11. The hedgerows and tall ruderal on the site provide habitat for reptiles with a single grass snake recorded on the site during the reptile surveys. Further recommendations are provided in section 5.7.

12. Recommendations to enhance the ecological value of the site are outlined in section 5.8.

1.0 INTRODUCTION

Lindsay Carrington Ecological Services Limited were commissioned by Grainger Plc to conduct an ecological appraisal of the school land at Berewood, Waterlooville, PO7 7PS (Grid Ref: SU 6659 0892).

Berewood, Waterlooville (Havant Borough Council planning ref: APP/10/00828/ Winchester City Council planning ref: 10/02862/OUT) is a large multi-phased development. This report is for the construction of a school on the site. The application boundary for these works in relation to the wider survey area is shown in appendix I.

An ecological appraisal is essentially a multi-disciplinary walk-over survey and was conducted with the objective of identifying any ecological constraints associated with the proposals such as the site's potential to support any legally protected species or habitats of high nature conservation value.

Section 2 of the report provides some background information on legislative requirements and relevant policy. Section 3 details the methodologies adopted for the ecological surveys that were conducted and section 4 provides an account of the survey results. Section 5 provides information on the relevance of the results to the proposed development and makes recommendations for measures to mitigate and compensate for the effects on a particular habitat or species.

2.0 LEGISLATION AND POLICY

2.1 Legislation

The following legislation may be of relevance to the proposed works. Full details of statutory obligations with respect to biodiversity and the planning system can be found in DCLG Circular 06/2005.

- **The Conservation of Habitats and Species Regulations 2017:**
  This transposes the EU Habitats Directive (Council Directive 92/43/EEC) into domestic law. The Regulations provide protection for a number of species including:
  - All species of bat;
  - Dormouse;
  - Otter; and
  - Great crested newt.

  This legislation makes it an offence to deliberately capture, kill or injure individuals of these species listed on Schedule 2 and damage or destroy their breeding site or place of shelter. It is also illegal to deliberately disturb these species in such a way as to be likely to significantly affect: (i) the ability of any significant group of the species to survive, breed or rear or nurture their young; or (ii) the local distribution or abundance of the species[1];

  This legal protection means that where development has the potential to impact on bats, or other European protected species, the results of a protected species survey must be submitted with a planning application.

  Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are also protected under this legislation. These are a network of sites designated for supporting habitats or species of high nature conservation importance in the European context. Any activity that has a detrimental effect on these European sites is made an offence under the Regulations. Where a development is likely to have a significant impact on a European site, the Regulations require a rigorous assessment of the impacts, known as an Appropriate Assessment.

[1] The *Conservation of Habitats and Species Regulations 2017* consolidates the numerous amendments that were made to the *Conservation (Natural Habitats, &c.) Regulations 1994*. Of particular relevance are amendments made in August 2007 and January 2009 which an increased the threshold of illegal levels of disturbance to European Protected Species (EPS). An offence is only committed if the deliberate disturbance would result in significant impacts to the EPS population. However, it should be noted that activities that cause low levels of disturbance to these species continue to constitute an offence under *Section 9* of the *Wildlife and Countryside Act* (*1981)*.

- **The Wildlife and Countryside Act 1981 (and amendments):** Protected fauna and flora are listed under Schedules 1, 5 & 8 of the Act. Species likely to be of relevance include:
    - All species of **bat.** It is an offence to intentionally or recklessly disturb any bat whilst it is occupying a roost or to intentionally or recklessly obstruct access to a bat roost;
    - All species of British **reptile** (in particular grass snake, common lizard, adder and slow-worm). It is illegal to kill or injure these species; and
    - **Great crested newt.** It is illegal to obstruct access to any structure or place which great crested newts use for shelter or protection or to disturb any great crested newt while it is using such a place.
    - **Water vole.** It is an offence to intentionally kill, injure or take water vole, intentionally or recklessly damage, destroy, obstruct access to water vole burrows or disturb them whilst in a burrow.

  This Act also makes it an offence to intentionally kill, injure or take any wild bird or to take, damage or destroy their eggs and nests (whilst in use or being built). In addition, it is an offence to disturb any nesting bird listed on Schedule 1 or their young.

  Schedule 9 of the Act lists those species for which it is an offence to cause their spread. Schedule 9 species that are most likely to be encountered are Japanese knotweed (*Fallopia japonica*) and New Zealand pigmyweed (*Crassula helmsii)*.

  Sites of Special Scientific Interest (SSSIs) are also protected under the Wildlife and Countryside Act 1981. These are a network of sites identified as being of national nature conservation importance and hence afforded legal protection.

- **The Countryside and Rights of Way Act 2000:** This Act strengthens nature conservation and wildlife protection. It places a duty on Government Ministers and Departments to conserve biological diversity, provides police with stronger powers relating to wildlife crimes, and improves protection and management of SSSIs.

- **The Protection of Badgers Act 1992:** This Act makes it an offence to wilfully take, injure or kill a badger (*Meles meles*); cruelly mistreat a badger; interfere with badger setts. A licence is required for work which may damage or disturb a sett.

- **Wild Mammals (Protection) Act 1996:** This Act provides protection for all wild animals from intentional acts of cruelty.

- **Hedgerow Regulations 1997:** These Regulations establish a set of criteria for assessing the importance of hedgerows. Where a hedgerow is deemed to be

'important' its removal is prohibited without consent from the local Planning Authority

2.2 Policy

The following policy is of relevance to the proposed works:

- **National Planning Policy Framework (NPPF):** This sets out the Government's vision for biodiversity in England with the broad aim that planning, construction, development and regeneration should maintain and enhance, restore or add to biodiversity and geological conservation interests. NPPF includes information on legally protected species and sites in section 15(2) (see section 2.1).

- **Local Sites (including Sites of Nature Conservation Interest (SNCIs), Local Nature Reserves (LNR), and Biological Notification Sites (BNSs)/County Wildlife Sites (CWSs)):** These are a network of sites designated for their nature conservation importance in a local context. Although they are not afforded legal protection they contribute towards local and national biodiversity. Where such development is permitted, the local planning authority will use conditions and/or planning obligations to minimise the damage and to provide compensatory and site management measures where appropriate.

- **Biodiversity Action Plans (BAPs):** BAPs set out policy for protecting and restoring priority species and habitats as part of the UK's response as signatories to the Convention on Biological Diversity. BAPs operate at both a national and local level with priority species and habitats identified at a national level and a series of Local BAPs that identify ecological features of particular importance to a particular area of the country. The requirement to consider and contribute towards BAP targets was strengthened through the Countryside and Rights of Way Act 2000. Habitat and Species Action Plans that are likely to be of relevance include:

    - Reptiles (UK BAP)
    - Brown long-eared bat (*Plecotus auritus*) (UK BAP)
    - Soprano pipistrelle (*Pipistrellus pygmeaus*) (UK BAP)
    - Dormice (*Muscardinus avellanarius*) (UKBAP).

3.0 METHODOLOGY

3.1 Desk study

Hampshire Biological Information Centre (HBIC) provided protected species records within two kilometres of the site and details of any non-statutory designated sites. The Multi-Agency Geographical Information for the Countryside (MAGIC) website was used to provide information on any statutory designated sites within five kilometres of the proposed development.

3.2 Field study

3.2.1 Vegetation

The standard phase 1 habitat survey methodology (JNCC, 2010) was adopted whereby habitats are mapped using colour codes (appendix I). A detailed walkover survey of the site was undertaken on 27th April 2018 by Andrew Heideman, directly searching for legally protected and invasive species of flora and fauna, and categorising any habitats of ecological value that were encountered. A general description of the vegetation on site was also recorded, listing species encountered and scoring their abundance using the DAFOR scale:

D Dominant;
A Abundant;
F Frequent;
O Occasional;
R Rare;
L Local (used as a prefix to any of the above).

3.2.2 Protected species assessment

Badgers

A direct search was undertaken for signs of badger. Signs of badger may include setts, dung pits, latrines, paths or hairs on fences and vegetation. Any setts encountered were classified according to the number of entrances and the extent of their use.

Where setts were recorded these were classified into four main categories, defined by the number of holes present:

- Main sett: A large well used and well established sett used for breeding. There is usually only one main sett within each clan of badgers.

- Annex sett: These are additional setts often located close to the main sett connected by well worn paths.
- Subsidiary sett: These are additional setts often some 150m from the main sett which are sometimes used for breeding but do not have obvious paths linking to other setts and are not always active.
- Outlier sett: These setts are usually smaller in size than the other setts, intermittently used and located some distance from the main sett.

Setts recorded were then examined to establish their level of usage. Each hole was classified under one of the following categories:

- Well used: An entrance free of leaf litter and showing recent signs of excavation.
- Partially used: An entrance with some leaf litter and debris around the hole but also showing some signs of recent digging.
- Disused: An entrance with debris and leaf litter partially obscuring the hole with no recent signs of digging, or a hole that exhibits the characteristics of a badger hole with a large D-shaped entrance and old spoil piles at the entrance, but shows no other signs of badger activity.

Bats

Trees

All bats use trees as they provide a foraging area, and connectivity between different habitats, however the most significant use is as a roost. Bats often roost in trees. Features such as old woodpecker holes, splits, cavities and rot holes, loose or flaking bark will be exploited by bats to roost. Any trees present on site were therefore assessed for their potential to support roosting bats by searching for such features. The presence of roosting bats can be spotted through signs such as accumulations of moth or butterfly wings, staining, bat droppings, or bats themselves. The absence of these cannot, however, be treated as conclusive evidence that bats are not present, and therefore an assessment was made of the potential of the trees to support bats based on the scale presented below in table 1, adapted from the *Good Practice Guidelines* (Collins, 2016):

Table 1: Criteria for assessing bat roosting potential of trees

High Roosting Potential	Trees with multiple, highly suitable features capable of supporting larger roosts or with evidence of bat occupation found
Moderate Roosting Potential	Trees with definite bat potential, supporting fewer suitable features than high roosting potential trees or with potential for use by single bats

Low or Negligible Roosting Potential	Trees with no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features which may have limited potential to support bats or trees with no potential to support bats

Trees were assessed on the 26th June 2018 by licensed ecologist Alex Hannam (Natural England class licence: 2015-16181-CLS-CLS).

Foraging/commuting habitat

The site was assessed for its suitability to support foraging/commuting bats. Bats will forage on sites that support linear landscape features (e.g. hedgerows, tree lines and rivers) with good habitat connectivity and within proximity to suitable roosting sites. Sites that support a range of semi-natural habitats with varied vegetation structure are considered to provide more suitable foraging habitat for bats as they support an abundance and diversity of insect prey.

Activity transect surveys

A suite of bat activity surveys were undertaken on site in accordance with the guidelines established by the BCT (Collins, 2016).

Bats are generally most active between the months of March and September with the optimal months for undertaking transects being June to August. Activity transects were undertaken on during April, May 2018, June 2018, July 2018, August 2018 and September 2018. The dusk transect surveys began at or just before sunset and continued for approximately two hours afterwards in order to record any bats commuting from roost sites to foraging grounds as well as general foraging activity. The dawn transect surveys commenced two hours before sunrise and continued until sunrise.

Bat transect surveys involve walking pre-defined route which incorporate key areas of habitat that are likely to be important for foraging and/or commuting bats. Such areas include scrub and grassland and linear features such as hedgerows and woodland/scrub edge. In regards to the development site, a predetermined transect route was walked by a pair of surveyors during each survey visit. The route was walked up to twice during any one survey at a steady speed and a number of listening station stops were also incorporated along the route. The surveyors paused at each listening stop for a duration of five minutes. The site transect route is illustrated on the plan included as appendix IV.

Static Monitoring

Static monitoring devices were left on site for a period of five nights in April, May, June, July, August and September 2018 following the updated guidelines by the BCT (Collins,

2016). The recording devices consisted of SM2, SM4 and Anabat expresses. The recording devices were set up at the same strategically selected locations around the site on each occasion. All analysis of the static recording device was conducted using Analook software.

For all months, the statics were deployed at the following locations:

- Static monitor 1 (SU 66546 08969): Positioned on the southern boundary on a hawthorn tree.

- Static Monitor 2 (SU 66626 08742): Positioned on a tree in the north western corner of the site.

The detectors ran throughout each survey period for five consecutive nights at each point. Table 2 below identifies the number of nights that recorded bat activity for each monitor per month. Recordings from these points were considered sufficient to gauge local bat activity levels.

Table 2: Static Monitoring days

	April	May	June	July	August	September
Monitor 1	1	8	6	6	3	4
Monitor 2	4	8	6	6	6	4

Limitations

Static 1 did not record any bats during April due to a suspected technical fault with the detector. In addition, not all statics recorded for a minimum of five nights throughout the survey period, however, sufficient data was obtained from the static monitoring and activity transects to assess the activity levels on the site.

Assessment of foraging and commuting habitat importance

A methodology for the ecological impact assessment of bats has been developed by Wray et al (2010). This uses a number of factors such as the species and number of bats involved, presence of roosts nearby and characteristics for foraging and commuting habitat to produce a score indicating level of importance. This scoring system has been applied to the foraging area and commuting routes for the site to assess their level of importance. The value of the habitat can be assessed for each of the bat species recorded during the survey, but the highest score (normally obtained for the rarest species) is used when defining the value of the habitat. The scores relate to the following levels of importance:

- 0–10 = not valuable
- 11–20 = locally important

- 21-30 = important at county level
- 31-40 = important at regional level
- 41-50 = nationally important

Dormice

The habitat on the site was assessed for the potential to support dormice (*Muscardinus avellanarius*), which are found in habitats such as woodlands, scrub and hedgerows with good connectivity and suitable food plants. A visual inspection for their distinctive nests was undertaken. Where fruiting hazel (*Corylus avellana*) was present nuts were checked for dormice distinctive opening holes. Satellite images were used to assess the connectivity of any suitable habitat present on the site to other areas of woodland and hedgerow networks.

Great crested newts

Suitable breeding ponds are essential to support populations of great crested newt (*Triturus cristatus*) although they actually only spend a relatively short period of the year in the ponds during the spring for breeding. The remainder of the year is spent in suitable 'foraging' terrestrial habitat such as tall grassland and woodland. During the winter the great crested newt hibernates, often amongst the roots of trees and scrub or in other places such as rubble piles, amongst the foundations of buildings or under fallen trees and logs.

Great crested newts are known to forage up to at least five hundred metres from their breeding pond and suitable habitats that fall within two hundred and fifty metres must be considered even in situations where the breeding pond itself will not be affected. The site and surrounding area were assessed during the phase 1 habitat survey for the presence of ponds that may provide suitable breeding habitat for great crested newts. Suitable terrestrial habitat was also assessed.

Reptiles

Common reptile species such as slow-worm (*Anguis fragilis*) and grass snake (*Natrix natrix*) are widespread in habitats that provide both cover, in the form of scrub or tall vegetation, and basking areas such as hard standing or short grassland communities. Piles of debris or rubble also provide excellent refuge and hibernation sites for reptiles. They do also have an affinity for hiding under debris exposed or partially exposed to the sun. This trait is exploited by adopting a methodology based upon placing artificial refuges around the survey site thus encouraging any reptiles present to use them.

Targeted reptile surveys were undertaken between May and June 2018. This involved distributing artificial refugia within the site on the 19th April 2018, in this case 0.25m² pieces of roofing felt were used. These were left to settle for fifteen days, after which seven survey visits were undertaken. The 'reptile mats' were checked between 0900 and

1100 hours or between 1600 and 1900 hours and/or during suitable weather conditions, when it was cloudy and/or with sunny breaks with temperatures between ten and eighteen degrees centigrade, when the refuges provide greater heat than the open ground.

4.0 RESULTS

4.1 Desk study

Designated sites

Table 3 below lists sites designated for nature conservation located within five kilometres of the development site.

Table 3: Statutory designated sites within a five kilometre radius and non-statutory sites within a two kilometre radius of the land at Berewood, Waterlooville.

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
Solent Maritime	SAC[2]	4.2 southeast	165300	The Solent encompasses a major estuarine system on the south coast of England. Designated for its estuary, salt meadow, coastal lagoons, mudflats. Qualifying species includes Desmoulin's whorl snail (*Vertigo moulinsiana*)
Chichester and Langstone Harbours	SPA[3]	4.2 southeast	5,810	The SPA qualifies under Article 4.1 for breeding little tern (*Sterna albifrons*) and sandwich tern (*Sterna sandvicensis*), passage little egret (*Egretta garzetta*) and overwintering bar-tailed godwit (*Limosa lapponica*) and little egret. This site also qualifies under Article 4.2 for passage ringed plover (*Charadrius hiaticula),* overwintering black-tailed godwit (*Limosa limosa islandica),* dark-bellied brent goose (*Branta bernicla bernicla*), dunlin

[2] SAC: Special Area of Conservation
[3] SPA: Special Protection Area

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				(*Calidris alpina alpina),* grey plover (*Pluvialis squatarola),* redshank (*Tringa totanus),* ringed plover and assemblage of international importance.
	Ramsar[4]	4.2 southeast	5,810	Chichester Harbour comprises extensive mud and sandflats that are exposed at low tide. The site is designated as a wetland of international importance and is of particular significance for wintering wildfowl and waders as well as breeding birds both within the Harbour and in the surrounding permanent pasture fields and woodlands.
Lye Heath Marsh	SSSI[5]	1.5 southwest	4.4	Lye Heath Marsh supports the following habitats including a mixture of basic flushes, unimproved grassland, alder woodland and dense hedgerows, which combine to form a now rare association of individually restricted habitats.
Hook Heath Meadows	SSSI	2.0 southwest	5.9	Hook Heath Meadows comprise an intimate mixture of woodland and agriculturally unimproved acid pasture lying within a shallow river valley over London Clays. Many of the habitats present are now rare in lowland Britain

[4] Ramsar: Internationally important wetland site
[5] SSSI: Site of Special Scientific Interest