‘chattering’ within a potential roost site, especially on warm summer days.

2.2.4 Limitations: It must be highlighted that the absence of any of these signs is not proof that the site is not being used by bats. Weathering and other factors will often remove any signs of bat activity, especially when present on the exterior of a building or a tree. As previously explained, many bat species will have several roost sites which they regularly move between and therefore an absence during a survey visit does not exclude their presence at a later date.

2.3 Activity Survey Methodology

2.3.1 Transect activity surveys are conducted at sunset and up to 3 hours after, or 2/3 hours before sunset. Due to the lifecycle of bats activity surveys are conducted between the months of April through to October. Prior bat scoping surveys have assessed areas of potential foraging and commuting habitat that may be affected by the proposed development. Based on this, transects have been designed covering a suitable extent and diversity of habitats, as well as considering the ease of accessibility for surveyors. Transect routes and stops are designed, and then walked during daylight hours to ensure the routes planned are suitable and can be realistically used during evening/low light periods.

2.3.2 Transects are walked at a steady pace. Data recorded includes: number of bats, flight direction, flight height and behaviour. Automated detectors were also left on site to facilitate quantitative analysis of data. During the transect survey surveyors stop at pre-designed points to record all bat activity for a period of 90 second, before continuing with the walked transect. All surveyors used by JCA have experience in conducting bat emergence surveys and an appropriate level of knowledge in bat ecology. Detectors used for transect survey include: frequency division and full spectrum.

2.3.3 At **Ashbrow Road,** the Bat Scoping Survey indicated that the site has moderate habitat suitability for bats, and therefore it was recommended that seven surveys, one per month from April until October, including a back to back dusk/dawn within the same 24 hour period during August would be required.

2.3.4 All surveyors present are equipped with the following items during each survey; a bat detector, Walkie Talkie, clock, printed site map, note pad and pen. Anabat automated bat detectors were also used. For this site Batscanners, Anabat Express and Echometer Touch 2 Pro detectors were used.

2.3.5 Limitations: Transects provide on only a snapshot of time because an ecologist is only at any one spot at any one time. This type of survey is subjective and limited by activity seen by individual surveyors. Difficult terrain and remote locations can also mean that part of a site can't be surveyed, and the risk to an ecologist is increased if working alone.

Automated detectors are unable to count bat numbers but can pick up variability in activity and numbers. They also don't provide qualitative information such as behaviour. These detectors are limited by their battery life and storage capacity, and there is risk such detectors are vandalised or stolen because of the long period they are left unattended.

3. Results

3.1 Desktop Study Results

3.1.1 The records obtained from the West Yorkshire Ecology Unit for **Ashbrow Road** are as follows:

Table 2: Summary of bat records held by the West Yorkshire Ecology within 2km of the site. Those marked with an asterisk * were recorded with 500m of the site.

Common Name	Scientific Name	Number of Records	Most Recent Record
Common Pipistrelle*	*Pipistrellus pipistrellus*	25	02/06/2017
Leisler's Bat	*Nyctalus leisleri*	2	20/06/2011
Noctule Bat	*Nyctalus noctula*	11	01/09/2014
Whiskered	*Myotis mystacinus*	1	01/08/2006
Unknown Pipistrelle Species	*Pipistrellus sp.*	3	03/08/2007
Unknown Bat Species*	*Vespertilionidae*	17	01/082012

The data search revealed records of Common Pipistrelle (*Pipistrellus pipistrellus*), Leisler's Bat (*Nyctalus leisleri*), Noctule (*Nyctalus noctula*), Whiskered Bat (*Myotis mystacinus*), unknown pipistrelle species and unknown bat species within 2km of the site. Common Pipistrelle and unknown bat species were recorded within 500m of the site. Bat roosts of unknown species have been recorded within 500m of the site.

Statutory Nature Conservation Sites

1.1.1 There are no statutory nature conservation sites within the boundary of the site.

1.1.2 The search revealed no designated conservation site within 2km of the site.

Non-Statutory Nature Conservation Sites

1.1.3 There are no non-statutory nature conservation sites within the boundary of the site.

1.1.4 The site falls within the Kirklees Wildlife Habitat Network Area.

1.1.5 The search revealed five non-statutory conservation sites within 2km of the site, which can be seen in **Table 3**.

Table 3: Non-statutory designated sites with 2km of the site.

Name	Designation	Description	Distance From Site
Sir John Ramsden Canal	Local Wildlife Site (LWS) & Site of Scientific Interest (SSI)	This canal supports a range of aquatic and swamp communities, typical of slow moving water. Although most of the communities are species poor, they contain a representative range which includes the regionally rare *Ceratophyllum demersum* and *Alisma lanceolatum.* This site holds the county's largest population of this latter species. In addition, the site is of considerable importance for the presence of the nationally rare *Luronium natans*. This is an internationally protected species under Annexe 1 of the Berne Convention for Conservation and Britain holds the major population of this species in the canal networks of Wales, Cheshire, Lancashire and West Yorkshire.	1km Southeast
Bradley Park Woods	Local Wildlife Site (LWS)	These two small areas of woodland within the site meet the Wd5 criteria for their bluebell coverage. Trees within these areas of woodland are mature and comprise mainly oak, with some mature ash. Both areas of woodland comprise a good amount of standing and fallen deadwood. Other ancient woodland indicator field layer species are present.	1.9km North
Grimescar Wood	Local Wildlife Site (LWS) &Site of Wildlife Significance (SWS)	The woodland contains a good density cover of bluebell and meets Criteria Wd5.	1.5km West
Bradley Park Golf Course	Site of Wildlife Significance (SWS)	Bradley Park Golf Course is a large active golf course composed of amenity grassland with pockets of broadleaved plantation, small water bodies (ponds and ditches), a strip of ancient semi-natural woodland and a large open area of semi improved neutral grassland. The semi-natural broadleaved woodland lies along the north-western boundary of the site. Bradley Wood is an area of plantation ancient woodland which lies to the north of the golf course, bisected by the M62. Clifton Interchange LWS stands 900 m northeast of the site in Calderdale.	1.9km North
Roundhill	Local Geological Site (LGS)	Geologically, Round Hill is an outlier of Greenmoor Rock (formerly thought to be the Elland Flags, but now recognized as being of different origin) lying on older sediments. The present structure of Round Hill is a testament to the processes of weathering and erosion slowly shaping the rock over geological time.	1.9km Northwest

3.2 Scoping Survey Results

3.2.1 The site was surveyed on the 23/01/18 by lead surveyor Jenny Butler *BSc (Hons),* NE Level 2 Class Licence – 2018-33192-CLS-CLS. Other surveyors included Amanda Beck. Survey conditions are summarised in **Table 4**.

Table 4: Survey times and weather conditions.

Survey date	Lead surveyor	Temp	Humidity	Wind speed/Direction		Cloud Cover	Precipitation
23/01/18	Jenny Butler	10°C	92%	SW	20mph	90%	None

3.2.2 Habitats and Features Present

The site comprises of semi-improved grassland, scattered broadleaved trees, coniferous trees, tall ruderal, species poor hedgerow, broadleaved woodland, plantation woodland, scattered scrub and dense scrub.

Broadleaved Woodland: To the west of the site is an area of broadleaved woodland habit, which continues beyond the site boundary, connecting to further wooded habitat. Species present include English Oak *(Quercus robur)*, Common Beech *(Fagus sylvatica)*, Holly *(Ilex aquifolium)*, Silver Birch *(Betula pendula)*, Field Maple *(Acer campestre)*, Wych Elm *(Ulmus glabra),* Dog Rose *(Rosa canina)* and Sycamore *(Acer pseudoplatanus).* Many of the trees present within this woodland are immature specimens or saplings. There are some larger trees; these are predominantly Common Beech and Silver Birch.

Broadleaved Woodland – Plantation: To the south of the site, are a number of Common Ash *(Fraxinus excelsior)* trees, these are densely packed causing stunted growth to a number of the trees. These trees are mostly thin stemmed, with diameters of less than 8cm. The stems are smooth with no signs of damage or decay. These trees have not been maintained. Within this plantation are a few larger Silver Birch trees, which are also suffering from being too densely packed. These trees also have smooth stems and do not show any signs of decay or damage.

Coniferous Scattered Trees: Along the southwestern boundary are a number of large Douglas Fir *(Pseudotsuga menziesii)* trees. These appear to be planted by the adjacent residential property. These trees border the broadleaf woodland habitat on site.

Dense Scrub: The site is not grazed by livestock and as a result there are numerous patches of thick, dense scrub. Species present include: Bramble *(Rubus fruticosus),* Ivy *(Hedera helix)*, Holly *(Ilex aquifolium)*, Common Nettle *(Urtica dioica)*, Rosebay Willowherb *(Chamerion angustifolium)*, Creeping Thistle *(Cirsium arvense)*, *Rumex sp.* and Yorkshire Fog *(Holcus lanatus)*. The dense scrub is thick and impenetrable in

places.

Scattered Broadleaved Trees: There are a number of self seeded, broadleaved trees present on site. These are small specimens, with no signs of damage or decay. Species present include: Silver Birch *(Betula pendula),* Common Ash *(Fraxinus excelsior)*, Rowan *(Sorbus sp)*, English Oak *(Quercus robur)*, Sycamore *(Acer pseudoplatanus)* and Field Maple *(Acer campestre).*

Scattered Scrub: The site contains small patches of sparse scrub. Species present include: Common Nettle *(Urtica dioica),* Creeping Thistle *(Cirsium arvense), Rumex sp.,* Yorkshire Fog *(Holcus lanatus)* and Field Buttercup *(Ranunculus acris).*

Species Poor Intact Hedgerow: There is a hedgerow dissecting the site from north to south. The hedgerow is thin and appears to be maintained infrequently. The hedgerow is approximately 5-6ft in height. Species present include: Hawthorn *(Crataegus monogyna),* Bramble *(Rubus fruticosus)* and Holly *(Ilex aquifolium)*. The hedgerow has been split into two sections

3.2.3 Building Assessment/ Built Structure Assessment

There are no built structures present on site. There are no buildings or built structures set for demolition/extension/alteration

3.3 Activity Survey Results

3.3.1 The site was surveyed from the 24/05/18 to the 26/10/18 by lead surveyor Jenny Butler *BSc (Hons),* NE Level 2 Class Licence – 2018-33192-CLS-CLS. Other surveyors included: Amanda Beck, Toby Thwaites and Joe Earnshaw. Survey conditions are summarised in **Table 5**.

Table 5: Survey times and weather conditions.

Survey date	Lead surveyor	Start/Finish		Temp Start/Finish		Humidity	Wind speed/Direction		Cloud Cover	Precipitation
24/05/2018	Jenny Butler	21:30	23:18	15°C	15°C	69%	8mph	NNE	35%	None
02/07/2018	Jenny Butler	21:40	23:22	13°C	11°C	78%	4mph	E	80%	None
25/07/2018	Jenny Butler	03:00	04:25	15°C	15°C	80%	2mph	NE	90%	None
24/07/2018	Jenny Butler	21:15	23:18	17°C	17°C	69%	4mph	W	20%	None
21/08/2018	Jenny Butler	20:15	22:06	17°C	16°C	54%	6mph	NE	70%	None
27/09/2018	Jenny Butler	19:00	20:48	16°C	16°C	62%	5mph	W	100%	Light Drizzle
26/10/2018	Jenny Butler	18:05	19:25	9°C	9°C	66%	10mph	SE	5%	None

3.3.2 Below are results from transect activity surveys carried out on site:

3.3.3 Activity Survey 24/05/18 Results

Common Pipistrelle commuting activity was recorded along tree line to the northeast of the site, at stop 1 at 21:38. Common Pipistrelle foraging activity was recorded at stop 1 at 22:38 and at stop 2 at 22:41, foraging around the hedgerows. Common Pipistrelle foraging activity was picked up at stop 4 and stop 7. At stop 7 the foraging activity was primarily around the site boundary, between the adjacent access track and the grassland areas.

See Appendix 1 for bat activity map.

3.3.4 Activity Survey 02/07/18 Results

Common Pipistrelle foraging activity was recorded at stop 10, foraging around the hawthorn and grassland areas, at approximately 22:15. Common Pipistrelle foraging activity was recorded along the boundary between the site and the adjacent primary school at 22:24, stop 11. Common Pipistrelle foraging activity was recorded at 22:37, stop 1, across the car park area towards the primary school, at 22:46, stop 5 and at 22:53 at stop 7.

See Appendix 1 for bat activity map.

3.3.5 Activity Survey 24/07/18 Results

Common Pipistrelle activity was recorded at 21:59 foraging at stop 2, near to the car park of the school. Common Pipistrelle foraging activity was also recorded at stop 6 at 22:11, stop 7 at 22:16 and stop 8 at 22:18. The activity was from individual bats, occurring across the grassland areas on site and towards the boundary wooded sections. Foraging Common Pipistrelles were recorded at stop 2 at 22:38, stop 7 at 22:59, stop 8 at 23:02, stop 9 at 23:06 and stop 10 at 22:11. The activity was from individual foraging bats, and occurred along the edge of the wooded habitats.

See Appendix 1 for bat activity map

3.3.6 Activity Survey 25/07/18 Results

Common Pipistrelle foraging activity was recorded at 03:17, stop 1, near to the car park area. Foraging Common Pipistrelle activity was recorded at 03:54, stop 11, between the school and the site, along the fence line boundary. Common Pipistrelle foraging activity was recorded at 03:37, stop 7, across the access path along the site boundary. One commuting Common Pipistrelle was recorded at 03:57, transect section11, adjacent to the primary school. Foraging Common Pipistrelle activity was recorded at 04:07, stop 3 near to the wooded edge of the site. At 04:25 Commuting Common Pipistrelle activity was recorded at stop 8,

near the residential area adjacent to site. A commuting Noctule was recorded at 22:47, the bat was not seen, so direction of flight could not be determined. This occurred at stop 4.

See Appendix 1 for bat activity map.

3.3.7 Activity Survey 21/08/18 Results

Common Pipistrelle foraging activity was recorded along the hedgerow of stop 4 at 20:24. Common Pipistrelle and Soprano Pipistrelle foraging activity was picked up along the adjacent road at 21:40 at stop 7. Common Pipistrelle foraging activity was recorded across the treeline of stop 9 at 21:49.

See Appendix 1 for bat activity map.

3.3.8 Activity Survey 27/09/18 Results

A commuting Noctule was recorded at 19:06 at stop 3, high overhead. The bat was seen commuting in the direction of Beech Tree Close and commuted straight over the site from the direction of the adjacent school field area. Common Pipistrelle foraging activity was recorded at stop 6 at 19:17.

See Appendix 1 for bat activity map.

3.3.9 Activity Survey 26/10/18 Results

No bat foraging or commuting activity was recorded during the survey. No bats were seen or heard during the survey period.

4. Discussion and Analysis of Results

4.1 Bat Records and Nature Conservation Designations

4.1.1 The data search revealed records of Common Pipistrelle *(Pipistrellus pipistrellus),* Leisler's Bat *(Nyctalus leisleri),* Noctule *(Nyctalus noctula),* Whiskered Bat *(Myotis mystacinus),* unknown pipistrelle species and unknown bat species within 2km of the site. Common Pipistrelle and unknown bat species were recorded within 500m of the site. Bat roosts of unknown species have been recorded within 500m of the site. These records indicate a moderate level of bat activity within the local vicinity. The site connects to the wider landscape via hedgerows, tree lines and further grassland areas.

4.1.2 There are no statutorily designated sites within 2km of the proposed development area boundary.

4.1.3 There are five non-statutorily designated areas within 2km of the site boundary. Sir John Ramsden Canal is a LWS and SSI site, designated for its aquatic and swamp communities. Bradley Park Woods is a LWS, designated for its oak and ash wooded areas meeting criteria wd5. Grimescar Wood is a LWS, and SWS designated for its good density and cover of Bluebell. Bradley Park Gold Course is an SWS, designated for its mosaic of habitats including grasslands, woodlands and ponds. Roundhill is an LGS, designated for its geological value locally. All these designated sites are more than 1km away from the proposed development boundary and show limited habitat connectivity to the proposed development site at **Ashbrow Road,** therefore it is unlikely that the proposed development will have a significant impact on the floral and faunal diversity of these designated areas.

4.2 Scoping Survey

4.2.1 The site comprises of semi-improved grassland, scattered broadleaved trees, coniferous trees, tall ruderal, species poor hedgerow, broadleaved woodland, plantation woodland, scattered scrub and dense scrub. Please refer to **Section 3.2** for further details.

4.2.2 The bat scoping survey found that the site offered foraging and commuting potential for bat species. The site has moderate potential to support bat activity (foraging and commuting). The broadleaved woodland on site offers excellent roosting and foraging opportunities for bat species. The hedgerow on site has the potential to act as a foraging and commuting corridor for bat species, connecting the site to the wider landscape.

4.2.3 Further bat activity surveys were recommended on the site to determine whether the habitat is a key foraging or commuting area for bat species locally, and which bat species the site supports.

4.3 Activity Surveys

4.3.1 After conducting the bat activity surveys low levels of bat activity were found on site, with no activity 'hot spot' areas determined. Low levels of bat foraging and commuting activity was picked up across the site during the surveys, which ranged from April until October. Species consisted of Common Pipistrelle, Soprano Pipistrelle and Noctule. Most of the foraging activity occurred along the site boundaries, between the wooded areas of site and adjacent habitats, and was predominantly Common Pipistrelle activity. It is unlikely the site provides key foraging habitat for local bat populations.

5. Conclusions and Recommendations

5.1 After conducting a thorough Bat Roost Potential survey and a detailed Desktop Study, we considered **Ashbrow Road** to have a moderate potential for supporting foraging, commuting and roosting bats.

As **Ashbrow Road** has been shown to be rarely used by foraging/commuting bats, we recommend that the proposed development at **Ashbrow Road** should go ahead, and that no **Bat Mitigation Licence** is required. However, the work should be carried out with care and vigilance.

Lighting Design: Lighting should be of low-level luminance, floodlights must not be used or installed within 10m of the wooded habitats on site. All lighting on site must be LED, avoiding the use of bright white lighting. Where possible lights are to be timed to turn off after sunset and not to turn on before sunrise, unless triggered by movement/motion. It is important to avoid:

- Uniform levels of luminance across the site.
- Metal halide and florescent lighting.
- Upward tilting lighting that increases skyline luminance.

Instead the following must be installed:

- Dark buffer zones.
- Screening in the form of vegetation, fences and structures.
- Appropriately designated darkened areas.
- Luminaries absent of UV elements
- LED luminaries with a sharp cut-off, low intensity and good rendition.
- Peak luminaire wavelength at a minimum of 550nm.
- Downward directional luminaires with upward light ratios of 0%
- Lower light columns to limit light spill.
- Recessed internal light fixtures.
- Window glazing treatments or automated blind systems.

Should any bats be found during any stage of the development, all work must stop immediately, and Natural England must be contacted. Natural England

will provide advice on the best course of action. It must be stated that this is a legal requirement, and that bats may only be handled, and their roost disturbed by an experienced ecologist holding an appropriate licence.

The development of any building or structure has the potential risk of removing bat roosting habitat. Therefore JCA always recommended that alternative bat roosting opportunities should be provided to replace any that are lost due to building alterations. Should you like advice on putting up bat boxes, or on increasing your site's value to bats through carefully designed planting schemes and habitat creation, JCA can provide this service.

6. References

Bat Mitigation Guidelines (Jan. 2004). A. J. Mittchell-Jones. English Nature.

Bat Survey Guidelines: Good Practice Guidelines (2007). Bat Conservation Trust (BCT).

Bat Workers Manual (3rd Edition 2004). A. J. Mitchell-Jones & A. P. McLeish. Joint Nature Conservation Committee (JNCC).

Websites:

Bat Conservation Trust (BCT). <http://www.bats.org.uk/>

Google Maps. **<**http://maps.google.co.uk/**>**

Multiple-Agency Geographic Information for the Countryside (MAGIC). <http://www.magic.gov.uk/>

National Biodiversity Network (NBN) Gateway. <data.nbn.org.uk>

Natural England. < http://www.naturalengland.org.uk/>

Nature on the Map. Natural England. <www.natureonthemap.org.uk>

Relevant Legislation:

Wildlife and Countryside Act 1981 <http://jncc.defra.gov.uk/page-3614>

The Conservation of Habitats and Species Regulations 2017
<https://www.legislation.gov.uk/uksi/2017/1012/contents/made>

Countryside and Rights of Way Act 2000
<http://www.legislation.gov.uk/ukpga/2000/37/pdfs/ukpga_20000037_en.pdf?view=interweave>

Appendices

Appendix 1: Bat Activity Plans

N

W E

S

Ashbrow Infant and Nursery School

Ash Meadow Close

Car Park

Ashbrow Road

10 SC10 11 SC11 12 SC12 1 SC1 2 SC2 3 SC3 4 SC4 5 SC5 6 SC6 7 SC7 8 SC8 9 SC9

Appendix 1: Site Plan

Ashbrow Road **21/08/18**
Huddersfield
West Yorkshire
HD2 1EX
JCA Ref: 13945a/JB

NOT TO SCALE

1 Stop location/number

SC1 Section location/number

Transect route

Trees

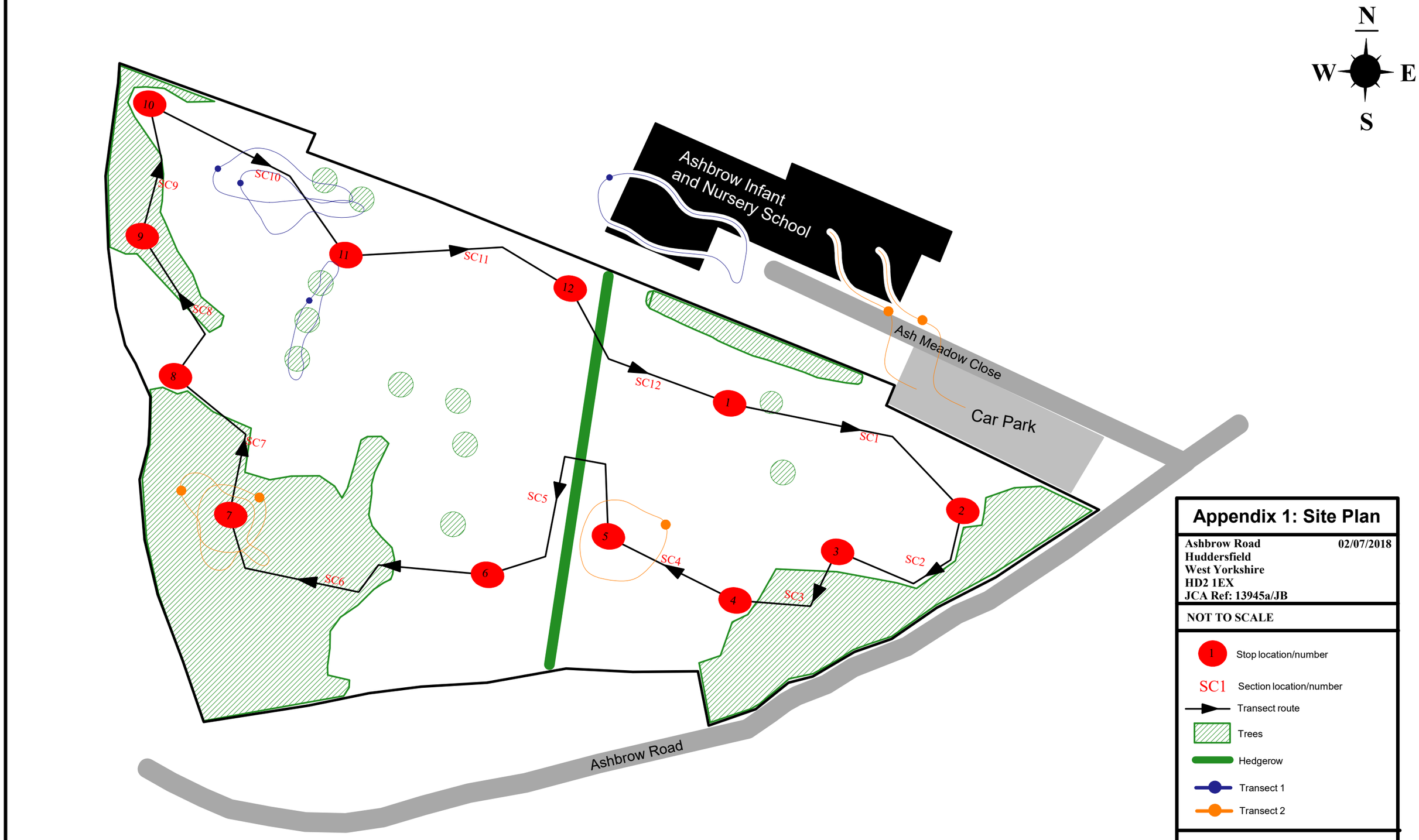
Hedgerow

Transect 1

Transect 2

JCA Limited

Arboricultural & Forestry Consultants



Appendix 1: Site Plan

Ashbrow Road **02/07/2018**
Huddersfield
West Yorkshire
HD2 1EX
JCA Ref: 13945a/JB

NOT TO SCALE

1 Stop location/number

SC1 Section location/number

Transect route

Trees

Hedgerow

Transect 1

Transect 2

JCA Limited

Arboricultural & Forestry Consultants

N
W E
S

Ashbrow Infant and Nursery School

Ash Meadow Close

Car Park

Ashbrow Road

10 9 11 12 8 7 6 5 4 3 2 1

SC1 SC2 SC3 SC4 SC5 SC6 SC7 SC8 SC9 SC10 SC11 SC12

X2 X3

Appendix 1: Site Plan

Ashbrow Road **24/07/18**
Huddersfield
West Yorkshire
HD2 1EX
JCA Ref: 13945a/JB

NOT TO SCALE

1 Stop location/number

SC1 Section location/number

Transect route

Trees

Hedgerow

Transect 1

Transect 2

JCA Limited

Arboricultural & Forestry Consultants

N
W E
S

Ashbrow Infant and Nursery School

Ash Meadow Close

Car Park

Ashbrow Road

10 9 11 12 8 7 6 5 4 3 2 1

SC9 SC10 SC11 SC8 SC12 SC7 SC1 SC5 SC6 SC4 SC3 SC2

Appendix 1: Site Plan

Ashbrow Road 25/05/2018
Huddersfield
West Yorkshire
HD2 1EX
JCA Ref: 13945a/JB

NOT TO SCALE

1 Stop location/number

SC1 Section location/number

Transect route

Trees

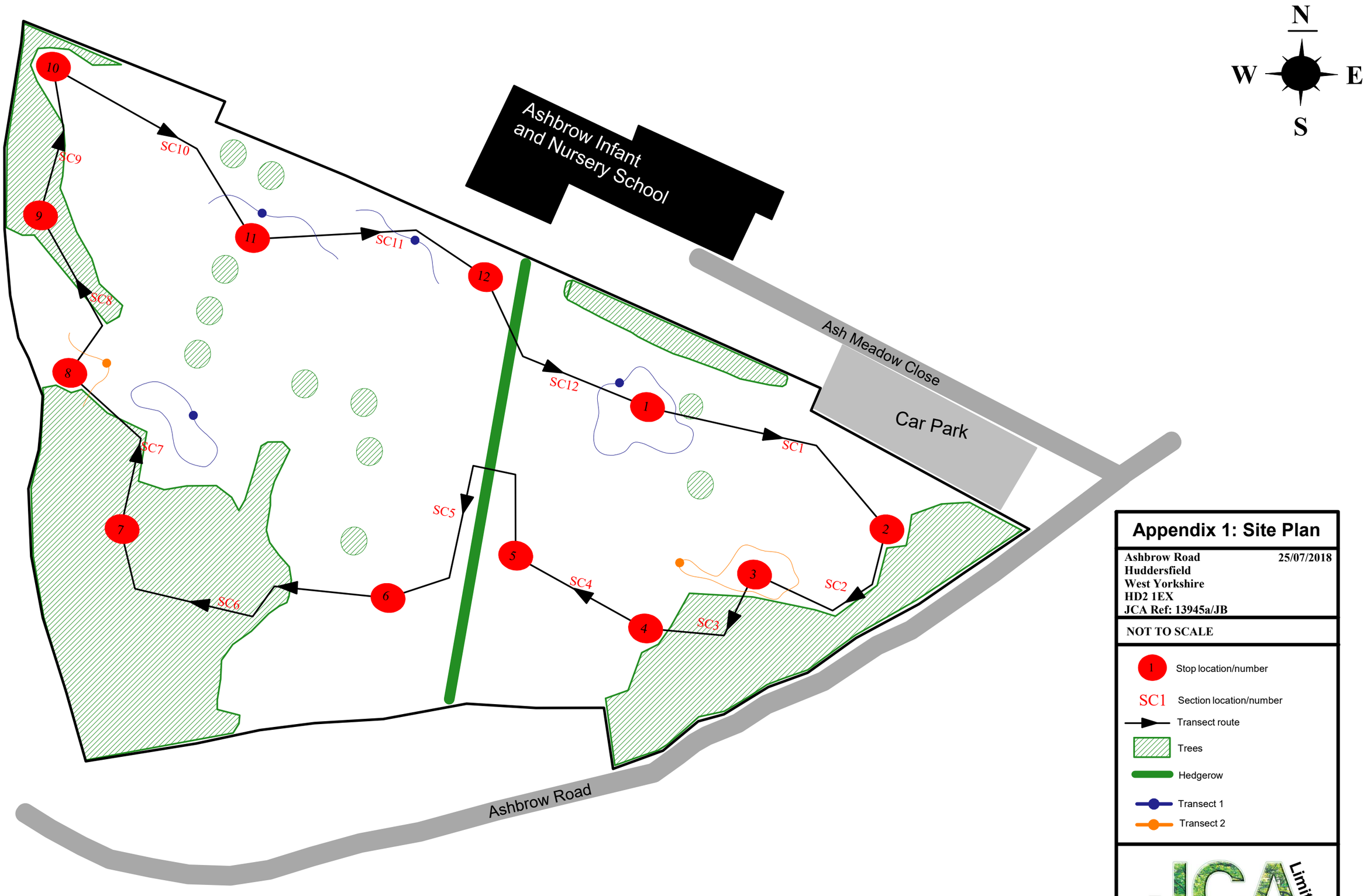
Hedgerow

Transect 1

Transect 2

JCA Limited

Arboricultural & Forestry Consultants



Appendix 1: Site Plan

Ashbrow Road **25/07/2018**
Huddersfield
West Yorkshire
HD2 1EX
JCA Ref: 13945a/JB

NOT TO SCALE

1 Stop location/number

SC1 Section location/number

Transect route

Trees

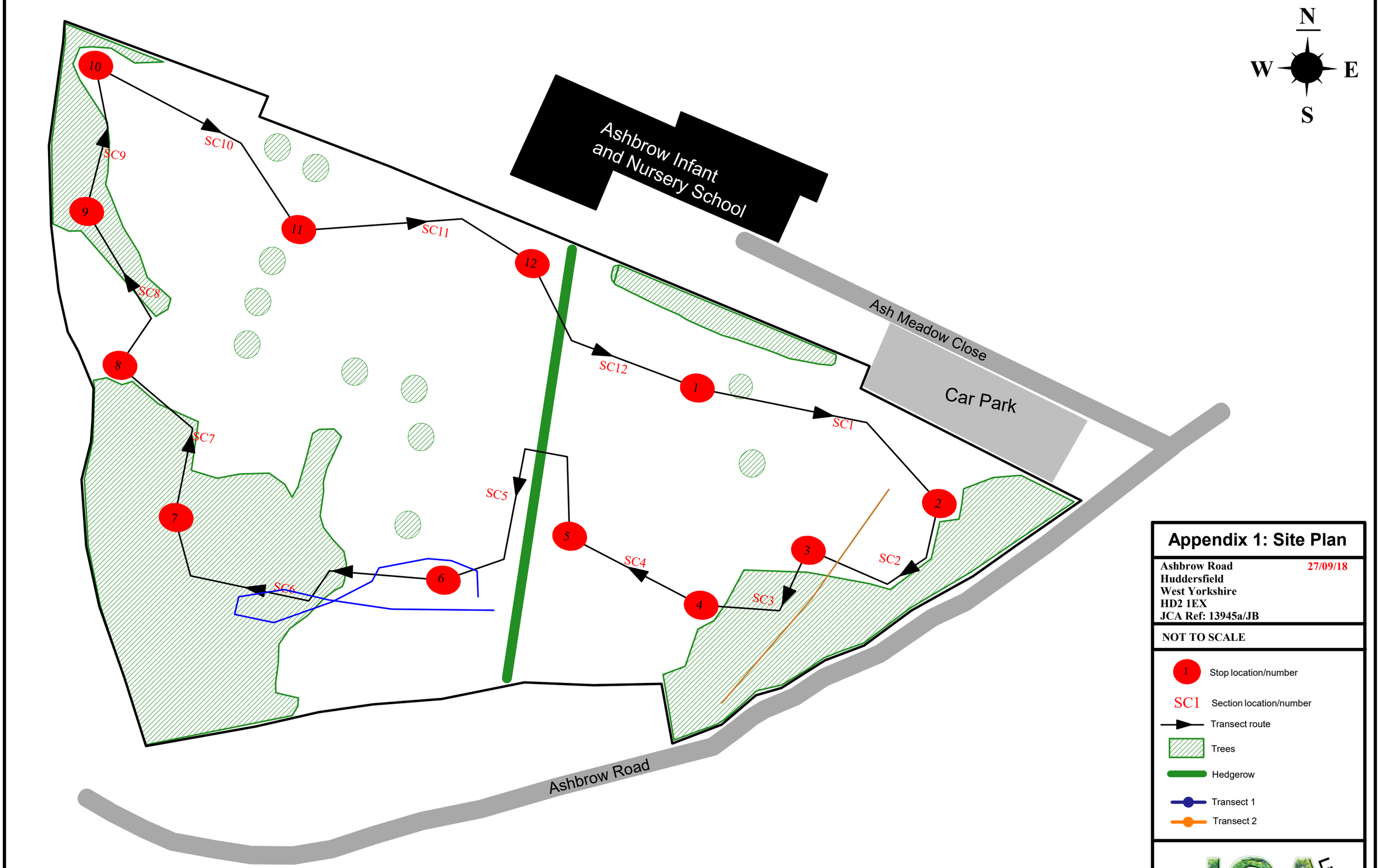
Hedgerow

Transect 1

Transect 2

JCA Limited

Arboricultural & Forestry Consultants



Appendix 1: Site Plan

Ashbrow Road 27/09/18
Huddersfield
West Yorkshire
HD2 1EX
JCA Ref: 13945a/JB

NOT TO SCALE

1 Stop location/number

SC1 Section location/number

Transect route

Trees

Hedgerow

Transect 1

Transect 2

JCA Limited

Arboricultural & Forestry Consultants

Appendix 2: Photographic Evidence

Photo 1: Hard standing on site, adjacent to the school

Photo 2: Rhododendron adjacent to the school, forming a shrub border

Photo 3: Semi-improved grassland adjacent to the school

Photo 4: Fence adjacent to the school

Photo 5: Semi-improved grassland adjacent to the fencing

Photo 6: Tall ruderal and plantation woodland

Photo 7: Vegetation on site

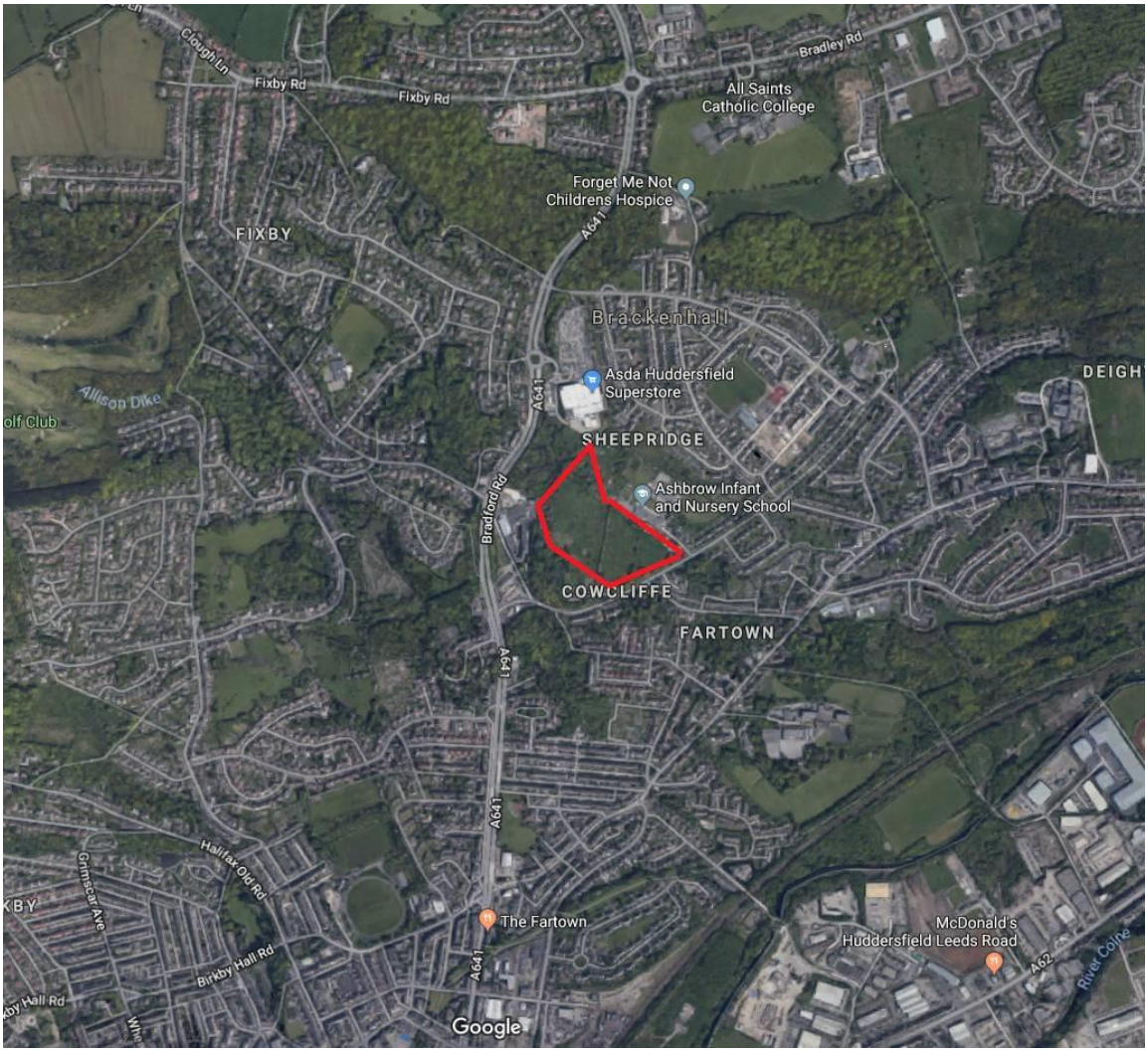
Photo 8: Broadleaved woodland on site

Photo 9: Semi-improved grassland and scattered trees

Photo 10: Semi improved grassland and scattered trees

Appendix 3: Map of Surrounding Landscape

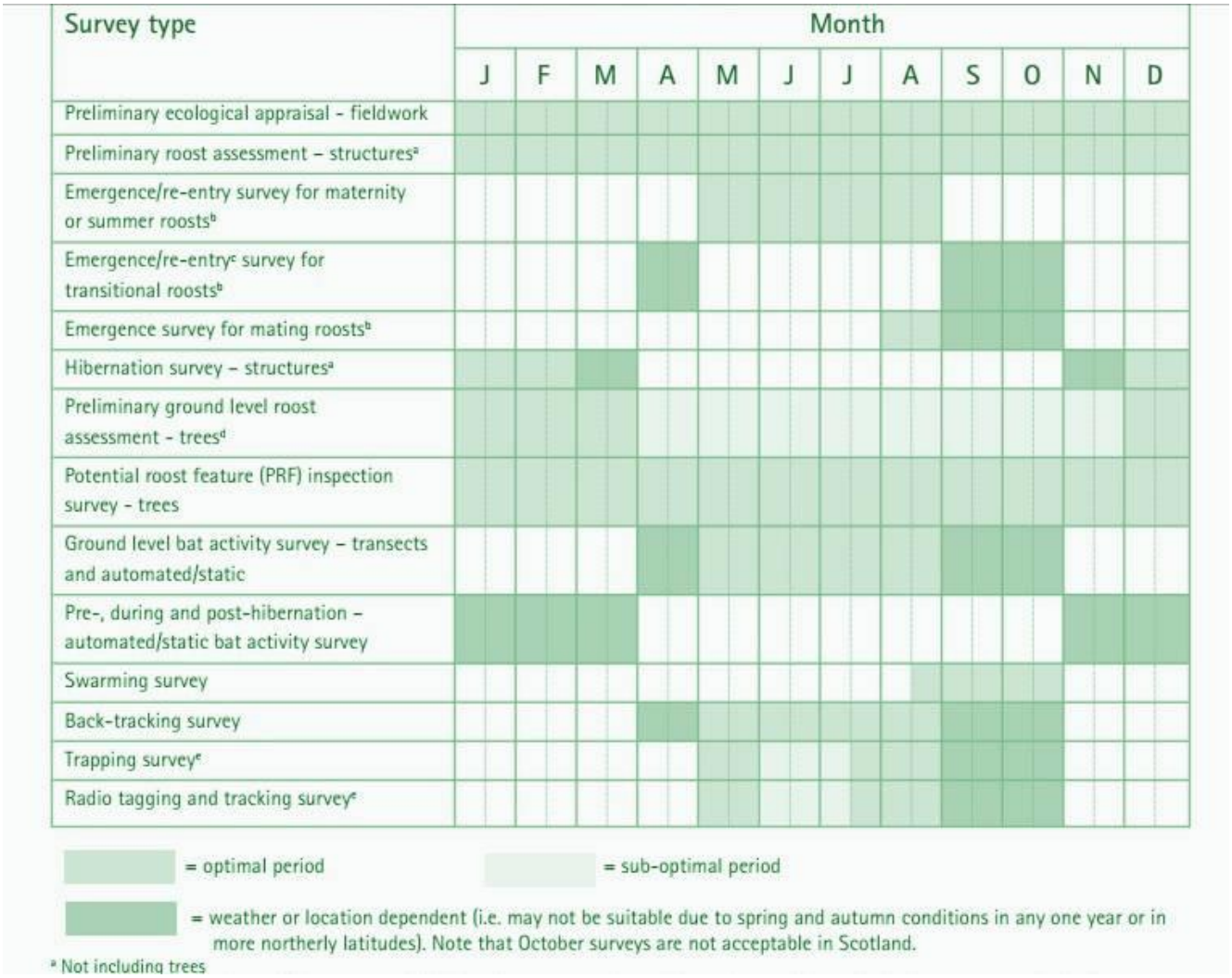
Figure 2: Google Maps image of **Ashbrow Road,** showing the survey site in relation to the surrounding landscape and habitats. Red line indicates site boundary. **© Google**



Google map image © September 2018

Appendix 4: Bat Survey Calendar

Figure 3: Survey timings calendar (taken from BCT: Bat surveys for professional Ecologists, Good Practice Guidelines; 3rd Edition).



Survey type	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Preliminary ecological appraisal - fieldwork												
Preliminary roost assessment – structures[a]												
Emergence/re-entry survey for maternity or summer roosts[b]												
Emergence/re-entry[c] survey for transitional roosts[b]												
Emergence survey for mating roosts[b]												
Hibernation survey – structures[a]												
Preliminary ground level roost assessment - trees[d]												
Potential roost feature (PRF) inspection survey - trees												
Ground level bat activity survey – transects and automated/static												
Pre-, during and post-hibernation – automated/static bat activity survey												
Swarming survey												
Back-tracking survey												
Trapping survey[e]												
Radio tagging and tracking survey[e]												

= optimal period = sub-optimal period

= weather or location dependent (i.e. may not be suitable due to spring and autumn conditions in any one year or in more northerly latitudes). Note that October surveys are not acceptable in Scotland.

[a] Not including trees

Appendix 5: Glossary

Activity surveys - are used to assess the level of bat activity at a site. This can be done either by using equipment such as an AnaBat device, or manually walking around a site with a heterodyne detector, documenting the number of bat passes and interceptions.

Dawn surveys - begin around 2 hours before and up to sunrise when bats are returning to their roosts from foraging, and swarming behaviour can be seen close to roost entrances.

Dusk surveys - begin around 30 minutes before sunset and up to 2 hours afterwards. These are done in order to see bats emerging from their roost sites at night.

Echolocation – is a system similar to sonar that allows bats to travel and forage even in total darkness. Bats make a call and then listen to the returning echoes in order to build up a map of their surrounding area. This allows bats to gauge the identity and distance of an object by how long the echo takes to return to them.

Habitat - the ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism.

Hibernation - is a state of inactivity and metabolic depression characterized by lower body temperature, slower breathing, and lower metabolic rate. Hibernating animals conserve energy, especially during winter when food is short, tapping energy reserves, i.e. body fat, at a slow rate.

Hibernacula - typically consist of underground sites, such as caves and cellars, which remain relatively cold and humid. Bats will hibernate to conserve energy over the winter months when falling temperatures cause a drop in the abundance of insects. These will typically be colonised around November to around March.

Insectivorous – is when an organism feeds exclusively on insects.

Nocturnal - a behaviour characterized by being active during the night and sleeping during the day.

Maternity roosts – colonised around late May early June and consist of mature females and their young. These roosts need to be warm and quiet, and are used up until around August, with females typically leaving first and then the young.

Mating roosts – mating begins around late October to November. Males of most species use special mating calls to attract females. These can include purrs, clicks and buzzing.

Roost – a site where bats live during the day, rear young and hibernate. These can be in man made structures, such as buildings, bridges, tunnels, cellars and mines, or natural features such as mature trees and caves.

Roosts in buildings – many types of buildings will be used by bats. The most likely sites are agricultural buildings (e.g. farmhouses and barns), buildings with exposed wooden beams (greater than 20cm thick), buildings with weather boarding and/or hanging tiles, and buildings close to woodland and/or water.

Roosts in trees – these are typically in mature trees with deep sheltered cracks, under loose sections of bark, or in woodpecker holes.

Species – a group of organisms in which all members can interbreed and produce viable offspring.

Summer roosts (non-breeding) - these are generally occupied by groups of males and immature females during the summer, and are usually only occupied for a short period before the group moves to another location.

Swarming – a behaviour exhibited by bats returning to their roost sites at dawn. Bats can be seen repeatedly flying to and from the roost entrance, making it much easier for consultants to identify where roosts are on a building or structure.

Temporary/Transitory roosts – These are used after hibernation (March – April) before mature females disperse to maternity roosts and male/immature females colonise summer (non-breeding) roosts. Similarly, temporary roosts form before hibernation (August -October).

Underground Roosts – these are typically used during the winter and can be mines, caves, tunnels or cellars.

Appendix 6: Author Qualifications

Principal Consultant and Managing Director

Jonathan Cocking *F.R.E.S., Tech. Cert. (Arbor.A), PDipArb (RFS) FArborA CBiol MSB. MICFor.* Jonathan is a Registered Consultant and Fellow of the Arboricultural Association and sits on its Professional Committee. He has 31 years experience in the Arboricultural profession and served for eight years as Senior Arboriculturist with a large local authority before establishing JCA in 1997. Jonathan has since developed JCA's portfolio of services and its extensive client base. He is a Chartered Biologist, a Chartered Arboriculturalist and an Expert Witness with much experience of litigation work.

Technical Director

Toby Thwaites *BSc (Hons), HND (Arboriculture).* Toby joined JCA in 1998 after graduating in Ecology at the University of Huddersfield and has since graduated in Arboriculture at the University of Central Lancashire. A former JCA team leader and Consulting Arboriculturist, Toby is now Technical Director and oversees all office and on-site activities at JCA and is on hand to offer technical support and advice.

Consulting Staff: Ecology

David Bodenham *BSc Ind (Hons) Zoology, MSc Biodiversity and Conservation.* David joined JCA as an addition to the expanding ecology department. An advocate of evidence based conservation, he studied Zoology (Ind) at University and moved onto an MSc in Biodiversity and Conservation where he gained the myriad of skills needed as an ecologist. With over 7 years of experience, David specialises in bat and amphibian ecology.

Jenny Butler *BSc (Hons) Environmental Science.* Jenny joined JCA's ecology department in 2017, bringing with her a bachelor degree in Environmental Science from Bangor University. Jenny has previously worked as an Environmental Consultant for an Agri- Environment company and as a freelance ecological consultant. Jenny specialises in great crested newt and bat ecology.

Amanda Beck *Cert He in Field Ecology, StudentCIEEM.* Amanda joined JCA's ecology department in 2018, previously working as a freelance Ecological Consultant in North Wales and Liverpool and as a trainee Ecologist in South Wales. Amanda has extensive practical experience in surveying for botanical, amphibians, terrestrial and marine mammals along with invertebrate research work. She has practical experience in habitat management and creation and is a CIEEM student member.

The information which we have prepared and provided is true. We confirm that the opinions expressed are our true and bona fide opinions.

Signed

.....

Jenny Butler *BSc (Hons) Environmental Science*

08/02/19 Rev 1 Amendment

Proofread by

.....

Amanda Beck *Cert He in Field Ecology, StudentCIEEM*

08/02/19 Rev 1 Amendment

For and on behalf of ***JCA Ltd***

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ECOLOGICAL SERVICES

Ecological Pre-Planning Services

- Phase 1 Habitat Surveys
- Great Crested Newt eDNA Sampling
- Protected species: Bat, Wintering and Nesting Bird, Badger, Amphibian, Otter, Water Vole, White-Clawed Crayfish, Dormice and Reptile Surveys.
- Preparation for Environmental Impact Assessment (EIA)
- Invasive Species Surveys
- Code for Sustainable Homes
- Butterfly & Insect Surveys

Ecological Post-Planning Services

- Biodiversity Enhancement Plans
- Protected Species Mitigation
- Ecological Management (Bat and Bird box installation and inspection)
- Planting Schemes
- Monitoring of bird or bat boxes.

ARBORICULTURAL SERVICES

Guidance for Architects & Developers

- British Standard 5837 Surveys
- Arboricultural Implications Assessments (AIA)
- Arboricultural Method Statements (AMS)

Advice for Engineers, Loss Adjusters and Insurers

- Tree Surveys for Subsidence
- Heave Assessment
- Tree Root Identification

Advice for Local Authorities and Social Housing

- Tree Safety Surveys
- Specialist Decay Detection
- Landscape and Orchard Design

Tree Advice for the Legal Profession

- Subsidence Litigation
- Personal Injury and Accident Investigation
- Expert Witness, Planning Inquiries and Appeals

Veteran Tree Management

- Ancient Woodland Management
- Veteran Tree Management

Tree Health and Pest and Disease Management

- Pest and Disease Surveys
- Tree Health Checks
- Disease Mitigation and Control

JCA Limited

Arboricultural & Ecological Consultants

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