

Common name	Latin name	Abundance	Status
nightshade			woodland sites
Lesser celandine	<i>Ficaria verna</i>	D-A	Common & widespread
Cleavers	<i>Galium aparine</i>	O	Common & widespread
Herb robert	<i>Geranium robertianum</i>	O	Common & widespread in woodlands
Wood avens	<i>Geum urbanum</i>	LO-R	Common & widespread
Ivy	<i>Hedera helix</i>	A	Common/widespread
Bluebell	<i>Hyacinthoides non-scripta</i>	O	Typically found in ancient woodland sites and old hedgerows
Dog's mercury	<i>Mercurialis perennis</i>	O	Typically found in ancient woodland sites and old hedgerows
Moschatel	<i>Adoxa moschatellina</i>	O-R	Typically found in ancient woodland sites and old hedgerows
Bramble	<i>Rubus fruticosus</i> agg.	LA-O	Common & widespread
Wood dock	<i>Rumex sanguineus</i>	O	Common & widespread
Early dog-violet	<i>Viola reichenbachiana</i>	R	Typically found in ancient woodland sites

The area of native broad-leaved woodland is considered to be a habitat of ecological value and would likely qualify as the UKBAP Priority habitat 'Lowland Mixed Deciduous Woodland'. This habitat is outside the area proposed for development. The area of native broad-leaved woodland could potentially support badgers, nesting birds, foraging/commuting/roosting bats, dormice, great crested newt, and reptiles, these species are discussed further in section 4.2.2.

Pond (Target note 8)

A pond is present in the south-west of the site which is approximately 740 metres² in size. It supports a moderately diverse assemblage of macrophytic vegetation which includes reed canary-grass (*Phalaris arundinacea*), soft rush (*Juncus effusus*), water mint (*Mentha aquatica*), bulrush (*Typha latifolia*), water plantain (*Plantago alisma-aquatica*), duckweed (*Lemna sp*), lesser spearwort (*Ranunculus flammula*) and marsh bedstraw (*Galium palustre*). Bulrush is the most dominant macrophyte and has colonised a large proportion of the pond. The pond is generally in good condition with areas of open water persisting amongst the bulrush and other macrophytic vegetation and good/clear water quality. Bulrush is likely to completely dominate the pond and reduce the area of open water if left unmanaged. The scrub on the pond margins may also encroach further and could completely enclose the perimeter of the pond in the absence of any management.

The pond on site is considered to be a habitat of ecological value which would likely support a range of invertebrates and a number of amphibians as well as providing a source of drinking water for birds and mammals. The pond could potentially support great crested newt, this species is discussed further in section 4.2.2.

Dry ditches (Target note 9, D1 & D2)

There are two dry ditches on site, D1 adjoins hedgerow H1 and D2 adjoins hedgerow H3. The dry ditches are mostly < 0.5 metres in depth and approximately 0.5 metres in width.

They are vegetated with the adjoining hedgerow field layer vegetation. It is considered that the dry ditches likely function as drains during periods of wet weather before rapidly drying again.

The dry ditches on site are vegetated with moderately diverse hedgerow field layer flora and would likely become damp during periods of sustained rainfall. It is considered that the dry ditches provide a habitat of moderate ecological value that could potentially support a range of fauna including invertebrates, birds and small mammals. The dry ditches could potentially support ground nesting birds, great crested newt, and reptiles, these species are discussed further in section 4.2.2.

Wet ditches (Target note 10, D3 – D5)

There are three wet ditches on site, D3 ditch adjoins hedgerow H3, D4 ditch adjoins hedgerow H4 and the D5 forms a small interconnected network within the native broad-leaved woodland area. The wet ditches which adjoin the hedgerows are approximately 0.5 metres in depth and 0.75 metres in width, they are vegetated with the adjoining hedgerow field layer vegetation. The water within ditches D3 and D4 mostly appeared to be stagnant and poor/turbid in quality. The wet ditch channels within the woodland area are mostly < 0.5 metres in depth and approximately 0.5 to 1 metre in width. The water level within the ditch channels was very shallow to dry in places, the ditches are vegetated with the woodland ground flora as described in the relevant section above. Ditch D5 also connects with ditch D4 to the west of the woodland area.

The wet ditches on site are considered to be of moderate ecological value as they provide an ecological resource and a source of drinking water for a range of fauna, including invertebrates, amphibians, birds and mammals. The wet ditches on site could potentially support great crested newt, otter and water vole, these species are discussed further in section 4.2.2.

4.2.2 Protected species assessment

Badgers

No evidence of badgers, including setts, dung pits, latrines, paths or fur, was identified during the field survey. Badgers are known to be present in the woodland, Newlands Row, to the east of the development site. The site provides limited foraging habitat for badgers which is predominantly arable land. The pond to the south of the development area may provide a drinking resource for the local badger population.

Further recommendations regarding construction impacts on foraging badgers have been provided in section 5.1.

Bats

Trees

The site comprises a number of mature trees which have features suitable for use by bats. The area around the school site has four trees with low potential to support bats and one tree with moderate potential and one tree with high potential. The locations of the trees are shown in appendix III and features are described in table 7 below.

Table 7: Potential of trees within the site

Tree number	Species	Grid reference	Roost feature	Potential
1	Oak	SU66679 08806	Veteran oak with multiple features	High
2	Oak	SU66690 08748	Lifted bark on all sides	Low
3	Oak	SU66531 08904	Split limbs present	Low
4	Oak	SU66531 08904	Hole at end of branch on the west side approximately 9 metres high	Low
5	Oak	SU66550 08977	Tear out on the east side approximately 8 metres high	Low
6	Oak	SU66844 09230	Multiple cavities present	Moderate

The plans do not include the removal of any trees and all trees with bat potential will be retained. If this should change an ecologist should be consulted and further surveys may be required.

Foraging habitat

The hedgerows, scrub and woodland on the site has been assessed as moderate value foraging/commuting habitat for bats. Collectively, these habitats are likely to support a diverse assemblage of invertebrate prey and they are also well connected with further suitable habitat in the surrounding area including hedgerows, woodland and lowland farmland. Within the wider surrounding area there are native hedgerows, woodland, arable and pasture fields, water courses, residential housing with associated gardens, and allotment gardens, all of which could provide suitable foraging and commuting habitat for bats.

Activity survey

A series of monthly bat transect surveys were started in April 2018 alongside static monitoring devices. Activity surveys were conducted in 2018 and a diagram showing the transect routes is located in appendix IV. A summary of the results is provided below while detailed results are provided in appendix V.

Low numbers of common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle, serotine (*Eptesicus serotinus*), Myotis species (*Myotis sp.*), long-eared (*Plecotus sp.*), Nathusius pipistrelle (*Pipistrellus nathusii*) and noctule (*Nyctalus noctula*) bats were recorded during the activity surveys. The bats were recorded mainly commuting and foraging along the hedgerows and tree lines around the external boundary of the survey area.

April dusk survey on 25th April 2018

- Low levels of bat activity were recorded during the survey. One common pipistrelle bat, one *Myotis* sp. bat and one soprano pipistrelle bat were heard but not seen.

May dusk survey on 21st May 2018.

- Moderate levels of bat activity were recorded, with the most abundant species being the common pipistrelle bat which was recorded foraging on the western side of the field and around the trees on the northern edge between 21:37 and 22:52.
- One noctule bat was recorded on the south-western boundary at 21:19.
- Soprano pipistrelle bats were heard and seen commuting west to east on the southwest boundary between 21:21 and 22:41.
- One long-eared bat was recorded on the northeast boundary at 22:24.
- One Nathusius' pipistrelle was recorded on the northeast boundary at 22:49.

June dusk survey on 11th June 2018

- High levels of bat activity were recorded across the entirety of the transect. The most abundant species was the common pipistrelle bat, which were recorded foraging along the treelines and hedgerows between 21:56 and 23:14.
- Soprano pipistrelle bats were seen on the southern boundary commuting northeast at 21:56 and foraging at 22:20.
- One *Myotis* sp. bat was recorded on the western boundary at 22:28.
- One Nathusius' pipistrelle was recorded on the southwest boundary at 23:14.

July dusk survey on 23rd July 2018

- Moderate levels of bat activity were recorded on the survey. The most abundant species was the common pipistrelle bat, which were recorded commuting and foraging between 21:48 and 22:58. Individual bats were observed foraging along the central hedgerow and southern hedgerow.
- Noctules were recorded between 21:56 and 22:09 with an individual bat seen commuting north to south across the field.
- A serotine was recorded at 22:10 and 22:50 but not seen.
- A long-eared bat was recorded north of the site at 22:28.

July dawn survey on 24th July 2018

- Moderate levels of bat activity were recorded on the survey. The most abundant species was the common pipistrelle bat, which were recorded commuting and foraging between 03:34 and 04:13 with only individual bats seen.
- Soprano pipistrelle bats were recorded on the southern boundary commuting, foraging and feeding between 03:41 and 04:45.
- A long-eared was recorded on the southern boundary at 03:37 and 03:50.

August dusk survey on 6th August 2018

- Consistent levels of bat activity were recorded on the survey with individual bats observed. The most abundant species was the common pipistrelle bat, which were recorded commuting and foraging between 21:14 and 22:25.
- Soprano pipistrelle bats were recorded twice commuting and foraging on the southern boundary of the site.
- One noctule was recorded south of the site at 21:41.
- Two long-eared bats were recorded at 21:43 and 22:00 south of the site.

September dusk survey on 13th September 2018.

- Low levels of bat activity were recorded on the survey. The most abundant species was the common pipistrelle bat, which were recorded commuting and foraging between 19:44 and 21:16.
- Soprano pipistrelle bats were recorded commuting and foraging between 20:24 and 21:23.
- Four noctules were recorded across the site between 19:45 and 21:13.

Static monitoring

A plan showing the location of the static detectors is located in appendix IV. The full results of the static monitoring are presented in table 8 below. A summary of the findings has been provided below:

- A total of six species and genus of bat were recorded during the static monitoring survey including common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, serotine, long-eared, and *Myotis* species.
- Low numbers of passes of Nathusius' pipistrelle were recorded during the surveys indicating that the habitats on site are visited infrequently by this species and does not form part of a core sustenance range around a roost. This species is considered to be a "rarer" bat.
- The majority of activity across the site was from common pipistrelle with a peak number of passes recorded in May and high activity levels in May, June and July across both statics. This indicates the area may be used by foraging bats within a maternity roost nearby.
- All other bats were recorded with very low levels of activity throughout the site.

Table 8: Average bat passes recorded during the static monitoring

Static 1						
Average passes	April	May	June	July	August	September
Common pipistrelle	0.00	561.00	163.67	284.00	0.00	347.75
Long-eared	0.00	1.13	0.33	21.50	3.33	0.75
Myotis sp.	0.00	3.88	2.33	5.67	0.00	0.50
Nathusius	0.00	4.75	0.50	0.17	0.00	0.25
Soprano pipistrelle	0.00	1.13	0.67	53.50	0.00	4.00
Serotine	0.00	2.63	0.33	2.67	0.00	0.00
Pipistrelle sp.	0.00	4.13	0.67	20.50	0.00	0.25
Static 2						
Average passes	April	May	June	July	August	September
Common pipistrelle	3.00	502.88	88.83	198.83	92.67	138.50
Long-eared	0.25	0.50	0.00	0.50	0.33	0.00
Myotis sp.	0.00	1.63	0.00	0.00	0.50	0.75
Nathusius	0.00	0.75	0.00	0.00	0.00	1.25
Soprano pipistrelle	0.00	0.25	0.00	0.67	12.33	0.25
Serotine	3.00	1.38	0.00	2.00	0.33	0.00

Value of the habitat for foraging and commuting bats

The value of the habitat for foraging and commuting bats was assessed. The scores in table 9 and 10 assume a small population of Nathusius' bat, the rarest species recorded. As this species was not consistently recorded at the same monitor, in similar numbers or over successive months, it is concluded there is not a roost located near the site.

Table 9: Scores for Berewood foraging habitat (bold indicates the relevant criteria)

Species	Number of bats	Roosts/potential roosts nearby	Foraging habitat characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
-	-	Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches, less intensive arable and/or small towns and villages (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

5	10	1	3
Total score			20

Table 10: Score for Berewood commuting habitat (bold indicates relevant criteria)

Species	Number of bats	Roosts/potential roosts nearby	Commuting habitat characteristics
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
-	-	Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Walls, gappy or flailed hedgerows, isolated well-grown hedgerows, and moderate field sizes (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Well-grown and well-connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and river/streams (5)
5	10	1	4
Total score			20

Using the scoring system above, the foraging and commuting routes across the site are considered to be locally important for bats. This is reflected in the survey data by the low number of passes recorded on the majority of the survey nights.

The site is locally important for bats and therefore further recommendations regarding foraging/commuting bats have been provided in section 5.3.

Birds

Breeding birds

Previous breeding bird surveys were carried out across the wider site by FCPR in 2003 and 2005 in relation to the Plant Farm development. Species recorded as breeding or probable breeding included the following: lesser whitethroat (*Sylvia curruca*), blue tit (*Cyanistes caeruleus*), skylark (*Alauda arvensis*), wren (*Troglodytes aedon*), whitethroat (*Sylvia communis*), dunnoek (*Prunella modularis*), blackcap (*Sylvia atricapilla*), robin (*Erithacus rubecula*), wood pigeon (*Columba palumbus*), pheasant (*Phasianus colchicus*) and chaffinch (*Fringilla coelebs*). Species recorded as possible breeding included starling (*Sturnus vulgaris*). Skylark, dunnoek and starling are UK BAP Priority bird species and BoCC red list species, the other recorded birds are common and widespread species which are not of conservation concern.

The hedgerows and scattered trees within the site provide suitable habitat for nesting birds. Further recommendations have been made in section 5.4.

Dormice

The hedgerows and woodland within the survey boundary provides suitable habitat for dormice, with good structure and availability of suitable food plants. The wider site is also well connected with further suitable habitat in the immediate surrounding area, including native hedgerows, scrub and semi-natural broad-leaved woodland.

Sixteen records of dormice were returned by HBIC for the vicinity of the site dated 2006 to 2012. A previous dormouse survey carried out on site and in the adjacent surrounding land by Biodiversity by Design Ltd between 2007 and 2009 (Biodiversity by Design Ltd, 2010a), found that dormice are present within the immediate surrounding area.

Dormice mitigation licences and an associated Berewood wide masterplan has been approved by Natural England for the clearance of small amounts of scrub, woodland and hedgerows for other phases of the development. Lindsay Carrington Ecological Services Limited are currently monitoring across the site for dormice.

The hedgerows within the site connect into the wider woodland network which are known to support dormice. Dormice are therefore considered to be present on site.

Dormice are present across the Berewood development site and works have been discussed with Natural England. Further recommendations have been made in section 5.5.

Great crested newts

The hedgerows and tall ruderal on the site are considered suitable habitat for great crested newts but this is very limited with the majority of the site comprising an arable field which is not considered suitable habitat.

Great crested newts are present within the Berewood development and previous licences have been granted on the wider site. The area for the proposed school site is approximately 50 metres from the main breeding pond for the development. This pond is currently being monitored in line with the great crested newt masterplan for the site and a medium population of great crested newts has been recorded.

Early plans for the site indicate that the central hedgerow (H2) will require removal. This is considered suitable habitat for great crested newts and therefore they are likely to be encountered during the works.

Great crested newts are present within the site and further recommendations have been made in section 5.6

Reptiles

The tall ruderal and hedgerows within the development site are considered to hold potential to support common reptile species such as slow-worm, common lizard (*Zootoca vivipara*) and grass snake. These habitats are also well connected to further suitable habitat in the surrounding area including lowland farmland, hedgerows, woodland and small water courses. The desk study returned records of slow-worm within two kilometres of the development site. A previous reptile survey of the site and wider development zone carried out by Biodiversity by Design Ltd (Biodiversity by Design Ltd, 2010a) recorded the presence of grass snake, slow-worm and common lizard in relatively low numbers dispersed across the area.

The majority of the reptile habitat is outside the development boundary and will be retained within the scheme. During the surveys a peak count of one juvenile grass snake was recorded along hedgerow one. This represents a low population of grass snake on the site (Froglife 1999). The results of the reptile surveys have been provided in table 11 below:

Table 11: Results of reptile surveys:

Date	Time	Weather	Temp (°c)	Species found
03/05/18	09:00	Wind 2/12, cloud 2/8	13	None
11/05/18	09:10	Wind 2/12, cloud 2/8	13	None
17/05/18	10:15	Wind 2/12, cloud 0/8	13	1 juvenile grass snake
24/05/18	9:45	Wind 2/12, cloud 7/8	15	None
07/06/18	12:00	Wind 1/12, cloud 8/8	18	None
14/06/18	10:00	Wind 2/12, cloud 8/8	14	None
27/06/18	07:00	Wind 2/12, cloud 0/8	14	None

A low population of grass snake was recorded across the site, further recommendations have been provided in section 5.7.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The School land at Berewood is generally considered to be of low ecological value although there are ecological constraints relating to the presence of hedgerows, great crested newts, dormice and reptiles. The development may have the following impacts:

- Loss of the native hedgerow which is considered to be a UKBAP habitat.
- The killing/injury of badgers during the clearance of the site.
- Disturbance to bats foraging in the local area through the use of lighting.
- The killing/injury of nesting birds during the clearance of the site.
- The killing/injury of dormice during clearance and loss of foraging habitat.
- The killing/injury of great crested newts during clearance.
- The killing/injury of reptiles during the clearance of the site.

Mitigation strategies have been provided below to prevent and minimise these impacts.

5.1 Hedgerow

5.1.1 Summary of findings

The native hedgerows running around the boundaries of the site are considered to be UKBAP hedgerows due to comprising 80% native species. These hedgerows should therefore be retained in any development plan where possible. Previous surveys of the hedgerows, carried out by Biodiversity by Design Ltd in 2009, found that two hedgerows (H1 and H2) qualified as ‘Important’ under the Hedgerow Regulations 1997. Mitigation is provided below in the event that sections of the hedgerows require removal for the works.

5.1.2 Mitigation

It is recommended that the hedgerows on site are retained alongside the development as far as reasonably possible. The proposals indicate that some sections of hedgerows on site qualifying as ‘Important’ (H1 and H2) will need to be removed and therefore written permission from the local council will need to be obtained before this work can proceed prior to the reserve matters approval.

If the design requires the removal of the hedgerows then further action will be required. The mitigation outlined below will be required.

- Retain and protect the hedgerows in accordance with the British Standards Institute (2012) *Trees in Relation to Design, Demolition and Construction – Recommendations BS5837:2012* by installing Heras fencing along the root protection zones before works.
- Mitigate any hedgerow loss using native tree planting that is equivalent to the length of habitat lost. This would provide suitable mitigation for the hedgerow loss resulting

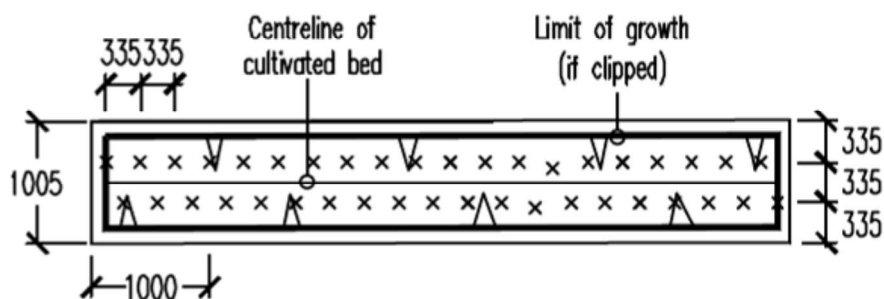
from the proposals as well as an additional habitat feature suitable for a range of fauna including birds, invertebrates, reptiles and amphibians. New hedgerow planting would also enhance the aesthetic appeal of the site and provide natural screening of the development.

- An example of the species that could be used within new hedgerow planting on site are outlined in table 14 below and following the planting pattern illustrated in diagram 1.

Table 14: Species to be included in hedgerow/shrub planting

Species	Proportion within hedgerow
Spindle (<i>Euonymus europaea</i>)	10%
Hawthorn (<i>Crataegus monogyna</i>)	15%
Blackthorn (<i>Prunus spinosa</i>)	15%
Field maple (<i>Acer campestre</i>)	15%
Dog rose (<i>Rosa canina</i>)	5%
Hazel (<i>Corylus avellana</i>)	20%
Elder (<i>Sambucus nigra</i>)	10%
Crab apple (<i>Malus sylvestris</i>)	5%
Guelder-rose (<i>Viburnum opulus</i>)	5%
Pedunculate oak (<i>Quercus robur</i>) will be used for standard tree planting within the hedgerow.	

Diagram 1: Planting Pattern



5.2 Badgers

5.2.1 Summary of findings

No evidence of badgers was recorded during the survey and there is limited foraging habitat on site. Badgers are known to be present across the wider Berewood development and these populations may commute across the site to access the water within the pond to the south of the proposed development area. Therefore, construction mitigation is proposed in line with the standard guidelines and the mitigation proposed in the Ecology Chapter, as per condition 6.

5.2.2 Mitigation

The following construction mitigation measures are recommended:

- Install fencing in areas where it is important to exclude badgers for safety reasons e.g. fuel storage areas.
- Locate any topsoil / material piles well away from identified badger activity and check on a daily basis for badger activity.
- Temporarily fence any piles of material that are to be on site for a significant period of time to prevent badgers from accessing the fresh soil.
- Minimise night-working to avoid disturbance to badgers, and cease works in proximity to active setts at least two hours before sunset.
- Where possible excavations should not be left open overnight. However, if excavations are left open at night, then an earth / wooden ramps must be installed to allow any animals that fall in to escape. Work areas would be checked daily to ensure no animals are trapped.
- Cap any pipes over-night on site to avoid animals becoming trapped.

5.3 Bats

5.3.1 Summary of findings

The mixture of arable field margins and hedgerows provide good foraging habitat for bats. A total of seven species and genus of bat were recorded during the static monitoring survey with no additional species being recorded on the activity surveys.

The Bat Conservation Trust considers bats *Nathusius' pipistrelle* to be uncommon (BCT, 2016). Other species recorded on site are considered to be common and widespread. It is considered that in the context of the bat populations in the wider area the site is considered to be locally important. The results indicate there may be a maternity roost for common pipistrelle in the area which use the hedgerows of the site as commuting and foraging corridors.

Development of the site could have a significant negative effect on bats using the area in terms of loss of foraging habitat, reduced landscape connectivity and disturbance from light pollution. Mitigation is therefore provided below.

5.3.2 Mitigation

Foraging and commuting habitat

The overall masterplan for the wider development maintains the connectivity across and around the site so that foraging or commuting bats are able to cross the site. Connectivity to retained woodland habitat will be maintained and where possible enhanced through planting additional hedgerows.

Lighting

The scheme is anticipated to have minimal lighting requirements. Where lighting is required the following measures will be put in place:

- Directing lighting to only where it is needed away from the hedgerows and trees;
- Through the design of the luminaire by using accessories such as cowls or hoods;
- Light sources should emit minimal ultra-violet light, peak higher than 550nm and be of a warm/neutral colour <4,200 kelvin.
- Using low pressure sodium lighting with light levels kept as low as practically possible (between 1 and 3 lux); and
- Restricting the height of the lighting columns to three metres or less.

5.4 Birds

5.4.1 Summary of findings

Breeding birds

The hedgerows, ditches, and woodland on site provided potential nesting habitat for birds. The arable field may also provide breeding habitat for arable species such as skylark.

5.4.2 Mitigation

Breeding birds

The following precautions should negate the risk of harming nesting birds during the development:

- The arable field should be left as bare ground prior to development to dissuade arable species such as skylark from nesting on the field.
- The clearance of any scrub and hedgerows should where possible be undertaken outside of the bird nesting season, this is considered to extend from the 1st March to the 31st August, or if this is not possible, must be done under the supervision of an ecologist to ensure that nesting birds are not harmed. Where nesting birds are encountered, clearance and/or demolition must be postponed until the nestlings have fledged.
- Ecological enhancement measures suggested in section 5.8 will provide foraging and nesting opportunities for many species of bird.

5.5 Dormice

5.5.1 Summary of findings