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28th June 2022
Our Ref: 22/E2139/01

Dear Sirs and Madams,

PLANNING APPLICATION 22/02066/FUL
ECOLOGICAL CONCERNS RELATING TO IMPACTS ON BAT ACTIVITY IN PARADISE LOCAL NATURE RESERVE

Further to your instruction on 13th June 2022, please see below our comments relating to anticipated impacts on bats arising from planning application 22/02066/FUL. The below is informed by a review of the relevant planning documents, a site visit and dusk bat survey on 15th June 2022, and a remote bat survey carried out over 9 nights between 15th June 2022 and 24th June 2022.

Potential Impacts on Bats from Lighting

The Preliminary Ecological Appraisal for Queen's College, Owlstone Croft (MKA Ecology, 21/04/2022) states in association with Recommendation 6: 'It is vital that lighting directed towards Paradise LNR does not exceed 0.5 lux given the ecological sensitivity of the site'.

Bioscan could not find any supporting reasoning given for the use of the 0.5 lux figure, so considers it more appropriate to use the guidance provided by Bats and Artificial Lighting in the UK (Bat Conservation Trust, 2018). These guidelines state: 'Where 'complete darkness' on a feature or buffer is required, it may be appropriate to consider this to be where illuminance is **below 0.2 lux on the horizontal plane** and **below 0.4 lux on the vertical plane**'.

The Lighting Impact Assessment for Owlstone Croft, Cambridge (Hoare LEA, April 2022) indicates that these cut-off levels will be exceeded by the resultant illumination (total value post development) at the following development site edge locations highlighted in green on the figure below (taken from the Lighting Impact Assessment, with highlighting added):

Location 3 (north east edge of site by tree line): 13.64 lux horizontal and 2.75 lux vertical post development
Location 12 (eastern edge of site by tree line): 0.47 lux vertical post development
Location 18 (eastern edge of site by tree line): 0.24 lux horizontal and 2.98 lux vertical post development
Location 21 (wooded area): 0.45 lux vertical post development

It is noted in passing that the most significant lighting impact occurs at location 3, where there is light spill of 13.64 lux horizontal, greatly exceeding the recommended 0.2 lux horizontal cut-off, though this report will focus on impacts on the Local Nature Reserve boundary.

The greatest lighting impact along the Local Nature Reserve boundary is at location 18, where vertical lighting impacts of 2.98 lux vertical are expected, greatly exceeding the recommended 0.4 lux vertical cut-off (by a factor of x7.4), and also exceeding the recommended horizontal lighting limit.

Lighting impacts in excess of the recommended levels were also measured to occur at location 21 along the Local Nature Reserve boundary, and at location 12, which falls very close to the Local Nature Reserve boundary (and comprises a line of poplar trees and seasonally wet ditch which are assessed to be ecologically contiguous with the Local Nature Reserve in terms of bat activity).

Such lighting impacts would be expected to impact upon bats on the western side of Paradise Local Nature Reserve, and could potentially even sever bat commuting routes along this edge of the woodland.

[It is also important to note that at location 19 (south eastern edge of site by tree line), the lighting impact report cites a moderate beneficial effect by reduction of existing lighting levels, and at location 18 existing lighting levels

already exceed recommended levels (though will worsen as a result of the proposed development). However, this must be viewed in the context that 'existing' light levels include floodlighting in front of the nursery. The Friends of Paradise Nature Reserve have previously contacted Queen's College to note that lighting levels here were not appropriate along the edge of the nature reserve, with the result that the floodlighting had been turned off for a long period, but for an unknown reason started to be turned on again recently. In contrast to the existing situation where floodlights could potentially be turned off or removed, with the post-development lighting situation it is considered unlikely to be possible to reduce light levels any further than has already been accounted for in the lighting calculations, and as such would be expected to represent a long-term impact on bat commuting.]

As additional observations on lighting:

- The lighting report employs a LT (light transmission factor) of 0.65 for the calculations based on light passing through window glazing. However, the Design and Access Statement states that all rooms will be ventilated via opening windows. On this basis, light spill would be expected to be greater than that modelled whenever windows were open with lights on (a situation over which little control could be exerted by the applicant).

- The blocks incorporate 'courtyards', described by the Design and Access Statement as '*A communal extension of the postgraduate homes … The focus of the gardens would be a large communal dining table and informal cooking area'*. For block 4, this is situated immediately adjacent to Paradise Local Nature Reserve. Again, it is considered likely that this would result in regular lighting (and noise) impacts which are not incorporated into the lighting model.

On the basis of the two points above, it is considered that the modelled light spill on the reserve edge may well be an underestimate of the real situation.

Information on Bat Activity Provided by Applicant

Having demonstrated that there will be lighting impacts at three of the sampled locations along the edge of Paradise Local Nature Reserve, one must then review the available information on receptors – i.e. the levels of bat activity along the reserve edge in each season, and the bat species composition.

In terms of the requisite levels of bat activity survey, Table 4.1 in Bat Surveys for Professional Ecologists Good Practice Guidelines 3rd edition (Bat Conservation Trust, 2016) specifies the following in terms of site suitability for commuting / foraging bats:

- Negligible Suitability: Negligible habitat features on site likely to be used by commuting or foraging bats.

- Low Suitability: Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.

- Moderate Suitability: Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.

- High Suitability: Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used by regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

If one considers the application site in the context of the above suitability levels for commuting / foraging bats, while the mown grassland comprising the majority of the site is accepted to have low value for bats in its own right, the seasonally wet ditch and line of poplar trees within the site and immediately adjacent to Paradise Local Nature Reserve are considered to be of much higher value for bats in the context that they are assessed to be ecologically contiguous with the nature reserve in terms of bat activity, as shown by the photographs below. A photograph of the row of large lime trees between the northern edge of the application site and the adjoining school is also included for reference.

Seasonally wet ditch and line of poplar trees within application site (between wooden and mesh fences).

Linkage of above habitats within application site to the edge of Paradise Local Nature Reserve (divided by mesh fence).

Line of large lime trees between application site and adjoining school.

In the context that the site includes some high quality bat habitat along its edge with Paradise Local Nature Reserve (as well as a line of mature trees along its boundary with the school), and that it directly adjoins Paradise Local Nature Reserve (a seasonally flooded wet woodland along the river Cam, which is assessed to comprise exceptionally good habitat for bats, and which forms part of a green corridor running along the river Cam between Cambridge and Grantchester), it is assessed that the application site must be considered to have at the very least 'moderate' suitability for bats, if not higher.

The BCT Bat Survey Guidelines state that for sites with 'moderate' suitability for bats the following bat surveys are recommended to achieve a reasonable survey effort in relation to habitat suitability:

- Transect / spot count / timed search surveys: one survey visit per month (April to October) in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn within one 24-hour period.

  AND

- Automated / static bat detector surveys: two locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.

However, the only bat activity surveys carried out by MKA Ecology were 3 bat activity surveys focused only on investigating whether the site supported any bat roosts, with no automated / static surveys, and inappropriate seasonal coverage (all 3 surveys were carried out in July-August 2021) (Nocturnal Bat Survey, Queens' College Owlstone Croft, MKA Ecology 19/04/2022). As this level of survey effort would be insufficient for even a site with 'low' suitability for bats, this suggests that MKA Ecology consider the site to have 'negligible' suitability for bat activity (a point on which Bioscan strongly disagrees for the reasons set out above), despite the results summary from their bat activity surveys stating 'high levels of bat activity were recorded throughout the surveys, particularly in the wet woodland of Paradise LNR'.

The resulting bat data deficiency for this application means that decision makers have insufficient information to be able to adequately assess the impacts on bats arising from the lighting impacts described above. It is considered that the application should be supported by an appropriate level of bat survey data provided by the applicant before impacts on bats can be adequately assessed.

Bioscan Bat Studies (June 2022)

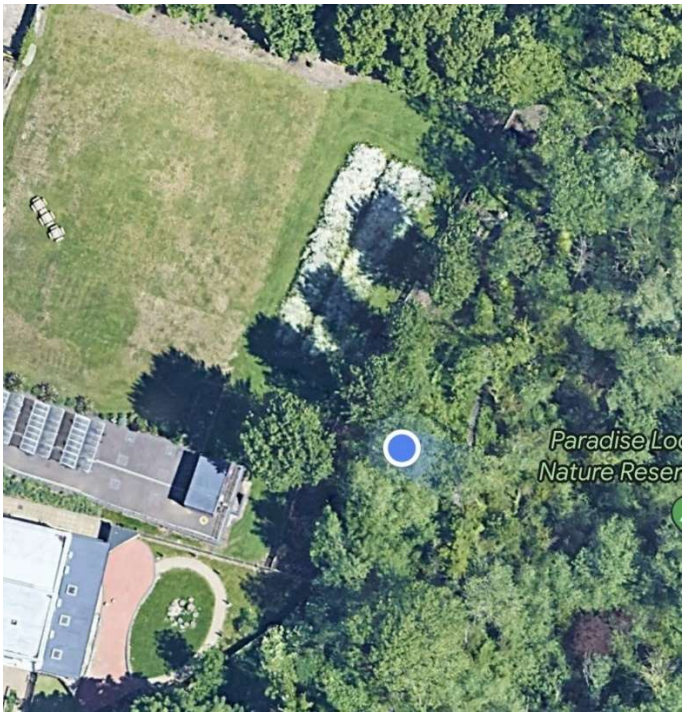
Whilst the onus to provide and pay for an appropriate level of bat surveys should fall to the applicant, Friends of Paradise Nature Reserve were sufficiently concerned about the lack of data on bats that they instructed Bioscan (UK) Ltd to carry out a remote bat survey (and accompanying site visit and dusk bat survey).

<u>Survey Methodologies</u>

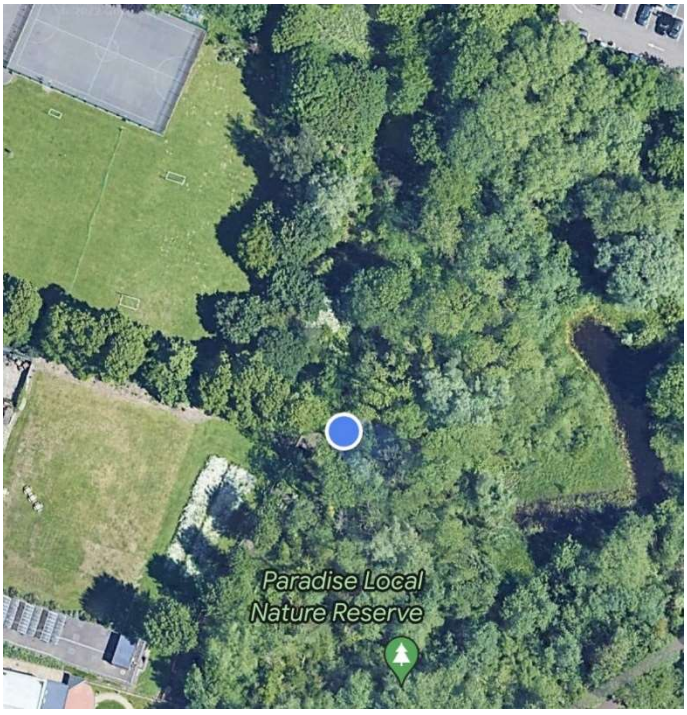
The bat surveys were carried out by Geoff Moxon (senior ecologist at Bioscan UK Ltd, with >15 years of bat survey experience, under Natural England bat class licence WML-CL18 Level 2, registration number 2015-11724-CLS-CLS).

A dusk bat activity survey was carried out on 15th June 2022, from 9.07pm (15 minutes before sunset) until 11.22pm (2 hours after sunset). A Pettersson D240x time expansion and heterodyne bat detector was used in tandem with an Anabat SD1 frequency division bat detector (with internal recording system). The survey focused primarily on the boundary between the nature reserve and the proposed development, and the edge of the Cam was also sampled.

A remote bat survey employed two Anabat Express bat detectors, installed over 9 nights between 15th June 2022 and 24th June 2022. The remote detector locations are shown below.



Remote Detector 1 position, located in edge of nature reserve, facing north into the application site (and along the seasonally wet ditch and line of poplar trees within the application site).



Remote Detector 2 position, located in edge of nature reserve, facing west into application site (and towards the line of large lime trees forming its northern boundary).

The sonograms from the surveys were later analysed using Analook software. Remote detector 2 was a newer model and possible to autoanalyse (with notable bat calls then checked manually), while remote detector 1 was analysed manually.

Weather conditions were generally suitable for bat activity during the above surveys, though the surveys were by necessity (given the planning timescales) carried out during a sustained period of hot weather, which can sometimes suppress levels of bat activity.

Survey Results

The dusk bat activity survey recorded frequent soprano pipistrelle bat activity along the boundary of the application site with Paradise Local Nature Reserve, as well as occasional common pipistrelle activity, and pipistrelle foraging was recorded and observed along the woodland edge at this location. In addition, a single noctule registration was recorded along this boundary. Myotis sp (most likely Daubenton's) bats were recorded foraging over the River Cam later in the survey. The first bat call (a soprano pipistrelle) was recorded at 9.16pm, six minutes before sunset, which is likely to suggest the presence of a bat roost nearby.

The remote bat survey results are set out in the Table below.

Bat Species	Detector 1 (9 nights)	Detector 2 (9 nights)	Total
45 Pip	700	521	**1221**
55 Pip	2104	1491	**3595**
45/55 Pip	0	1281	**1281**
Noctule	0	7	**7**
Nyctalus/ Eptesicus	81	27	**108**
Myotis sp	4	11	**15**
LE Bat	19	18	**37**
Barbastelle	20	15	**35**
Total (all species)	**2928**	**3371**	

Key: 45 Pip = Common Pipistrelle *Pipistrellus pipistrellus*, 55 Pip = Soprano Pipistrelle *Pipistrellus pygmaeus*, 45/55 Pip = Common or Soprano Pipistrelle, Noctule = Noctule *Nyctalus noctula*, *Nyctalus/Eptesicus* = Noctule or Serotine *Eptesicus serotinus*, *Myotis* sp = *Myotis* species, LE Bat = long-eared bat *Plecotus*.sp, Barbastelle = Barbastelle *Barbastella barbastellus*.

Bat activity levels were noted to be high along the application site boundary (averaging 325 bat passes per night at detector 1, and 375 bat passes per night at detector 2).

Overall, soprano pipistrelle was by far the most common species recorded (57.1% of registrations), followed by common pipistrelle (19.4% of registrations). Occasional registrations from noctule bats, *Myotis* sp bats and long-eared bats were also noted.

Of greatest note is the recording of the rare species barbastelle bat (20 passes at detector 1 and 15 passes at detector 2, which is a significant number of registrations for this rare species). Aside from being rare, this species is also particularly sensitive to light.

Supplementary Information

The paper 'Impact of bat friendly lighting on bat activity and bat species diversity at Coe Fen and Sheep's Green, Cambridge' (Johanna Chesham, 2019) comprises a study of bat activity on land immediately adjoining Paradise Local Nature Reserve to the north, along a cycleway. The bat species list from the most recent (2019) component of the research, comprising 7 nights of static detector coverage together with 8 dusk transects, included soprano pipistrelle (50.1% of registrations), common pipistrelle (44.3% of registrations), noctule (3.4% of registrations), *Myotis* sp (2.1%) and serotine, Nathusius' pipistrelle and barbastelle (cumulatively 0.2% of registrations in 'other' category).

The rare species barbastelle was also recorded by Chesham, though Chesham also recorded another rare bat species: Nathusius' pipistrelle. Given the proximity of the Chesham study to Paradise nature reserve, it is considered likely that a longer-term study may also record this species in this area.

Closing Comments

In closing, it is noted that the above surveys represent only a snapshot of bat activity along the edge of Paradise Local Nature Reserve immediately adjoining the application site. As noted above, the Bat Conservation Trust Bat Survey Guidelines recommend that bat activity and remote survey data is collected each month from April to October for a site of 'moderate' suitability for bats in order to provide a robust dataset to inform decision makers about bat usage of a site at different times of year, including the peak months of August and September. This information has not been provided.

Other Potential Ecological Impacts

Aside from the key concerns set out above relating to impacts from lighting on bat activity, the following concerns are also briefly noted:

1) It is understood that the line of poplar trees adjoining Paradise Local Nature Reserve is intended to be removed. As shown by the photos above, this habitat is assessed to be ecologically contiguous with the nature reserve in terms of usage by bats. As such, the removal of these trees and wet ditch would be expected to have a further impact on bat activity (including on rare bat species) in addition to the lighting impacts described above. And again, there is insufficient information on bat activity for the level of these impacts to be assessed.

2) It is understood that drainage channels are proposed to be cut through Paradise Local Nature Reserve as part of the drainage strategy. Yet no studies on the ecological effects on the nature reserve appear to have been carried out by MKA Ecology, so the impacts this may have on the ecology of the nature reserve are unknown.

3) The southernmost of the four proposed accommodation blocks is extremely close to the Local Nature Reserve boundary, and comprises a three-storey block which will be far more imposing than the existing nursery building. Aside from the ecological concerns already raised, the positioning of this building is considered incongruous and out of character so close to the LNR and the River Cam green corridor linking Cambridge and Grantchester, and likely to impact significantly on the amenity of users of the reserve (particularly during the winter when the reserve floods and the boardwalk alongside Owlstone Croft is the only means of passage through the reserve).

Conclusions

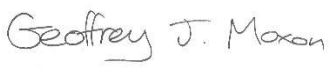
To conclude, it is considered that the above concerns mean that the application contravenes the following policies of the Cambridge Local Plan:

- Policy 69 (Protection of Sites of Biodiversity and Geodiversity Importance)
  This policy states: '… development will be permitted if it will not have an adverse effect on, or lead to the loss of, part or all of a site identified on the Policies Map'.
  In light of the points raised above, it is considered that the proposed development will have an adverse effect on Paradise Local Nature Reserve / its associated bat fauna.

- Policy 70 (Protection of Priority Species and Habitats)
  This policy states: 'Proposals that harm or disturb populations … should secure achievable mitigation and/or compensatory measures').
  Without sufficient survey information, it is not possible to accurately assess the level of impacts expected on protected species (bats, including the rare species barbastelle), in order to determine whether or not the proposed levels of mitigation / compensation for bats are appropriate.

It is thus hoped that the Council will request both the provision of an appropriate level of bat survey information, and for the applicant to reconsider the appropriateness of the current scheme, given its impacts on bats within the Local Nature Reserve, including the rare and light-sensitive species barbastelle (and potentially also Nathusius pipistrelle).

Yours sincerely,
FOR AND ON BEHALF OF BIOSCAN (UK) LTD



Geoff Moxon
Senior Ecologist

Geoff Moxon

Geoff joined Bioscan (UK) Ltd in 2008, and has worked in the role of senior ecologist since 2012, prior to which he was a surveyor at the Somerset Environmental Records Centre (SERC), and involved in a variety of environmental research projects in Asia, Africa, Europe and Central America. He is a full member of the CIEEM.

Over the past 14 years, Geoff has been responsible for 'cradle to grave' management of many large projects, ranging from major housing developments to windfarms to quarries, and involving EIA assessment, preparation and implementation of management plans, ecological monitoring, Condition submissions, habitat creation, site works supervision and European Protected Species licensing. He holds Natural England and Natural Resources Wales survey licences for dormice, bats and great crested newts, and has been named ecologist on numerous dormouse and bat licences.

In his spare time, Geoff is involved with the Ashmolean Natural History Society of Oxfordshire (ANHSO), having previously served 5 years as the society's field secretary, and in Environmental Education with the ANHSO, Oxford Natural History Museum and Earth Trust.