

Welsh Government

Celtic Lakes, Newport

Dormouse Survey Report

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1. Introduction

1.1 Background

Ove Arup and Partners Limited (Arup) has been appointed by Welsh Government (WG) to undertake a range of consultancy services in relation to the 'Celtic Lakes' site located south of Imperial Park, Newport and its immediate surroundings, hereafter referred to as 'the site'.

As part of that commission, a range of ecological surveys have been undertaken to identify the baseline ecological conditions of the Project area, and inform a future Ecological Impact Assessment (EcIA).

An Extended Phase 1 survey and the associated Preliminary Ecological Appraisal (PEA) was issued in August 2021¹. As a result of the survey and a desk study of available records, it was considered that there was the potential for hazel dormouse *Muscardinus avellanarius* to be present within the site and therefore detailed species-specific surveys were recommended.

A detailed dormouse survey was undertaken by Arup in 2021. This report presents the baseline findings of the ecological desk study and the results of the dormouse survey. The purpose of the report is to establish the presence or likely absence of dormouse within the site.

An EcIA will be provided by Arup for the Celtic Lakes proposed development separate to this report and will include an assessment of the significance of impacts from the proposed development on dormice. This will also detail any mitigation or compensation measures required to ensure there is no significant effect on these species within the site and to offer enhancement measures where appropriate.

1.2 Study Area

The Study area is shown in Figure 1, located to the south and south-east of Imperial Park, Coedkernew, Newport. The entirety of plot 1 and plot 2, in addition to adjacent habitat, was surveyed.

In the wider landscape lies the A48 highway and M4 motorway to the north, Tredegar House and Park and the settlement of Duffryn to the east. An extensive area of agricultural fields and the Gwent levels lie to the south and west of the site, extending to the Severn Estuary.

1.3 The Proposed Development

The proposed development will include 1no. proposed substation (measuring approximately 96x70m) and associated vehicular and pedestrian access, landscaping and drainage.

1.4 Survey Objectives

The aims and objectives of the surveys were to:

- Determine the presence and distribution of dormouse, or likely absence of dormouse within the study area;
- To record the location of dormouse evidence within the survey area;
- To confirm the presence of breeding within the site;
- To provide an indication of likely population size based on the habitats present; and
- To provide sufficient information to inform the assessment of impacts on dormice from the proposed development as part of any future EcIA.

¹ Arup (2021) Celtic Lake Plots C1 and C2, Preliminary Ecological Appraisal.

1.5 Legislation and Biodiversity Framework

1.5.1 European Protected Species

The dormouse is protected as a European Protected Species (EPS), under the Conservation of Habitats and Species Regulations 2017 (as amended), commonly referred to as the Habitats Regulations. Under this legislation it is an offence to:

- Deliberately or recklessly kill, injure or capture a dormouse;
- To deliberately or recklessly disturb a dormouse such as to affect its ability to breed or its local distribution, and;
- To damage, destroy or obstruct access to a breeding site or resting place (e.g. shelter) used by a dormouse.

1.5.2 UK Protected Species

Dormice are also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Legal protection makes it an offence to:

- Intentionally kill, injure or take (capture) a dormouse;
- Possess or control alive or dead dormouse, or any part of a dormouse, and;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which dormice use for shelter or protection, or disturb dormouse while they are using such a place.

1.5.3 Other Legislation and Policy Related to Species

The dormouse is identified as a species that are a priority for nature conservation (Priority Species) within the 'UK Post-2010 Biodiversity Framework' Biodiversity Action Plan (UKBAP).

The Environment (Wales) Act 2016 includes a duty on all public authorities to have regard to the conservation of biodiversity in the exercise of their functions. This duty applies to government bodies, local authorities and statutory undertakers. The Act also requires lists to be published of Habitats and Species considered to be of Principal Importance for the Conservation of Biological Diversity. These are referred to as Section 7 habitats and species under the sections of the Act which require the publication of lists in each devolved area. Dormice are listed as a Section 7 Species considered of Principal Importance for the Conservation of Biological Diversity. Moreover, the Dormouse Action Plan within the Newport Local Biodiversity Action Plan², outlines the objective to maintain and increase the population of dormice in Newport.

² <https://www.newport.gov.uk/documents/Leisure-and-Tourism/Countryside/Newport-Local-Biodiversity-Action-Plan.pdf>

2. Methodology

2.1 Desk Study

Desk study information was obtained from the South East Wales Biodiversity Records Centre (SEWBReC)³ on the 25th May 2021. The search included information on dormice up to 2km from the site boundary, with data limited to the last ten years. The full desk study results are provided in the PEA¹.

2.2 Habitat Suitability

The Extended Phase 1 Habitat Survey undertaken as part of the PEA assessed the suitability of different habitats on and adjacent to site for dormice. Full details of the habitats on site are provided in the PEA report¹.

2.3 Presence / Absence Surveys

Between July and November 2021 Arup undertook dormouse nest tube and nest box surveys within the Site and surrounding area. The surveys were carried out using the methodology described in the Dormouse Conservation Handbook⁴.

Nest tubes and nest boxes are an effective method to survey for dormice, who use them for breeding as well as daytime shelter. Dormouse nest tubes consist of a length of corrugated plastic tubing with a wooden sliding tray which also forms the end of the tube. Tubes are attached horizontally within trees and shrub using wire. Dormouse nest boxes consist of a wooden box, resembling a bird box, with an entrance hole at the back of the box. Boxes are attached to trees such that the entrance hole faces the tree, using wire. Nest tubes and boxes are used by dormice as an alternative to tree holes and other suitable nesting sites. Other species, such as wood mice *Apodemus sylvaticus* or birds, may also use the dormouse nest tubes and boxes. However, dormice build tightly woven nests which are usually readily identifiable from the nests of other species.

Nest tube and box use by dormice varies throughout the year, with occupancy generally highest between May and September⁵. Guidance recommends the use of at least 50 tubes to sample a site, with tubes deployed and spaced at about 20m intervals in suitable habitat, e.g. dense hedgerow. A such, a total of 115 artificial nest tubes and 25 nest boxes were placed in areas of suitable habitat (woodland and scrub) within and adjacent to the Site (the survey area) (see Figures 2a and 2b). Where possible, tubes and boxes were spaced between 15m and 20m apart. Tubes were fastened underneath horizontal tree/scrub branches (including bramble *Rubus fruticosus*), and boxes were fastened to tree trunks.

The tubes were installed in July 2021 and checked monthly up to November 2021. The surveys were undertaken by Debbie Brown (license number: S088542/4), or surveyors accredited to this license. Appendix A.1 provides the details of the surveys, including surveyors, dates, timings, and weather details.

For all surveys, a record was taken of positive and negative results at each nest tube and box location. Incidental sightings of other species and comments such as vandalism were also noted. Field signs or features relevant to the survey were photographed.

In accordance with the Dormouse Conservation Handbook⁴, adequate survey effort was achieved using the scores provided in Table 1 (which are per 50 nest tubes), derived from the index of probability in the Handbook. Using this method, the survey effort provided a score of 43.2, indicating that the survey effort was sufficient (the Conservation Handbook cites a score of 20 required to judge likely absence in any area).

³ <http://www.sewbrec.org.uk/>

⁴ Bright, P. W., Morris, P.A. & Mitchell-Jones, T. (2006). The Dormouse Conservation Handbook. 2nd Edition. Natural England, Peterborough.

⁵ Chanin, & Woods. (2003). *Surveying Dormice using nest tubes: results and experiences from the South West Dormouse Project (English Nature Research Report No. 524)*. Peterborough: English Nature.

This score was obtained by using a total of 140 nest boxes and nest tubes - 2.7 times the minimum number of tubes cited in guidance (50, as cited in the Dormouse Conservation Handbook⁴), as illustrated in Table 1.

Table 1. Index of probability of finding dormice present in nest tubes and boxes in any one month (based on 50 nest tubes). Months denoted with a * are months in which survey visits took place.

Month	Score
April	1
May	4
June	2
July	2
August*	5
September*	7
October*	2
November*	2
Total for 50 tubes	16
Total for 115 tubes + 25 boxes	2.7 x 16 = 43.2

2.4 Likely Population Size

Likely population size was estimated using population estimates provided by the National Dormouse Monitoring Programme (NDMP) and the small mammal population densities based on habitat outlined in Table 2 of the Dormouse Conservation Handbook⁴. An abbreviated form of this table is shown below in Table 2.

Table 2. Dormouse population densities (pre-breeding numbers of adults per ha). Autumn densities may be several times higher.

Habitat	Mean spring density (individuals per ha)	Source
Diverse deciduous woodland with abundant scrub and vigorous understorey	4 to 10 adults	Bright, pers. comm.
Oak dominated woodland, with hazel	2 adults, increased by 48 percent by appropriate management	Bright & Sanderson, pers. comm.
Scrub	Unknown	N/A
Conifer woodland	1 to 3 adults	Trout, pers. comm.
Hedgerow	1.3 adults	Bright & MacPherson, 2002

The NDMP suggests that the average adult population density across the country is 2.2 individuals per hectare, with the average varying between 1.75 and 2.5 adults per hectare based on 83 sites in habitats of

varying suitability (1993 to 2000 inclusive)⁶. The average of 2.2 per hectare has been used to estimate population numbers within the site.

2.5 Survey Limitations

The findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of flora and fauna, such as time of year and behaviour of the animals.

The beginning of survey season was missed (April to June), however this was compensated for through using a greater number of nest tubes/boxes than the scoring is based off (2.7 times the minimum of 50 nest tubes). These surveys were conducted during the remaining months of the optimal survey period and using standard methodologies. In addition, the Index of Probability score achieved indicates sufficient survey effort was employed.

⁶ Cited in the Dormouse Conservation Handbook, Bright & Sanderson, pers. comm.

3. Results

3.1 Desk Study

Two records of dormice were returned by the data search, with the latest record being from 2020. The two records were recorded 20m south and 1.1km north-west of the site boundary.

3.2 Field Survey

3.2.1 Habitat Suitability

5.5ha of broadleaved plantation woodland is present within the survey area. Several species cited as being of value to dormice by the Dormouse Conservation Handbook⁴ were identified in the woodland within Plot 1, including hazel *Corylus avellana*, oak *Quercus robur* and bramble. Ash *Fraxinus excelsior*, described as suboptimal habitat by the Dormouse Conservation Handbook, was dominant within the woodland of Plot 2. In addition, the understorey within this area is generally species poor, limiting its suitability for dormice.

Scrub is abundant throughout the survey area, with 14.77 ha of dense scrub, and 5.02 ha of scattered scrub. The dense scrub within both Plot 1 and Plot 2 are dominated by bramble, but also include hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*, which provide a foraging resource for dormice. The scattered scrub is located within Plot 2, and is largely comprised of bramble and willow *Salix* sp. Given the relatively species poor nature of this scrub, and lack of density, the scattered scrub is considered unsuitable to support significant numbers of dormice.

3.2.2 Presence/absence

The dormouse nest tube surveys undertaken confirmed dormouse presence within the site. A total of 30 tubes and four boxes were found to contain confirmed or probable nests of dormice during the course of the surveys. The peak number of boxes found to contain evidence of dormice in any one month of surveys was 24 in November. The results of the dormouse nest tube and nest box surveys are summarised in Table 3 below. As illustrated in Figures 2a and 2b, evidence of dormice was found within suitable habitat across the survey area. The raw survey data can be found in Appendix A.1, and photographs of nests are provided in Appendix B.

Table 3. Dormouse nest tube/box survey results summary.

Month	Evidence of dormouse activity	Nest tube / box number
August 2021	None	N/A
September 2021	Unoccupied dormouse nest	T16
	Unoccupied dormouse nest	T34
	Unoccupied dormouse nest	T45
	Unoccupied dormouse nest	T131
	Male juvenile dormouse captured and another escaped	NB6
	Unoccupied dormouse nest	NB23
October 2021	Unoccupied dormouse nest	T32
	Unoccupied dormouse nest	T34
	Unoccupied dormouse nest	T35
	One juvenile dormouse	T41
	Unoccupied dormouse nest	T46
	Unoccupied dormouse nest	T60
	Unoccupied dormouse nest	T77
	Unoccupied dormouse nest	T110

Month	Evidence of dormouse activity	Nest tube / box number
	Two juvenile dormice	T115
	Two dormice	T122
	One dormouse	T136
	Two male juvenile dormice	NB6
	Unoccupied dormouse nest	NB23
November 2021	Adult dormouse	T1
	Juvenile dormouse	T8
	Unoccupied dormouse nest	T10
	Adult dormouse	T15
	Unoccupied dormouse nest	T32
	Unoccupied dormouse nest	T33
	Adult dormouse	T37
	Unoccupied dormouse nest	T41
	Unoccupied dormouse nest	T49
	Adult dormouse	T60
	Adult dormouse	T70
	Unoccupied dormouse nest	T80
	Unoccupied dormouse nest	T82
	Adult dormouse	T86
	Juvenile dormouse	T109
	Unoccupied dormouse nest	T110
	Adult dormouse	T111
	Unoccupied dormouse nest	T115
	Two dormice	T121
	Unoccupied dormouse nest	T122
	Adult dormouse	T124
	Adult dormouse	T179
	Juvenile dormouse	NB3
	Adult dormouse	NB5

3.2.3 Likely Population Size

Suitable dormouse habitat on site is comprised of 5.5 ha of broadleaved plantation woodland, 14.77 ha of dense scrub, and 5.02 ha of scattered scrub within the study area. Based on the NDMP average population density of 2.2 dormice per hectare, the total number of dormice inhabiting scrub within the survey area is estimated at 44, and total number of dormice within the woodland is estimated to be 12. Therefore, total number of adult dormice is estimated to be 56 within site (pre breeding populations).

However, under the Dormouse Conservation Handbook population estimates outlined in Table 2, between 22 and 55 adult dormice is estimated within the woodland habitat alone, by classifying the broadleaved plantation woodland as the “Diverse deciduous woodland with abundant scrub and vigorous understorey” category within Table 1, given a diverse range of deciduous with a bramble dominated understorey were recorded as being present. Taking a precautionary approach, this higher estimate of up to 55 adult dormouse for the woodland habitat should be considered.

If the average population density of dormouse density per hectare is used to calculate total number of adults within scrub habitats (44), together with the maximum number of adults within woodland habitats (55), the total number of adult dormice within the study area is 99. This is considered likely to be maximum numbers

within the site, since the highest adult dormouse population density estimates per hectare have been used for woodland habitats; and, it is acknowledged that due to the absence of specific scrub population densities, an average across all habitats has been used, which may be higher than the actual population densities within scrub habitat.

4. Conclusions and Recommendations

The surveys have confirmed the presence of dormice within suitable habitats (scrub and woodland) within the study area. The total number of adult dormice within the study area is estimated to be 99. This is considered likely to be maximum numbers within the site, since the highest adult dormouse population density estimates per hectare have been used for woodland habitats; and, it is acknowledged that due to the absence of specific scrub population densities, an average across all habitats has been used, which may be higher than the actual population densities within scrub habitat.

A dormouse European Protected Species Licence will need to be obtained from NRW for any clearance of scrub and/or woodland within the site, and mitigation measures and/or compensation will need to be agreed with NRW, along with enhancement measures.

This report is the result of survey work undertaken between July and November 2021. This report refers, within the limitations stated, to the condition or proposed works of the site at the time of the surveys. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. No warranty is given as to the possibility of future changes to the condition of the site.

Figures

Figure 1. Site Location and Study Area
Figures 2a & 2b: Locations of results



Survey boundary

050100200

Meters

Coordinate System:

British National Grid

01	24/04/2023	EH	CP	PC	PC
Rev	Date	By	Chkd	Appd	Authd

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Project Name

Celtic Lakes

Drawing Title

Site Location and Study Area

Scale at A3

1:6,000

Role

Ecology

Suitability

For issue

Project Number

281823

Rev

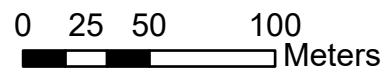
01

Drawing Name

Figure 1



- Survey boundary
- Tubes without evidence
- Tubes with evidence
- Nestboxes with evidence
- Nestboxes without evidence



Coordinate System:
British National Grid

01	19/04/2023	EH	CP	PC	PC
Rev	Date	By	Chkd	Appd	Authd

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Project Name
Celtic Lakes

Drawing Title
Locations of results

Scale at A3 1:3,000	
Role Ecology	
Suitability For Issue	
Project Number 281823	Rev 01
Drawing Name Figure 2b	

Appendix A

Survey details and results

A.1 Survey details and results

Table 4. Timings, weather conditions and full results of dormouse surveys.

Date	Timing	Weather conditions	Surveyors	Notes	Results
17/08/2021 and 18/08/2021	17 th : 10:00 – 15:00 18 th : 10:00 – 15:00	17 th and 18 th : Cloudy, light rain	17 th and 18 th : Debbie Brown (SO88542/4) Georgia Lonsdale		N/A
10/09/2021 and 14/09/2021	10 th : 10:00-15:00 14 th : 15:00-18:00	10 th : overcast with light rain 14 th : clear, warm	10 th : Alexandra Hall (accredited agent) Georgia Lonsdale 14 th : Alexandra Hall (accredited agent) Chloe Hooper	T54 – Inner tube missing T64 – Fallen out of tree T121 – Fallen out of tree	T16 – Empty dormouse nest T34 – Potential dormouse nest T45 – Empty dormouse nest T109 – Dormouse food cache T131 – Empty dormouse nest NB6 – Male juvenile dormouse captured and another escaped NB23 – Potential dormouse nest

20/10/2021 and 21/10/2021	20 th : 10:00 – 16:30 21 st : 09:30 – 15:00	20 th : Overcast with light rain 21 st : Clear, warm	20 th : Eloise Arif (accredited agent) Alexandra Hall (accredited agent) 21 st : Eloise Arif (accredited agent) Chloe Hooper		T5 - Two wood mice in nest T6 - One wood mouse in nest T10 - Dormouse nest- something ran out but too quick to see if dormouse or wood mouse. Woven grasses, good structure with cavity T16 - Empty wood mouse nest T24 - Empty wood mouse nest T21 - Wood mouse in nest T112 - Wood mouse in nest T110 - Dormouse nest T106 - Wood mouse nest empty T115 - At least two dormice in nest. Both ran away as putting bung in. Did not open up or take down so as not to disturb further. One was quite grey - potential juvenile. T116 - Wood mouse in nest T119 - Old wood mouse nest T69 - Wood mouse in nest T32 - Wood mouse in nest - potentially an old dormouse nest? T33 - Wood mouse in nest T34 - Potential dormouse nest T35 - Dormouse nest T39 - Wood mouse nest empty T38 - Wood mouse nest empty T41 - Juvenile dormouse in nest T42 - One wood mouse in wood mouse nest T77 - Potential dormouse nest? Old. Droppings on shelf T76 – Wood mouse nest T46 - Start of a dormouse nest
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					T49 - Empty wood mouse nest T50 – Wood mouse nest T60 - Potential dormouse nest T122 – Two dormice ran out of tube before bung. T136 – Dormouse in tube, ran out before bung. NB6 – Single male dormouse in nest. Nest looks like wood mouse – potentially just dormouse first attempt at nest? NB23 – Old wood mouse nest
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Date	Timing	Weather conditions	Surveyors	Notes	Results
15/11/2021 and 16/11/2021	15 th : 10:00 – 16:30 16 th : 09:30 – 15:30	15 th : clear in morning, overcast with light drizzle in afternoon 16 th : overcast with light rain	15 th and 16 th : Alexandra Hall (Accredited agent) Rosie Seager-Jones		T1- 1 adult dormouse present T5 - Wood mouse nest. T6 - Old wood mouse nest T10 - Dormouse nest T16 - Wood mouse nest and wood mouse present T17- Wood mouse nest with 2 wood mouse present T24- Wood mouse nest T23- Wood mouse nest T26- 4 Wood mice T27 – Wood mouse in nest T28 - Food cache - no evidence of dormouse T111 - Dormouse escaped adult (white tip on tail) T110 - Dormouse nest TN109 - Juvenile Dormouse nut cache T69- Potential wood mouse nest T70 - Adult dormouse in nest T32- (opposite power station) dormouse nest T33- Old dormouse nest T34- Wood mouse in nest T35- Wood mouse in nest T37 - Adult dormouse. T41 – Wood mouse potentially using old dormouse nest T76 - Potential old wood mouse nest

Date	Timing	Weather conditions	Surveyors	Notes	Results
					T77 – Wood mouse nest TN179 - 1 adult dormouse escaped TN115 – Dormouse nest TN41 - Old dormouse nest TN49 - Dormouse nest T50 – Wood mouse in nest T21 – Wood mouse nest T60 - Adult dormouse. T64 – Wood mouse nest T15 - Adult dormouse escaped T66 - 2 wood mice. T8 – Juvenile dormouse T97 – Wood mouse in nest T86 - Hibernating dormouse T89 – Wood mouse adults x2 T85 – Wood mouse nest T82 - Potential dormouse T80 - Dormouse nest T136 – Wood mouse nest T129 – Wood mouse nest T124 - Dormouse nest T122 - Dormouse nest T121 - Two dormice in nest NB2 – Three wood mice

Date	Timing	Weather conditions	Surveyors	Notes	Results
					NB3 – Juvenile dormouse escaped NB4 – Potential dormouse nest NB10 – 1 adult dormouse seen in nest. Could be more underneath but did not disturb. NB7 – 4 wood mice NB25 – 4 wood mice NB24 – wood mouse NB22 – wood mouse nest with multiple wood mouse occupants NB17 – 2 wood mice NB18 - Wood mouse NB16 – 3 wood mice

Appendix B

Photographs of Nests Found

B.1 Photographs of Nests Found



Photograph 1. Empty nest found in T16.



Photograph 2. Empty nest found in NB6.



Photograph 3. Dormouse nest found in T45.



Photograph 4. Nest and dormouse found in NB6.