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Guidance

# Bats: surveys and mitigation for development projects

Standing advice for local planning authorities to assess impacts of development on bats.

From:  
Natural England (<https://www.gov.uk/government/organisations/natural-england>) and Department for Environment, Food & Rural Affairs (<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>)

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Applies to:  
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Survey reports and mitigation plans are required for development projects that could affect protected species, as part of getting planning permission or a mitigation licence. Surveys need to show whether protected species are present in the area or nearby, and how they use the site. Mitigation plans show how you'll avoid, reduce or manage any negative effects to protected species.

This is Natural England's species standing advice for local planning authorities who need to assess planning applications that affect bats. This information can be used to decide what is needed for surveys and planning mitigation measures for bats.

Ecologists need to decide which survey and mitigation methods are right for the project they're working on. If this standing advice is not followed, they'll have to include a statement with the planning application explaining why.

Where this guide says 'you' it means the applicant or their ecologist.

Get more detail on:

- bats protection and licences (<https://www.gov.uk/guidance/bats-protection-surveys-and-licences>)
- bat mitigation licence forms (<https://www.gov.uk/government/collections/bat-licences>) - you'll have to follow this standing advice if you're applying for a mitigation licence otherwise the licence may be refused
- construction near protected wildlife (for developers) (<https://www.gov.uk/construction-near-protected-areas-and-wildlife>)
- how planning authorities can assess applications involving protected wildlife (<https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications>)

## Decide if you need to survey

Bats can be affected by construction work including:

- demolishing buildings
- extensions that block roof access
- wind turbines
- barn conversions
- removal of trees or hedgerows
- building or maintenance of roads

Survey for bats if:

- records show that there are bat roosts in the development site or roosts in the area
- the area includes buildings or other structures that bats tend to use
- there are underground structures like abandoned mines, tunnels or cellars nearby
- there are trees with features that bats tend to use nearby
- distribution and historical records suggest they may be present
- a wind turbine of more than 250 kilowatts (kW) is proposed near to a site designated for bat populations located within an SSSI impact risk zone of a Special Area of Conservation (SAC) or site of special scientific interest (SSSI) (<https://www.gov.uk/protected-areas-sites-of-special-scientific-interest>)
- a wind turbine of more than 250kW is proposed within 50m of features like woodland, hedgerows, rivers, lakes, caves, mines or structures that bats might use

## Buildings that bats use

You're more likely to find bats using a building (particularly during summer) because of certain features including that it:

- is not affected by artificial light levels
- is close to woodland or water
- was built a long time ago (particularly early 20th century or before), but bats use modern houses too
- has cracks or crevices
- has a roof warmed by the sun
- has an uneven roof covering with gaps (but is not too draughty)
- has entrances bats can fly into
- has a large roof area with clear flying spaces
- has large roof timbers with cracks, joints and holes
- has hanging tiles or wood cladding, especially on south-facing walls

You're less likely to find bats using a building (particularly during summer) if it:

- is in a heavily urbanised area with few green spaces or suitable habitat
- is an active industrial premises
- was built after the 1970s with few gaps
- is prefabricated with steel and sheet materials
- has a small or cluttered roof space (especially for long-eared bats)

## **Underground sites that bats use**

Bats may hibernate underground in winter. You're more likely to find bats using an underground roost if it:

- is close to woodland or water
- is large enough to have a stable temperature in winter
- is humid
- has many cracks and crevices (but this is less important for lesser and greater horseshoe bats)

You're less likely to find bats using an underground roost if it:

- is in a heavily urbanised area affected by artificial light
- is heavily disturbed, for example if people use it regularly
- is small and draughty
- has smooth surfaces (bats cannot grip on polished surfaces)

## **Trees that bats use**

You're more likely to find bats roosting in a tree if it:

- is in ancient woodland or parkland
- is large with a complex growth form
- has natural cavities - ash, beech and oak often have these
- has damage caused by rot, wind, woodpeckers or lightning, for example

- has loose bark

You're less likely to find bats roosting in a tree if it:

- is in a coniferous plantation with no mature trees that have splits, cracks or holes for bats to roost in
- is young and less than 20cm diameter at chest height, with a simple growth form and little damage

## Survey methods

You can use any of the following methods to survey bats:

- visually inspect buildings or other structures
- inspect trees
- use bat detectors
- use netting and harp trapping
- use radio-tracking

You can only use some methods at certain times of year - timings are explained in this guide.

Read the bat surveys guidance (<https://www.bats.org.uk/resources/guidance-for-professionals/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition>) by The Bat Conservation Trust.

You'll need a license for many methods if you're surveying for bats.

## Visually inspect buildings or other structures

You should:

- ask owners and neighbours if there's a history of bats using the building
- inspect in the daytime using high-quality binoculars
- check for access points into the building
- inspect outside the building for bat droppings, such as on the ground or stuck to walls
- inspect the inside of the building thoroughly - use endoscopes to inspect cavities if possible
- record signs of bats on a plan and compare them with a reference collection

You should also:

- visit during summer or autumn if possible, although winter is acceptable
- explain in your report if it was not possible to get to certain areas
- search roof areas for 1 to 2 hours (for a normal-sized house)
- search a large building for 1 day, or narrow down the search area using bat detectors

Use bat detector (bat activity) surveys to confirm whether a bat roost is present if you cannot access the whole building or your building inspection shows evidence of bats.

## Visually inspect trees

You should:

- inspect using high quality binoculars
- use endoscopes to inspect cavities if possible

## Bat detectors

Use bat detectors if visual inspections suggest bats may be present.

You should:

- survey over several visits at dawn or dusk, spread over several weeks between May and September
- only use hand-held detectors between dusk and dawn during the summer for buildings and trees, and during autumn for underground roosts
- survey buildings for up to 2 hours after sunset
- survey during the 90 minutes before sunrise and continue until 15 minutes after sunrise, after bats re-enter their roost
- in autumn, survey starting at sunset and continue for at least 1 1/2 hours to include the times of emerging for all bat species

You can use automated detectors linked to data loggers as well as thermal and infra-red imaging.

## Netting and harp trapping

You should:

- be suitably qualified to use this method
- only catch bats in flight as a last resort, for example if you need to identify a species

## Radio tracking

You can use this method to find out what foraging areas bats from a particular roost use or if they have alternative roosts.

You should discuss this method with Natural England before starting because it involves handling bats and you must have a licence.

## Survey effort needed

You should assess how likely it is that concentrations of bats will be present at the site and how they'll use it. Your survey should include checking whether bats:

- fly into or out of features likely to contain roosts, including swarming around underground structures like caves or mines
- travel through or near features likely to be used as commuting routes, like hedgerows, tree lines or water courses
- are active in habitats where they're likely to forage or feed, such as lakes and rivers

The number of visits you'll need to make will depend on the local conditions and how much risk the proposed work and the location will be for bats.

The local planning authority will need to see the survey reports and mitigation plans to check they meet the standards required.

You may be asked for more surveys if:

- habitats or other information (such as local records) show that it's very likely that bats are present
- the bats' use of the habitat varies between seasons
- your survey was done outside of the bats' active season (May to September)
- your survey was done in unusual weather conditions like a particularly bad storm
- your planning or licence applications are based on poor data, unless you can show the area is not very important to bats

You should assess how likely it is that concentrations of bats will be present at the site and how they'll use it.

## **Surveying buildings using bat activity surveys**

For this method:

- survey the entire building for signs like droppings
- visit during summer or autumn if possible - you can also look for evidence of bats in winter but you'll need to follow this up with surveys in the active season
- explain in your report if it was not possible to get to certain areas, and what should happen if bats are later found during development
- search roof areas for 1 to 2 hours (for a normal-sized house)
- search a large building for 1 day, or narrow down the search area using bat detectors

Back up your searches with bat detector surveys or emergence counts to confirm whether a small, hard to detect roost is present, or if you cannot access the whole building.

## **Searching caves, mines and other underground structures**

To survey these structures:

- survey for hibernating bats during January and February, depending on the weather, although extra care needs to be taken
- survey for swarming bats between August and October, continuing for up to 4 hours from dusk
- make 2 or 3 visits if you're surveying in any month except January or February
- look for droppings or oil-staining around cracks and crevices
- check for signs of a maternity roost (where babies are born and raised until they're independent) - if you find any, survey again in summer

You can also use activity loggers.

## **When and how to survey roosts**

Visual inspections can be done all year round. Bat activity surveys should be done in the bat active season, May to September.

## Spring (March to May)

Roost type	Inspect at this time	Use bat detectors or emergence counts
Building	Yes, for historical signs and maybe bats	Limited use, depending on weather
Trees	Yes, for historical signs and maybe bats	Limited use, depending on weather
Underground	Yes, for historical signs	Can use static detectors

## Bat active season (May to September)

Roost type	Inspect at this time	Use bat detectors or emergence counts
Building	Yes, for signs and bats	Yes
Trees	Yes, for signs and bats	Yes
Underground	Yes, for signs	Rarely useful

## Autumn (September to November)

Roost type	Inspect at this time	Use bat detectors or emergence counts
Building	Yes, for signs and maybe bats	Limited use, depending on weather
Trees	Yes, for historical signs	Limited use, depending on weather
Underground	Yes, for signs and maybe bats	Can use static detectors

## Winter (December to February)

Roost type	Inspect at this time	Use bat detectors or emergence counts
Building	Yes, for signs and maybe hibernating bats	Rarely useful
Trees	No, but best for signs after leaves have gone	Rarely useful
Underground	Yes, for signs and hibernating bats	Can use static detectors

## Influences on survey results

Explain the implications if any of these factors affected your survey counts:

- weather
- an event that disturbed the bats, for example adverse weather event or extreme noise

- signs of bats were removed, such as someone swept the floors to remove droppings

## Estimate population size class

For a planning application that will need mitigation, provide an estimate of colony or population size per species of bat and include:

- how you've identified the species, including information from bat detectors
- counts of bats in the roost or activity, including dates
- the position of bats in the roost (for example clustered or dispersed)
- the pattern and amount of droppings, and how old they are
- whether you discovered food remains
- a map or plan of the site showing where you found bats or signs of them

## Assess the roost's importance

Assess the site's importance per bat species using these factors, along with your survey data:

- droppings, for example significant quantities in piles in the roof void can suggest a maternity roost
- bat activity has been recorded
- there are access points in the building
- there are signs of cobwebs being removed by bats
- local records show bats could be present

Give a description of any bat roosts or sites you find using these definitions:

- day roost - where individual bats, or small groups of males, rest or shelter in the day, but rarely on summer nights
- night roost - where bats rest or shelter at night, but rarely during the day
- feeding roost - where bats rest at night between feeding sessions, but rarely during the day
- hibernation roost - where bats are found during winter
- transitional or occasional roost - where bats gather at a temporary site before and after hibernation
- mating site - where males and females gather from late summer to early winter
- maternity roost - where babies are born and raised until they're independent
- satellite roost - where breeding females roost close to the main nursery colony in the breeding season
- swarming site - where bats gather in large numbers from late summer to autumn

## Assess the impacts

Provide an impact assessment showing what effect this development would have on bats if no mitigation were to take place. Include this with your planning or licence application. Consider the following potential impacts.

### Short-term impacts

During development, bats can be disturbed by:

- increased human presence at the site
- increased noise
- changes to the area's layout, temperature or humidity (these can affect commuting routes)

## Long-term impacts

Changes to bat roosts can have long-term effects, for example:

- reduced roosting space or loss of roosts altogether
- changed entrance positions and sizes
- new entrances
- changed ventilation
- increased human activity
- external lighting near flight paths and commuting routes

Wind turbines can harm bat populations when bats:

- fly into the turbine tower or rotor blades
- suffer from the changes in air pressure caused by the blades' rotation, otherwise known as 'barotrauma'

## Scale of impacts

Use the following tables to work out the scale of impacts on the bat populations per species - include this assessment with your planning application. You'll need mitigation measures even for low impacts.

Some bat species accept changes to their roosts better than others - take this into account in your planning.

This is a general guide only and does not take into account species differences. Medium impacts in particular will depend on how carefully mitigation is designed and carried out and could range between high and low.

<b>Maternity roosts</b>	<b>Impact</b>
Destruction	High
Fragmentation and isolation	High
Post-development interference	High
Partial destruction or modification	Medium
Temporary disturbance	Low (if you do work out of breeding season)

<b>Major hibernation roosts</b>	<b>Impact</b>
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<b>Major hibernation roosts</b>	<b>Impact</b>
Destruction	High
Fragmentation and isolation	High
Post-development interference	High
Partial destruction or modification	Medium
Temporary disturbance	Low (if you do work out of hibernation season)

<b>Minor hibernation roosts</b>	<b>Impact</b>
Destruction	High
Fragmentation and isolation	High
Post-development interference	Medium
Partial destruction or modification	Medium
Modified management, such as changes to light, temperature or noise which will affect bats	Medium
Temporary disturbance	Low (if you do work out of hibernation season)

<b>Mating roosts</b>	<b>Impact</b>
Destruction	Medium
Fragmentation and isolation	Medium
Partial destruction or modification	Medium
Modified management, such as changes to light, temperature or noise which will affect bats	Medium
Post-development interference	Low
Temporary destruction followed by reinstatement	Low

<b>Swarming roosts</b>	<b>Impact</b>
Destruction	High
Fragmentation and isolation	High

<b>Swarming roosts</b>	<b>Impact</b>
Partial destruction or modification	Medium
Modified management, such as changes to light, temperature or noise which will affect bats	Medium
Post-development interference	Low
Temporary destruction	Low
Temporary destruction then reinstatement	Low

<b>Night roosts, day roosts or feeding roosts</b>	<b>Impact</b>
Destruction	Medium
Fragmentation and isolation	Medium
Partial destruction or modification	Low
Modified management, such as changes to light, temperature or noise which will affect bats	Low
Post-development interference	Low
Temporary destruction then reinstatement	Low
Temporary destruction	Low

<b>Transitional roosts</b>	<b>Impact</b>
Destruction	Low
Fragmentation and isolation	Low
Partial destruction or modification	Low
Post-development interference	Low
Temporary destruction	Low

<b>Satellite roosts</b>	<b>Impact</b>
Destruction	Medium
Fragmentation and isolation	Medium
Partial destruction or modification	Medium

<b>Satellite roosts</b>	<b>Impact</b>
Post-development interference	Low
Temporary destruction	Low

<b>Species</b>	<b>Risk to individual bats from wind turbines</b>	<b>Risk to bat populations from wind turbines</b>
Noctule	High	High
Leisler's	High	High
Nathusius' pipistrelle	High	High
Serotine	Medium	Medium
Barbastelle	Medium	Medium
Common pipistrelle	Medium	Low
Soprano pipistrelle	Medium	Low
Myotis species	Low	Low
Long-eared bats	Low	Low
Horseshoe bats	Low	Low

## Mitigation and compensation methods

Address the potential impacts on bats by creating mitigation plans. Use the following approach.

1. Aim to avoid negative effects, for example by redesigning the scheme.
2. If this is not possible, use mitigation measures to reduce the impacts.
3. Use compensation measures if there are still negative impacts for bats.

Mitigation and compensation methods can include:

- changing the location of the work
- changing work methods or timing to avoid bats
- creating, restoring or improving roosts (and replacing any that will be damaged or removed)
- creating, restoring or improving habitats including foraging areas
- managing and maintaining habitats in the long term
- monitoring the roost status after the development

- limiting the use of wind turbines to particular times of day or year, or weather conditions (such as stopping blades in low winds)

## **Bat boxes**

Do not use bat boxes as a like-for-like replacement for existing roosts.

## **Incorporate existing roosts into refurbished buildings**

For this method:

- make sure the roost is kept at the appropriate size and type for the species of bat
- put roost entrances back in their original positions

Do not use breathable roofing membranes (also called non-woven textiles) in a roof used by bats - use type 1F roofing felt with a hessian matrix instead.

## **Create new roosts in buildings**

For this method:

- make sure the new roosts are appropriate for the species of bat, for example provide crevices for species that typically roost in them
- avoid trussed rafters, unless it creates a large roof void
- make sure the new roost will have an appropriate temperature
- avoid plastic roof linings (or use rough timber planks along the ridge beam)

You can use large bat boxes in roofs.

## **Roost entrances**

For horseshoe bats, create roost entrances they can fly through. For other species you can use smaller holes or slits for the bats to crawl through.

## **Bat houses or barns**

Only use this method if it's not possible to keep existing roosts. If you use this method:

- position the house as close as possible to the roost that will be lost and match it closely in size and aspect (direction it faces)
- position the replacement roost close to existing flight lines with the entrance close to the appropriate habitat, for example foraging and feeding habitat highlighted as important in the survey
- make sure the roost is designed with features appropriate to the species, including the temperature
- make sure the building will be safe from vandalism and bad weather
- make arrangements to keep the roost secure for the long term
- get planning permission if needed

## Discovering bats after development has started

Stop all work that's likely to be breaking the law if bats are found after development has started. Get expert help from a qualified and licensed ecologist. Then conduct a survey and develop mitigation plans.

## Management and site maintenance after development

In your management plans, explain the maintenance that will be needed for any bat boxes or new roosts during the time you expect them to be used.

## Population monitoring

Put a monitoring plan in place to assess the bat population after mitigation.

Use the same counting methods you used before the development so you can compare population trends.

Your monitoring methods should be in proportion to the level of risk to bats. For example, monitor the highest risk cases during high risk periods and include activity monitoring and casualty surveys where possible.

## Wind turbines

Wind turbines can affect bats. Read the guidance for developers, planners and ecological consultants in [Bats and onshore wind turbines: survey, assessment and mitigation](https://www.nature.scot/sites/default/files/2019-01/Bats%20and%20onshore%20wind%20turbines%20-%20survey%2C%20assessment%20and%20mitigation.pdf) (<https://www.nature.scot/sites/default/files/2019-01/Bats%20and%20onshore%20wind%20turbines%20-%20survey%2C%20assessment%20and%20mitigation.pdf>). The guidance applies to onshore wind energy developments. It's not intended for use with single wind turbines, micro installations (under 50kW) or offshore wind farms.

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1. 28 February 2020

Corrected link to bat surveys guidance.

2. 4 March 2019

Wind turbines section links to new guidance on bats and onshore wind energy developments. It replaces Natural England's Technical Information Note TIN051.

3. 28 March 2015

First published.

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