



RIVERDALE ECOLOGY

Preliminary Ecological Appraisal

Land at Navarac, Great Green, Thurston, Suffolk

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Contents

Executive Summary.....	1
1 Introduction.....	3
1.1 Background to Commission	3
1.2 Scope of Report	3
1.3 Site Description and Context	3
1.4 Project Overview	3
1.5 Relevant Legislation and Planning Policy	4
2 Methodology	5
2.1 Desk Study	5
2.2 Extended Phase 1 Habitat Survey.....	5
2.3 Protected Species	6
2.4 Preliminary (Ground Level) Tree Bat Roost Assessment	6
2.5 Great Crested Newt Habitat Suitability Index (HSI)	7
2.6 Great Crested Newt eDNA	7
2.7 Site Evaluation	8
2.8 Survey and Assessment Limitations	8
3 Results.....	9
3.1 Desk Study	9
3.2 Habitat Survey	10
3.3 Protected Species	11
4 Discussion and Recommendations.....	14
4.1 Nature Conservation Evaluation.....	14
4.2 Further Surveys.....	14
4.3 Constraints and Mitigation/Compensation.....	14
4.4 Biodiversity Net Gain (BNG).....	15
4.5 Ecological Enhancement	16
5 References	17

Appendices

- Appendix 1 – Site Plans
 - Appendix 2 – Photographs
 - Appendix 3 – Legislation
 - Appendix 4 – GCN eDNA Report
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Executive Summary

Riverdale Ecology Ltd were commissioned by Locus Planning Limited to carry out a Preliminary Ecological Appraisal (PEA) of a potential development site comprising part of the garden of the residential property known as Navarac, Poplar Farm Lane, Great Green, Thurston, Bury St Edmunds, Suffolk, IP31 3SH; situated around Ordnance Survey Grid Reference TL 93954 65987. The appraisal was carried out in order to inform two separate planning applications for small-scale residential development at the site.

The Application Site is approximately 0.5 hectares in area comprising part of the garden of Navarac, a residential property located to the northeast of Thurston, a village approximately 10km from Bury St Edmunds and within the administrative area for Babergh and Mid-Suffolk Councils.

The site is broadly triangular in shape comprising part of an existing residential garden with a large lawn, semi-mature trees, a gravel driveway and a pond all bounded by a non-native hedge.

The wider landscape is generally arable farmland with an extensive network of field hedgerows interconnecting pockets of semi-natural broadleaved woodland.

There are two separate planning applications being submitted for consideration to Mid-Suffolk Council:

Application 1 is for a single residential dwelling located in the northwest corner of the site.

Application 2 is for three new residential properties along the southeast edge of the site aligned with Norton Road.

This Preliminary Ecological Appraisal report has assessed the site as a whole and has been produced in order to support both planning applications.

The intrinsic value of the habitats on-site within a defined geographic context is generally considered to be of importance at site level only. The site is an existing residential garden with fairly unremarkable habitats that are widespread and abundant locally.

The habitats within the development footprint are generally common and widespread existing locally in both larger area and higher quality to the site. Any loss of other habitats from within the site would be unlikely to affect the overall assemblage of species or the conservation status of any individual species beyond the context of the site.

The following ecological constraints have been identified within the site:

The individual trees and boundary hedges provide some low value habitat for forwarding bats. Bats are sensitive to artificial lighting, which can disrupt the normal 24-hour pattern of light and dark and is likely to affect the natural behaviour of bats. Bright light may reduce social flight activity or restrict access to foraging areas causing bats to move away from the light area. Lighting can be particularly harmful if used near high value foraging and commuting habitat such as woodland edges, hedgerows or rivers.

Based on the known population of great crested newts locally, the proximity of a known breeding pond it is considered highly likely that great crested newts are present within the Application Site and would be at risk from development within the site. As such a protected species license will be required.

There is suitable nesting habitat for common and widespread bird species within the individual trees and boundary hedges within the site.

The site could support hedgehogs which are vulnerable to impacts from development.

Mitigation measures recommended include:

It is recommended that directional lighting is used to avoid illuminating habitat which could be utilised by bats. Foraging habitat is very limited at this site, but it is recommended to avoid excessive light spill across the boundary hedge, and trees lining the entrance driveway which may provide limited opportunities for commuting and foraging.



Due to the presence of a known breeding pond directly adjacent to the development site the risk to great crested newts is very high. As such it will be necessary to obtain a protected species mitigation license prior to the commencement of works. Based on the size of the site and the low value of the habitats within the site for great crested newts it is recommended that a District Level License is obtained from Natural England. The Impact Assessment and Conservation Payment Certificate (IACPC) should be submitted in support of the planning application.

Any clearance of suitable nesting vegetation should be undertaken outside of the bird nesting season (from 1st March to the 31st August, inclusive) where appropriate. If this is not possible a detailed inspection for nesting birds should be carried out by a suitably qualified ecologist no more than 48 hours prior to removal of vegetation capable of supporting nesting birds. Any active nests found must be retained with an appropriate buffer until young birds have fledged, and the nest is no longer in use. It should be noted that the nesting bird check is only appropriate for small areas of nesting habitat. No sections of Leylandii hedge should be removed during the nesting season as the efficacy of nesting bird checks is low due to the very dense vegetation.

Consideration should be given to hedgehogs during construction and hedgehog friendly features included into the design of the development. Hedgehog highways should be maintained between gardens through installation of hedgehog tunnels or simple gaps in any new fences.

Possible opportunities to enhance the wildlife potential, appropriate to this site, in line with NPPF policies to achieve NET GAIN in biodiversity through planning include:

New native hedgerow planting should be incorporated into the design for the development. Any new hedgerow planting should include native species only and utilise a minimum of five to seven woody species within each 30m section.

Opportunities exist within the site to provide habitat for great crested newts. Woodpile refuges and a hibernaculum should be constructed adjacent to the pond to provide permanent secure refuge and hibernation sites for great crested newts and other amphibians known to be breeding in the pond.

Small passerine nest boxes should be installed on trees within and adjacent to the Application Site to provide suitable nesting habitat for a range of common garden bird species. A combination of at least 6 No. standard hole-fronted and open-fronted boxes would provide a variety of nesting locations for common and widespread garden species including blue tit, great tit, robin, blackbird, wren and chaffinch.

Bat boxes such as the Schwegler 1FR bat tube and the Schwegler Brick Box Type 27 or other integrated bat boxes such as those supplied by birdbrickhouses (<http://www.birdbrickhouses.co.uk/brick-nesting-boxes/bat-box>) provide opportunities for bats to roost in specially made boxes designed to be built into the external walls of the new dwelling. The boxes are very discrete and require no maintenance. At least one box should be installed on each of the new dwellings at locations advised by the project ecologist.

At least one house sparrow box should be installed on each of the new dwellings. Integrated boxes produced by birdbrickhouses or Schwegler would be the most appropriate option. Alternatively, an externally mounted house sparrow terrace would be a suitable alternative. Any exterior boxes must be affixed securely to deter removal or tampering in the future.

Swift boxes should be installed on any new dwellings of at least two-storeys within the site. Integrated boxes should be installed during construction at approximately 5m above ground level and at appropriate locations advised by an ecologist. It is recommended that the S Brick produced by Action for Swifts (<https://www.actionforswifts.com/galvanised-steel-s-brick>) or boxes produced by birdbrickhouses (<http://www.birdbrickhouses.co.uk/brick-nesting-boxes/nesting-boxes/>) are used on dwellings with exposed brickwork as they can be faced with the bricks used in construction. If the building is to be rendered, then Schwegler swift bricks or Ibstock swift bricks would be suitable alternatives.



1 Introduction

1.1 Background to Commission

Riverdale Ecology Ltd were commissioned by Locus Planning Limited to carry out a Preliminary Ecological Appraisal (PEA) of a potential development site comprising part of the garden of the residential property known as Navarac, Poplar Farm Lane, Great Green, Thurston, Bury St Edmunds, Suffolk, IP31 3SH; situated around Ordnance Survey Grid Reference TL 93954 65987. The appraisal was carried out in order to inform two separate planning applications for small-scale residential development at the site.

1.2 Scope of Report

The purpose of this PEA report is to establish the current biodiversity value of the site, to identify any potential ecological constraints or ecological impacts associated with the proposed development and provide recommendations for additional survey work to further evaluate any impacts that may risk contravention of legislation or policy relating to protected species and nature conservation. Where necessary, avoidance, mitigation/compensation and/or enhancement measures have been recommended to ensure compliance. It is based on the following information sources:

- A desk study of the site and within a 2km surrounding radius;

- A Phase 1 Habitat Survey (JNCC, 2010) of the site boundary and immediate surrounds to map habitats and identify features with potential to support protected or otherwise notable species; and

- Great crested newt eDNA sampling and analysis of a pond at the property.

This report has been prepared with reference to best practice as published by the Chartered Institute for Ecology and Environmental Management (CIEEM, 2017) and to British Standard 42020:2013 (BSI, 2013). This report provides recommendations for enhancement of the site for biodiversity in line with the National Planning Policy Framework (NPPF) (Department of Communities and Local Government, 2019) and best practice guidelines.

The survey, assessment and report were conducted and written by Danny Thomas CEcol, MCIEEM, Principal Ecologist at Riverdale Ecology Ltd. Danny has over 19 years' experience within ecological consultancy and as such is suitably qualified to undertake habitat surveys and protected species assessments. He is a Chartered Ecologist and has a BSc (Hons) in Ecology with Biology and an MSc in Environmental Sciences from the University of East Anglia. He holds current Natural England survey licences for great crested newts, bats, dormice and water vole and has a Schedule 1 licence for several protected bird species including barn owl and Cetti's warbler.

1.3 Site Description and Context

The Application Site is approximately 0.5 hectares in area comprising part of the garden of Navarac, a residential property located to the northeast of Thurston, a village approximately 10km from Bury St Edmunds and within the administrative area for Babergh and Mid-Suffolk Councils.

The site is broadly triangular in shape comprising part of an existing residential garden with a large lawn, semi-mature trees, a gravel driveway and a pond all bounded by a non-native hedge.

The wider landscape is generally arable farmland with an extensive network of field hedgerows interconnecting pockets of semi-natural broadleaved woodland.

Plans of the site are included in Appendix 1 and Photographs are included in Appendix 2.

1.4 Project Overview

There are two separate planning applications being submitted for consideration to Mid-Suffolk Council:



Application 1 is for a single residential dwelling located in the northwest corner of the site.

Application 2 is for three new residential properties along the southeast edge of the site aligned with Norton Road.

This Preliminary Ecological Appraisal report has assessed the site as a whole and has been produced in order to support both planning applications.

1.5 Relevant Legislation and Planning Policy

The following key pieces of nature conservation legislation are relevant to this appraisal:

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (commonly referred to as the Habitats Regulations);

Wildlife and Countryside Act 1981 (as amended);

The Environment Act 2021; and

Natural Environment and Rural Communities (NERC) Act 2006.

The National Planning Policy Framework (DfCLG, 2019) requires local authorities to avoid and minimise impacts on biodiversity and, where possible, to provide net gains in biodiversity when taking planning decisions:

“The planning system should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes and minimising impacts on biodiversity and providing net gains in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.”

To protect and enhance biodiversity and geodiversity, plans should:

“Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and steppingstones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation”; and,

“Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.”

When determining planning applications, local planning authorities should apply the following principles:

“If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.”

“Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists”; and,

“Developments whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.”

A summary of relevant legislation and planning policy is provided in Appendix 3.

2 Methodology

2.1 Desk Study

A desk study was carried out to determine if any Statutory¹ land designations occur within 2km of the site; these were identified using the Multi-Agency Geographic Information for the Countryside website (www.magic.gov.uk).

Aerial photographs were reviewed to identify any habitats surrounding the site or wildlife corridors connecting the site to other habitats. Ordnance Survey maps, aerial photographs and the MAGIC website were used to identify the presence of water bodies within 250m of the site in order to establish if the land within the site could be used as terrestrial habitat for great crested newts. This species can use suitable terrestrial habitat up to 500m from a breeding pond although Natural England research report ENRR574 suggests that newts are likely to travel no more than 250m from ponds where suitable habitats for foraging, refuge and hibernation exist in immediate proximity (Cresswell, W. & Whitworth, R. 2004). The 250m zone was considered an appropriate distance for this assessment based on the presence of a pond within the property, the low value of the terrestrial habitat within the site and the separation of the site by roads.

Information relating to the location of non-Statutory² wildlife sites and records of protected³ or otherwise notable⁴ species within the site and up to 2km from the site boundary was obtained from Suffolk Biodiversity Information Service (SBIS).

The status of species is taken directly from the relevant legislation, UK Biodiversity Action Plan (UK BAP, 2009), local (Suffolk) BAP or the list of Birds of Conservation Concern 5 (Stanbury et al., 2021). The red and amber lists of Birds of Conservation Concern refer to bird species of particular conservation concern for a number of reasons. In general terms, red list species are globally threatened showing severe recent declines in population. Amber list species are species either with unfavourable conservation status or those species showing moderate recent declines in population; they may also include particularly localised species.

2.2 Extended Phase 1 Habitat Survey

A habitat survey of the site was carried out including any boundary features of interest. Habitats were described and mapped broadly in accordance with standard Phase 1 Habitat survey methodology (JNCC, 2010). Habitats were also assessed against Habitat of Principal Importance (HPI) criteria as set out by the JNCC (<http://jncc.defra.gov.uk/page-5706>).

Scientific names are given for vascular plant species only, following their first mention, thereafter common names only are used. Nomenclature for vascular plants follows Stace (2010). Incidental records of birds and other fauna noted during the course of the habitat survey were also compiled.

The presence of invasive or injurious plant species as defined by Schedule 9 of the Wildlife and Countryside Act, 1981 (as amended) was also recorded.

1 Statutory designations include Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR).

2 Non-statutory sites are designated by local authorities and protected through the planning process (e.g., County Wildlife Sites, Sites of Importance for Nature Conservation or Local Wildlife Sites).

3 Legally protected species include those listed in Schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981; Schedule 2 of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019; or in the Protection of Badgers Act 1992 (as amended).

4 Notable species include Species of Principal Importance under the Natural Environment and Rural Communities Act 2006; Local Biodiversity Action Plan (LBAP) species; Birds of Conservation Concern (Eaton et al., 2009); and/or Red Data Book/nationally notable species (JNCC, undated).

2.3 Protected Species

The habitats were assessed for their potential to support legally protected species using a combination of the desk study information and field observations carried out during the habitat survey. The assessment was based on professional judgement and best practice survey guidance methodology for identifying field signs of protected species including but not limited to: [REDACTED] bats (Hundt, L. 2012, Collins, J. (ed) 2023, Mitchell-Jones, A. 2004, Andrews, H. 2018); hazel dormouse (English Nature, 2006); great crested newt (Langton et al, 2001; English Nature, 2001; Cresswell & Whitworth 2004); reptiles (Gent and Gibson, 2003); barn owl (Shawyer, 1998); and UK BAP Mammals (Cresswell et al, 2012). The potential for protected species presence was based on the following criteria:

- **Present** – Confirmed presence through first-hand survey evidence or recent verified records.
- **High Potential** – Local records highlight presence in the local vicinity. The site and immediate surrounds support good quality habitat or good connectivity to such habitat.
- **Moderate Potential** – Habitat within the site provides key elements for any species or species group although may be limited by factors including habitat area, isolation or disturbance. Desk study records highlight presence in proximity to site.
- **Low Potential** – On-site habitat is of low quality for any species or species group, lacking key elements and limited by factors including habitat fragmentation and habitat area. Few or absence of local records but within national distribution and thus cannot be completely discounted.
- **Negligible Potential** – Habitats within the site are very poor quality or completely absent for any species or species group. Desk study records are absent, the site is outside of the normal range of the species or species group and the surrounding habitat is unlikely to support wider populations. Presence cannot be completely ruled out, but it is considered 'reasonably unlikely' to support any species or species group.

The findings of this assessment establish any requirement for targeted protected species surveys that may be required to achieve compliance with relevant legislation. Surveys may be required where a site is judged to be of low suitability for a particular species or species group, alternatively it may be more appropriate to ensure compliance with protected species legislation through precautionary measures prior to and during construction.

Specific features within the site with potential to support protected species such as buildings and trees which may support bat roosts, waterbodies which may support water vole, otters and white-clawed crayfish and ponds which may support great crested newts will be superficially assessed to determine potential but further surveys may be required if potential is identified.

2.4 Preliminary (Ground Level) Tree Bat Roost Assessment

A Preliminary Roost Assessment (PRA) survey of any trees within the site boundary was undertaken in accordance with best practice guidelines for assessing roost potential of trees (Collins, J. (ed.) 2016; Hundt, L. 2012, Andrews, H. 2018).

The survey comprised a systematic and detailed inspection of the exterior of the tree from ground level to search for Potential Roost Features (PRFs) which could be utilised by bats for roosting. The survey comprised a description of the physical characteristics of the tree alongside identification of any PRFs or evidence of roosting bats. PRFs found in trees include woodpecker holes; rot holes; vertical or horizontal cracks or splits in limbs; partially detached or loose bark; epicormic growth; enclosed gaps between overlapping stems or branches; and dense ivy with stem diameter in excess of 50mm.

2.5 Great Crested Newt Habitat Suitability Index (HSI)

Accessible ponds within 250m of the Application Site were assessed using the Habitat Suitability Index (HSI) methodology (Oldham et al., 2000). The HSI of a pond is determined by calculating a geometric mean of ten variables that are known to have an influence on its suitability as a breeding location for great crested newts (see Table 1), thus:

$$\text{HSI} = (\text{SI1} \times \text{SI2} \times \text{SI3} \times \text{SI4} \times \text{SI5} \times \text{SI6} \times \text{SI7} \times \text{SI8} \times \text{SI9} \times \text{SI10})^{1/10}$$

Table 1: HSI parameters.

Parameter	Name	Description
SI1	Geographic Location	Lowland England or upland England, Scotland and Wales
SI2	Pond area	To the nearest 50m ²
SI3	Permanence	Number of years' pond dry out of ten
SI4	Water quality	Measured by invertebrate diversity
SI5	Shade	Percentage shading of pond edge at least 1m from shore
SI6	Fowl	Level of waterfowl use
SI7	Fish	Level of fish population
SI8	Pond count	Number of ponds within 1km ²
SI9	Terrestrial habitat	Quality of surrounding terrestrial habitat
SI10	Macrophytes	Percentage extent of macrophyte cover on pond surface

Once calculated, the HSI score for a waterbody can be categorised as follows (Oldham et al, 2010):

Excellent (>0.8)

Good (0.7 – 0.79)

Average (0.6 – 0.69)

Below Average (0.5 – 0.59)

Poor (<0.5)

2.6 Great Crested Newt eDNA

eDNA is DNA collected from the environment in which an organism lives, rather than directly from the plants or animals themselves. In aquatic environments animals, such as great crested newts, shed cellular material into the water via reproduction, saliva, urine, faeces, skin cells, etc. This DNA will persist for several weeks and can be collected through a water sample which is then analysed to determine if the target species of interest have been present in the waterbody.

The method for eDNA survey was developed by The Freshwater Habitats Trust (FHT) and published in March 2014 (Biggs et al, 2014) and is accepted as a valid presence / absence technique by Natural England. Environmental DNA (eDNA) is nuclear or mitochondrial DNA that is released from an organism into the environment. In aquatic environments, eDNA is diluted and distributed in the water where it persists for 7–21 days, depending on the



conditions. Recent research has shown that the DNA of a range of aquatic organisms can be detected in water samples at very low concentrations using qPCR (quantitative Polymerase Chain Reaction) methods.

Water samples were taken on 4th May 2023 within the approved period for sampling (15th April to 30th June). Water samples were collected by Danny Thomas, a great crested newt licence holder and an approved eDNA surveyor/trainer. The samples were sent to NatureMetrics Ltd, one of a handful of approved laboratories, and the samples were tested in accordance with Natural England's approved protocol (Biggs J., et al. 2014).

2.7 Site Evaluation

An evaluation of the site was carried out in general accordance with guidance issued by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2019) which ranks the nature conservation value of a site according to a geographic scale of reference: International/ European, National, Regional, Metropolitan, County, vice-county or other local authority-wide area, or of value at the Local scale or just within the context of the site.

In evaluating the nature conservation value of the site, the following factors were considered: nature conservation designations, rarity, naturalness, fragility, connectivity and relevant nature conservation aims and objectives for a given area as contained in national and local biodiversity action plans and planning policies.

2.8 Survey and Assessment Limitations

The data and conclusions presented here are an evidence-based assessment of the current status of the application site and should not be taken as providing a full and definitive survey of any protected species group. The results of this ecological assessment have allowed an evaluation of the likely ecological constraints to the proposed development and are considered sufficient to inform the need for further ecological survey and mitigation measures.

Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. Therefore, the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

3 Results

3.1 Desk Study

Statutory Sites for Nature Conservation

There are no statutory sites for nature conservation within 2km of the site.

Non-Statutory Sites for Nature Conservation

There are three non-statutory County Wildlife Sites (CWS) within 2km of the site boundary, these are discussed in detail in Table 1 below:

Table 1: Non-Statutory Sites within 2km of Site Boundary.

Site Name	Distance from site and Orientation	Reason for Designation
Mid-Suffolk 208: Black Bourn Valley CWS	650m Southeast	Black Bourn Valley comprises a Suffolk Wildlife Trust reserve. Formerly known as Grove Farm, Black Bourn Valley is a transitional habitat mosaic created from the arable reversion (rewilding) of the land and includes lowland dry and wet meadow, scrub, woodland and ponds. The ex-arable fields, hedgerows and scrub attract important farmland birds and the Black Bourn River which flows through the reserve is used by otter and water vole. There are three meadows bordering the river separated by ditches, parts of which are colonised by aquatic plants. The low-lying areas support a diverse wetland community with a number of uncommon Suffolk plants. In winter the river floods these meadows attracting flocks of wintering waterfowl. Reptiles such as slow worm, common lizard and grass snake have colonised the developing habitats and numerous ponds of different successional stages support a vast range of aquatic species and amphibians such as great crested newt and common toad. A wide range of bat species use the reserve including barbastelle. Black Bourn Valley is well connected to the surrounding landscapes via the river, railway embankments and a network of hedgerows, which allow for onward dispersal of a variety of species to the landscapes beyond the reserve boundary.
St Edmundsbury 89: Pakenham Wood CWS	995m North	Pakenham Wood was at one time a Site of Special Scientific Interest (SSSI). However, in recent years much of the wood has been clear-felled and replanted with Corsican pine <i>Pinus nigra</i> and larch <i>Larix</i> spp. In some areas Christmas trees are growing under a stand of overgrown deciduous coppice. Unfortunately, the wildlife value of the wood has been affected by the planting of conifers and Pakenham Wood has been de-notified by English Nature and is no longer a SSSI. Remnants of the rich woodland flora which was once widespread in Pakenham Wood are now largely confined to the wide woodland rides that cross the wood.



Site Name	Distance from site and Orientation	Reason for Designation
St Edmundsbury 88: Pakenham Fen Meadows CWS	1.9km Northwest	Pakenham Fen borders the river, west of the Fen Road and north of the main part of Pakenham village. It is divided into small fields, some of which have not been agriculturally improved and retain a diverse fen meadow flora, which is a Priority habitat. These areas support a good range of wetland plants including a number of uncommon Suffolk plants. The site also provides habitat opportunities for other wildlife, such as invertebrates.

The proposed development site is not subject to any statutory or non-statutory nature conservation designations. The site also does not contain equivalent habitat that could be considered as functionally linked to any nature conservation sites. Furthermore, the site is not located in proximity to any statutory or non-statutory designated site where the development could result in direct impacts to any designated site. Any impacts resulting from the proposed development are anticipated to be localised and are not expected to extend beyond the redline site boundary and so will not directly affect any statutory or non-statutory sites.

3.2 Habitat Survey

Summary

The habitat survey was carried out on 5th May 2023 in appropriate weather conditions.

The site is part of the garden of the residential property Navarac which is located to the southwest of the Application Site. The site comprises a large area of lawn bounded by a non-native hedge around much of the site. Access to the site is via a tree-lined gravel driveway leading from Poplar Farm Lane which runs adjacent to the northern edge of the site. A pond is present within the garden but has not been included in the development area.

A Phase 1 Habitat Plan is included in Appendix 1.

Grassland

The majority of the site comprises an improved grassland lawn (Appendix 2, Photographs 1 & 2). The grass is managed sympathetically, and mowing is relaxed in spring and early summer which allows spring flowers to emerge, but the grassland is managed as a lawn and mown regularly through the remainder of the year.

The sward is typical of lawn grassland comprising abundant perennial ryegrass *Lolium perenne* with red fescue *Festuca rubra* or similar horticultural fescue varieties. Very occasional Timothy grass *Phleum pratense* is present adjacent to the pond where it appears to be a strip overseeded with a wildflower seed mix (Appendix 2, Photograph 3)

Flowering forbs were being deliberately encouraged at the time of the site visit in early May through cessation of mowing and comprised a number of spring bulb species including bluebells (Spanish) *Hyacinthoides hispanica*, grape hyacinth *Muscari armeniacum*, Tulips *Tulipa* spp. and daffodils *Narcissus* spp., alongside native species including primroses *Primula vulgaris*, creeping buttercup *Ranunculus repens*, daisy *Bellis perennis*, dandelion *Taraxacum officinale* agg., cut-leaved cranesbill *Geranium dissectum*, ribwort plantain *Plantago lanceolata*, ground ivy *Glechoma hederacea* and occasional red deadnettle *Lamium purpureum* and chickweed *Stellaria media*. The strip along the side of the pond also supports common knapweed *Centaurea nigra*, oxeye daisy *Leucanthemum vulgare* and a small number of bee orchid *Ophrys apifera* spikes were emerging at the time of the survey.



Hardstanding

Entering the site from Poplar Farm Lane along the north edge of the site there is a gravel driveway which leads to the existing property (Appendix 1, Photograph 4).

Hedges

The majority of the site boundaries are demarked by managed non-native Leyland cypress *Cupressus x Leylandii* hedges.

Individual trees

The existing gravel driveway is lined with young saplings and semi-mature trees. Species include silver birch *Betula pendula* alongside various flowering cherries and other prunus varieties.

Pond

There is a single pond within the property; the pond is a typical garden pond constructed with a butyl pond liner. The pond is rectangular in shape with the banks formed from flint rocks. The pond is relatively shallow and contained some floating aquatic plants at the time of the survey including probable common pondweed *Potamogeton natans* and a red leaved water lily species. Yellow flag iris *Iris pseudacorus* and pendulous sedge *Carex pendula* is present on the banks and marsh marigold *Caltha palustris* is present in the shallow margins. Adult smooth newts were visible within the pond at the time of the survey in May.

Offsite habitats

There are five additional ponds located within 250m of the Application Site boundary.

3.3 Protected Species

Bats

There were 67 individual records comprising nine species of bats within 2km of the site returned in the SBIS data search. Species recorded included Western barbastelle, serotine, noctule, Leisler's bat, soprano pipistrelle, common pipistrelle, Nathusius's pipistrelle, brown long-eared bat and three myotis⁵ not identified to species level.

There are no existing buildings within the site and no trees within the Application Site exhibiting Potential Roost Features that could support roosting bats. The trees within the site are typically young saplings or semi-mature trees lining the entrance driveway and have not developed any PRF for bats.

The habitats within the Application Site have some limited value as foraging habitat for bats around the semi-mature trees but this is comparable to a typical garden habitat and any loss of trees would be unlikely to significantly affect foraging bats.

Great Crested Newts

There were eight records of great crested newt returned in the SBIS data search within 2km of the site. The majority of records originate from a collection of five confirmed breeding ponds located to the southeast of the Application Site around Grove Farm.

There are six ponds located within 250m of the Application Site including one pond within the redline planning boundary but outside of the development area so it will be retained.

The pond onsite tested positive for great crested newt eDNA in May 2021 (see Appendix 4) and as such is a confirmed breeding pond for great crested newts.

⁵ Bat species of the genus *Myotis*.



The habitats within the site principally comprise mown grassland, with boundary hedges and as such lack an abundance of terrestrial habitat for great crested newts. The banks of the pond are lined with rocks which provide some opportunities as terrestrial refuge habitat for great crested newts, but foraging habitat is fairly limited within the Application Site. It is likely that newts breeding within the pond are utilising the garden adjacent to the site or land to the north of the site, on the opposite side of Poplar Farm Lane where there is abundant foraging habitat and another pond. Poplar Farm Lane is a small, quiet rural road and as such would not represent a significant barrier to great crested newt dispersal.

Based on the known population of great crested newts within the pond it is considered reasonably likely that an offence under the Habitat Regulations could occur and a protected species license will be required.

Birds

There were extensive records of bird species returned by SBIS, comprising many common species as well as species of conservation concern and Schedule 1 listed.

In general, the habitats within the site are likely to support a typical assemblage of common or widespread species with some potential to support red or amber listed species of conservation concern including dunnock and house sparrow.

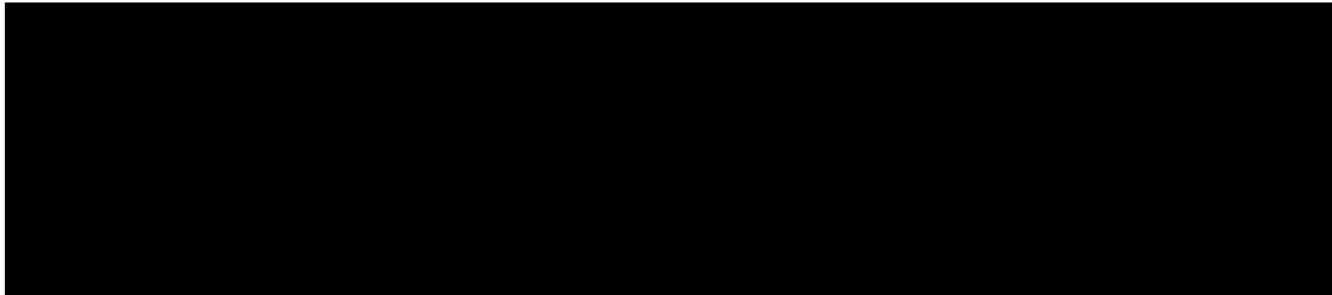
Bird species recorded on site during the PEA site visit included song thrush, robin, wren, blackbird, woodpigeon, chaffinch, great spotted woodpecker, goldcrest, dunnock, blue tit, great tit and goldfinch.

There is available nesting habitat within the Application Site, the Leyland cypress hedge around the site boundaries provides abundant high value nesting habitat and trees along the access road also provide some limited nesting potential.

Reptiles

There were four records of reptile species returned by SBIS within 2km of the Application Site. These included records for slow worm and grass snake from Grove Farm to the southeast of the Application Site.

However, the habitats within the site have negligible value for common and widespread reptile species. As such it is reasonable to conclude that reptiles will not be affected by the proposed development at the site.



Other protected species

There were records of water vole and European otter returned by SBIS within 2km of the site.

However, the site does not contain any suitable aquatic habitat which could support these species.

NERC Act SPI /Local or National BAP Species

The SBIS data search returned approximately 56 individual records for European hedgehog, which is a Species of Principal Importance. Hedgehogs are likely to utilise the habitats within the Application Site, which provides abundant foraging habitat, with daytime refuge sites available in the boundary hedge.



However, much of the Application Site will remain as garden for the new dwellings and providing that site clearance of any potential refuge or habitat is undertaken at an appropriate time of year, and with care, and ensuring that unobstructed access between the properties is maintained for hedgehogs, then the proposed residential development of the site is not likely to significantly affect the distribution or population of hedgehogs locally.



4 Discussion and Recommendations

4.1 Nature Conservation Evaluation

The intrinsic value of the habitats on-site within a defined geographic context is generally considered to be of importance at site level only. The site is an existing residential garden with fairly unremarkable habitats that are widespread and abundant locally.

The habitats within the development footprint are generally common and widespread existing locally in both larger area and higher quality to the site. Any loss of other habitats from within the site would be unlikely to affect the overall assemblage of species or the conservation status of any individual species beyond the context of the site.

4.2 Further Surveys

No further surveys are recommended.

4.3 Constraints and Mitigation/Compensation

Bats

Bats are sensitive to artificial lighting, which can disrupt the normal 24-hour pattern of light and dark and is likely to affect the natural behaviour of bats. Bright light may reduce social flight activity or restrict access to foraging areas causing bats to move away from the light area. Studies have shown that in extreme cases continuous lighting can sometimes create barriers which some bat species will not cross. Lighting can be particularly harmful if used near high value foraging and commuting habitat such as woodland edges, hedgerows or rivers.

It is recommended that directional lighting is used to avoid illuminating habitat that could be utilised by bats. The Application Site has very low value for foraging bats, but some habitat features provide some limited opportunities for commuting and foraging bats, including the boundary hedge and trees along the entrance driveway. External lighting in the vicinity of these areas should be designed to avoid excessive light spill, which could disrupt bats. However, it should be highlighted that any impacts from light spill at this site are likely to be negligible due to the absence of high value foraging or commuting habitat for bats within the site.

Great Crested Newts

Due to the confirmed presence of great crested newts within the pond at the site it will be necessary to obtain a protected species mitigation licence prior to the commencement of works. Based on the size of the site and the small scale of the actual development proposals it is recommended that a District Level Licence is obtained from Natural England.

The DLL enquiry should be submitted and the Impact Assessment and Conservation Payment Certificate (IACPC) agreeing the conservation payment must be signed by the client and Natural England prior to submission to the LPA in support of the planning application.

Following receipt of planning the full licence can be applied for and issued by Natural England following their receipt of the agreed conservation payment.

The Pond is not within the development boundary for either the single dwelling or the three-dwelling development site and as such will be retained. The DLL will be assessed and the IACPC will be calculated on the basis of the pond being retained and protected. As such, the pond must be retained in perpetuity and maintained as a suitable breeding pond for great crested newts. Fish must never be introduced as this would be devastating to the great crested newt population within the pond.

Birds

Any clearance of suitable nesting vegetation such as scrub, trees or hedgerow should be undertaken outside of the bird nesting season (from 1st March to the 31st August, inclusive) where appropriate. If this is not possible a detailed inspection for nesting birds should be carried out by a suitably qualified ecologist no more than 48 hours prior to removal of vegetation capable of supporting nesting birds. Any active nests found must be retained with an appropriate buffer until young birds have fledged, and the nest is no longer in use. It should be noted that the nesting bird check is only appropriate for small areas of nesting habitat.

Hedgehogs

Consideration should be given to hedgehogs during construction and hedgehog friendly features included into the design of the development. Hedgehog highways should be maintained between gardens through installation of hedgehog tunnels or simple gaps in any new fences.

4.4 Biodiversity Net Gain (BNG)

The design of the site must consider the requirement under the Environment Act 2021 to incorporate a mandatory 10% Biodiversity Net Gain demonstrable through the DEFRA metric. This requirement is due to be included in Schedule 7A of the Town and Country Planning Act 1990 as introduced by Schedule 14 of the Environment Act 2021, once published by DEFRA's Secretary of State. This will become mandatory once it is laid before Parliament, expected to be January 2024, but is required as part of recent local planning policy updates.



4.5 Ecological Enhancement

The National Planning Policy Framework (NPPF) encourages developers to incorporate habitat enhancement measures into development projects with the aim of providing tangible benefits for wildlife and achieving no net loss or where possible an observed gain in biodiversity within an individual site. Where opportunities exist, an individual development may provide enhancements to biodiversity which contribute to wildlife and habitat connectivity in the wider area. Enhancements act to improve the quality of the habitat for the flora and fauna on and within the vicinity of the site, although these enhancements may also provide aesthetic appeal.

Possible opportunities to enhance the wildlife potential, appropriate to this site, are provided below. It is important that any measures adopted be clearly demonstrated to the Planning Authority through inclusion in design plans and accompanying documentation.

New hedgerow planting should be incorporated into the design for the development. Any new hedgerow planting should include native species only and utilise a minimum of five to seven woody species within each 30m section. Species should comprise approximately 65% hawthorn *Crataegus monogyna* with 35% being a mix of at least six other native hedging plants including field maple *Acer campestre*, blackthorn *Prunus spinosa*, beech *Fagus sylvatica*, willow *Salix* spp., wild privet *Ligustrum vulgare*, hornbeam *Carpinus betulus*, hazel, dogwood, wayfaring tree *Viburnum lantana*, guelder rose *Viburnum opulus*, crab apple *Malus sylvestris*, spindle *Euonymus europaea*, dog rose, field rose *R. arvensis* and elder *Sambucus nigra*.

Opportunities exist within the site to provide habitat for great crested newts. Woodpile refuges and a hibernaculum should be constructed adjacent to the pond to provide permanent secure refuge and hibernation sites for great crested newts and other amphibians known to be breeding in the pond.

Small passerine nest boxes should be installed on trees within and adjacent to the Application Site to provide suitable nesting habitat for a range of common garden bird species. A combination of at least 6No. standard hole-fronted and open-fronted boxes would provide a variety of nesting locations for common and widespread garden species including blue tit, great tit, robin, blackbird, wren and chaffinch.

Bat boxes such as the Schwegler 1FR bat tube and the Schwegler Brick Box Type 27 or other integrated bat boxes such as those supplied by birdbrickhouses (<http://www.birdbrickhouses.co.uk/brick-nesting-boxes/bat-box>) provide opportunities for bats to roost in specially made boxes designed to be built into the external walls of the new dwelling. The boxes are very discrete and require no maintenance. At least one box should be installed on each of the new dwellings at locations advised by the project ecologist.

At least one house sparrow box should be installed on each of the new dwellings. Integrated boxes produced by birdbrickhouses or Schwegler would be the most appropriate option. Alternatively, an externally mounted house sparrow terrace would be a suitable alternative. Any exterior boxes must be affixed securely to deter removal or tampering in the future.

Swift boxes should be installed on any new dwellings of at least two-storeys within the site. Integrated boxes should be installed during construction at approximately 5m above ground level and at appropriate locations advised by an ecologist. It is recommended that the S Brick produced by Action for Swifts (<https://www.actionforswifts.com/galvanised-steel-s-brick>) or boxes produced by birdbrickhouses (<http://www.birdbrickhouses.co.uk/brick-nesting-boxes/nesting-boxes/>) are used on dwellings with exposed brickwork as they can be faced with the bricks used in construction. If the building is to be rendered, then Schwegler swift bricks or Ibstock swift bricks would be suitable alternatives.

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Appendix 1: Site Plans

Figure 1: Phase 1 Habitat Plan





Appendix 2: Photographs



Photograph 1.
View across main part of site showing semi-improved grassland lawn.



Photograph 2.
Rows of spring bulbs planted in the lawn.



Photograph 3.
Strip of grassland with floral diversity likely to be established from over seeding.



Photograph 4.
Existing entrance driveway.



Photograph 5.
Non-native Leyland cypress hedge along site boundary.



Photograph 6.
Pond 1 within the property boundary.

Appendix 3: Legislation

Relevant Legislation

Please note: This section contains key details of legislation and planning policy applicable in England and Wales only (i.e. not including the Isle of Man, Scotland, Northern Ireland, the Republic of Ireland or the Channel Islands) and does not provide full details. It is provided for general guidance only. While every effort has been made to ensure accuracy, this section should not be relied upon as a definitive statement of the law. Further information can be obtained from the relevant authorities.

National Legislation: Species

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

The Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019 provides safeguards for European Protected Sites and Species (as listed in the Habitats Directive) and was transferred directly into UK law, thereby continuing the same provision for European protected species, licensing requirements, and protected areas after leaving the European Union.

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 interpret the Birds Directive and Habitats Directive into English and Welsh law with appropriate amendments introduced following the removal of the UK from the European Union in January 2021.

Explanatory notes relating to species protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (which includes smooth snake, sand lizard, great crested newt and natterjack toad, all bat species, otter, dormouse and some plant species) are given below and consider the case in England only, with Natural England given as the appropriate nature conservation body. These should be read in conjunction with the relevant species sections that follow.

In the legislation, the term 'deliberate' is interpreted as being somewhat wider than intentional and may be thought of as including an element of recklessness.

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 does not define the act of 'migration' and therefore, as a precaution, it is recommended that short distance movement of animals for e.g. foraging, breeding or dispersal purposes, are also considered.

In order to obtain a European Protected Species Mitigation (EPSM) licence, the application must demonstrate that it meets the following three 'tests':

- (i) the action(s) is(are) necessary for the purpose of preserving public health or safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequence of primary importance for the environment;
- (ii) that there is no satisfactory alternative; and
- (iii) that the action authorised will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range.

The Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) is a fundamental piece of national legislation which implements the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and implements the species protection obligations of Council Directive 2009/147/EC (formerly 79/409/EEC) on the conservation of wild birds (EC Birds Directive) in Great Britain. Various amendments have been made to the Wildlife & Countryside Act 1981 including the Countryside and Rights of Way (CROW) Act (2000).

Other Legislation

Other legislative Acts affording protection to wildlife and their habitats include:

- Deer Act 1991
- Countryside and Rights of Way (CROW) Act 2000
- Natural Environment & Rural Communities (NERC) Act 2006

- [REDACTED]
- Wild Mammals (Protection) Act 1996.

Species and species groups that are protected or otherwise regulated under the aforementioned domestic and European legislation, and that are most likely to be affected by development activities, include herpetofauna (amphibians and reptiles), [REDACTED] bats, birds, dormouse, invasive plant species, otter, plants, red squirrel, water vole and white clawed crayfish.

Wild Mammals (Protection) Act 1996

Under the Wild Mammals (Protection) Act 1996 all wild mammals are protected against intentional acts of cruelty under the above legislation. It is an offence to:

- Mutilate, kick, beat, nail or otherwise impale, stab, burn, stone, crush, drown, drag or asphyxiate any wild mammal with intent to inflict unnecessary suffering.

To avoid possible contravention, due care and attention should be taken when carrying out works (for example, operations near nests or burrows) with the potential to affect any wild mammal in this way, regardless of whether they are legally protected through other conservation legislation or not.

Bats

All species of bat are fully protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 which prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species (e.g. all bats)
- Deliberate disturbance of bat species as:
 - a) to impair their ability:
 - (i) to survive, breed, or reproduce, or to rear or nurture young;
 - (ii) to hibernate or migrate
 - b) to affect significantly the local distribution or abundance of the species
- Damage or destruction of a breeding site or resting place
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

Bats are also protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

Implication for development works

For works liable to affect a bat roost or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate), a European Protected Species Mitigation (EPSM) Licence, issued by the relevant countryside agency (e.g. Natural England), will be required. The licence is to allow



derogation from the relevant legislation and to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.

Though there is no current case law the legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded de facto protection, for example, where it can be proven that removal of such features may have a major impact to maintaining the viability of a bat roost⁶.

Birds

With certain exceptions, all wild birds, their nests and eggs are protected under Sections 1-8 of the Wildlife and Countryside Act 1981 (as amended). Among other things, this makes it an offence to:

Intentionally kill, injure or take any wild bird;

Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built;

Intentionally take or destroy an egg of any wild bird;

Sell, offer or expose for sale, have in his possession or transport for the purpose of sale any wild bird (dead or alive) or bird egg or part thereof.

Certain species of bird, for example the barn owl, black redstart, hobby, bittern and kingfisher receive additional special protection under Schedule 1 of the Act and Annex 1 of the European Community Directive on the Conservation of Wild Birds (2009/147/EC). This affords them protection against:

Intentional or reckless disturbance while it is building a nest or is in, on or near a nest containing eggs or young;

Intentional or reckless disturbance of dependent young of such a bird.

Implication for development works

Works should be planned to avoid the possibility of killing or injuring any wild bird, or damaging or destroying their nests, in order to avoid breaching the Wildlife and Countryside Act 1981 (as amended). To reduce the likelihood of nest destruction in particular, work should be undertaken outside the main bird breeding season (March to September⁷). Where this is not achievable any areas of habitat suitable for birds must be thoroughly checked for nests prior to vegetation clearance.

Species of bird listed on Schedule 1 are additionally protected against disturbance during the breeding season. It will therefore be necessary to ensure that no potentially disturbing works are undertaken in the vicinity of the nest. The most effective way to avoid disturbance is to postpone works until the young have fledged. If this is not achievable, it may be possible to maintain an appropriate buffer zone or standoff around the nest.

Herpetofauna (Amphibians and Reptiles)

Through their inclusion EPS under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, the sand lizard *Lacerta agilis*, smooth snake *Coronella austriaca*, natterjack toad *Epidalea calamita* and great crested newt *Triturus cristatus* receive full protection. The pool frog *Pelophylax lessonae* is also afforded full protection under the same legislation. Regulation 41 prohibits:

Deliberate killing, injuring or capturing of species listed on Schedule 2

Deliberate disturbance of any Schedule 2 species as:

6 Garland & Markham (2008) Is important bat foraging and commuting habitat legally protected? Mammal News, No. 150. The Mammal Society, Southampton.

7 It should be noted that this is the main breeding period. Breeding activity may occur out of this period (depending on the particular species and geographical location of the site) and as such due care and attention should be given when undertaking potentially disturbing works at any time of year.

Preliminary Ecological Appraisal

- a) to impair their ability:
 - (i) to survive, breed, or reproduce, or to rear or nurture young;
 - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate
- b) to affect significantly the local distribution or abundance of the species

- Deliberate taking or destroying of the eggs of a Schedule 2 species
- Damage or destruction of a breeding site or resting place
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

With the exception of the pool frog, these species are also currently listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

Other native species of herpetofauna are protected solely under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended). Species such as the adder *Vipera berus*, grass snake *Natrix natrix*, common lizard *Zootoca vivipara* and slow-worm *Anguis fragilis* are listed in respect to Section 9(1) & (5). For these species, it is prohibited to:

- Intentionally (or recklessly in Scotland) kill or injure these species
- Sell, offer or expose for sale, possess or transport for purpose of sale these species, or any part thereof.

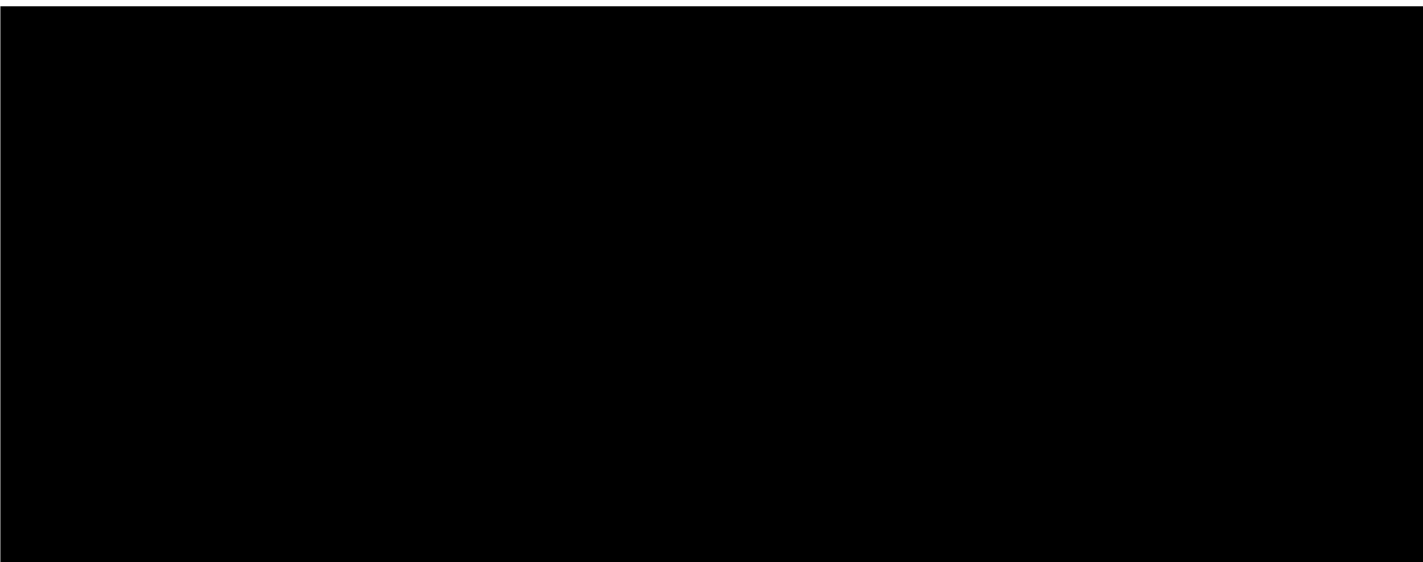
Common frog *Rana temporaria*, common toad *Bufo bufo*, smooth newt *Lissotriton vulgaris* and palmate newt *L. helveticus* are listed in respect to Section 9(5) only which affords them protection against:

- Sale, offering or exposing for sale, possession or transport for the purpose of sale.

Implication for development works

A European Protected Species Mitigation (EPSM) Licence issued by the relevant countryside agency (e.g. Natural England) will be required for works liable to affect the breeding sites or resting places of those amphibian and reptile species protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (sand lizard, smooth snake, natterjack toad, great crested newt and pool frog). A licence will also be required for operations liable to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate). The licences are to allow derogation from the relevant legislation but also to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.

Although not licensable, appropriate mitigation measures may also be required to prevent the intentional killing or injury of adder, grass snake, common lizard and slow worm, thus avoiding contravention of the Wildlife and Countryside Act 1981 (as amended).





Invasive Plant Species

Certain species of plant, including Japanese knotweed *Fallopia japonica*, giant hogweed *Heracleum mantegazzianum* and Himalayan balsam *Impatiens glandulifera* are listed on Part II of Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) in respect to Section 14(2). Such species are generally non-natives whose establishment or spread in the wild may be detrimental to native wildlife. Inclusion on Part II of Schedule 9 therefore makes it an offence to plant or otherwise cause these species to grow in the wild.

Implication for development works

Although it is not an offence to have these plants on your land, it is an offence to cause these species to grow in the wild. Therefore, if they are present on site and development activities (for example movement of spoil, disposal of cut waste or vehicular movements) have the potential to cause the further spread of these species to new areas, it will be necessary to ensure appropriate measures to prevent this prior to the commencement of works.

International and National Legislation: Habitats

Statutory Designations: International

Special Protection Areas (SPAs) and Special Areas of Conservation (SACs)

Special Protection Areas (SPAs), together with Special Areas of Conservation (SACs) form the Natura 2000 network in Europe (National Site Network in the UK). The Government was obliged to identify and classify SPAs under the EC Birds Directive (Council Directive 2009/147/EC (formerly 79/409/EEC)) on the Conservation of Wild Birds) and these sites have been retained within UK law despite the removal of the UK from the European Union via The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

- ***Special Protection Areas*** are areas of the most important habitat for rare (listed on Annex I of the Directive) and migratory birds within the UK and Europe. Protection afforded SPAs in terrestrial areas and territorial marine waters out to 12 nautical miles (nm) is given by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) provide a mechanism for the designation and protection of SPAs in UK offshore waters (from 12-200 nautical miles (nm)).
- ***Special Areas of Conservation*** are areas which have been identified as best representing the range and variety of key habitats and rare (non-bird) species listed on Annexes I and II of the Directive. The Government is still obliged to identify and designate SACs under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 whereby the EC Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora) was incorporated fully into the UK legislation despite the removal of the UK from the European Union. SACs in terrestrial areas and territorial marine waters out to 12 nm are protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) provide a mechanism for the designation and protection of SACs in UK offshore waters (from 12-200 nm).

Ramsar sites

Ramsar sites are designated under the Convention on Wetlands of International Importance. The Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources, in particular it recognises wetlands as ecosystems that are globally important for biodiversity conservation. Wetlands can include areas of marsh, fen, peatland or water and may be natural or artificial, permanent or temporary. Wetlands may also incorporate riparian and coastal zones adjacent to the wetlands. Ramsar sites are underpinned through prior notification as Sites of Special Scientific



Interest (SSSIs) and as such receive statutory protection under the Wildlife & Countryside Act 1981 (as amended) with further protection provided by the Countryside and Rights of Way (CROW) Act 2000. Policy statements have been issued by the Government in England and Wales highlighting the special status of Ramsar sites. This effectively extends the level of protection to that afforded to sites which have been designated under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. (e.g. SACs & SPAs).

Statutory Designations: National

Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNR)

Sites of Special Scientific Interest are nationally important areas of special scientific interest, designated for their flora, fauna, or geological or physiographical features, under the National Sites and Access to the Countryside Act 1949 and latterly the Wildlife & Countryside Act 1981 (as amended). National Nature Reserves are declared by the countryside agencies under the same legislation. As well as underpinning other national designations the system also provides statutory protection for terrestrial and coastal sites which are important within a European context (National Site Network) and globally (such as Wetlands of International Importance). See subsequent sections for details of these designations. Improved provisions for the protection and management of SSSIs have been introduced by the Countryside and Rights of Way Act 2000 (in England and Wales).

Statutory Designations: County

Local Nature Reserves (LNRs)

LNRs are statutory sites of lower conservation value designated under national legislation. LNR designation is declared for sites holding special wildlife or geological interest at a local level and are managed for nature conservation and provide opportunities for research and education and enjoyment of nature.

Non-Statutory Designations

Non-statutory sites designated under local legislation are areas considered to be of local conservation interest. These may be designated by local authorities as **Local Wildlife Sites (LWS)**, also known as **County Wildlife Sites (CWS)**, **Local Nature Conservation Sites (LNCS)**, **Sites of Biological Importance (SBIs)** or **Sites of Importance for Nature Conservation (SINCs)**. May vary between counties.

Together with the statutory designations, these are defined in local and structure plans under the Town and Country Planning system and are a material consideration when planning applications are being determined. The criteria for designation and the level of protection afforded to these sites through local planning policies and development frameworks may vary between counties.

National Planning Policy

The National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) replaced Planning Policy Statement (PPS9) in April 2012 as the key national planning policy concerning nature conservation. The NPPF emphasises the need for suitable development and specifies the need for protection of designated sites and priority habitats and priority species. An emphasis is also made for the need for ecological networks via preservation, restoration and re-creation. The protection and recovery of priority species – those listed as UK Biodiversity Action Plan priority species – is also listed as a requirement of planning policy. The NPPF was updated in February 2019 and now includes a presumption in favour of providing a net gain in biodiversity as opposed to a 'no net loss' as was previously the policy.

In determining a planning application, planning authorities should aim to conserve and enhance biodiversity by ensuring that:

- Designated sites are protected from adverse harm;

- Planning permission is refused where significant harm from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for;

- Opportunities to incorporate biodiversity in and around developments are required and a net gain in biodiversity through enhancement during development is now expected;



Planning permission is refused for development resulting in the loss or deterioration of irreplaceable habitats including aged or veteran trees and also ancient woodland; and

Protection should be given to biodiversity within areas designated for their landscape value to include National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty.

The Natural Environment and Rural Communities (NERC) Act 2006, (as amended)

The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 40 of the Act requires all public bodies to have regard to biodiversity conservation when carrying out their functions. The Act includes a list of habitats and species of 'principal importance for the conservation of biodiversity' in England. They are referred to in this report as *Species of Principal Importance and Habitats* or *Principal Importance*. Local Authorities are required to consider the needs of these habitats and species when making decisions such as on planning application. A developer must show that their protection has been adequately addressed within a development proposal.

Local Planning Authority's planning policy

The Local Planning Authority has policies relating to biodiversity conservation. For details, please see the planning website for the relevant authority.

Regional and Local BAPs

Many local authorities in the UK have also produced a local Biodiversity Action Plan (LBAP) at the County or District level. For details, please see the planning website for the relevant authority.

The Hedgerow Regulations 1997

The Hedgerow Regulations 1997 are intended to protect 'important' countryside hedgerows from destruction or damage by controlling their removal through a system of notification. A hedgerow is considered important if it:

has existed for 30 years or more; and

satisfies at least one of the criteria listed in Part II of Schedule 1 of the Regulations.

Schedule 1 criteria are related to the presence of protected plants and animals, or a high diversity of woody species and other qualifying features, e.g. connectivity to other hedgerows, woodlands or ponds, and the presence of standard trees.

Under the Regulations, it is a criminal offence to remove or destroy certain hedgerows without permission from the local planning authority. Countryside hedgerows are defined as those on or adjoining:

common land;

village greens;

SSSIs (including all NNRs, SPAs and SACs);

LNRs, and;

land used for agriculture, forestry or the breeding or keeping of horses, ponies or donkeys are covered by these regulations.

Garden hedgerows, e.g. within or marking the boundary of the curtilage of a dwelling-house, are exempt from The Hedgerow Regulations.



Appendix 4: Great Crested Newt eDNA Report



NATURE
METRICS
DNA-BASED MONITORING

Environmental DNA Report

Great Crested Newt



Order number	3001619
Prepared for	Riverdale Ecology Ltd
Project	Navarac Thurston Suffolk
Number of samples	1
Sampling dates	2023/05/04
Report ID	3CN-JSO574
Date of report	2023-05-25



Thank you for choosing NatureMetrics

Welcome to your report. We are the leading provider of powerful, scalable biodiversity data delivered using environmental DNA.

Your sample(s) have been processed in accordance with the protocol set out in Appendix 5 of Biggs et al. (2014). Results are based on the samples as supplied by the client to the laboratory. Incorrect sampling methodology may affect the results. Note that a negative result does not preclude the presence of GCN at a level below the [limits of detection](#).

A results interpretation guide and a glossary of terms highlighted throughout this report can be found at the end of the report.

GCN Detection Results

Pond ID	Inhibition	Degradation	GCN Score	Result
Navarac Pond 1	No	No	12	Positive

Sample Information

Pond ID	Kit ID	Sampling Date	Received Date
Navarac Pond 1	GCN-23-00020	2023/05/04	2023/05/16

Methods

eDNA was precipitated via centrifugation at 14,000 x g and then extracted using Qiagen DNeasy Blood and Tissue extraction kits. qPCR amplification was carried out in 12 replicates per sample, using GCN specific [primers](#) and [probe](#) (developed by Thomsen et al. (2012) and adopted by Biggs et al. (2014)), in the presence of [extraction negative controls](#), [qPCR positive controls](#), and [qPCR negative controls](#). A score is given for the number of positive replicates out of 12.

The qPCR method follows the recommendations set out by NatureMetrics for Natural England in the qPCR validation project and helps improve the reliability of the interpretation of the data.

Results from the GCN assay are considered to have a [high](#) confidence rating according to our [Validation Scale](#) (Harper et al. 2021).

The quality control methods exceed the requirements outlined in Appendix 5 of Biggs et al. (2014). These consist of the use of [kit blanks](#), additional [extraction negative controls](#), [qPCR negative controls](#), and [qPCR positive controls](#). Using these controls ensures assay performance is as expected and increases confidence in any weak or late amplifications.

The extraction and qPCR negative controls analysed alongside your samples showed no target



amplification and the triplicate positive controls performed as expected.

END OF REPORT

Contact: team@naturemetrics.co.uk



Result Interpretation Guide

- Positive** Target DNA has been detected in this sample, meaning that at least 1 of the 12 qPCR replicates has amplified. This is not a quantitative test, so you should not interpret a high eDNA score (e.g. 12/12) as necessarily indicating a larger population of GCN than a low eDNA score (e.g. 1/12).
- Negative** No target DNA has been detected in this sample, but the internal and external controls worked as expected. This tells us that if there had been GCN DNA in the sample, we would have detected it, so we can be confident in its absence from the sample provided.
- Inconclusive** No GCN DNA was detected in the sample, but the internal controls failed to amplify as expected. This means that any GCN DNA in the sample might also have failed to amplify properly, so we cannot have confidence in this negative result. Inconclusive results can be caused by the degradation of the DNA (as indicated by delayed or no amplification of the DNA marker contained in the ethanol in the kits) or by inhibition of the reaction (as indicated by delayed or no amplification of the DNA marker added in the lab) caused by certain chemicals or organic compounds that may be present in the water sample.
- Validation Scale** We have developed our own confidence assessment tool for qPCR eDNA assays that builds upon the Thalinger et al. (2021) validation scale and helps end-users to interpret the qPCR outputs but also contextualise these with the level of validation that the assay itself has gone through. Briefly, the level of confidence that can be assigned to results coming from an assay is derived from several validation steps:
- Basic analysis - can the assay work in principle on the computer?
 - PCR protocol - has the protocol been optimised in the lab?
 - Specificity analysis - has the assay been tested in the lab against other co-inhabiting and/or closely related species?
 - How extensively has the assay been tested with natural samples?
 - Have the theoretical limits of detection been established?
 - Have detection probabilities been estimated with extensive site occupancy modelling?
 - Have external factors affecting detectability been extensively tested (e.g. seasonality, spatial heterogeneity)?
- Low** Results from these assays are difficult to interpret with confidence. It is impossible to conclusively tell if the target species is present or absent because of the limited amounts of *in silico*, *in vitro*, and *in vivo* testing.
- Medium** Assays with this rating have been tested *in silico*, have optimised lab protocols, specificity and sensitivity tested in and out of the lab, but with no estimates of detection probabilities or extensive testing of external factors that may affect the detectability of the target. Positive results can be interpreted as meaning the target species' DNA is present (assuming the correct sampling conditions), but negative results could mean that the target is absent or that external



factors such as ecology, seasonality, and spatial scales are influencing the detections.

- High

High rating assays have everything that a Medium assay has, in addition to site occupancy modelling and extensive testing of external effects such as ecological, temporal and spatial factors. Positive results can be conclusively interpreted, and negative results can be interpreted as meaning the target species' DNA is absent (assuming the correct sampling conditions). In some instances, a probability of target species presence at a site and in a sample can be given.

Glossary

Controls

Controls are used to monitor both the performance of the assays but also any contamination. Controls are treated in the same way as a normal sample. This is particularly important given the sensitivity of eDNA qPCR methods. Our full complement of controls enables us to fully monitor the whole GCN eDNA process from kits to data.

Kit blank

Used to determine if the kits are contaminated but also to monitor the early stages of the pipelines, e.g. sample reception. These samples also act as uninhibited samples that can be used as a baseline to compare against. This is an additional control not specifically mentioned in the Biggs et al. (2014) protocol.

Extraction negative

Extraction blank. Used to monitor potential contamination during the DNA extraction process.

qPCR negative

Template negative control. Used to monitor potential contamination during the qPCR setup process. For every qPCR reaction, we include more qPCR negative controls than are prescribed in the Biggs et al. (2014) protocol.

qPCR positive

Used to determine whether the qPCR run performed as expected. In addition to the 4 standard dilutions prescribed by the Biggs et al. (2014) protocol, we include an additional standard dilution and amplify all standards in triplicate. The increased number of standard dilutions and replicates allow us to generate standard curves to assess run performance and assay sensitivity.

Limit of detection

The lowest standard positive control concentration at which 95 % of technical replicates amplify. Target amplification below the LOD cannot automatically be considered as negative but should be further investigated as spurious amplifications are more prevalent at these low concentrations.

eDNA

Short for 'environmental DNA'. Refers to DNA deposited in the environment through excretions and secretions, such as mucus, skin cells, saliva, faeces, urine etc. This can be collected in environmental samples (e.g. water, sediment) and used to identify the organisms that it originated from. eDNA in water is broken down by environmental processes over a period of days to weeks. It can travel some distance from the point at which it was released from



the organism, particularly in running water. eDNA is sampled in low concentrations and can be degraded (i.e. broken into short fragments), which limits the analysis options.

Inhibitors

Chemicals/compounds that reduce or prevent DNA amplification, potentially resulting in false-negative results. Common inhibitors include tannins, humic acids and other organic compounds. Inhibitors can be overcome by either diluting the DNA (and the inhibitors), but dilution carries the risk of reducing the DNA concentration below the limits of detection.

qPCR

Stands for 'quantitative PCR'. A PCR reaction incorporating a coloured dye that fluoresces during DNA amplification, allowing a machine to track the progress of the reaction. Often used with species-specific primers and probe where amplification is used to infer the presence of the target species' DNA in the sample. If the species is not present in the sample, no fluorescence will be detected.

Primers

Short sections of synthesised DNA that bind to either end of the DNA segment to be amplified by qPCR.

Probe

A short section of synthesised DNA that binds to a specific section of the target species' DNA within the section flanked by the primers. The probe is designed to be totally specific to that species. The probe is labelled such that it fluoresces during amplification, which is used to infer the presence of the target species' DNA in the sample.

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