Planning Inspectorate,
Examining Authority,
A47 North Tuddenham to Easton Examination,
National Infrastructure Planning,
Temple Quay House,
2 The Square,
Bristol, BS1 6PN.

13th December 2021

Dear Planning Inspectorate,

**Re. Application by Highways England for A47 North Tuddenham to Easton - the Examining Authority's written questions and requests for information (ExQ3), Issued on 30 November 2021**

Regarding the request for information, we had not been contacted regarding the request for information from us (Q3.3.4) in the above document. The request was only very recently brought to our attention, by a third party, so I am providing what information I can, at this stage, and at short notice. More detailed information can be provided at a later date.

**Q3.3.4**

*"The submitted representation [RR-084] makes reference to the presence of a super colony of Barbastelle bats, however no survey data or detailed evidence to support this assertion has been submitted to the Examination.*

*Please provide the survey data and evidence to support this submission. If this is not possible, please explain in detail why this cannot be submitted and why the information has not been made available to NCC and the Applicant so far."*

**Background**

Research has been carried out for a number of years on a key population of a very rare and highly protected bat species, the Western Barbastelle (*Barbastella barbastellus*). This population is located to the north-west of Norwich. The research programme has been a collaboration between Wild Wings Ecology and the University of East Anglia, contributed to and supported by the Norfolk Barbastelle Study Group and a number of other professional ecologists, bat experts and researchers.

At this stage, having only completed data collection in September 2021, we are currently analysing our data and writing-up our research findings from the last four years, 2018-2021. Consequently, we are not in a position to provide the full dataset to external parties at this stage. We will be submitting our research papers for publication in peer-reviewed scientific

journals. Consequently, the data cannot be released prior to this, as that would preclude publication. Publication in peer-reviewed scientific journals will ensure that the data and findings have been robustly and objectively assessed and presented and as such will minimise the risk of the data being misinterpreted by any third parties who may seek to use it. Essentially, this protects us and our data from any potential misuse.

Our research findings clearly have relevance for the proposed A47 dualling and the potential impacts of the scheme on barbastelle bats, therefore we are providing as much detail as possible at this stage, prior to publication, to assist. An interim report was also submitted to Norfolk County Council, in relation to the proposed Norwich Western Link road, in March 2021. It is important to note that our research has focused on barbastelle maternity colonies in the Lenwade/Weston Longville/Ringland area and we have not surveyed woodlands to the south of here (i.e. closer to the A47).

## Key research findings

1. The area to the north-east of Norwich is a **nationally important area** for a rare, Annex II species: the barbastelle bat
2. This area is home to the **UK's only known 'super-colony' of barbastelles** (a cluster of significant, linked maternity colonies)
3. The 'Wensum Valley Super-Colony' includes what is thought to be the **UK's largest extant barbastelle roost**, with ≥105 individuals
4. The super-colony as a whole is estimated to have a ***minimum* of 270 barbastelles** (to put this in context, the criteria for 'Site of Special Scientific Interest' designation for barbastelles is breeding complexes of 20 or more adults)
5. To date we have located **>80 roost trees** used by the super-colony
6. There are concerns about the impact of proposed road schemes (the Norwich Western Link (NWL) and dualling of the A47), given the failures of bat mitigation/compensation measures for the Norwich Northern Distributor Road (NDR) and the apparent disappearance of the two barbastelle colonies that were located within 2.5 km of the NDR, prior to construction
7. Our radio-tracking data show that **barbastelles avoid the bat mitigation road crossing structures on the NDR** (including the green bridge and bat gantries), instead crossing at potentially 'unsafe' locations, risking collision with vehicles
8. Barbastelles from two maternity colonies within the super-colony (Weston Park (west) and the Ringland Woods) were recorded **crossing the A47 east of Hockering** (2020 and 2021 radio-tracking data), raising concerns about the impact of the A47 dualling on these colonies
9. The projected scale and severity of the impacts of the proposed road schemes in the area on this nationally important barbastelle population and the documented ineffectiveness of mitigation/compensation options on the NDR are such that the

**Favourable Conservation Status[1] of this barbastelle population is very likely to be impacted should the road schemes proceed as proposed**

10. It is essential that a **cumulative impact assessment** is undertaken for this nationally important barbastelle population in respect of the proposed **NWL, A47 dualling and off-shore windfarm cable routes**, all of which would pass through the super-colony's Core Sustenance Zone (see page 4 for definition)

# 1. About barbastelles

## 1.1 Conservation status & legislation

Barbastelles are one of the rarest of the UK's 17 resident/breeding bat species. They are one of only two of our UK bat species to be listed as '*Near Threatened*' globally on the IUCN Red List, having undergone substantial population declines and extinctions in other parts of their range. In the Mammal Society's recently updated Red List of UK Mammals, barbastelles are described as being *'at imminent risk of extinction'* and listed as '*Vulnerable*'[2].

Barbastelles are protected by a range of legislation, including The Wildlife and Countryside Act 1981 (as amended) and are listed on Annex II of The Conservation of Habitats and Species Regulations 2017 (along with only three other UK bat species). It is an offence to deliberately or recklessly disturb, capture, possess, injure or kill bats or obstruct access to, damage or destroy their roosts. Disturbance includes *'to impair their ability to breed or reproduce or rear or nurture their young or to affect significantly the local distribution or abundance of the species'.* Annex II species are those whose conservation requires the designation of 'Special Areas of Conservation'.

## 1.2 Barbastelles in Norfolk – and the Norwich Northern Distributor Road

Norfolk is considered a stronghold for barbastelles and, thanks to the work of the Norfolk Barbastelle Study Group (Harris 2020[3]), we now understand a lot more about the species and the importance of Norfolk in ensuring the future persistence of this species.

Post-construction monitoring of the Norwich Northern Distributor Road (NDR) raised concerns over the road's impact on two (of three) main barbastelle colonies in the area, located c. 2.5 km and c. 350 m from the road. These colonies could not be located after the

[1] *"conservation status will be taken as 'favourable' when: population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis."* - Habitats Directive Article 1 (i).

[2] https://www.mammal.org.uk/2020/07/one-quarter-of-native-mammals-now-at-risk-of-extinction-in-britain/

[3] Harris, J. (2020) A review of the barbastelle *Barbastella barbastellus* in Norfolk based on the work of the Norfolk Barbastelle Study Group. British Island Bats, Volume One, p33-49.

road had been completed and opened to traffic (Packman 2019[4]). In light of this and the location of the remaining/third significant colony in the area (furthest from the NDR, c. 3.5 km to the west), concerns over the likely impact of the proposed extension of the NDR through this area (the NWL) were highlighted. These concerns were removed from the monitoring report, without the author's consent, prior to publication on the council's website.

NDR post-construction bat monitoring data on the implemented mitigation/compensation measures for bats (including road crossing structures) showed that these measures had very low usage by bats and as such had likely failed to protect local bat populations. However, this was not adequately analysed and conveyed in the associated reports published by the council.

### 1.3 Landscape use & Core Sustenance Zones

Barbastelles have large home ranges, travelling up to 20 km away from their roosts in a night to forage (more typically in Norfolk, 5-6 km and up to 11 km). Consequently, they have large 'Core Sustenance Zones' (CSZ, see definition box below), of 6 km radius around communal bat roosts, reflecting their requirement for substantial areas of good quality habitat to support viable colonies. Foraging habitats include woodlands, riparian habitats and hedgerows/field edges.

> *"A Core Sustenance Zone (CSZ), as applied to bats, refers to the* ***area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost****. With reference to planning and development the CSZ could be used to indicate:*
>
> *1. The area surrounding the roost* ***within which development work can be assumed to impact the commuting and foraging habitat of bats using the roost****…*
>
> *2. The area within which mitigation measures should* ***ensure no net reduction in the quality and availability of foraging habitat for the colony****…*
>
> *…Note:* ***There may be justification with Annex II and other rare species to increase the CSZ to reflect use of the landscape by all bats in a population****"*
>
> (Bat Conservation Trust[5])

[4] Packman, C.E. (2019) Norwich Northern Distributor Road post-construction barbastelle bat radio-tracking monitoring report, Year 1: 2018 (January 2019 v1.0 – correct/author-approved version). Wild Wings Ecology, Norwich.

## 2. Data collection

### 2.1 Bat trapping surveys

Bat trapping surveys provide information on species presence, reproductive status and enable barbastelles to be fitted with radio-tags and/or rings. Bats are trapped in fine 'mist-nets', processed (biometric data recorded and, where applicable, a radio-tag and/or ring fitted) and then released.

We have undertaken 32 bat trapping surveys in woodlands in the Lenwade/Weston Longville/Ringland area between 2018-2021, as part of our research. Bat trapping surveys were carried out in the periods May to early June and August, to gain key information on barbastelle maternity colonies whilst avoiding the mid-June to end of July period when trapping/tagging carries a significant risk of harm to heavily pregnant females and very young, dependent pups.

### 2.2 Barbastelle radio-tracking

By temporarily fitting individual barbastelles with tiny, lightweight radio-transmitters, their movements can be tracked using a receiver and antenna, revealing roost locations, home ranges, foraging areas and commuting routes. Tracking also enables an assessment of habitat use and interactions with other landscape variables, such as existing roads and bat mitigation road crossing structures e.g. 'green bridges' and 'bat gantries' on the NDR.
To date we have radio-tagged 53 adult female barbastelles from the Lenwade/Weston Longville/Ringland area.

### 2.3 Roost emergence counts & colony estimates

Once roosts are located through radio-tracking, the number of barbastelles emerging from each roost at dusk can be counted. A colony will make use of multiple roost trees within a woodland and at any one time the colony may be utilising any number of these (although typically bats within a maternity colony will be roosting together or split between a small number of these roosts at any one time). All roost trees in use by radio-tagged bats are counted simultaneously (on the same night) to give a minimum estimate of colony size. Counts are conducted by experienced bat surveyors, equipped with infrared night vision/recording equipment and bat detectors to enable species identification.

### 2.4 Acoustic data (bat activity levels)

Static bat detectors, which record bats' ultrasonic echolocation and social calls, have been positioned throughout key woodlands in the area. These data provide an index of

[5] Bat Conservation Trust (2016) Core Sustenance Zones: determining zone size. Bat Conservation Trust, London.

barbastelle (and other bat species) activity levels, by analysing the number of bat 'passes' recorded for each species (identified from sonograms/spectrograms). Data have been collected each month for a period of one year (August 2020 – July 2021 inclusive).

## 3. Preliminary results

### 3.1 Bat trapping surveys

To date we have trapped 603 bats from the Lenwade/Weston Longville/Ringland area, which includes 161 barbastelles.

During trapping surveys we have recorded the following seven species:

- Barbastelle *Barbastella barbastellus*
- Common pipistrelle *Pipistrellus pipistrellus*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Natterer's bat *Myotis nattereri*
- Daubenton's bat *Myotis daubentonii*
- Brown long-eared bat *Plecotus auritus*
- Noctule *Nyctalus noctula*

### 3.2 Barbastelle radio-tracking

All-night tracking of barbastelles from key maternity colony woodlands within the 'Wensum Valley Super-Colony' have provided detailed information on home ranges, foraging areas and commuting routes. Roost and foraging woodlands, other foraging areas and commuting routes within close proximity to the proposed NWL (northern section) are summarised in Figure 1. We are still in the process of producing maps for other areas, including the area that includes the A47 North Tuddenham to Easton section.

Detailed, 'close-approach' radio-tracking enabled crossing points over major roads in the area to be located with a high degree of precision. Crossing points were at a few discreet locations and, predictably, where suitable habitat was located close to and on both sides of the roads, such as woodland/trees or vegetated waterways (unlit). Along the western section of the NDR, radio-tracked barbastelles crossed at two specific locations only (where habitat connectivity was best) and avoided the bat mitigation road crossing structures (a green bridge and a bat gantry) in the vicinity.

Furthermore, the Marriott's Way is well used as a commuting route (and foraging area) for barbastelles in the super-colony (see Figure 1), but it was clear from the radio-tracking data that the green bridge was ineffective, with barbastelles flying up to the end of the vegetated corridors either side of the bridge, but not passing over the (exposed and mostly unvegetated) bridge itself (with a c. 300 m gap in vegetation cover over and either side of the bridge). Instead, barbastelles crossed the NDR c. 130 m to the east, utilising a quiet,

dark, mature tree-lined lane, with a corresponding tree and hedgeline on the opposite side (a gap in vegetation cover of only c. 100 m).

With regards to the A47, barbastelles from two of the maternity colonies (Weston Park (west) and the Ringland Woods) within the Wensum Valley Super-Colony crossed the A47 (2020 and 2021 radio-tracking data). The crossing point was located just east of Hockering (see Figure 2) – within the stretch of the proposed dualling.

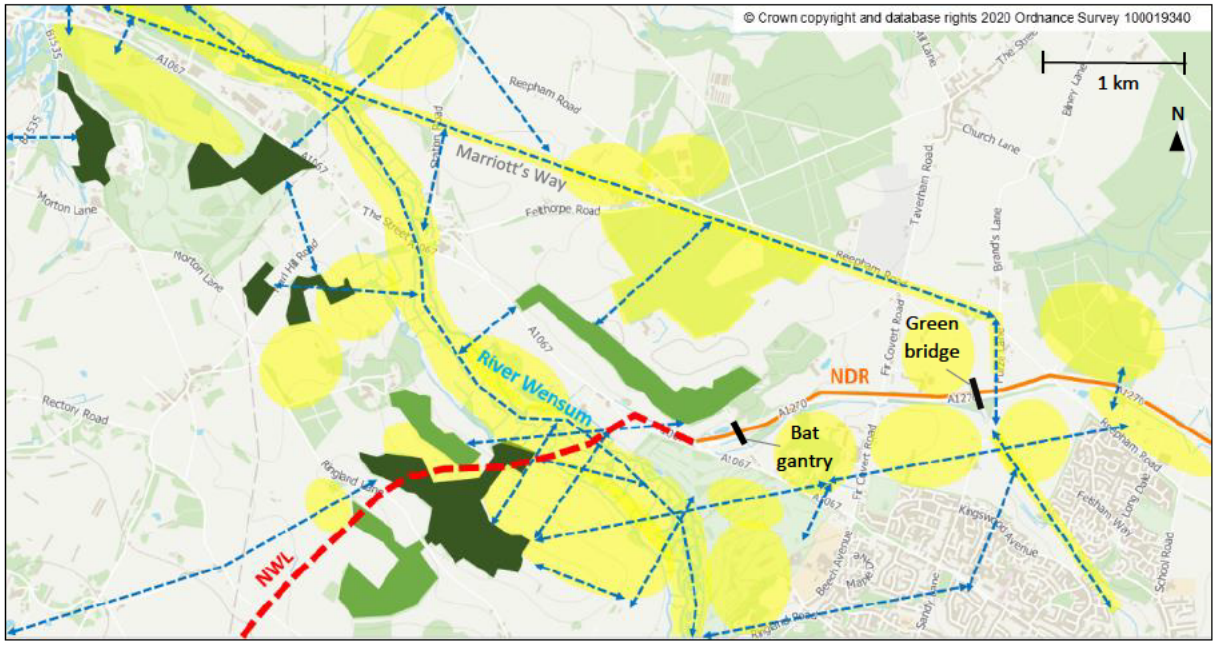


**Figure 1.** Summary schematic showing the key barbastelle areas which are in close proximity to the proposed NWL (northern section, red dashed line). Maternity colony (also used for foraging) woodlands shown in dark green, other barbastelle roost and key foraging woodlands in light green, foraging areas (outside of key roost/foraging woodlands) in yellow and main commuting routes with blue dashed arrows. The NDR (orange line) and bat mitigation road crossing structures within this area (green bridge and bat gantry) are also shown (labelled black rectangles). Overlaid on an Ordnance Survey map.

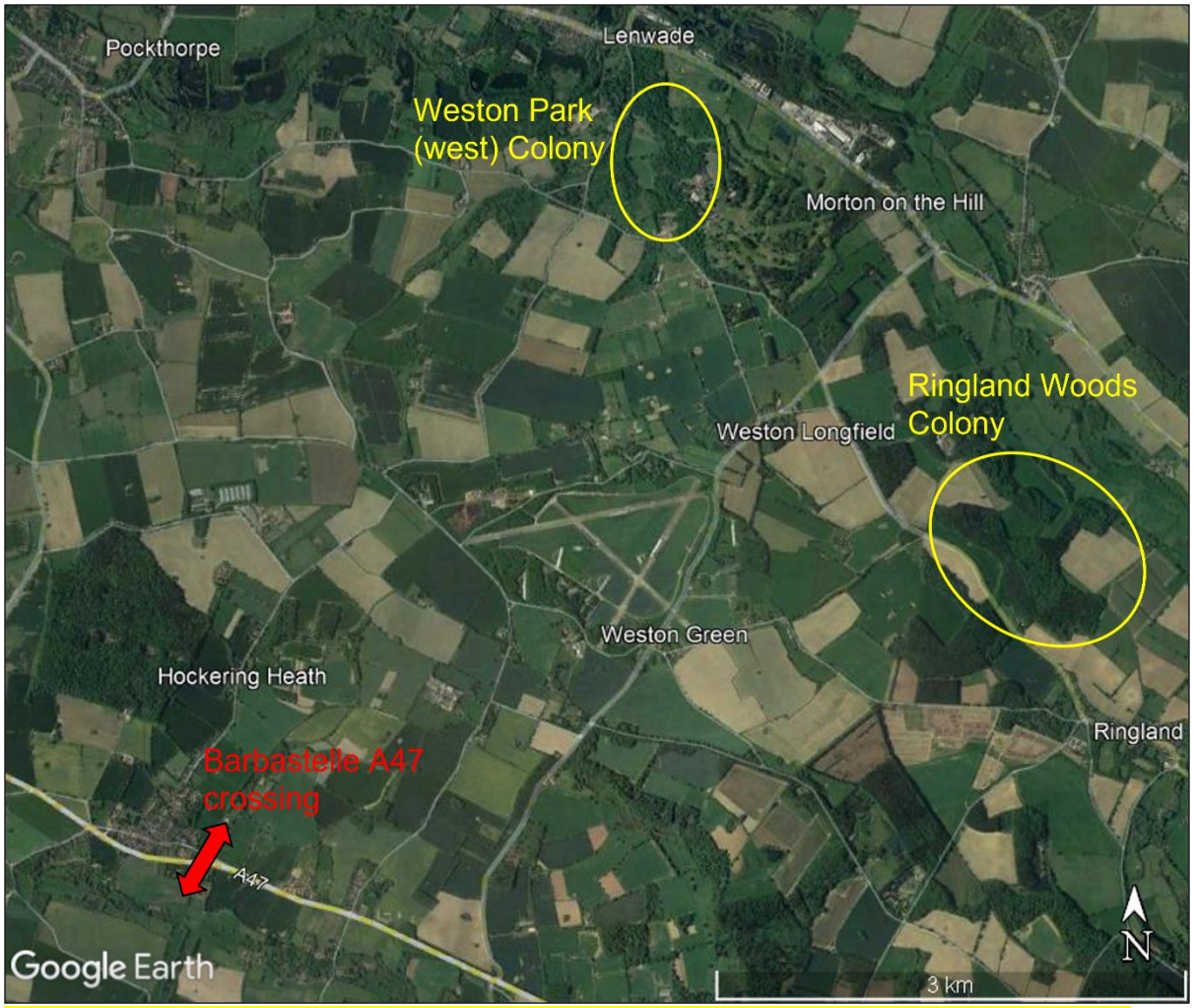


**Figure 2.** A47 barbastelle crossing point (red arrow), identified from radio-tracking adult females from the Wensum Valley Super-Colony in 2020 and 2021. This crossing point is located just east of Hockering. The crossing point was used by barbastelles from two maternity colonies within the super-colony: Weston Park (west) Colony (located at Roarr! Dinosaur Adventure) and the Ringland Woods Colony (includes Rose Carr, The Nursery, Primrose Grove and Long Plantation).

### 3.3 Roosts, emergence counts & colony size estimates

From radio-tracking adult female barbastelles in the area we have, to date, identified >80 roost trees used by the super-colony (this includes a roost in Hockering Wood).

Individual maternity colonies within the super-colony range in size from 27 - ≥105 barbastelles. Factoring in males, this gives a minimum estimate for the barbastelle population within the super-colony as a whole of 270 individuals.

Figure 3 shows the outer boundary of the merged (overlapping) 6 km Core Sustenance Zones around the known maternity colony woodlands in the area.

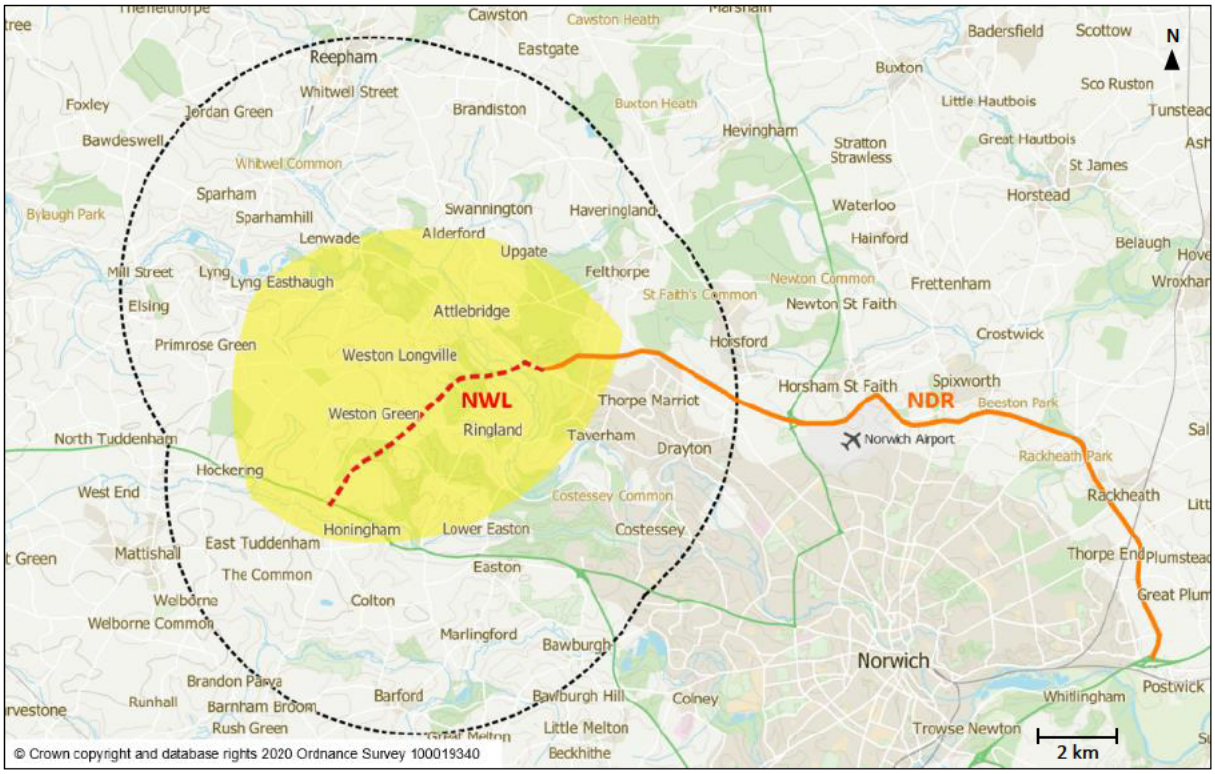


**Figure 3.** Outline of merged Core Sustenance Zones (black dashed line) around known barbastelle maternity colony woodlands in the vicinity of the proposed NWL, with the 'core of the cores' (the area where all six CSZs overlap) highlighted in yellow. Overlaid on an Ordnance Survey map and with the NDR (orange line) and proposed NWL (red dashed line) highlighted. The merged CSZs include the A47 between North Tuddenham and Bawburgh and the 'core of the cores' includes the A47 between Hockering and Honingham.

### 3.4 Acoustic data (bat activity levels)

The bat acoustic data are still being analysed. However, based on preliminary analyses:

- 10 bat species have been recorded in the area
- High levels of barbastelle activity have been recorded

- In winter/spring 2020, barbastelles were the second most commonly recorded species (after soprano pipistrelle)
- In summer 2020, barbastelles were the third most commonly recorded species, after soprano and common pipistrelles

## 4. Conclusions

The importance of this area for barbastelles is summarised by Emerson *et al.* 2020[6], on the basis of this research: *"there are several areas within Norfolk where high levels of activity have been recorded, including in the Wensum Valley where extensive radio-tracking work has been carried out to locate roosts of this species. The Wensum Valley appears to be a stronghold for this red-listed species in Norfolk and is likely to be important in a national context. This population is under threat by the proposed Western Link road in Norwich… loss of old mature woodland and veteran trees is the greatest threat".*

Our research has resulted in the discovery of what is **one of the most important areas in the country for barbastelles**, which are '*at imminent risk of extinction*' (Mammal Society 2020). The research has revealed the presence of the **first known barbastelle 'super-colony'** in the UK (the 'Wensum Valley Super-Colony') with an **estimated minimum population size of 270 barbastelles**. It also includes the **largest known extant roost in the country (≥ 105 barbastelles), one of >80 roosts identified to date as being used by the super-colony**. The proposed **NWL and much of the A47 dualling would pass through the 'core of the cores'; the critical area where the CSZs for each of the maternity colony woodlands overlap**. **In both summer and winter, barbastelle activity levels in this area are exceptionally high**. As a result there is a **very high risk that the proposed road schemes could have a substantial negative impact on this population, of significant national importance, which is vital to the future persistence of this threatened species.**

Our independent Ecological Impact Assessment for the NWL (and its associated substantial construction corridor) and A47 dualling on barbastelles includes:

- Destruction of barbastelle maternity colony (and foraging) woodlands
- Habitat fragmentation
- Habitat degradation
- Loss of foraging habitat
- Severance of bat commuting routes
- Bat fatalities resulting from collisions with vehicles
- Disturbance from noise and light

[6] Emerson, J., Farrow, F., Leech, T., Parmenter, J. (eds) (2020) Norfolk's Wonderful 150. Norfolk & Norwich Naturalists' Society Occasional Publication 18. Norfolk & Norwich Naturalists' Society, Norwich.

**Evidence shows that bat mitigation measures on the NDR have failed and analysis of commuting routes in our study has revealed new evidence that barbastelles avoid using bat mitigation road crossing structures including green bridges and bat gantries.**

Given the **exceptional importance of the Wensum Valley barbastelle population**, we propose that key roost, foraging and commuting habitats should be robustly protected from future threats by **designation of a barbastelle Special Area of Conservation** (as required under The Conservation of Habitats and Species Regulations 2017).

It is imperative that cumulative impacts from the proposed A47 dualling, Norwich Western Link and off-shore windfarm cable routes, all of which would occur within the barbastelle super-colony's Core Sustenance Zone, are fully considered. The impacts of the Norwich Northern Distributor Road on the barbastelle population and failure of mitigation measures on that road scheme should also be carefully considered.

Yours faithfully,

[redacted]

Dr Charlotte Packman PhD CEcol MCIEEM
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