



The Sizewell C Project

6.6 Volume 5 Two Village Bypass Chapter 7 Terrestrial Ecology and Ornithology Appendix 7A Ecological Baseline and Method Statements

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VOLUME 5, CHAPTER 7,
APPENDIX 7A – ECOLOGICAL BASELINE AND METHOD
STATEMENTS

Documents included within this Appendix are as follows:

ANNEX 7A.1 - FIGURES (provided separately)

ANNEX 7A.2 - DESK STUDY

ANNEX 7A.3 - PRIMARY DATA

ANNEX 7A.4 - BIODIVERSITY NET GAIN REPORT

ANNEX 7A.5 - DRAFT PROTECTED SPECIES LICENCE

APPLICATIONS:

- **ANNEX 7A.5A BADGER METHOD STATEMENT**
(CONFIDENTIAL, provided separately)

- **ANNEX 7A.5B WATER VOLE METHOD STATEMENT**

ANNEX 7A.6 - NON-LICENSABLE METHOD STATEMENTS:

- **ANNEX 7A.6A - BATS**

- **ANNEX 7A.6B - GREAT CRESTED NEWTS**

- **ANNEX 7A.6C - OTTERS**

- **ANNEX 7A.6D - REPTILES**

NOTE:

Please note that the red line boundary used in figures within this document may have since been amended, and therefore does not reflect the boundaries in respect of which development consent has been sought in this application. However, the amendment to the red line boundary does not have any impact on the findings set out in this document and all other information remains correct.



VOLUME 5, CHAPTER 7, APPENDIX 7A: ECOLOGICAL BASELINE

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Executive Summary

Baseline ecological conditions were assessed within habitat, species or species assemblage specific Zones of Influence (Zol) of two village bypass (hereafter referred to as the ‘proposed development’) and wider study area. For this Technical Appendix, the ‘site’ is defined as the area of land which will be used to construct the new two village bypass. The ecological baseline has specifically considered designated sites, plants and habitats, invertebrates, amphibians, reptiles, birds, bats and other terrestrial mammals.

A Zol of 5km was assigned for statutory designated sites, and a Zol of 2km was assigned to non-statutory designated sites, plants and habitats, invertebrates, reptiles, amphibians, birds and terrestrial mammals, which is considered to be conservative. Species-specific Zols were assigned to bat species, ranging from 10km (barbastelle (*Barbastellus barbastellus*)) to 2km (common pipistrelle (*Pipistrellus pipistrellus*)), based on the species’ Core Sustainment Zones (CSZs) as defined by the Bat Conservation Trust (BCT) (Ref 1.1).

Desk-study data from the Suffolk Biodiversity Information Service (SBIS) was obtained, within the relevant Zol, for notable species of conservation interest. A range of species considered to be typical of the habitats present within these areas was identified. Surveys were undertaken in 2019 and have been used to help assess the current baseline conditions, these included:

- extended Phase 1 habitat and protected species survey and hedgerow assessment;
- National Vegetation Classification (NVC) habitat survey of the ditches and the River Alde, as well as the floodplain grassland;
- great crested newt (*Triturus cristatus*) Habitat Suitability Index (HSI¹) and eDNA surveys of ponds;
- breeding bird surveys;
- invertebrate surveys within the area of River Alde, ditches, riparian vegetation and floodplain grassland;
- water vole (*Arvicola amphibius*) and otter (*Lutra lutra*) surveys;

¹ HSI refers to the suitability of ponds for supporting great crested newts, a score of excellent indicates that the pond is suitable to support great crested newts.

NOT PROTECTIVELY MARKED

- bat activity, emergence/re-entry and static detector surveys; and
- bat tree roost assessments.

Twelve statutory designated sites (one Ramsar site, two Special Protection Areas (SPAs), one Special Area of Conservation (SAC) and eight sites of Special Scientific Interest (SSSIs)) were identified within a 5km radius of the site boundary (several of these with over-lapping boundaries). Nine non-statutory County Wildlife Sites (CWS) were identified within a 2km radius of the site boundary.

The area within the site boundary predominantly consists of intensively managed arable fields with small areas of heavily grazed semi-improved grassland, improved floodplain grassland and interspersed patches of tall ruderal and scattered scrub. The arable fields are bounded by fences and hedgerows. Twenty-nine hedgerows are recorded within the site boundary, of which seven are classified as 'Important' under the Wildlife and Landscape Criteria of the Hedgerows Regulations (Ref 1.2). Several woodland blocks are identified, within and adjacent to the site, most notably an area of ancient, semi-natural woodland (Foxburrow Wood CWS). An area of poor floodplain grassland adjacent to the River Alde was identified for NVC assessment along with the River Alde and a number of ditches. Twenty-five water bodies (ponds) are identified within 500m of the site, none are within the site boundary.

One NVC community was recorded within the area of floodplain grassland comprising MG7 *Lolium perenne* - *Trifolium repens*. One NVC community was recorded within the River Alde comprising S14 *Sparganium erectum* swamp community. Two ditches comprising S7 - *Carex acutiformis* community and M23 - *Juncus effusus/acutiflorus* community were recorded and one ditch comprising S7 - *Carex acutiformis* community was recorded.

The site supports an assemblage of plants, invertebrates and terrestrial animals typical of the habitats present. A total of five invertebrate species of recognised conservation value were recorded within the site. Of these species great silver water beetle (*Hydrophilus piceus*) and a soldier beetle *Cantharis fusca* are considered to be characteristic species of higher quality floodplain grazing marsh habitats. Of the waterbodies surveyed, none are found to support great crested newts. The majority of habitat present within the site boundary (arable fields) is considered sub-optimal for reptiles; however, the field margins are considered suitable to support foraging and sheltering common reptile species. An incidental record of grass snake (*Natrix helvetica helvetica*) was noted in rough semi-improved grassland surrounding the nearby River Alde. This area is considered to provide suitable breeding and foraging opportunities for grass snake and other common reptiles species. The site supports a number of bird species including six species listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act (Ref 1.3) and Birds of Conservation Concern (BoCC) Red List species (Ref 1.4), one species listed under the BoCC Red List species (Ref 1.4), three species listed under Section 41 of the NERC Act (Ref 1.3) and BoCC Amber List species (Ref 1.4), and 11 BoCC Amber list species (Ref 1.4).

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Six species/species groups of bat have been recorded historically within the Zol. Four records of brown long-eared bat (*Plecotus auritus*) and unidentified *Pipistrellus* spp., roosts were identified within the Zol with the closest roost record located 695m north-east of the site within Benhall (a brown long-eared bat roost). One hundred and fourteen trees within the site boundary have been identified as having suitable features with potential to support roosting bats. Bat activity and static surveys recorded 13 bat species/species groups, predominantly common pipistrelle and soprano pipistrelle (*Pipistrellus pygmaeus*) activity with low levels of activity recorded of other species, this includes the nationally rare barbastelle.

An otter footprint was recorded along the River Alde within the site boundary and habitat suitable to support this species was identified within the site boundary. Numerous water vole field signs were also recorded along the River Alde and watercourse 12 within the site boundary, with both watercourses assessed as having low water vole populations densities.

Records of hedgehog have been identified within close proximity of the site boundary. A number of habitats within the site boundary have the potential to support hedgehog including the woodland blocks and hedgerows. Brown hare has been identified within the site boundary, with the arable and hedgerow habitat providing habitat suitable to support this species. A single entrance, well-used outlier badger (*Meles meles*) sett was identified within the site boundary. Habitat suitable to support water shrew was also recorded within the site boundary.

To ensure a robust Ecological Impact Assessment (EclA) process, species and habitats of conservation interest and/or legally protected or designated species and habitats within the relevant Zol of the site have been assessed to determine whether or not they would qualify as Important Ecological Features (IEFs) as defined in the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines on EclA (Ref 1.5). In addition, habitats and species have been assessed in accordance with the standard EIA methodology used elsewhere within the Environmental Statement (ES).

The CIEEM guidelines (Ref 1.5) define IEFs on the basis of nature conservation importance as well as legally protected and/or controlled species where there is the potential for a breach in the relevant legislation as a result of the proposed development. This baseline report focuses on those IEFs that have been assessed as being sufficiently important (in nature conservation terms) to be a material consideration in the planning decision. Those IEFs that qualify purely on the basis of legislative considerations are discussed in less detail and are addressed separately in the EclA.

On the basis of these criteria, the following species/habitats within the Zol of the proposed development have been classified as IEFs and scoped into the detailed assessment of the EclA:

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- The designated site Alde-Ore Estuary SPA, SAC, Ramsar and SSSI is an IEF at the international level under CIEEM Guidelines (Ref 1.5) and of high importance, following the EIA-specific assessment methodology.
- Foxburrow Wood CWS is an IEF at the national level under CIEEM guidelines (Ref 1.5) and of high importance, following the EIA-specific assessment methodology.
- Lowland mixed deciduous woodland is an IEF at the county level under CIEEM guidelines (Ref 1.5) and of medium importance, following the EIA-specific assessment methodology.
- Hedgerows are IEFs at the county level under CIEEM guidelines (Ref 1.5) and are of medium importance, following the EIA-specific assessment methodology.
- The River Alde is an IEF at the county level under CIEEM guidelines (Ref 7A.5) and of medium importance, following the EIA-specific assessment methodology.
- Floodplain grassland is an IEF at the county level under CIEEM guidelines (Ref 1.5) and of medium importance, following the EIA-specific assessment methodology.
- The invertebrate assemblage is an IEF at the county level under CIEEM guidelines (Ref 1.5) and of medium importance, following the EIA-specific assessment methodology.
- Breeding birds are an IEF at the local level under the CIEEM guidelines (Ref 1.5) and of low importance, following the EIA-specific assessment methodology.
- The bat assemblage is an IEF at the county level under the CIEEM guidelines (Ref 1.5) and of medium importance following the EIA-specific assessment methodology.
- Otter is an IEF at the local level under CIEEM guidelines (Ref 1.5) and of low importance, following the EIA-specific assessment methodology.
- Water vole is an IEF at the county level under CIEEM guidelines (Ref 1.5) and of medium importance, following the EIA-specific assessment methodology.

1 Introduction

1.1 Purpose of this appendix

1.1.1 SZC Co ² is proposing to build a new nuclear power station at Sizewell, known as Sizewell C. The new nuclear power station would be located on the Suffolk coast, north-east of the town of Leiston. The proposed site of Sizewell C lies within an area of high landscape and ecological sensitivity.

1.1.2 As part of the development proposals, a number of sites where associated development are required to support construction and operation of Sizewell C. These associated development sites are not located within the Sizewell C main development site (hereafter referred to as the ‘main development site’). Further detail is provided in **Volume 1, Chapter 2** of the **Environmental Statement (ES)**. Each of the associated development sites has been subject to a suite of ecological survey work and desk-study, and the ecological baseline has been developed for each associated development site. This appendix presents the ecological baseline for the two village bypass (hereafter referred to as the ‘proposed development’). The two village bypass site (herein referred to as the ‘site’) would bypass the villages of Farnham and Stratford St Andrew with a new single carriageway road to the south.

1.1.3 To carry out a robust Ecological Impact Assessment (EclA) of the Scheme for the Environmental Impact Assessment (EIA), it is first necessary to determine the ecological baseline describing the existing conditions for the habitats and species that could be affected by the proposed development. Baseline conditions were determined through a combination of a desk-study and field surveys undertaken in 2019.

1.1.4 This appendix to the proposed development **Chapter 7** of **Volume 5** of the **ES** presents the methodologies employed in carrying out the desk studies and detailed surveys (as well as the results of this work), and also evaluates the ecological features that could be affected. This then forms the ecological baseline for the impact assessment presented in **Chapter 7** of **Volume 5** of the **ES**.

1.2 Structure of this appendix

1.2.1 This appendix describes the ecological baseline conditions for designated habitats and sites, legally protected species and habitats, and species and habitats of conservation interest within the Zone of Influence (Zoi) of the

² NNB Generation Company (SZC) Limited

proposed development and wider study area. Zol, study area and survey area are all defined in **section 3**.

1.2.2 Within this appendix, the following terms are used to describe the biological data underpinning the description of baseline conditions:

- Desk-study – this refers to any third-party biological data held, for example, by the Suffolk Biodiversity Information Service (SBIS) or Suffolk Wildlife Trust (SWT), and that has been requested for the site and surrounding area.
- Primary data – this refers to survey work carried out in 2019 specifically targeted at informing the proposed development.

1.2.3 The remainder of this appendix is set out as follows.

- **Section 2** discusses the legislative framework of designated sites and legally protected and notable species and habitats;
- **Section 3** establishes the site boundary, Zol(s), study area and survey area for the proposed development;
- **Section 4** sets out the approach and methodology used for obtaining the desk-study information and primary data used to inform the assessment, as well as the results of this data acquisition. The primary data includes 2019 survey work, along with the justification for the scope and extent of the survey work undertaken. The detail of the desk-study information acquired is presented in **Annex 7A.2**. Detailed results of any 2019 surveys are presented in **Annex 7A.3**; and
- **Section 5** presents the collated baseline conditions for the relevant ecological receptors within the Zol. This section considers the nature conservation importance and legal protection for each ecological receptor and follows the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (Ref 1.5) to assess whether the ecological receptors considered can be categorised as Important Ecological Features (IEFs). Those IEFs which may be materially affected by the proposed development are taken forward for detailed assessment within the EclA. The value and sensitivity of the ecological features are also assessed in accordance with the wider EIA methodology used elsewhere within the ES.

1.2.4 Figures summarising the ecological baseline with regard to IEFs are presented in **Annex 7A.1**.

1.3 Legislative framework

a) Introduction

1.3.1 This section provides a summary of the legislative and policy context regarding designated sites, legally protected and/or controlled species, and other habitats and species of nature conservation importance that could be affected by the proposed development. The aim is to summarise the key implications of this legislation and policy, particularly with regard to how it influences the assessment of IEFs.

b) Designated Sites

1.3.2 Three classes of designated site are considered within this report.

- European designations: (Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites (an international designation));
- national designations: (Sites of Special Scientific Interest (SSSIs)); and
- non-statutory Local: (County) designations (County Wildlife Sites (CWSs)).

i. European designated sites

1.3.3 SPAs are classified in accordance with Article 4 of the European Community (EC) 'Birds Directive' (Ref 1.6). They are designated for the protection of rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly-occurring migratory species.

1.3.4 SACs are designated under the EC 'Habitats Directive' (Ref 1.7). Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annex I and II of the Directive. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).

1.3.5 Ramsar sites are wetlands of international importance designated under the Ramsar Convention (Ref 1.8). They often cover a similar area to that already designated as a SAC and/or SPA, where these sites support a notable amount of wetland habitat.

1.3.6 Before a site can be designated as a European site, it must first have been designated as a SSSI. In many cases, a single European designation may encompass multiple SSSIs. The constituent habitats and species listed

within the citations for European sites (often referred to as qualifying features) are considered to be of European/International importance for nature conservation.

ii. National designated sites

1.3.7 SSSIs are designated at the national (UK) level. Originally notified under the National Parks and Access to the Countryside Act (Ref 1.9), SSSIs were re-notified under the Wildlife and Countryside Act (W&CA) (Ref 1.10). Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act (Ref 1.11). The SSSI network in the UK provides statutory protection for the best examples of the country's flora, fauna, and geological or physiographical features.

1.3.8 These sites are also used to underpin other national and international nature conservation designations (SACs, SPAs, Ramsar sites and National Nature Reserves (NNRs)). NNRs are declared by the national statutory nature conservation agencies under the National Parks and Access to the Countryside Act (Ref 1.9) and the W&CA (Ref 1.10).

1.3.9 The constituent habitats and species listed within SSSI and/or NNR citations are of national importance for nature conservation.

iii. Local designated sites

1.3.10 CWSs are non-statutory sites supporting habitats and/or species considered to be rare or vulnerable across the county.

1.3.11 In Suffolk they are identified via a panel that includes technical expertise from Natural England, SWT, SBIS and Suffolk County Council (SCC). The panel evaluates proposed CWSs against agreed selection criteria to ensure that the sites meet the threshold for designation.

1.3.12 The constituent habitats and species listed within the citations of non-statutory designated sites are of county importance for nature conservation

c) Legally protected and controlled sites

1.3.13 Many species of animals and plants receive some degree of legal protection. For the purposes of this study, legal protection refers to species included on Schedules 1, 5 and 8 of the W&CA (Ref 1.10), species included on Schedules 2 and 5 of The Conservation of Habitats and Species Regulations (Ref 1.12); and badgers (*Meles meles*), which are protected under the Protection of Badgers Act (Ref 1.13).

1.3.14 Species that are fully protected under the W&CA (Ref 1.10) and/or Conservation of Habitats and Species Regulations (Ref 1.12), known as

protected species and European Protected Species (EPS), respectively, tend to be the focus of impact assessments and nature conservation action in the UK. However, the geographical scale at which they are important varies from species to species. Thus, the designation of a species as an EPS does not necessarily mean that all individuals of that species are of European importance.

- 1.3.15 In addition, Schedule 9 of the W&CA (Ref 1.10) lists controlled species of animals that it is an offence to release or allow to escape into the wild, as well as species of plant that it is an offence to plant or otherwise cause to grow in the wild. These species are clearly not of any nature conservation importance (other than with regard to the damage they can do to habitats and species of importance) and are therefore not a material consideration in planning decisions. They do, however, require careful consideration in the design and implementation of development.

d) **Priority habitats and species**

- 1.3.16 Public bodies have a duty to conserve biodiversity, in accordance with Section 40 of the Natural Environment and Rural Communities (NERC) Act (Ref 1.14). In addition to designated sites and legally protected/controlled species (discussed in **section 1.3b**) and **c**), a large number of habitats and species have been identified as a priority for biodiversity conservation within the UK. These features therefore also need due consideration in any EclA, although the level at which they are considered important will vary.

- 1.3.17 Priority habitats and species groupings considered within this report include:

- Habitats and species of principal importance for the conservation of biological diversity in England, as listed under Section 41 of the NERC Act (Ref 1.14).
- Species listed as being of conservation interest in the relevant UK Red Data Book (RDB) or Birds of Conservation Concern (BoCC) Red List (Ref 1.4).
- Nationally Scarce species, which are species recorded from 16-100 10x10km grid squares in the UK.
- Ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600, and which are listed within the relevant County Ancient Woodland Inventory).
- Habitats and species listed on Suffolk's Priority Species and Habitats list (Ref 1.15).

1.3.18 It should be noted that a large number of habitats and species will qualify under more than one of the above instruments and will also need to be considered at the correct spatial scale, so the process of assigning importance to these features is therefore a complex one. For example, listed under Section 41 of the NERC Act (Ref 1.14), habitats and species of principal importance for the conservation of biological diversity in England would be considered to be of national importance, reflecting the fact that these features have been assessed at a national level. However, this status relates to the total amount/population and distribution of habitat/species. The level of importance therefore pertains to the species/habitat concerned as a whole rather than to individual areas of habitat or species populations, which can be difficult to value objectively.

1.3.19 Within this ecological baseline report, detailed consideration is given to the importance assigned to each ecological feature (both habitats and species, and species assemblages), and this necessarily requires a degree of professional judgement.

1.4 Scope of the baseline

a) Introduction

1.4.1 This section defines the terms ‘site boundary’, ‘Zol’, and ‘study area’ and ‘survey area’, and the terminology and approach applied to the ecological data.

b) Site boundary

1.4.2 Please refer to **Figure 7.3** in **Annex 7A.1** for the site boundary used within the **Chapter 7** of **Volume 5** of the **ES** and this ecological baseline.

c) Defining the Zones of Influence

1.4.3 The Zol is defined as *‘the area over which ecological features may be affected by biophysical changes caused by a proposed project and associated activities’* (Ref 1.5).

1.4.4 It is not a simple task to define the extent of the Zol for the proposed development, as it follows that the Zol will be different for each ecological feature and with the biophysical change being considered. For example, disturbance to bird species caused by displaced recreation activities is likely to manifest itself over a larger area than disturbance caused to bird species arising from construction noise, which is likely to be limited to the area in close proximity to the construction activity.

1.4.5 An appropriate Zol has been defined for each ecological feature (species, assemblage or habitat) considered, using published information and

professional judgement. Given the discrete nature of the associated development site proposals and the likelihood that effects arising from the proposed development will be highly localised, 5km is considered to be a suitable maximum radius over which to consider potential effects, unless otherwise defined for specific species or species groups. Statutory designated sites (SPAs, SACs, Ramsar sites and SSSIs) have been considered within a 5km radius, and County Wildlife Sites (CWS) within a 2km radius.

1.4.6 For interest features of designated sites (i.e. species), only those designated sites falling within the Zol of that species or species assemblage are considered. For example, all statutory designated sites within 5km are considered, but only those falling within the 2km Zol for reptile species are assessed for their specific value to reptile species (i.e. presence of reptile species as a cited interest feature).

1.4.7 Full details of the Zol defined for the considered ecological features is provided in **Table 1.1**.

d) **Defining the study area and survey area**

1.4.8 The study area is the land within the site boundary and Zol (as defined within **Table 1.1** of the proposed development. This includes desk-study data and primary data (as defined in **section 1.2**). The study area will differ depending on the type of data and the data sets being considered.

1.4.9 Survey area is defined as *‘the geographical extent over which a particular field survey activity took place’*. Similarly, it follows that the survey area will differ depending on the type of survey being considered. For example, great crested newt surveys were undertaken within the site boundary and a 500m radius, whilst no surveys were undertaken for reptiles as the extended Phase 1 habitat and protected species survey identified habitats within the site boundary to be sub-optimal for these species. However, the extended Phase 1 habitat and protected species survey did include surveying for protected species, such as badger, within the site boundary.

1.4.10 Professional judgement has been used to ensure that sufficient ecological information has been obtained within the likely Zol that has been defined for each habitat and species assemblage. The study area for each habitat and species assemblage generally closely corresponds to the Zol, whilst the survey areas are more limited in extent, being targeted at key areas where it is envisaged effects on ecological receptors may manifest themselves. For some ecological features, it was not considered necessary to undertake specific field survey work. In these instances, the ecological baseline has been informed by desk-study obtained within the defined study area.

e) Defining Zol, study area and survey area for ecological features

1.4.11 **Table 1.1** defines the Zol, study area and survey area for the considered ecological features.

Table 1.1: Specific Zol, study area and survey areas for ecological features

Ecological Feature		Zol	Study Area	Survey Area
Designated Sites	Statutory designated	5km	5km	N/A
	Non-statutory designated	2km	2km	
Plants and Habitats		2km	2km	Within the site boundary
Invertebrates		2km	2km	General assessment included as part of extended Phase 1 habitat and protected species survey, targeted surveys of the River Alde, ditches, riparian vegetation and floodplain grassland
Reptile		2km	2km	Included as part of extended Phase 1 habitat and protected species survey
Amphibians		2km	2km	Within the site boundary and a 500m buffer area*
Birds		2km	2km	Within the site boundary
Bats	Daubenton's bat (<i>Myotis daubentonii</i>)	2km	2km	Within the site boundary
	Natterer's bat (<i>Myotis nattereri</i>)	4km	4km	
	Noctule (<i>Nyctalus noctula</i>)	4km	4km	
	Leisler's bat (<i>Nyctalus leisleri</i>)	3km	3km	
	Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	2km	2km	
	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	3km	3km	
	Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	3km	3km	
	Serotine (<i>Eptesicus serotinus</i>)	4km	4km	
	Barbastelle	10km	10km	
	Brown long-eared bat	3km	3km	

Ecological Feature	Zol	Study Area	Survey Area
(<i>Plecotus auritus</i>)			
Otters (<i>Lutra lutra</i>)	2km	2km	Within the site boundary and watercourses within 500m of the site boundary.
Water vole (<i>Arvicola amphibius</i>)	2km	2km	Within the site boundary and watercourses within 500m of the site boundary.
Other terrestrial mammals	2km	2km	Included as part of extended Phase 1 habitat and protected species survey.

* This is in accordance with standing advice from Natural England for assessing the impacts of developments on great crested newts (Natural England, 2015).

1.4.12 Consideration of the Zol, study area and survey area for bats has been undertaken on a species-specific basis to take into account species-specific variations in foraging and commuting distances. The Zol for bat species has therefore been determined on the basis of Core Sustenance Zones (CSZs), which have been defined by the Bat Conservation Trust (BCT) (Ref 1.1), through an extensive literature review. With reference to planning and development, the CSZ is defined as:

- The area surrounding the roost within which development work can be assumed to impact the commuting and foraging habitat of bats using the roost, in the absence of information on local foraging behaviour. This will highlight the need for species-specific techniques where necessary.
- The area within which mitigation measures should ensure no net reduction in the quality and availability of foraging habitat for the colony, in addition to mitigation measures shown to be necessary following ecological survey work.

1.4.13 CSZs may be used to indicate commuting and foraging areas used by bats in relation to a roost, and to interpret the results of data searches. The only variation that has been made from the use of CSZs is in the case of barbastelle. The CSZ determined for barbastelle is 6km; however, the Zol has been increased to 10km on the basis of the results of radio-tracking surveys across the main development site which showed barbastelle to be using larger areas in that location. (**Volume 2, Chapter 14, Appendix 14A8 - Bats**).

1.5 Desk-study/Baseline data

a) Approach and methodology

i. Desk-study

1.5.1 Records of protected or otherwise notable species of conservation interest within 2km of the site boundary were obtained from SBIS in June 2018.

1.5.2 Statutory and non-statutory designated sites were considered within the following radii of the Site:

- internationally (SPA, SAC and Ramsar) and nationally (SSSI and NNR) recognised sites within 5km; and
- locally recognised sites (CWS) within 2km.

1.5.3 Where designated sites were found to fall within the radii detailed above, citations were obtained from SBIS/the Joint Nature Conservation Committee (JNCC) (Ref 1.16) and Natural England's (Ref 1.17) websites. The citations were reviewed to allow for an assessment of the likely presence of any species or habitats of nature conservation importance which may pose a constraint to the proposed development.

1.5.4 Suffolk's Priority Species and Habitats list (Ref 1.15), and the habitats and species of principal importance included on the Section 41 list of the NERC Act (Ref 1.14), were also reviewed with reference to the habitats and species present, or likely to be present, within the site and wider study area.

ii. Primary data

1.5.5 Ecological surveys carried out in 2019 included:

- extended Phase 1 habitat and protected species survey and Hedgerow Assessment (May and June 2019);
- National Vegetation Classification (NVC) habitat surveys of the ditches and the River Alde, as well as the floodplain grassland either side (June 2019);
- breeding bird surveys (April to June 2019);
- bat surveys including walked transects, static deployment and tree assessments (April to October 2019);

- invertebrate surveys within the area of River Alde, ditches, riparian vegetation and floodplain grassland (June and August 2019);
- great crested newt (*Triturus cristatus*) eDNA and HSI surveys (April to June 2019) and;
- otter (*Lutra lutra*) and water vole (*Arvicola amphibius*) surveys (June to September 2019).

1.5.6 Full details of the methodologies employed can be found in **Annex 7A.3**.

b) Results

i. Designated sites

1.5.7 Twelve statutory designated sites (one Ramsar site, two SPAs, one SAC and eight SSSIs) were identified within a 5km radius of the site boundary. Details of these sites have been provided in **Table 1.2** whilst their locations are presented on **Figure 7.1** in **Annex 7A.1**.

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Table 1.2: Statutory sites located within 5km of the site

Site name	Distance from site	Reason for designation
Gromford Meadow SSSI	1.3km south-east	Gromford Meadow is a good example of an unimproved base-rich marsh on an alluvial soil with a high organic content. The sward is species-rich with Meadowsweet (<i>Filipendula ulmaria</i>) dominant.
Blaxhall Heath SSSI	2.4km south	Blaxhall Heath is one of the few fragments of the once extensive ‘Sandlings’ heath of coastal Suffolk. Of additional interest is a broad anti-glider ditch whose exposed sandy sides provide an excellent habitat for lizards and solitary bees. A number of heathland birds on the site including nightjar and tree pipit (<i>Anthus trivialis</i>).
Sandlings SPA	2.4km south	The SPA qualifies by supporting populations of European importance of the following species listed on Annex I of the Directive: nightjar (<i>Caprimulgus europaeus</i>) and woodlark (<i>Lullula arborea</i>).
Sandlings Forest SSSI	2.4km south	The main conservation interest of the forest lies in the open areas such as young plantations and rotational clear-fell which provide suitable habitat for breeding woodlark and nightjar (both included on Annex 1 of the European Directive 79/409/EEC Directive on the Conservation of Wild Birds).
Alde-Ore Estuary SPA, SAC, Ramsar site and SSSI	2.8km south-east	<p>This site stretches along the coast from Bawdsey to Aldeburgh and inland to Snape. The SAC is designated for Annex I habitats including estuaries, mudflats and sandflats not covered by seawater at low tide, and Atlantic salt meadows. The SPA qualifies by supporting populations of European importance of the following species listed on Annex I of the Directive: avocet (<i>Recurvirostra avosetta</i>), little tern (<i>Sterna albifrons</i>), ruff (<i>Calidris pugnax</i>), sandwich tern (<i>Thalasseus sandvicensis</i>), Lesser black-backed gull (<i>Larus fuscus</i>), Little tern (<i>Sternula albifrons</i>), Marsh harrier (<i>Circus aeruginosus</i>) and redshank (<i>Tringa totanus</i>).</p> <p>The Ramsar site is designated for supporting a number of nationally-scarce plant species and British RDB invertebrates, supporting a notable assemblage of breeding and wintering wetland birds and supporting a number of species/populations occurring at levels of international importance. This includes lesser black-backed gull during the breeding season, and pied avocet (<i>Recurvirostra avosetta</i>) and redshank during the winter.</p> <p>The SSSI is designated for supporting estuary and saline coastal lagoon habitats, SD1¹ - <i>Rumex crispus</i> - <i>Glaucium flavum</i> shingle communities, SD2 - <i>Cakile maritima-Honkenya peploides</i> strandline community</p> <p>Sheltered muddy shores (including estuarine muds) , SM14 - <i>Atriplex portulacoides</i> saltmarsh , vascular plant assemblage, fauna and invertebrate assemblages.</p>

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Site name	Distance from site	Reason for designation
Iken Wood SSSI	3.5km east south-	An interesting example of lowland coppice oakwood in Suffolk and has a distinctive flora typical of woods on light soils. The wood is almost entirely of the lowland Hazel (<i>Corylus avellana</i>)-Pedunculate Oak (<i>Quercus robur</i>) stand-type. Pedunculate Oak standards are dominant with scattered Silver Birch (<i>Betula pendula</i>), Holly (<i>Ilex aquifolium</i>) and Rowan (<i>Sorbus aucuparia</i>).
Snape Warren SSSI	3.2km east south-	Snape Warren is an important remnant of the once extensive 'Sandlings' heaths of coastal Suffolk. The site is a fine example of the lowland heathland of eastern England, which has been subject to considerable loss in the last 40 years. The vegetation is characterised by extensive areas of Calluna heath interspersed with acid grassland dominated by Common Bent (<i>Agrostis capillaris</i>). Trackways across the site support populations of the uncommon Mossy Stonecrop (<i>Crassula tillaea</i>). The site supports a number of reptile and bird species characteristic of heathland, including common lizard (<i>Zootoca vivipara</i>), adder (<i>Vipera berus</i>) and nightjar.
Tunstall Common SSSI	4.2km south	Tunstall Common is a fragment of the once extensive 'sandlings' heath of coastal Suffolk and is a good example of this dry lowland heath type. Most of the site is dominated by Heather (<i>Calluna vulgaris</i>), but Bell Heather (<i>Erica cinerea</i>) occurs locally especially in stands of young heather and on heather to grassland margins.
Cransford Meadow SSSI	4.9km north-west	This site consists of two unimproved species-rich meadows which have developed in a shallow valley close to the headwaters of a tributary of the River Alde. The site is notable for Sulphur Clover (<i>Trifolium ochroleucon</i>) and Lady's Mantle (<i>Alchemilla filicaulis vestita</i>) and is one of only two known sites in East Anglia for the latter species.

- 1.5.8 The development proposals will involve no direct land take from any of these statutory designated sites; however, the site is hydrologically linked to the Alde-Ore Estuary SPA, SAC, Ramsar and SSSI.
- 1.5.9 Nine non-statutory designated CWS are within 2km of the site boundary. Details of these sites are provided in **Table 1.3** and the location of these sites illustrated on **Figure 7.2** in **Annex 7A.1**.

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Table 1.3: Non-statutory designated sites within 2km of the site

Site name	Distance from site	Reason for designation
Foxburrow Wood CWS Also, an Ancient and Semi-Natural Woodland (ASNW) on the Ancient Woodland Inventory (AWI)	Adjacent to the site boundary	Foxburrow Wood is an ancient wood on sandy soils with a variety of tree species including oak (<i>Quercus</i> spp.), Ash (<i>Fraxinus excelsior</i>) and Beech (<i>Fagus sylvatica</i>) (some of which are very mature) in the canopy and also Hazel Field Maple (<i>Acer campestre</i>), Hawthorn (<i>Crataegus monogyna</i>) and Hornbeam (<i>Carpinus betulus</i>) coppice. In the shrub layer, Elder (<i>Sambucus nigra</i>) and Holly (<i>Ilex aquifolium</i>) are also present. The perimeter of the wood is marked by a ditch and bank boundary with one very old oak pollard on the northern edge. The ground flora includes ferns and carpets of Bluebell (<i>Hyacinthoides non-scripta</i>), with Dog's-mercury (<i>Mercurialis perennis</i>) dominant in parts.
Farnham Churchyard CWS	0.2km west	Farnham Churchyard provides a valuable refuge for wildlife in an intensively farmed landscape. In addition to many fairly common wildflowers the site also supports a number of scarce Suffolk plants. Orpine (<i>Sedum telephium</i>), which grows here in abundance is a declining species throughout Suffolk. Grass Vetchling (<i>Lathyrus nissolia</i>) which is scattered throughout the churchyard is also uncommon in Suffolk and is mainly restricted to a few sites on the coast.
Great Glemham Wood CWS Also an Ancient & Semi-Natural Woodland on the Ancient Woodland Inventory	1.3km north-west	Great Glemham Wood is a large woodland appearing in English Nature's Ancient Woodland Inventory. The composition of the tree species is typically ash, Field Maple (<i>Acer campestre</i>), and Hazel, although there are good areas of hornbeam in the western areas, with coppice stools up to six feet across. Despite this treatment much of the wood remains intact and there is an excellent ground flora. There are a number of ancient woodland indicator plants, such as Remote Sedge (<i>Carex remota</i>) and Wood-sedge (<i>Carex sylvatica</i>), Wood Spurge (<i>Euphorbia amygdaloides</i>) and Barren Strawberry (<i>Potentilla sterilis</i>).
Denney's Grove CWS	1.6km north-west	Denney's Grove is one of a number of small ancient woodlands situated in the Great Glemham area. The tree layer consists of oak (both Pedunculate Oak and Turkey Oak (<i>Quercus cerris</i>)), Ash, Field Maple and Hornbeam. Beneath the canopy is dense understorey composed mainly of Hazel and Hawthorn, with occasional Dogwood (<i>Cornus sanguinea</i>), Bramble (<i>Rubus fruticosus</i> agg.) and Elder. A Dog's-mercury woodland, the ground flora also contains a number of other plants including violet (<i>Viola</i> spp.), male fern (<i>Dryopteris</i> spp.), Selfheal (<i>Prunella vulgaris</i>) and wood sedge. The damp conditions of the woodland floor and numerous fallen trees provide suitable conditions for bryophytes and fungi to grow.
Great Wood CWS Also, an Ancient & Semi-Natural Woodland on the Ancient Woodland Inventory	1.1km west	Great Wood is an ancient woodland surrounded by a ditch and bank and includes internal ditches and banks. The structure is one of abandoned coppice with standards. The oak and Ash standards have grown very large and are shading the undergrowth; which is principally Hazel and Ash but with some Hornbeam, maple (<i>Acer</i> spp.) and willow (<i>Salix</i> spp.) also present. The rides have become overgrown, and no recent management has taken place. The ground

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Site name	Distance from site	Reason for designation
		flora is rich and a total of 87 species have been recorded. This includes Early-purple Orchid (<i>Orchis mascula</i>), twayblade (<i>Neottia</i> spp.) and Common Spotted-orchid (<i>Dactylorhiza fuchsii</i>), and a range of ancient woodland indicators.
Benhall Churchyard CWS	1.2km north	Benhall Churchyard provides a valuable refuge for plants and animals in an intensively farmed landscape. It is a good example of unimproved grassland (biodiversity priority habitat) supporting species such as Pignut (<i>Conopodium majus</i>), Bugle (<i>Ajuga reptans</i>), Lady's Bedstraw (<i>Galium verum</i>), Oxeye Daisy (<i>Leucanthemum vulgare</i>), Field Wood-rush (<i>Luzula campestris</i>), Pepper Saxifrage (<i>Silaum silaus</i>), Cowslip (<i>Primula veris</i>) and Primrose (<i>Primula vulgaris</i>). Slow-worms (<i>Anguis fragilis</i>) (biodiversity priority) have been seen.
Manor Farm Meadows CWS	600m east	These small wet meadows support a good wet grassland flora typical of lowland grazing meadows (biodiversity priority habitat). They are similar in composition to the larger Benhall Green Meadows to the north. With the latter, they form the only remaining areas of unimproved marsh in the Fromus Valley. Between the two meadows lies the sewage works. The southern meadow contains a richer flora with good colonies of Southern Marsh-orchids (<i>Dactylorhiza praetermissa</i>) and a greater diversity of marsh flowers. Typical wetland species include Brown Sedge (<i>Carex disticha</i>) and Hairy sedge (<i>Carex hirta</i>), Meadowsweet (<i>Filipendula ulmaria</i>), Ragged-Robin (<i>Silene flos-cuculi</i>) and Water Mint (<i>Mentha aquatica</i>). The floristic diversity has been maintained in the past by traditional grazing. Without such management it will become rank and overgrown and the diversity will decline. The wettest areas near the drains are fen with Common Reed (<i>Phragmites australis</i>), Reed Canary-grass (<i>Phalaris arundinacea</i>) and pond sedge (<i>Carex</i> spp.). They support good numbers of reed warbler (<i>Acrocephalus scirpaceus</i>) and sedge warbler (<i>Acrocephalus schoenobaenus</i>).
River Fromus Marshes CWS	1km south-east	River Fromus Marshes consists of a complex of different habitats bordering the River Fromus at Gromford. The west side of the river is generally drier and is composed of open areas dominated with Bracken (<i>Pteridium aquilinum</i>) and scattered oak standards. The banks of the watercourse are characterised by dense clumps of willow and old overhanging willows some of which require repollarding. The area is managed to promote wildlife conservation. The eastern side of the river in contrast is composed of wet marshland, old willows and willow/alder carr. One area of wet meadow adjacent to this site is Gromford meadow, which has been scheduled as a SSSI. The meadow situated to the south of the SSSI supports a similar species-rich flora. Amongst the many wildflowers growing here are Yellow-rattle (<i>Rhinanthus minor</i>), Ragged-Robin and Purple-loosestrife (<i>Lythrum salicaria</i>).
Benhall Green Meadows CWS	1.2km north-east	This series of meadows forms one of the largest remaining areas of flower-rich marsh in the Alde catchment. They are bordered by the River Fromus and contain a wide range of wet meadow plants. Wild Angelica (<i>Angelica sylvestris</i>), Brown sedge, Cuckooflower (<i>Cardamine pratensis</i>), Marsh Thistle (<i>Cirsium palustre</i>) and Ragged-Robin are abundant whilst Southern Marsh orchids and Greater Bird's-foot-trefoil (<i>Lotus pedunculatus</i>) are common. The ditches are not botanically rich, with Greater Pond-sedge (<i>Carex riparia</i>), Fool's-water-cress (<i>Apium nodiflorum</i>) and Lesser Water-

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Site name	Distance from site	Reason for designation
		parsnip (<i>Berula erecta</i>) dominating. Old records suggest there was a more diverse flora here in the past with species such as Bogbean (<i>Menyanthes trifoliata</i>) found in the pond on the green. The floristic diversity has been maintained in the past by traditional grazing.

- 1.5.10 The majority of the habitat within the site boundary is arable farmland. The non-statutory sites in **Table 1.3** support blocks of ancient woodland. Ancient woodland is targeted for action on Suffolk’s Priority Species and Habitats list (Ref 1.15).
- 1.5.11 The development proposals will involve no direct land take from any of these non-statutory designated sites.
- ii. Plants and habitats
- 1.5.12 The desk-study identified a number of records for plant species within 2km of the site. These records have been sorted by location to identify those recorded within or close to the site boundary. The results are presented in **Annex 7A.2** whilst a summary is presented below.
- 1.5.13 The plant species identified by the desk-study data can be divided into two broad categories
- Lesser Pondweed (*Potamogeton pusillus*) which is associated with aquatic habitats.
 - Meadow Saffron (*Colchicum autumnale*), Common Valerian (*Valeriana officinalis*) and Southern Marsh-orchid associated with marshy grassland.
- 1.5.14 None of these species were present within the site boundary.
- 1.5.15 Eight species of non-native invasive plant species listed under Schedule 9 of the W&CA (Ref 1.10) were also identified by the desk-study: Canadian Waterweed (*Elodea canadensis*); Nuttall’s Waterweed (*Elodea nuttallii*); Indian Balsam (*Impatiens glandulifera*), Himalayan Cotoneaster (*Cotoneaster simonsii*), Japanese Knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum mantegazzianum*), Japanese Rose (*Rosa rugosa*) and Yellow Archangel (*Lamiastrum galeobdolon subsp. Argentatum*). These non-native invasive plant species were not identified within or immediately adjacent to the site during surveys.
- 1.5.16 The Phase 1 habitat survey map and associated Target Notes (TNs) are presented in **Figure 7.3** in **Annex 7A.1**. TNs are described in **Annex 7A.3** and are not repeated in this document. Those hedgerows assessed against the Wildlife and Landscape criteria of the Hedgerows Regulations (Ref 1.2) are indicated by green ‘hedgerow numbers’ H1, H2 and so on. The results of this assessment are also presented in **Annex 7A.3**.
- 1.5.17 The site comprises predominately intensively managed arable fields with small areas of semi-improved grassland which has been heavily grazed by

cattle and horse paddocks, species-poor floodplain grassland which have been recently mown and interspersed patches of tall ruderal and scattered scrub. Floodplain grassland and arable field margins are a habitat listed under Suffolk's Priority Species and Habitats list (Ref 1.15).

- 1.5.18 Ten ditches were recorded within the site boundary. The majority of these ditches were predominantly dry at the time of survey. Species recorded within the ditches comprised of species commonly associated with ditch habitats including Common Reed, Reed Canary-grass, Fool's-water-cress, Hard Rush (*Juncus inflexus*), Soft-Rush (*Juncus effusus*), Water Mint and Creeping Bent (*Agrostis stolonifera*).
- 1.5.19 The arable fields are bounded by fences and hedgerows, with hedgerows present being classified as intact species-poor hedgerows, species-rich hedgerows with trees, and defunct species-poor hedgerows. Hedgerows H45, H46, H49, H50, H53, H61 and H66 are classed as 'Important' when assessed against the Wildlife and Landscape Criteria of the Hedgerows Regulations (Ref 1.2). Hedgerows are a Suffolk BAP priority habitat (Ref 1.18) and are listed under Section 41 of the NERC Act (Ref 1.14).
- 1.5.20 Eight blocks of woodland are present within and adjacent to the site boundary. Of particular note is Foxburrow Wood CWS (TN7 (**Figure 7.3** in **Annex 7A.1**) immediately to the east of the site (with a 15m buffer between the site and Foxburrow Wood CWS). This CWS is ancient woodland and recorded on the Ancient Woodland Inventory along with the connected Palant's Grove (also ancient woodland) further east. The woodland has a canopy of Field Maple Pedunculate Oak and Beech with an understory of Hazel and Elder (*Sambucus nigra*). The ground flora is dominated by native Bluebell, Red Campion (*Silene dioica*), Cleavers (*Galium aparine*), Ramsons (*Allium ursinum*) and Dog's Mercury (*Mercurialis perennis*).
- 1.5.21 On the southern boundary of the site is a young woodland block (TN2) (**Figure 7.3** in **Annex 7A.1**) Whin Covert, with a canopy of Beech, Sweet Chestnut and Alder and sparse understory. The ground flora consists of Bluebell, Cleavers, Red Campion, Ground Ivy (*Glechoma hederacea*) and Wood Sorrell (*Oxalis acetosella*).
- TN3 (Nuttery Belt), TN4 (The Belt), TN5, TN6 (Pond Wood), TN9 (**Figure 7.3** in **Annex 7A.1**) are all broadleaved woodland copses which support a similar suite of flora species as the woodland already described; a detailed description is given in **Annex 7A.3**. Lowland mixed deciduous woodland is a habitat listed under Suffolk's Priority Species and Habitats list (Ref 1.19) and is listed under Section 41 of the NERC Act (Ref 1.14);

- 1.5.22 A large number of mature trees and mature tree lines were recorded within the site boundary. The majority of species recorded comprise Ash and willow species (*Salix sp.*). Other species recorded included elm (*Ulmus sp.*), oak species (*Quercus sp.*), Sycamore (*Acer pseudoplatanus*), Beech, Horse-chestnut (*Aesculus hippocastanum*), Field Maple and Alder (*Alnus glutinosa*).
- 1.5.23 The River Alde was recorded towards the western extent of the site, running north to south. The river is slow flowing, with earth banks and emergent vegetation. The River Alde and adjacent floodplain grassland were subject to an NVC survey.
- 1.5.24 One NVC community was recorded within the area of floodplain grassland MG7 *Lolium perenne - Trifolium repens*. The grassland was mown short and comprised abundant Perennial Rye-grass (*Lolium perenne*) and White Clover (*Trifolium repens*) (**Figure 7.4 in Annex 7A.1**).
- 1.5.25 One NVC community was recorded within the River Alde (**Figure 7.4 in Annex 7A.1**) - S14 *Sparganium erectum* swamp community. The vegetation present within the southern five quadrats were assigned to the *Phalaris arundinacea* sub-community given the increased presence of Reed Canary-grass (*Phalaris arundinacea*) with relatively few forbe species, although, a higher abundance of Water Mint (*Mentha aquatica*) was recorded in some of the quadrats.
- 1.5.26 The vegetation present within the northern five quadrats were assigned to the *Sparganium erectum* sub-community due to the dominance of Branched Bur-reed (*Sparganium erectum*) and the absence of other species.
- 1.5.27 The bankside was dominated by tall ruderal species including False Oat-grass (*Arrhenatherum elatius*), Common Nettle (*Urtica dioica*), dock species (*Rumex sp.*), Reed canary-grass and Common Reed (*Phragmites australis*), with many areas having a thick layer of dead leaf litter.
- 1.5.28 Two NVC communities were recorded within Ditches 10 and 11 (**Figure 7.4 in Annex 7A.1**), S7 - *Carex acutiformis* community and M23 - *Juncus effusus/acutiflorus*. The ditches were shallow with little water present and evidence of poaching was recorded.
- 1.5.29 One community was recorded within Ditch 22 (**Figure 7.4 in Annex 7A.1**), S7 - *Carex acutiformis* community. The ditch contained slow flowing, shallow water. The bankside vegetation comprised predominately tall ruderal species.
- 1.5.30 The vegetation present within the S7 *Carex acutiformis* community comprised abundant Lesser Pond-sedge (*Carex acutiformis*). Other species associated with this community such as Soft-rush (*Juncus effusus*) and

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Water Mint were also present, albeit at lower frequencies. Although Lesser Pond-Sedge is a lowland species, this community is still considered uncommon in the south of Britain. This community is, however, degraded with other common species such as *Juncus* spp.

- 1.5.31 The vegetation present within the M23 - *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture community was dominated by Hard Rush (*Juncus inflexus*); however, other species such as Soft Rush associated with this community were also present in abundance.
- 1.5.32 Rivers and floodplain grassland are habitats listed under Suffolk's Priority Species and Habitats list (Ref 1.15) and are listed under Section 41 of the NERC Act (Ref 1.14);
- 1.5.33 Twenty-five water bodies (ponds) have been identified within 500m of the site (**Figure 7.6** in **Annex 7A.1**). None of these are within the site boundary. Ponds are a habitat listed under Suffolk's Priority Species and Habitats list (Ref 1.20) and are listed under Section 41 of the NERC Act (Ref 1.14).

iii. Invertebrates

- 1.5.34 The desk-study revealed six records of invertebrates within 2km of the site boundary. All invertebrates were over 1.3km away from the site except one record of grayling (*Hipparchia semele*) 650m away. Desk-study records revealed two butterfly species (grayling and small heath (*Coenonympha pamphilus*)) that are RDB listed species, listed under Section 41 of the NERC Act (Ref 1.14) and on Suffolk's Priority Species and Habitats list (Ref 1.15). All records of these species records were outside of the site boundary.
- 1.5.35 Targeted sampling of ditches and other waterbodies and riparian habitat was undertaken to assess the importance of the waterbodies within the study area for both aquatic and terrestrial invertebrates. Two survey visits were conducted (one in June 2019 and one in August 2019).
- 1.5.36 During surveys, an invertebrate assemblage broadly characteristic of coastal and floodplain grazing marshes of national importance, was recorded from the survey area around TM 36111 60423, located 500m north of the site, north of the A12. The survey area supported habitat classified as 'Coastal and floodplain grazing marsh'. This habitat is listed under Section 41 of the NERC Act (Ref 1.14) and on Suffolk's Priority Species and Habitats list (Ref 1.15) and forms part of a habitat corridor linking sites supporting important invertebrate species and assemblages in the wider landscape.
- 1.5.37 The 2019 invertebrate sampling reasonably accounted for the majority of terrestrial and aquatic fauna occurring within the survey area. The terrestrial dataset is arguably compromised to some extent by weather conditions during the first sampling event in particular and by wet ground conditions

during the second sampling event. In addition, the site was sampled over only two survey events, which may have compromised the coverage of recorded fauna with limited flight periods. Whilst this may be considered a lower priority than the aquatic habitats and associated wet and dry grassland habitats, species of higher conservation associated with floodplain trees and scrub may have been overlooked. Overall, the diversity of taxa recorded from both aquatic and terrestrial samples were well represented and the species assemblages recorded representative of the habitats present; however, certain taxa including notably, bees ants and wasps (*Aculeate Hymenoptera*) and soldierflies (*Stratiomyidae*) were poorly represented in the dataset. It is uncertain whether this was due to survey conditions, the limited number of sampling events over the season, or merely due to these groups being poorly represented on site.

1.5.38 The Site Quality Index (SQI) score³ recorded for the combined aquatic and terrestrial invertebrate fauna was 3.5, indicating a site of moderate invertebrate value; however, Community Conservation Index (CCI) scores⁴ for combined River Alde samples indicated high conservation value, whilst the drainage ditch network aquatic fauna was classed as being of moderate conservation value.

1.5.39 A total of five species of recognised conservation value were recorded during the 2019 surveys and are presented in **Table 1.4**. Of these species both the ‘Near Threatened’ (Ref 1.23) and nationally scarce Great Silver Water Beetle (*Hydrophilus piceus*) and a nationally scarce soldier beetle *Cantharis fusca* (Ref 1.24) were recorded and are considered to be characteristic species of higher quality floodplain grazing marsh habitats. The presence of these species, as well as some of the more local species also associated with such habitat, such as a species of water-scavenger beetle *Anacaena bipustulata* and a backswimmer *Notonecta viridis*, indicate the importance of the site as linkage habitat within the wider River Alde floodplain.

Table 1.4 Species of recognised conservation value recorded during the 2019 surveys

Species	Order	Conservation Status (as of 2019)
Great Silver Water Beetle (<i>Hydrophilus piceus</i>)	Coleoptera	Nationally Scarce; Near threatened (post-2001 IUCN criteria)
A linyphiid spider (<i>Palliduphantes insignis</i>)	Araneae	Nationally Scarce
A soldier beetle (<i>Cantharis fusca</i>)	Coleoptera	Nationally Scarce

³ Site Quality Index (SQI) scores are calculated to enable a semi-quantitative evaluation of invertebrate conservation value on a site-level. The method follows that used by Harvey (2014) (68).

⁴ Community Conservation Index (CCI) scores provide a means of assessing the conservation value of aquatic invertebrate assemblages. The method follows Chadd and Extence (2004) (68).

Species	Order	Conservation Status (as of 2019)
An opomyzid fly (<i>Geomyza subnigra</i>)	Diptera	Nationally Scarce
Cinnabar (<i>Tyria jacobaeae</i>)	Lepidoptera	S41 'research only'; Widespread

- 1.5.40 The results from analysis using Pantheon⁵ and an independent version of the SQI (Ref 1.21) indicated a rather unexceptional invertebrate fauna in the grassland assemblages including 'Tall herb and scrub' and to a lesser 'Short sward and bare ground' and wetland assemblages including 'Marshland', 'Peatland' and 'Flowing water' assemblages.
- 1.5.41 A separate evaluation of aquatic-only fauna using the CCI (Ref 1.22), indicated that the aquatic fauna of the River Alde was of 'high conservation value', with the drainage ditch network supporting aquatic species of only 'moderate conservation value'.
- 1.5.42 Of the five species of recognised conservation status recorded during the survey; two species, the 'Near Threatened' and nationally scarce Great Silver Water Beetle (Ref 1.23) and a nationally scarce soldier beetle *Cantharis fusca* (Ref 1.24) are considered to be characteristic species of higher quality floodplain grazing marsh habitats.
- 1.5.43 Overall, the habitat within the survey area should be considered overall, to be of county importance for invertebrates.

iv. Amphibians

- 1.5.44 There were two desk-study records of amphibians within 2km of the site boundary. Species recorded comprised common toad (*Bufo bufo*) (one record) and common frog (*Rana temporaria*) (one record), both of which were approximately 1.2km from the site boundary.
- 1.5.45 Suffolk is a stronghold for great crested newts, particularly in the north-east of the county, where there is a higher abundance of ponds (Ref 1.25). A review of Suffolk's Priority Species and Habitats list (Ref 1.15) identified great crested newts as priority species for conservation action in the county (Ref 1.25). Great crested newts are listed under Section 41 of the NERC Act (Ref 1.14) and protected under Schedule 5 of the W&CA (Ref 1.10), and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.12).
- 1.5.46 Arcadis identified 25 waterbodies within 500m of the site boundary. Access was not granted to six ponds for surveys. Ponds P023, P024, P025, P101, P102, P155, P156 and P157 were surveyed in 2016 for a previous element

⁵ Pantheon is the online invertebrate analytical recording and analytical tool developed by Natural England and the Centre for Ecology and Hydrology.

of the Sizewell C Project. These ponds were not subject to further surveys in 2019 as they are on the north side of the A12 which is now considered a barrier to great crested newt movement, therefore these were scoped out. HSI surveys were conducted for the remaining 11 ponds (P014, P015, P016, P017, P020, P021, P022, P077, P098, P162 and P300). Of these 11, eDNA for great crested newt surveys were undertaken on nine ponds, as at the time survey, one pond was dry, and one was not extant at the time of scoping.

Table 1.5 provides a summary of the habitat suitability of the ponds scoped into the 2019 surveys. The location of each pond is shown on **Figure 7.6 (Annex 7A.1)**.

Table 1.5: HSI for Ponds within 500m of the site boundary.

Pond ID	HSI score	Comments
P014	Good	None
P015	Dry	Dry pond, no survey undertaken
P016	Average	None
P017	Good	None
P018	Unknown	No Access
P019	Unknown	No Access
P020	Poor	None
P021	Below Average	None
P022	Poor	None
P023	Unknown	Scoped out – north of A12 and a barrier to great crested newt movements
P024	Unknown	Scoped out – north of A12 and a barrier to great crested newt movements
P025	Unknown	Scoped out – north of A12 and a barrier to great crested newt movements
P026	Unknown	No Access
P077	No Pond	No pond present at location e
P097	Unknown	No Access
P098	Below Average	None
P099	Unknown	No Access
P100	Unknown	No Access
P101	Dry	Scoped out for further HSI and eDNA surveys in 2016 due to being dry.

Pond ID	HSI score	Comments
P102	Dry	Scoped out for further HSI and eDNA surveys in 2016 due to being dry.
P155	Average	Farnham Pond F2 – scoped out of eDNA survey due to being north of the A12, HSI results from 2016.
P156	Good	Farnham Pond F1 – scoped out of eDNA survey due to being north of the A12, HSI results from 2016
P157	Unknown	Farnham Pond F11 – scoped out of eDNA survey due to being north of the A12, HSI results from 2016
P162	Poor	None
P300	Below Average	New pond identified in 2019

1.5.47 Great crested newt eDNA was not confirmed in any ponds surveyed in 2019. A summary of the survey results is presented in **Table 1.6**.

Table 1.6: Summary of amphibian surveys in 2019 (eDNA survey methods)

Pond	Date sampled	GCN detection	GCN score	Inhibition	Degradation
P014	15/05/2019	Negative	0	No	No
P098	15/05/2019	Negative	0	No	No
P020	16/05/2019	Negative	0	No	No
P021	16/05/2019	Negative	0	No	No
P022	16/05/2019	Negative	0	No	No
P162	16/05/2019	Negative	0	No	No
P016	28/05/2019	Negative	0	No	No
P017	28/06/2019	Negative	0	No	No
P300	28/06/2019	Negative	0	No	No

1.5.48 Six ponds (P018, P019, P026, P097, P099 and P100) were not surveyed due to access issues. The locations, habitat suitability and connectivity of these ponds to the site were examined so as to consider if there is any potential for great crested newts to be present.

- Pond P018 and P019 are in between Pond P020 and the cluster of Ponds P016, P017 and P300, the later four of which have confirmed absence of great crested newts. There is good connectivity of habitat between these ponds with blocks of woodland and hedgerows;

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therefore, great crested newts are likely to be absent from P018 and P019.

- Similarly, there is good habitat connectivity between the group of ponds P016, P017, P018, P019, P020 and P300, and the two ponds P099 and P100; therefore, great crested newt absence is also likely.
- Pond P097 is approximately 190m south of Pond 098 where great crested newts are confirmed absence. There is some habitat connectivity between these two ponds through a woodland strip and hedgerow; therefore, great crested newt absence is likely within Pond P097.
- Pond P026 is approximately 360m east of the site boundary in an arable field (unsuitable habitat) with poor connectivity of any suitable great crested newt habitat. Great crested newt absence from this pond is also assumed.

1.5.49 Great crested newts are therefore considered absent from the site and Zol. For full details of survey results, please refer to **Annex 7A.3**.

v. Reptiles

1.5.50 A review of Suffolk's Priority Species and Habitats list (Ref 1.15) identified four native, reptile species including adder, common lizard, grass snake (*Natrix helvetica helvetica*) and slow-worm (*Anguis fragilis*) as priority species for conservation action in the county. In addition, all four species are included under Section 41 of the NERC Act (Ref 1.14).

1.5.51 There were four desk-study records of reptiles within 2km of the site boundary. Species recorded comprised grass snake and common lizard. Two grass snake records were 1.3km to the east of the site. One common lizard record was 1.2km from the site, at Benhall Green; the remaining single common lizard record was 580m from the site boundary.

1.5.52 No targeted reptile surveys were conducted given the limited number of desk-study records within the site, and because the site is largely sub-optimal habitat for reptiles as it generally comprises arable fields. There are small pockets of suitable habitat recorded during the extended Phase 1 habitat and protected species survey. During the extended Phase 1 habitat and protected species survey a single grass snake was seen in an area of semi-improved grassland surrounding the River Alde. This area provides sub-optimal breeding and foraging opportunities for grass snake. The site could also support other common reptile species. Within the site boundary, the majority of habitat comprises arable field with a small portion of grass margins and semi-improved grassland. Field margins of the arable fields are

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narrow and, in some cases, non-existent, but where present have the potential to provide sheltering and foraging habitat for three reptile species (common lizard, slow-worm and grass snake), but the arable fields are sub-optimal to support these species. The available habitat to support reptile species is extremely limited and the site considered to be of little value to reptile species, however grass snake are likely to be present within the River Alde floodplain.

vi. **Birds**

1.5.53

The results of the desk-study presented in **Annex 7A.2** has identified records of 14 bird species that are protected under Schedule 1 of the W&CA (Ref 1.10), 20 species are on the Red List of BoCC (Ref 1.4) (species of high conservation concern) and 16 species are on the Amber List of BoCC (Ref 1.4) (species of medium conservation concern). In addition, a further 18 species that are either Green List of BoCC (Ref 1.4) or of no conservation status (species of low conservation concern) were also identified. All bird records were within 2km of the site boundary. A number of bird species are also listed within Section 41 of the NERC Act (Ref 1.14). The species identified are presented in **Table 1.7**.

Table 1.7: Desk-study records for notable bird species and their status within 2km

Bird Species	Sch 1 W&CA	Section 41 NERC Act	Red List (BoCC)	Amber List (BoCC)
Lesser Redpoll (<i>Acanthis cabaret</i>)		✓	✓	
Skylark (<i>Alauda arvensis</i>)		✓	✓	
Kingfisher (<i>Alcedo atthis</i>)	✓			✓
Pintail (<i>Anas acuta</i>)	✓			✓
Greylag Goose (<i>Anser anser</i>)				✓
Meadow Pipit (<i>Anthus pratensis</i>)				✓
Common swift (<i>Apus apus</i>)				✓
Cetti's Warbler (<i>Cettia cetti</i>)	✓			
Marsh Harrier (<i>Circus aeruginosus</i>)	✓			✓
Quail (<i>Coturnix coturnix</i>)	✓			✓
Cuckoo (<i>Cuculus canorus</i>)		✓	✓	
House Martin (<i>Delichon urbicum</i>)				✓
Yellowhammer (<i>Emberiza citrinella</i>)		✓	✓	
Reed Bunting (<i>Emberiza schoeniclus</i>)		✓		✓

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Bird Species	Sch 1 W&CA	Section 41 NERC Act	Red List (BoCC)	Amber List (BoCC)
Kestrel (<i>Falco tinnunculus</i>)				✓
Brambling (<i>Fringilla montifringilla</i>)	✓			
Herring Gull (<i>Larus argentatus</i>)		✓	✓	
Black-tailed godwit (<i>Limosa limosa</i>)	✓	✓	✓	
Linnet (<i>Linaria cannabina</i>)		✓	✓	
Woodlark (<i>Lullula arborea</i>)	✓	✓		
Red Kite (<i>Milvus milvus</i>)	✓			
Grey Wagtail (<i>Motacilla cinerea</i>)			✓	
Yellow Wagtail (<i>Motacilla flava</i>)		✓	✓	
Spotted Flycatcher (<i>Muscicapa striata</i>)		✓	✓	
Curlew (<i>Numenius arquata</i>)		✓	✓	
House Sparrow (<i>Passer domesticus</i>)		✓	✓	
Marsh tit (<i>Poecile palustris</i>)		✓	✓	
Dunnock (<i>Prunella modularis</i>)		✓		✓
Bullfinch (<i>Pyrrhula pyrrhula</i>)		✓		✓
Whinchat (<i>Saxicola rubetra</i>)			✓	
Turtle Dove (<i>Streptopelia turtur</i>)		✓	✓	
Tawny Owl (<i>Strix aluco</i>)				✓
Starling (<i>Stumuns vulgaris</i>)		✓	✓	
Shelduck (<i>Tadorna tadorna</i>)				✓
Greenshank (<i>Tringa nebularia</i>)	✓			✓
Green Sandpiper (<i>Tringa ochropus</i>)	✓			✓
Redwing (<i>Turdus iliacus</i>)	✓		✓	
Song thrush (<i>Turdus philomelos</i>)		✓	✓	
Fieldfare (<i>Turdus pilaris</i>)	✓		✓	
Barn Owl (<i>Tyto alba</i>)	✓			
Lapwing (<i>Vanellus vanellus</i>)		✓	✓	

1.5.54 Of the 14 bird species that are protected under Schedule 1 of the W&CA (Ref 1.10), the majority are considered to be passage migrants and therefore unlikely to be breeding within the site. Of those species recorded, only barn

owl is considered likely to breed in the vicinity of the site. Of the BoCC Red List bird species recorded, yellowhammer, house sparrow and skylark are the species considered most likely to be breeding within the arable, woodland and hedgerow habitat present.

1.5.55 Breeding bird surveys were conducted between April 2019 to June 2019. The results of these surveys are summarised below with the full details presented in **Annex 7A.3**.

1.5.56 No Schedule 1 species of the W&CA (Ref 1.10) were recorded over the course of the breeding bird surveys undertaken in 2019. Nine species listed under Section 41 of the NERC Act (Ref 1.14) were recorded. A summary of these results can be found in **Table 1.8**.

Table 1.8: Species of conservation concern recorded during the breeding bird surveys

Bird Species	Sch 1 W&CA	Section 41 NERC Act	Red List (BoCC)	Amber List (BoCC)
Herring gull		✓	✓	
Song thrush		✓	✓	
Marsh tit		✓	✓	
Black-headed gull (<i>Chroicocephalus ridibundus</i>)				✓
Dunnock		✓		✓
Mallard (<i>Anas platyrhynchos</i>)				✓
Snipe (<i>Gallinago gallinago</i>)				✓
Reed bunting		✓		✓
Willow warbler (<i>Phylloscopus trochilus</i>)				✓
Linnet		✓	✓	
Mistle thrush (<i>Turdus viscivorus</i>)			✓	
Stock dove (<i>Columba oenas</i>)				✓
House martin				✓
House sparrow (<i>Passer domesticus</i>)		✓	✓	
Skylark		✓	✓	
Nightingale (<i>Luscinia megarhynchos</i>)			✓	
Bullfinch		✓		✓

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Bird Species	Sch 1 W&CA	Section 41 NERC Act	Red List (BoCC)	Amber List (BoCC)
Meadow pipit				✓
Mediterranean gull (<i>Ichthyaetus melanocephalus</i>)				✓
Lesser black-backed gull				✓
Kestrel				✓
Teal (<i>Anas crecca</i>)				✓

1.5.57 In addition to the above, 29 Green Listed species of BoCC (Ref 1.4) were recorded. These species are listed in Table 4.3 in **Annex 7A.4**. Two introduced species with no conservation listing, pheasant (*Phasianus colchicus*) and red-legged partridge (*Alectoris rufa*), were also recorded.

1.5.58 Of the species recorded during the surveys, herring gull, black-headed gull, lesser black-backed gull, Mediterranean gull, teal, snipe, reed bunting, and mallard are predominately associated with the River Alde floodplain. Given that the site is located 3.4km upstream of Alde-Ore SAC, SPA, Ramsar site and SSSI, it is likely that these species are associated with this site. The majority of species that are qualifying features for the Alde-Ore SPA are assumed to not be present onsite due to the lack of suitable habitats; however, lesser black-backed gull which is a qualifying feature of the Alde Ore Estuary SPA, Ramsar and SSSI is present within the site, as are herring gull and black headed gull which are qualifying features of the Alde-Ore Estuary SSSI.

1.5.59 Of the species recorded during the breeding bird survey, linnet, stock dove, kestrel, skylark, reed bunting, whitethroat (*Sylvia communis*), greenfinch (*Carduelis chloris*), rook (*Corvus frugilegus*), goldfinch (*Carduelis carduelis*), wood pigeon (*Columba palumbus*) and jackdaw (*Corvus monedula*) are associated with farmland habitats and are included on the UK Farmland Indicator list (Ref 1.26).

vii. **Bats**

1.5.60 The desk-study identified 23 records of bat species within the species-specific Zols as detailed in **Table 1.1**. Species recorded comprised noctule, common pipistrelle, soprano pipistrelle, serotine, barbastelle and brown long-eared bat. Records were also identified for unspecified species within the *Plecotus* spp., *Myotis* spp. and *Pipistrellus* spp. groups.

1.5.61 Four records, for two species brown long-eared bat and unidentified *Pipistrellus* spp., were identified relating to bat roost locations. None of the roost records were located within the site, with the closest roost record

located 695m north-east of the site within Benhall (a brown long-eared bat roost).

- 1.5.62 A summary of the results of 2019 bat surveys at the site is provided below. Full details of the results of bat surveys at this location are provided in **Annex 7A.4**.
- 1.5.63 One hundred and fourteen trees were assessed during bat tree assessment surveys as having specific features potentially suitable for use by roosting bats. A summary of the roost assessment levels assigned to these features is provided in **Table 1.9**. Full details of the results of the bat tree assessment survey are provided in **Annex 7A.4**. The location of assessed trees is illustrated on **Figure 7.12 to 7.14** in **Annex 7A.1**.

Table 1.9: Summary of bat tree assessment results

Tree roost assessment level	Number of trees identified
High potential	37
Medium potential	43
Low potential	27
Negligible potential	7

- 1.5.64 Of all the trees identified with high or moderate potential for roosting bats, 37 trees required further endoscope surveys, tree climbing surveys were undertaken on 46 trees and emergence surveys on 18 trees to confirm ground inspection classifications.
- 1.5.65 Activity transect surveys were undertaken across three transect routes along the site alignment on a monthly basis between April and October 2019. In addition, ten static detectors were deployed once a month. The location of the transect routes and the static detectors Monitoring Stations (MS) along the site are illustrated on **Figure 7.9 to 7.11** in **Annex 7A.1**. The location of recorded bat passes on all transects are provided on **Figure 7.9 to 7.11** in **Annex 7A.1**.
- 1.5.66 Six species (noctule, common pipistrelle, soprano pipistrelle, serotine, barbastelle and brown long-eared) and species belonging to four species groups (*Myotis* sp., *Nyctalus* sp., 'Big bat' sp. and *Pipistrellus* sp.) were identified during activity surveys at the site. Across all transects common and soprano pipistrelle were the most frequently recorded. All other species were recorded at very low levels.
- 1.5.67 During the course of the static detector surveys, twelve species/species groups were recorded (Natterer's, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*), serotine, barbastelle, noctule,

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brown long-eared, pipistrelle species, *Myotis* species, “big bat”, and long-eared species (*Plecotus spp.*). Recorded activity levels largely reflected those recorded during transect surveys, with activity dominated by common and soprano pipistrelle. All other species groups were recorded at significantly lower levels.

viii. Terrestrial Mammals

- 1.5.68** The desk-study revealed 37 records of terrestrial mammals within 2km of the site boundary. Species recorded comprised European otter (three records), Western European hedgehog (*Erinaceus europaeus*) (20 records), badger (10 records), brown hare (*Lepus europaeus*) (three records), and water shrew (*Neomys fodiens*) (one record).
- 1.5.69** Three otter records were identified by the desk-study, with the closest record located north of the site along a drain which connects to the River Alde which runs through the south of site. During the targeted otter and water vole surveys, a single otter footprint was found along the River Alde within the site boundary. The habitat present within the site boundary was considered suitable to support otter, with areas of woodland and scrub suitable to provide resting areas. . A review of Suffolk’s Priority Species and Habitats list (Ref 1.15) identified otter as priority species for conservation action in the county. Otter are listed under Section 41 of the NERC Act (Ref 1.14) and protected under Schedule 5 of the W&CA (Ref 1.10), and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.12).
- 1.5.70** There were no water vole desk-study records; however, the targeted otter and water vole surveys found recent field signs of occupation by water vole along the River Alde and a connected ditch to the north of the River Alde within the site, including burrows, latrines and feeding signs Both watercourses were assessed as having low water vole populations densities. A review of Suffolk’s Priority Species and Habitats list (Ref 1.15) identified water vole as priority species for conservation action in the county. Water vole are listed under Section 41 of the NERC Act (Ref 1.14) and protected under Schedule 5 of the W&CA (Ref 1.10).
- 1.5.71** The desk-study revealed a single record of water shrew 1.3km from the site. This species was not recorded during surveys although, habitat suitable to support this species was recorded within the site boundary including the River Alde and ditches. Water shrews are reported as declining in Suffolk (Ref 1.27). The water shrew is on Suffolk’s Priority Species and Habitats list (Ref 1.15) and considered locally important.
- 1.5.72** The closest Western European hedgehog desk-study record was 16m from the site boundary. The woodland blocks and hedgerows within the site provide potentially suitable habitat for hedgehog and this species is likely to

be present within the site boundary. Hedgehog is a Suffolk Priority Species and Habitats listed species (Ref 1.15) and listed under Section 41 of the NERC Act (Ref 1.14).

1.5.73 The desk-study revealed ten records of badgers, of which a single record of badger has been made within the site boundary. The extended Phase 1 habitat and protected species survey recorded a single outlier badger sett within the site boundary. The sett constituted one well-used entrance (with no other field signs or fresh spoil) on the northern edge of a woodland copse, between an arable field and area of neutral grassland. Badgers are protected under the Protection of Badgers Act (Ref 1.13).

1.5.74 Three brown hare desk-study records were identified, the closest of which was approximately 600m away from the site boundary. As part of the extended Phase 1 habitat and protected species survey there were several incidental sightings of brown hare within the site. Additionally, the arable and hedgerow habitat present provides suitable habitat to support hare. The Suffolk BAP (Ref 1.28) states that brown hare is widespread in Suffolk, however, recent reports in the east of England in 2018 suggest brown hare are suffering from a disease epidemic with records of sick or dead animals (Ref 1.29), and with rabbit haemorrhagic disease type 2 now confirmed in brown hare from Dorset and Essex (Ref 1.30).

1.6 Baseline conditions – ecological features and their importance

a) Assessment methodology

1.6.1 The purpose of this final section is to describe the distribution and relative abundance of the habitats and species present within the Zol of the site boundary, and to use this information, in the context of the wider distribution, to assess the importance of the habitats and species that could be affected by the proposed development. This assessment has been used, in conjunction with a description of the extent and magnitude of the predicted impacts of the scheme, to carry out the detailed EclA presented in **Chapter 7 of Volume 5** of the **ES**.

1.6.2 To comply with both the CIEEM Guidelines for Ecological Impact Assessment (Ref 1.5) and with the standard EIA methodology used elsewhere within the ES, both methodologies have been used to assess the habitats and species within the Zol of the proposed development.

1.6.3 Under the CIEEM guidelines (Ref 1.5), the first stage is to identify IEFs, to include habitats, species and ecosystems, including ecosystem function and processes, with reference to the geographical context in which they are considered important. An assessment is then made of whether these IEFs will likely be subject to impacts and, if so, these are taken forward into the

EclA as a material consideration in the planning decision. Where protected species are present and there is the potential for a breach of the legislation, those species are also considered to be IEFs to be included in the EclA.

1.6.4 Those IEFs that qualify purely on the basis of legislative considerations (such as badgers) rather than as a result of their conservation status, are addressed separately in the EclA from those that are of material concern, with the latter being assessed in greater detail. For both, the ES outlines what measures are required to prevent any contravention of the legislation.

1.6.5 In line with the CIEEM guidelines (Ref 1.5), the importance of an ecological feature, as determined with reference to legal, policy and/or nature conservation considerations, has been assessed within the following geographical context:

- International and European importance;
- National importance (i.e. England);
- Regional importance (i.e. the East of England);
- County importance (i.e. Suffolk); and
- Local importance (within Zol of the scheme).

1.6.6 The following table has also been used in order to assess the ecological features in accordance with the wider EIA methodology (**Table 1.10**).

Table 1.10: Criteria for assessment of ecological importance. *

Importance	Criteria	
High	International; UK; National (England)	Very high importance and rarity. Feature/resource possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site (for example designated features of international/national importance, such as SACs, SPAs, Ramsar sites and SSSIs.
Medium	Regional (East Anglia);	Medium importance and rarity, regional scale. Feature/resource possesses key

Importance		Criteria	
		County (Suffolk)	characteristics which contribute significantly to the distinctiveness and character of the site/receptor (for example designated features of regional or county importance, such as CWSs, County BAP habitats, etc.).
Low		Local - district/ borough (Suffolk Coastal)	Low or medium importance and rarity, local scale. Feature/resource possesses characteristics which are only locally significant. Feature/resource not designated or only designated at a district or local level (for example local nature reserve).
Very low		Within the Zol	Feature/resource characteristics do not make a significant contribution to local character or distinctiveness. Feature/resource not designated.

*As part of the assessment process, the sensitivity of the ecological features should also be assessed. Sensitivity has not been addressed within the ecological baseline. Sensitivity and a detailed rationale explaining how a particular sensitivity rating has been arrived at for each ecological feature will be dealt with in the Environment Statement. [Note that Importance and Sensitivity should be assessed separately, as they are to an extent independent of each other (e.g. a feature of high value could be of low sensitivity, and vice versa)].

b) Description and assessment of ecological features

1.6.7 This section sets out the relevant ecological features and their importance and discusses each in turn. For each feature, its importance is described by:

- Description and distribution: the habitat or species are described in terms of its distribution and abundance locally, regionally and nationally.
- Assessment: the habitat or species is described by its protected/nature conservation status, and other measures of value, to determine its relative importance both in terms of the CIEEM guidelines (Ref 1.5) and the wider EIA assessment methodology.

1.6.8 As outlined in **section 1.3**, the legislative and policy framework for each ecological receptor is considered in full and, together with professional judgement, is used to assign a value to each ecological receptor. This technical appendix gives a detailed rationale for the value assigned to each ecological receptor and the conclusions reached.

i. **Feature: Designated sites**

Description and distribution

1.6.9 Twelve statutory designated sites (two SPAs, one SAC, one Ramsar and eight SSSIs) were identified within a 5km radius of the site boundary. Nine non-statutory designated sites (all CWSs) were identified within a 2km radius of the site boundary. These sites are detailed in **Table 1.2** and **Table 1.3**.

Assessment

1.6.10 Given that for statutory designated sites (with the exception of Alde-Ore Estuary SAC, Ramsar and SPA):

- Sandlings SPA support populations of European importance of Annex I species listed on Article 4 of the EC Birds Directive (Ref 1.6);
- the SSSIs (Gromford Meadow SSSI, Blaxhall Heath SSSI, Sandlings Forest SSSI, Iken Wood SSSI, Snape Warren SSSI, Tunstall Common SSSI and Crawford Meadow SSSI) support habitats and species of national importance; however
- no direct land take of these sites will occur, and no obvious impact pathways have been identified.

then statutory sites (except Alde-Ore Estuary SAC, Ramsar and SPA) within the Zol would be:

- an IEF at the international (SPA, SAC and Ramsar sites)/National (SSSI sites) level under the CIEEM guidelines (Ref 1.5);
- of high importance, following the EIA-specific assessment methodology; but
- scoped out of the detailed assessment as there would be no direct or indirect impacts.

1.6.11 Given that for statutory designated site Alde-Ore Estuary SPA, SAC and Ramsar site:

- supports Annex I habitats and species of European importance listed on Article 4 of the EC Birds Directive (Ref 1.6), and is a wetland of international importance; however
- while there will be no direct land take from Alde-Ore Estuary SAC, Ramsar and SPA, the site is hydrologically linked to this designated site.

then Alde-Ore Estuary SPA, SAC and Ramsar site and within the ZOI would be:

- an IEF at the international level under the CIEEM guidelines (Ref 1.5); and
- of high importance, following the EIA-specific assessment methodology.

1.6.12 Given that the non-statutory CWSs (with the exception of Foxburrow Wood CWS):

- support habitat types listed on Section 41 of the NERC Act (Ref 1.14) and are targeted for action in the Suffolk BAP (Ref 1.15); however
- no direct land take of these sites will occur, and these sites are sufficiently far away so that no indirect impact pathways have been identified;

then the CWSs (except Foxburrow Wood CWS) would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5); and
- of medium importance, following the EIA-specific assessment methodology; but
- scoped out of the detailed assessment as there would be no direct or indirect impacts.

1.6.13 Given that Foxburrow Wood CWS (also an ASNW on the AWI):

- supports habitat types listed on Section 41 of the NERC Act (Ref 1.14) and has been targeted for action within the Suffolk BAP (Ref 1.15);
- has been recorded on the AWI for Suffolk; and

- would be retained in its entirety, but could experience indirect impacts as it is adjacent to the site boundary;

then Foxburrow Wood CWS would be:

- an IEF at the national level under the CIEEM guidelines (Ref 1.5); and
- of high importance, following the EIA-specific assessment methodology.

ii. Feature: Plants and habitats

Description and distribution

- 1.6.14 The main habitat present is arable farmland, which is widespread in Suffolk and no botanically rich arable margins were identified. Twenty-nine hedgerows were recorded within the site boundary, of which seven are classed as 'Important' under the Hedgerows Regulations (Ref 1.2). Hedgerows have been targeted for action in the Suffolk BAP (Ref 1.18). At the last assessment (2004), there were an estimated 12,500 to 15,000km of species-rich hedgerow in the County (Ref 1.18).
- 1.6.15 In addition to Foxburrow Wood CWS along with the connected Pallant's Grove (also ancient woodland), there are seven other broadleaved woodland blocks (including Nuttery Belt, 'The Belt', Whin Covert and Pond Wood) identified that are relatively discrete and limited in area (0.71 ha in extent). The Suffolk BAP (Ref 1.19) identifies that there are 15,466ha of broadleaved woodland within Suffolk. Lowland mixed deciduous woodland is a priority habitat (Ref 1.15) and is listed under Section 41 of the NERC Act (Ref 1.14).
- 1.6.16 The River Alde is present within the site boundary. Rivers are a priority habitat (Ref 1.15) and listed under Section 41 of the NERC Act (Ref 1.14).
- 1.6.17 Floodplain grassland is present within the site boundary. Floodplain grassland is a priority habitat (Ref 1.31) and is listed under Section 41 of the NERC Act (Ref 1.14).
- 1.6.18 The Suffolk BAP states that Suffolk 'has a very high density of ponds with an estimate of 22,635 across the county' (Ref 1.20), with 25 ponds identified within 500m of the site boundary; however, no ponds were identified within the site.

Assessment

- 1.6.19 Arable: Given that arable habitat is widespread in Suffolk and no botanically rich margins were identified, then the arable habitat within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

1.6.20 Hedgerows: Given that:

- Hedgerows are listed on Suffolk’s Priority Species and Habitats list (Ref 1.15) and is listed under Section 41 of the NERC Act (Ref 1.14);
- Twenty-nine hedgerows were recorded within the site boundary, of which seven are classified as ‘important’; and
- hedgerows are widespread in Suffolk;

then hedgerow habitats within the Zol would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5); and;
- of medium importance, following the EIA-specific assessment methodology.

1.6.21 Ponds: Given that no ponds were identified within the site boundary and none will be impacted by the proposed development; then pond habitats within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5);
- be of very low importance, following the EIA-specific assessment methodology.

1.6.22 Lowland mixed deciduous woodland: Given that:

- lowland mixed deciduous woodland is listed on Suffolk’s Priority Species and Habitats list (Ref 1.15) and is listed under Section 41 of the NERC Act (Ref 1.14);
- would be not be retained in its entirety; and
- none of the areas of lowland mixed deciduous woodland within the site boundary are areas of ancient woodland.

then lowland mixed deciduous woodland within the Zol would be:

- an IEF at the county under the CIEEM guidelines (Ref 1.5); and;
- of medium importance, following the EIA-specific assessment methodology.

1.6.23 Rivers: Given that:

- rivers are included on Suffolk's Priority Species and Habitats list (Ref 1.15) and is listed under Section 41 of the NERC Act (Ref 1.14);
- impact pathways have been identified between the site and the River Alde;

then the river habitat within the ZoI would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5); and;
- of medium importance, following the EIA-specific assessment methodology

1.6.24 Floodplain grassland: Given that

- Floodplain grassland is included on Suffolk's Priority Species and Habitats list (Ref 1.15) and is listed under Section 41 of the NERC Act (Ref 1.14);
- impact pathways have been identified between the site and the floodplain grassland;

then the floodplain habitat within the ZoI would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5); and;
- of medium importance, following the EIA-specific assessment methodology

iii. [Feature: Invertebrates](#)

[Description and distribution](#)

1.6.25 The invertebrate survey area supported habitat classified as 'coastal and floodplain grazing marsh'. This habitat is listed under Section 41 of the NERC Act (Ref 1.14) and on Suffolk's Priority Species and Habitats list (Ref 7A.15)

and forms part of a habitat corridor linking sites supporting important invertebrate species and assemblages in the wider landscape.

- 1.6.26 Five species of recognised conservation value were recorded during the 2019 surveys comprising great silver water beetle, a linyphiid spider (*Palliduphantes insignis*), a soldier beetle (*Cantharis fusca*), an opomyzid fly (*Geomyza subnigra*) and cinnabar. Of these, the ‘Near Threatened’ and nationally scarce great silver water beetle and a nationally scarce soldier beetle *Cantharis fusca* are considered to be characteristic species of higher quality floodplain grazing marsh habitats. The presence of these species, as well as some of the more local species also associated with such habitat, such as a species of water-scavenger beetle *Anacaena bipustulata* and a backswimmer *Notonecta viridis*, indicate the importance of the site as linkage habitat within the wider River Alde floodplain.

Assessment

- 1.6.27 Given that:

- a total of five species of recognised conservation value were recorded during surveys within the site boundary;
- there is an importance of the site as linkage habitat within the wider River Alde floodplain; The aquatic fauna of the River Alde was of ‘high conservation value’, with the drainage ditch network supporting aquatic species of ‘moderate conservation value’.

then the invertebrate assemblage within the Zol would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5); and;
- of medium importance, following the EIA-specific assessment methodology

iv. Feature: Amphibians

Description and distribution

- 1.6.28 The presence of great crested newt was not found in any of the ponds that were surveyed within 500m of the site, and this species is considered absent from the Zol.

- 1.6.29 The desk-study identified two records of other amphibian species (common toad and common frog) located 1.2km from the site boundary, of which common toad is listed on Suffolk’s Priority Species and Habitats list (Ref 1.15). It is considered that the woodland blocks within the site boundary

would provide suitable foraging and hibernation habitat to support small populations of these species.

Assessment

1.6.30 Given that great crested newt:

- is included on Suffolk's Priority Species and Habitats list (Ref 1.15), is listed under Section 41 of the NERC Act (Ref 1.14), and protected under Schedule 5 of the W&CA (Ref 1.10) and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.12).
- is widespread but patchily distributed with populations of conservation interest in the UK, and has a population stronghold in the Suffolk; however
- has been confirmed absent from the Zol from baseline surveys;

then great crested newts in the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

1.6.31 Given that common toad:

- is on Suffolk's Priority Species and Habitats list (Ref 1.15) and listed under Section 41 of the NERC Act (Ref 1.14);
- is likely to be found in low numbers within woodland blocks; and
- only a small area (0.71ha) of woodland habitat suitable to support this species within the site boundary would be lost with sufficient, suitable habitat outside the site being retained;

then common toad within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

1.6.32 Given that common frog:

- common frog has a low nature conservation status;
- it likely to be found in low numbers within woodland blocks; and
- only a small area (0.71ha) woodland habitat suitable to support this species within the site boundary would be lost;

then the population of this species within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

v. **Feature: Reptiles**

Description and distribution

- 1.6.33 On the basis of the extended Phase 1 habitat and protected species survey undertaken, the majority of the site consists of large tracts of arable farmland which is considered sub-optimal for reptiles; however, some of the arable field margins and areas of semi-improved grassland have the potential to support common sheltering and foraging reptile species.
- 1.6.34 There was a single incidental sighting of a grass snake within the site boundary and there were no desk-study records of reptiles within the site.
- 1.6.35 A review of the Suffolk's Priority Species and Habitats list identified adder, grass snake, common lizard and slow-worm as a priority species (Ref 1.15). In addition, adder, grass snake, common lizards and slow-worm are included within Section 41 of the NERC Act (Ref 1.14).

Assessment

- 1.6.36 Given that:
- only a single grass snake was recorded within the site;
 - there were no desk-study records within the site boundary; and
 - the habitat is considered predominantly to be sub-optimal for reptiles;
- then the reptile assemblage within the Zol would:
- not be an IEF under the CIEEM guidelines (Ref 1.5); and;

- be of very low importance, following the EIA-specific assessment methodology.

vi. **Feature: Ornithology**

Description and distribution

- 1.6.37 A number of Schedule 1 species of the W&CA (Ref 1.10) were reported in the desk-study; however, these species are likely to be incidental sightings of passage migrants and therefore unlikely to be breeding within the site. Only barn owl is considered likely to breed in the vicinity. Of the BoCC Red List bird species recorded, yellowhammer, house sparrow and skylark are the species considered most likely to be breeding within the arable, woodland and hedgerow habitat present within the site.
- 1.6.38 No Schedule 1 species of the W&CA (Ref 1.10) were recorded over the course of the breeding bird surveys. Six species listed under Section 41 of the NERC Act (Ref 1.14) and BoCC Red List species (Ref 1.4) were recorded during the breeding bird surveys including herring gull, song thrush, marsh tit, house sparrow, skylark and linnet. Mistle thrush, a BoCC Red List species (Ref 1.4), was also recorded. Three species listed under Section 41 of the NERC Act (Ref 1.14) and BoCC Amber List species (Ref 1.4) were recorded during the breeding bird surveys including dunnock, reed bunting and bullfinch. Eleven BoCC Amber list species were also recorded during the breeding bird surveys.
- 1.6.39 Of the species recorded during the surveys, herring gull, black-headed gull, lesser black-backed gull, Mediterranean gull, teal, snipe, reed bunting and mallard are predominately associated with wetland habitats, Lesser black-backed gull is a qualifying feature of the Alde Ore SPA, Ramsar and SSSI is present within the site, as are herring gull and black headed gull which are qualifying features of the Alde-Ore Estuary SSSI.
- 1.6.40 Of the species recorded during the breeding bird survey, linnet, stock dove, kestrel, skylark, reed bunting, whitethroat, greenfinch, rook, goldfinch, wood pigeon and jackdaw are associated with arable habitat that are present within the site boundary.
- 1.6.41 Arable farmland is extensive within Suffolk and the distribution of farmland bird species such as linnet and stock dove, to a large extent, be dependent on the diversity of the arable habitat. Fields with large diverse margins or crops sown to benefit wild birds are likely to support a greater number and diversity of bird species than the intensively managed arable farmland present along the site which are likely to be less valuable to farmland birds.

1.6.42 Floodplain grassland habitats are in decline within Suffolk and the distribution of birds associated with these habitats will be dependent on the quality of these habitats.

Assessment

1.6.43 Given that:

- no Schedule 1 bird species of the W&CA (Ref 1.10) were recorded within the site boundary.
- intensively managed arable habitat, and the breeding bird assemblage it supports, is widespread in Suffolk, and the arable habitat is not being managed specifically to benefit breeding birds;
- eleven species included on the Farmland Indicator List have been identified during the breeding bird surveys;
- the floodplain grassland within the site boundary will not be retained;
- lesser black-backed gull is a qualifying feature of the Alde-Ore Estuary SPA, Ramsar and SSSI and herring gull and black headed gull are included within the citation for Alde-Ore Estuary SSSI; and
- the nesting and foraging resource of the broadleaved woodland within the site will not be retained in its entirety;

Notwithstanding the legal protection afforded to nesting bird species, then the breeding bird assemblage within the ZoI would be:

- an IEF at the local level under CIEEM guidelines (Ref 1.5); and
- of low importance, following the EIA-specific assessment methodology.

vii. Feature: Bats

Description and distribution

1.6.44 Areas of woodland, hedgerows and mature trees within and in land adjacent to the site were considered to have potential for roosting bats and to provide good quality commuting and foraging opportunities. One hundred and fourteen trees were identified as having the potential to support bat roosts, including 38 trees of high potential and 42 trees of medium potential.

1.6.45 Activity and static detector surveys demonstrated that activity within the site and within adjacent habitats was dominated by common and soprano pipistrelle with low levels of Natterer's, Nathusius' pipistrelle, serotine, barbastelle, noctule, brown long-eared, Myotis species, "big bat", *Nyctalus* species and long-eared species .

Assessment

1.6.46 Given that:

- Barbastelle are nationally rare with a restricted distribution and are listed on Suffolk's Priority Species and Habitats list (Ref 1.15), Section 41 of the NERC Act (Ref 1.14) and on Annex II of the Habitats Directive (Ref 1.7). However, barbastelle only accounted for a small proportion of the overall activity recorded along the site and immediately adjacent habitats. While a breeding population of barbastelle is using the Zol of the proposed development (defined as 10km), including the EDF Energy estate, for foraging and roosting (all types); there is little indication that the site is of importance to barbastelle;
- common and soprano pipistrelle are common and widespread in the UK and Suffolk and were the most frequently recorded species within the site and immediately adjacent habitat.
- Other species activity was only recorded at very low levels and are unlikely to be reliant on habitat within or immediately adjacent to the site;

then the bat assemblage within the Zol would be:

- an IEF at a county level under CIEEM guidelines (Ref 1.5.); and
- of medium importance, following the EIA-specific assessment methodology.

1.6.47 Full details of the criteria considered during the assessment of bats at the site are provided in **Table 1.11**, **Table 1.12** and **Table 1.13**:

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Table 1.11: Criteria for assessing the importance of the bat species within the Zol of the Project. Note that Zol differs between species

Source of data	Published data		Information derived from project data (inc local desk-study information) supported by professional judgement based on known species ecological traits			
KEY to SCORE	Conservation status	Status UK/Suffolk	Status within the site	Breeding roosts (maternity) within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/ commuting
Red [score 3]	+ Habs. Dir. Annex II [additional importance applied if species is qualifying feature of a SAC]	Nationally rare	Population apparently centred on the t site (for at least part of the year); 50+ individuals rarest/rarer species.	Maternity colony of rarest/rarer species within the site.	Majority of individuals likely to hibernate within the site and adjacent areas.	High reliance on habitats present within the site (inside or out with the construction site boundary).
Amber [score 2]	+ NERC Act	Nationally uncommon /less common	Fewer than 50 rarest/rarer species; 50+ more common species. <i>Note these are very broad estimates.</i>	Maternity colony of more common species within the site; rarer species outside the site but within Zol.	Hibernation within Zol very likely; within the site probable	Moderate reliance on habitats present within the site (based on data and species preferences); higher reliance on habitats outside of the site.
Green [score 1]	EPS only	Common/ widespread	Present in lower numbers than above (in low or very low numbers).	No evidence of maternity roost within the site; more common species outside the site but within Zol	Majority of individuals are likely to hibernate outside the site (or outside the Zol)	Low reliance on habitats present within the site; species considered to be generalist and adaptable.

Table 1.12: Summary of geographical importance boundaries

Geographic importance: Local	Geographic importance: County	Geographic importance: Regional	Geographic importance: National
<p>A score of 6-10 This matrix does not allow for finer definitions of Local importance (district, borough, Zol, site) for which professional judgement is required.</p>	<p>A score of 11 to 13</p>	<p>A score of 14 to 16</p>	<p>A score of 17+ International if species is qualifying feature of a SAC</p>
<p>The boundaries between these are subjective based on an even distribution of possible scores between the three categories.</p>			

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Table 1.13: Summary of the elements considered in determining the geographical context of each species' importance.*

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding Roosts (maternity) within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/ commuting	Geographic context of importance
Barbastelle	Habs. Dir. Annex II EPS NERC Act	Nationally rare/ Widespread but uncommon in Suffolk.	Recorded at low levels in 2019.	No evidence within (and low likelihood) of breeding roosts within the site. A small number of trees with roost features preferred by barbastelle (i.e. oaks with loose bark or hazard beans) identified within the site.	No evidence within or adjacent to the site; these areas support very few trees with features preferred by barbastelle.	Habitats within the site largely unsuitable but adjacent and bisecting woodland blocks and hedgerows may be used as occasional foraging/commuting habitat. Habitat mosaic in Zol offers reasonable connectivity and foraging opportunities.	County (score of 11)
Natterer's bat	EPS	Nationally common, widespread in the UK/ Widespread but uncommon in Suffolk	Only very low numbers identified specifically to Natterer's.	No evidence within Site and activity recorded indicate unlikely within the site. A variety of potential roost resources are present in the Zol.	No evidence within Site and roosting preferences indicate unlikely within Site. A variety of potential roost resources are present in the Zol.	Known to use a wide range of habitats. The site is open and sub-optimal. May use adjacent woodland blocks but unlikely to be large enough for reliance.	Local (score of 8)
Noctule	EPS NERC Act	Common in England and	Recorded in very low numbers during activity surveys in 2019.	Large number of trees with roost potential within the site. Woodland blocks within	Trees with roost potential within the site.	Use almost all landscape types and less reliant on linear features.	Local (score of 9)

NOT PROTECTIVELY MARKED

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding (maternity) within the Zol	Roosts within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/ commuting	Geographic context of importance
		widespread in Suffolk		Zol may support breeding roost(s).		Woodland blocks within Zol may support hibernation roost(s).	Unlikely to be heavily reliant on the Site or immediately adjacent habitat but Zol will provide habitats on which noctule rely.	
Common pipistrelle	EPS	Common and widespread in the UK and Suffolk	Common and widespread across the site. Most frequently recorded species across the site along with soprano pipistrelle.	Habitat within the site largely unsuitable. Adjacent trees and woodland blocks have some features suitable (but larger roosts are found in buildings).		Few winter roosts are known; these tend to be solitary individuals. Buildings favoured.	Habitat within the site largely unsuitable; however, activity in 2019 suggested the site supports foraging and commuting. Generalist, widespread and common.	Local (score of 6)
Soprano pipistrelle	EPS NERC Act	Common and widespread in UK and Suffolk	Common and widespread across the site. Most frequently recorded species across the site along with common pipistrelle.	Habitat within the site largely unsuitable (and larger roosts are found in buildings).		Few winter roosts are known; these tend to be solitary individuals. Buildings favoured.	Habitat within the site largely unsuitable; however, activity in 2019 suggested proposed development	Local (score of 7)

NOT PROTECTIVELY MARKED

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding (maternity) within the Zol	Roosts within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/ commuting	Geographic context of importance
							supports foraging and commuting. Generalist, though with a bias towards riparian habitats.	
Nathusius' pipistrelle	EPS	Uncommon in the UK/Rare in Suffolk	Recorded in only very low numbers.	Habitat within the site largely unsuitable although adjacent trees and woodland blocks have some features potentially suitable.	Habitat within the site largely unsuitable although adjacent trees and woodland blocks have some features potentially suitable.		Generalist, though with a bias towards riparian habitats	Local (score of 7)
Serotine	EPS	Uncommon but widespread in UK and Suffolk.	Low levels activity recorded only ⁶ .	No evidence within Site and roosting preferences strongly indicate unlikely within Site A variety of potential roost resources are present in the Zol.	No evidence within Site and roosting preferences strongly indicate unlikely within Site A variety of potential roost resources are present in the Zol.		The site is open and sub-optimal. Known to use the Zol but in low numbers.	Local (score of 7)
Brown long-eared bat	EPS NERC Act	Common and widespread	Very low activity levels recorded	Large number of trees with roost potential within the site. Woodland blocks within	Large number of trees with roost potential within the site. Woodland		Often under-recorded, generalist	Local (score of 9)

⁶ Note. 'Big bat' calls may contain serotine passes that cannot be identified to the species level.

NOT PROTECTIVELY MARKED

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding (maternity) within the Zol	Roosts within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/ commuting	Geographic context of importance
		in UK and Suffolk	throughout survey period.	Zol may support breeding roost(s).	blocks within Zol may support hibernation roost(s).			

c) Feature: Terrestrial Mammals

i. Description and distribution

- 1.6.48 The desk-study revealed ten records of badgers, of which a single record was within the site boundary. The extended Phase 1 habitat and protected species survey recorded a single outlier badger sett that comprised one well-used entrance with a no other field signs or fresh spoil on the northern edge of a woodland copse. National badger surveys were undertaken between 1985-1988 and 1994-1997 to detect changes in the badger population (Ref 1.34 and Ref 1.35). The national surveys detected a large increase in badger numbers over a ten-year period, and evidence from other surveys between 1996 and 2002 suggests that populations may still be increasing, although there was limited information to confirm any trends (Ref 1.36). A further survey of badger setts across England and Wales between 2011 and 2013, concluded there had been a 103% increase in social groups over the last 25 years (Ref 1.37). There has also been an increase in Suffolk's badger population since the 1980s (Ref 1.37).
- 1.6.49 The desk study did not identify any records of water vole within the site boundary; however, during the targeted otter and water vole surveys numerous recent field signs of occupation by water vole along the River Alde within the site were identified including burrows, latrines and feeding signs. Distribution data for water voles demonstrates that the water vole population in Britain had suffered a long-term decline since 1900 (Ref 1.38), with a 78% decline between 1989-1990 and 1996-1998 (Ref 1.38). Further research suggests a further decrease by 50% for the period 1998-2016 ((Ref 1.38).
- 1.6.50 Three otter records were identified by the desk study, one of which was located north of the site along a drain which connects to the River Alde which runs through the south of site and an otter print was identified along the River Alde within the site boundary during the targeted otter and water vole surveys. A review of the Suffolk's Priority Species and Habitats list (Ref 1.15) identified otters as a priority species for conservation action in the county. Otter is protected under Schedule 5 and 6 of the W&CA (Ref 1.10), and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.12) and is listed under Section 41 of the NERC Act (Ref 1.14).
- 1.6.51 The desk-study identified a Western European hedgehog record 16m from the site boundary. The woodland blocks and hedgerows within the site provide potentially suitable habitat to support hedgehogs. Hedgehog is a Suffolk Priority Species and Habitats listed species (Ref 1.15) and listed under Section 41 of the NERC Act (Ref 1.14).
- 1.6.52 The desk-study identified three records of brown hare, one of which was recorded 600m from the site. The extended Phase 1 habitat and protected

species survey recorded several incidental records of brown hare within the site boundary. Habitats identified within the site boundary that are considered suitable to support brown hare include arable fields and hedgerow habitat. East Anglia has been a reservoir for brown hare, holding approximately 20% of the national population across the three counties (Cambridgeshire, Suffolk and Norfolk) (Ref 1.39). Brown hare is widespread in Suffolk (Ref 1.15); however, recent reports in the east of England in 2018 suggest brown hare are suffering from a disease epidemic with records of sick or dead animals (Ref 1.29). The individual recorded on site would not comprise a significant contribution to the wider population of this highly mobile species.

1.6.53 The desk-study identified a single record of water shrew 1.3km from the site. During the extended Phase 1 habitat and protected species survey habitats within the site including the River Alde and ditch habitat as suitable for water shrew. Water shrews are reported as declining in Suffolk (Ref 1.27). The water shrew is on Suffolk's Priority Species and Habitats list (Ref 1.15) and considered locally important.

ii. **Assessment**

1.6.54 Badger: Given that:

- only a single outlier badger sett was identified within the site boundary that could be affected by the proposed development;
- badger is widespread across England and Wales, and populations are increasing both in England and Wales and in Suffolk (Ref 1.37);

then badger within the ZOI would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

Water vole: Given that:

- water vole is legally protected;
- is on Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.14);
- suitable habitat to support this species is present within the site boundary and numerous water vole field signs including burrows, latrines and feeding signs have been recorded within the site boundary;

then water vole within the Zol would:

- be an IEF at the county level under CIEEM guidelines (Ref 1.5)
- be of medium importance following the EIA specific assessment methodology.

1.6.55 Otter: Given that:

- is on Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.14) and are protected under Schedule 5 of the W&CA (Ref 1.10) and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.12);
- has a population that is increasing both in England and Suffolk specifically from virtual extinction during the early 1970s, but is still considered to be vulnerable, threatened by: lack of safe and suitable habitat along rivers; poor water quality and pollution; and road traffic accidents;
- only a single otter footprint has been recorded within the site boundary but there is habitat within the site and within the River Alde floodplain suitable to support this species;

then the population of otter within the site would:

- be an IEF at the local level under CIEEM guidelines (Ref 1.5)
- be of low importance following the EIA specific assessment methodology.

1.6.56 Given that the remaining mammal assemblage:

- is, in the case of the brown hare, on Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.14); while the habitat within the site boundary is suitable for brown hare, it is considered that the population on site would not be a significant contribution to the wider population of this highly mobile species;
- is, in the case of water shrew, legally protected, and is on Suffolk's Priority Species and Habitats list (Ref 1.15). There is an absence of desk-study and survey records for water shrew within the site boundary, however suitable habitat to support this species is present within the site boundary.

- is, in the case of hedgehog, on Suffolk’s Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.14); however, there was an absence of desk-study and survey records for hedgehogs within the site boundary, and limited suitable habitat;

then brown hare, water shrew and hedgehog within the Zol would:

- not be IEFs under CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

1.7 Summary of ecological features/receptors

1.7.1 Following a review of the known baseline within the Zol, **Table 1.14** lists the ecological features/receptors and details which will be carried forward into the detailed assessment. Those carried forward are IEFs of sufficient conservation value that will be sufficiently affected by the proposed development to require material consideration within the assessment.

1.7.2 There are a number of ecological receptors that, while not of significant nature conservation value within the Zol, do require some consideration because of the legislative protection afforded to them. While not taken forward for detailed assessment, these are considered further in the ES, where appropriate secondary mitigation is prescribed to ensure legislative compliance.

Table 1.14: Determination of IEFs to be taken forward for detailed assessment

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/out
Statutory designated sites (excluding Alde-Ore Estuary SAC, Ramsar and SPA)	International and National/High	Statutory designated sites Gromford Meadow SSSI; Blaxhall Heath SSSI; Sandlings SPA; Sandlings Forest SSSI; Iken Wood SSSI; Snape Warren SSSI; Tunstall Common SSSI; and Cransford Meadow SSSI are located within 5km of the site boundary. These statutory designated sites support a range of habitats and European protected species. Given the distance of these sites from the site, no direct land take of these sites will occur, and no obvious impact pathways have been identified. These statutory designated sites have therefore been scoped out of the detailed assessment	Scoped out
Statutory designated sites - Alde-Ore Estuary SPA, SAC and Ramsar site	International/High	The Alde-Ore Estuary SPA, SAC, Ramsar site and SSSI is a statutory designated site that supports a range of habitats and European protected species. While there will be no direct land take from Alde-Ore Estuary SPA, SAC, Ramsar site and SSSI, the site is hydrologically linked to this designated site. The impact on the Alde-Ore Estuary SAC, Ramsar and SPA has therefore been scoped into the detailed assessment.	Scoped in
Non-statutory designated sites (excluding Foxburrow Wood CWS)	County/Medium	Farnham Churchyard CWS; Great Glemham Wood CWS; Denny's Grove CWS; Great Wood CWS; Benhall Churchyard CWS; Manor Farm Meadows CWS; River Fromus Marshes CWS; and Benhall Green Meadows CWS are located within 2km of the site boundary. CWS support a range of habitats types that are listed on Section 41 of the NERC Act (Ref 1.14) and which are targeted for action in the Suffolk BAP (Ref 1.15). Given the distance of these sites from the site boundary, no direct land take of these sites will occur, and no obvious impact pathways have been identified. Therefore, these CWS have been scoped out of the detailed assessment.	Scoped out
Non-statutory designated sites – Foxburrow Wood CWS	National/High	Foxburrow Wood CWS is immediately to the east of the site. This site is also listed on the ancient woodland inventory. The site supports habitat types listed on Section 41 of the NERC Act (Ref 1.14) and has been targeted for action within the Suffolk BAP (Ref 1.15). Whilst this site will be retained in its entirety there is the potential for it to experience indirect impacts.	Scoped in

NOT PROTECTIVELY MARKED

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/out
		Foxburrow Wood CWS has therefore been scoped into the detailed assessment.	
Arable	Local/Very Low	Arable field margins are a habitat listed under Suffolk’s Priority Species and Habitats list (Ref 1.15). Arable farmland is widespread in Suffolk and no botanically rich arable margins were identified within the site boundary. The arable margins support common ruderal and weed species. This habitat has therefore been scoped out of the detailed assessment; however, as it does support farmland bird assemblages which has been considered further below.	Scoped out
Hedgerows	County/Medium	Hedgerows are a habitat listed under Suffolk’s Priority Species and Habitats list (Ref 1.15). The proposed development would lead to the loss of seven ‘important’ hedgerows, as well as 22 other hedgerows comprised of intact and defunct species-poor hedgerows; intact and defunct species-rich hedgerows and species-rich and species-poor hedgerows with trees. Hedgerows are widespread in Suffolk although it is considered that the loss of ‘important’ hedgerows and species-rich hedgerows within the site boundary has the potential to result in a significant effect. Therefore, hedgerows have been scoped into the detailed assessment.	Scoped In
Ponds within the and Zol	Local/Very Low	Twenty-five ponds are present within 500m of the site boundary; however, none were recorded within the site. Ponds are a habitat listed under Suffolk’s Priority Species and Habitats list (Ref 1.15). As no ponds will be lost as a result of the proposed development, ponds have been scoped out of the detailed assessment.	Scoped out
Lowland mixed deciduous woodland	County/Medium	There is 0.71 ha of broadleaved woodland located within the proposed development boundary, 0.38ha would be permanently lost due to the construction of the proposed development. Although only small areas of these woodlands would be lost due to construction, they would not be able to be retained in their entirety and therefore the impact on this habitat has been scoped into the detailed assessment.	Scoped in

NOT PROTECTIVELY MARKED

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/out
Rivers (River Alde)	County/Medium	Rivers are a habitat listed under Suffolk’s Priority Species and Habitats list (Ref 1.15). The River Alde runs through the site, and there is the potential for direct and indirect impacts. This habitat has therefore been scoped into the detailed assessment.	Scoped in
Floodplain grassland	County/Medium	Floodplain grassland is a habitat listed under Suffolk’s Priority Species and Habitats list (Ref 1.15). This habitat within the site boundary has been shown to support breeding bird assemblages associated with wetland habitat including species listed under Section 41 of the NERC Act (Ref 1.14), BoCC Red List species (Ref 1.4) and BoCC Amber List species (Ref 1.4). Floodplain grassland has therefore been scoped into the detailed assessment.	Scoped in
Invertebrate assemblage	County/medium	Five species of recognised conservation value were recorded within the site boundary, including the ‘Near Threatened’ (Ref 1.23) and nationally scarce great silver water beetle and a nationally scarce soldier beetle <i>Cantharis fusca</i> (Ref 1.24) were recorded and are considered to be characteristic species of higher quality floodplain grazing marsh habitats. The species assemblages within the site indicates the importance of the site as linkage habitat within the wider River Alde floodplain. Invertebrate assemblages have therefore been scoped into the detailed assessment.	Scoped in
Great crested newts	Local/Very Low	The presence of great crested newt was not found in any of the ponds that were surveyed within 500m of the site, and this species is considered absent from the Zol. Great crested newts have therefore been scoped out of the detailed assessment.	Scoped out
Common toad and frog	Local/Very Low	It is envisaged that the woodland blocks within and adjacent to the site would support a small population of common toad and common frog. Common toad is listed under Section 41 of the NERC Act (Ref 1.14), while common frog has a low conservation status. Only a small area of woodland suitable to support this species within the site boundary will be lost with sufficient, suitable habitat outside the site will be retained. Common toad and common frog have therefore been scoped out of the detailed assessment; however, mitigation measures employed to protect reptiles would also protect this species. These have been detailed within section 7.5 of Chapter 7 of Volume 5 of the ES.	Scoped out

NOT PROTECTIVELY MARKED

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/out
Reptile assemblage	Local/Very Low	<p>All four common, native reptile species (adder, common lizard, grass snake and slow-worm) are protected under Schedule 5 of the W&CA (Ref 1.10) and are on Section 41 of the NERC Act (Ref 1.14) and included on Suffolk’s Priority Species and Habitats list (Ref 1.15).</p> <p>Habitat within and adjacent to the site boundary is of relatively little value to reptile species. From the review of available baseline data, the reptile population is predicted to be fragmented within the wider landscape and the population within the Zol of the proposed development would not be significant to the wider reptile population within Suffolk. Overall, it is considered that any impacts that may affect foraging and/or hibernating reptiles are unlikely to be significant.</p> <p>Reptiles have therefore been scoped out of the detailed assessment, but details of the mitigation measures that should be employed to safeguard reptiles have been detailed within section 7.5 of Chapter 7 of Volume 5 of the ES.</p>	Scoped out
Breeding bird assemblage	Local/Low	<p>Breeding birds are protected while nesting under the W&CA (Ref 1.10). The breeding bird assemblage identified within the site is representative of the arable, wetland and woodland habitats present, and the populations observed on site are comparable to the populations within the wider area.</p> <p>Many of the species recorded are common and widespread, including the intensively managed arable habitat, and the farmland bird assemblage it supports, which is widespread in Suffolk. However, farmland birds are in decline nationally due to a combination of habitat loss and intensive farming practices. Eleven birds on the Farmland Bird Indicator List have been found on site. It is therefore considered that any impacts could affect the farmland bird populations found within the site.</p> <p>The intensively managed arable habitat, and the farmland bird assemblage it supports, is widespread in Suffolk and the arable habitat is not being managed specifically to benefit birds. Many of the species recorded are common and widespread, including the intensively managed arable habitat, and the farmland bird assemblage it supports, which is widespread in Suffolk. However, farmland birds are in decline nationally due to a combination of habitat loss and intensive farming practices. Eleven birds on the Farmland Bird Indicator List have been found on site. It is therefore</p>	Scoped in

NOT PROTECTIVELY MARKED

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/out
		considered that any impacts could affect the farmland bird populations found within the site and farmland birds have therefore been scoped into the assessment.	
Roosting/commuting/foraging bats	County/Medium	<p>At least thirteen bat species/species groups have been recorded within the site. The Zol of the proposed development is known to support noctule, common pipistrelle, soprano pipistrelle, serotine, barbastelle, brown long-eared bat and <i>Myotis</i> species.</p> <p>Activity surveys within the site boundary revealed common and soprano pipistrelle as the mostly frequently recorded species with other species recorded at very low levels. A number of trees were identified within the site boundary that have a high or medium potential to support roosting bats.</p> <p>The degree of sensitivity bats display varies between species; however, it is recognised that all bat species can be negatively impacted by human disturbance. All bat species in the UK are protected under Annex IV of the Habitats Directive (Ref 1.7), transposed to English law under the Conservation of Habitats and Species Regulations (Ref 1.12). Additional relevant legislation includes the W&CA (Ref 1.10), and the NERC Act (Ref 1.14).</p> <p>Bats have therefore been scoped into the detailed assessment and details of the mitigation measures that should be employed to safeguard bats have been detailed within section 7.5 of Chapter 7 of Volume 5 of the ES.</p>	Scoped in
Badgers	Local/Very Low	<p>Badgers are protected under Schedule 6 of the W&CA (Ref 1.7) and by the Protection of Badgers Act (Ref 1.13).</p> <p>A single record of badger sett was identified within the site boundary and a single well used outlier badger sett was recorded within the site boundary. Badgers are widespread across England and Wales, and populations are increasing both in England and Wales and in Suffolk (Ref 1.37).</p> <p>Badgers have therefore been scoped out of the detailed assessment; however, details of the mitigation measures that should be employed to safeguard badgers have been detailed within section 7.5 of Chapter 7 of Volume 5 of the ES.</p>	Scoped out
Water vole	County/Medium	Habitat suitable to support water vole was recorded within the site and numerous water vole signs were recorded within the site boundary. Survey results indicate a low population of water vole along the River Alde within the Zol of the proposed development.	Scoped in

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Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/out
		<p>A review of the Suffolk's Priority Species and Habitats list (Ref 1.15) identified water vole as a priority species for conservation action in the county. Water vole are protected under Schedule 5 and 6 of the W&CA (Ref 1.10) and are included within Section 41 of the NERC Act (Ref 1.14).</p> <p>Water vole has therefore been scoped into the detailed assessment.</p>	
Otter	Local/Low	<p>A single otter footprint was recorded along the River Alde within the site boundary. Although no other fields signs were recorded, habitat present within the site boundary is considered suitable to support this species. An otter footprint was found along the River Alde within the site boundary, with the River Alde providing connectivity to suitable habitat in the wider vicinity.</p> <p>A review of the Suffolk's Priority Species and Habitats list (Ref 1.15) identified otters as a priority species for conservation action in the county. Otters are protected under Schedule 5 and 6 of the W&CA (Ref 1.10), and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.12) and are included within Section 41 of the NERC Act (Ref 1.14).</p> <p>Otter has therefore been scoped into the detailed assessment and details of the mitigation measures that should be employed to safeguard otters have been detailed within section 7.5 of Chapter 7 of Volume 5 of the ES.</p>	Scoped in
Brown hare	Local/Very Low	<p>Brown hare has been recorded within the site boundary, comprising of a few individual records. While a limited number of brown hare are considered to be found within or adjacent to the proposed development, there is sufficient adjacent habitat to support this species. The population found within the site boundary is not considered to be a significant contribution to the potential wider population within the Zol.</p> <p>The effects of the proposed development on this highly mobile species are unlikely to be significant and brown hare have therefore been scoped out of the detailed assessment. Details of the mitigation measures that should be employed to safeguard brown hare have been detailed within section 7.5 of Chapter 7 of Volume 5 of the ES.</p>	Scoped out
Hedgehog	Local/Very Low	<p>Records of hedgehog have been identified within close proximity to the site boundary and the areas of broadleaved woodland and the boundary hedgerows present within the site boundary are considered suitable habitat to support this species.</p>	Scoped out

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Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/out
		<p>Hedgehog is a priority species for conservation action on Suffolk’s Priority Species and Habitats list (Ref 1.15) and listed under Section 41 of the NERC Act (Ref 1.14).</p> <p>While hedgehog is likely to be found within or adjacent to the site, there is sufficient adjacent habitat to support this species and the effects of the proposed development on this species (in both habitat loss and fragmentation) is unlikely to be of significance.</p> <p>Hedgehog has therefore been scoped out of the detailed assessment, but details of the mitigation measures that should be employed to safeguard hedgehog have been detailed within section 7.5 of Chapter 7 of Volume 5 of the ES.</p>	Scoped out
Water shrew	Local/Very Low	<p>No water shrew was found within the site boundary; however, habitats present within the site could support this species. Water shrews are considered to be declining in Suffolk (Ref 1.27). The water shrew is also on Suffolk’s Priority Species and Habitats list (Ref 1.15) and considered locally important, but is not included within Section 41 of the NERC Act (Ref 1.14), so is not identified as a species of principal importance for the purpose of conserving biodiversity in England.</p> <p>This species has been scoped out the detailed assessment.</p>	Scoped out

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VOLUME 5, CHAPTER 7, APPENDIX 7A: ANNEX 7A.2: DESK-STUDY

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Plates

None provided.

Figures

None provided.

Annexes

Annex 7A.2A Designated Sites Citations

1. Desk Study

1.1 Methodology

- 1.1.1. Desk-study records of protected or otherwise notable species of conservation interest within 2km (unless otherwise stated) of the two village bypass site boundary (hereafter referred to as the site) were obtained from Suffolk Biodiversity Information Service (SBIS) in March 2018.

1.2 Plants

1.2.1. **Table 1.1** summarises the desk-study results for plants within the 2km Zone of Influence (Zol) of the site.

Table 1.1: Desk-study results for plants

Plant Species	Location	Site Details	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
Harebell (<i>Campanula rotundifolia</i>)	Farnham Churchyard		TM363599	2010		154m
Meadow Saffron (<i>Colchicum autumnale</i>)	Benhall		TM386611	2013		1.3km
Southern Marsh-orchid (<i>Dactylorhiza praetermissa</i>)	Benhall		TM386611	2013		1.3km
Lesser Pondweed (<i>Potamogeton pusillus</i>)	Snape Marshes		TM3817958387	2015		1.9km
	Snape	Snape NVC	TM3818458392	2015		1.9km
	Snape	Snape NVC	TM3779158253	2015		1.7km
Common Valerian (<i>Valeriana officinalis</i>)	Benhall	The Wadd	TM386611	2013		1.3km

*An approximate distance from the red line boundary can only be calculated where the grid reference has been received in full

1.3 Invertebrates

1.3.1. **Table 1.2** summarises the desk-study results for invertebrates recorded within 2km Zol of the site.

Table 1.2: Desk-study results for invertebrates

Invertebrate Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
Small heath (<i>Coenonympha pamphilus</i>)	Saxmundham		TM3762	1.46897356	52.20477274	2014	1 count	1.4km
	Campsey Ash	Campsey Ash to Saxmundham	TM3658	1.451581084	52.16930129	2010	1 count	1.4km
	Great Glemham	Great Glemham, Lusaka House	TM3461	1.424457278	52.197079	2010	2 counts	1.8km
	Farnham	Walk Barn Farm, Farnham	TM35U	1.451581084	52.16930129	2009	1 count	1.4km
Grayling (<i>Hipparchia semele</i>)	Farnham	Farnham, Racewalk covert	TM3759	1.46687597	52.17784784	2010	1 count	655m
	Farnham	Walk Barn Farm, Farnham	TM35U	1.451581084	52.16930129	2009	16 counts	1.4km

1.4 Reptiles

1.4.1. **Table 1.3** summarises the desk-study results for reptiles recorded within 2km Zol of the site.

Table 1.3: Desk-study results for reptiles

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
Grass snake (<i>Natrix helvetica helvetica</i>)	Benhall Green		TM386612	1.491782387	52.19690279	2011		1.3km
	Benhall Green	2a Benhall Green	TM385612	1.490321883	52.19694605	2009		1.2km
Common lizard (<i>Zootoca vivipara</i>)	Benhall Green		TM385612	1.490321883	52.19694605	2014		1.2km
	Farnham	Walk Barn Farm, Farnham	TM372594	1.470075518	52.18135189	2009	1	580m

1.5 Birds

1.5.1. **Table 1.4** below summarises the desk-study results for birds within 2km Zol of the proposed development.

Table 1.4: Desk-study results for birds

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
Lesser redpoll (<i>Acanthis cabaret</i>)	Benhall		TM3761	2014	1 count	405m
Skylark (<i>Alauda Arvensis</i>)	Snape		TM3959	1994	1 count of flying south	N/A*
	Sternfield		TM36V	2011	1 probable count of breeding confirmed	830m
	Stratford St Andrew	Stratford St Andrew	TM358601	2010	5 counts	200m
	Benhall		TM36R	2010	1 probable count of breeding confirmed	1.6km
	Benhall		TM36Q	2010	1 probable count of breeding confirmed	19m
	Stratford St Andrew		TM36K	2010	5 possible counts of breeding confirmed	1.3km
Kingfisher (<i>Alcedo atthis</i>)	Snape	Snape NVC	TM3820558445	2015		1.9km
	Great Glemham		TM36K	2010	1 count	1.3km
Pintail (<i>Anas acuta</i>)	Gromford Meadow	Gromford Marshes	TM381593	2010	54 counts	1.4km
Greylag goose	Sternfield		TM36V	2011	1 count	830m

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Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
(<i>Anser anser</i>)						
Meadow pipit (<i>Anthus pratensis</i>)	Benhall		TM36Q	2010	1 count	19m
Common swift (<i>Apus apus</i>)	Benhall Green		TM3828761194	2017		1.1km
	Benhall	Benhall and Sternfield	TM382611	2015		950m
	Benhall	24 Benhall Green	TM38336125	2014	5 counts	1.1km
	Benhall		TM383612	2014		1.1km
	Benhall Green		TM3861	2014	7 counts	720m
	Benhall	Coronation Row, Benhall	TM38306117	2011	1 count	1.1km
	Sternfield		TM36V	2011		830m
	Benhall		TM383611	2011		1.0km
	Benhall		TM384610	2011		1.1km
	Benhall	1 Coronation Row, Benhall	TM38426105	2011	1 count	1.1km
	Benhall		TM36R	2010	1 confirmed count of breeding	1.7km
	Benhall		TM36Q	2010	1 possible count of breeding	20m

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 confirmed count of breeding	1.3km
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Little owl (<i>Athene noctua</i>)	Great Glemham		TM36K	2010	1 count	1.3km
	Benhall		TM36R	2010	1 possible count of breeding	1.7km
Waxwing (<i>Bombycilla garrulus</i>)	Saxmundham	Saxmundham (south-west)	TM3762	2013	3 counts	1.4km
	Benhall	Benhall Church	TM3761	2011	25 counts	410m
	Saxmundham	Saxmundham (south)	TM3862	2011	22 counts	1.5km
Goldfinch (<i>Carduelis carduelis</i>)	Stratford St Andrew		TM36K	2011		1.3km
	Sternfield	Bankside Sternfield	TM36V	2011		830m
	Saxmundham		TM36R	2010	2 possible counts of breeding	1.7km
	Benhall		TM36Q	2010	20 counts	20m
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Stratford St Andrew	Stratford St. Andrew	TM358601	2010	4 counts	200m
	Benhall		TM384609	2009		1.1km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
	Benhall		TM383614	2009		1.2km
Treecreeper (<i>Certhia familiaris</i>)	Benhall	Benhall Sewage Works	TM3860	2014	1 count	830m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 count	1.3km
	Saxmundham	Saxmundham	TM36R	2010	1 possible count of breeding	1.7km
	Benhall		TM36Q	2010	1 probable count of breeding	20m
Cetti's warbler (<i>Cettia cetti</i>)	Farnham	Walk Barn, Farnham Hall	TM35U	2010	1 probable count of breeding	1.4km
Greenfinch (<i>Chloris chloris</i>)	Farnham	Walk Barn, Farnham Hall	TM35U	2011	1 probable count of breeding	1.4km
	Sternfield	Bankside Sternfield	TM36V	2011		830m
	Stratford St Andrew	Stratford St. Andrew	TM358601	2010	7 counts	200m
	Saxmundham	Saxmundham	TM36R	2010	1 probable counts of breeding	1.7km
	Benhall		TM36Q	2010	1 probable counts of breeding	20m
	Stratford St Andrew		TM36K	2010	7 possible counts of breeding confirmed	1.3km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
	Benhall		TM383614	2009		1.2km
	Sternfield		TM382603	2009		900m
	Benhall		TM384609	2009		1.1km
	Benhall		TM385613	2009		1.3km
Marsh harrier (<i>Circus aeruginosus</i>)	Great Glemham		TM36K	2010	breeding confirmed	1.3km
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
Quail (<i>Coturnix coturnix</i>)	Sternfield	Sternfield Tetrad	TM36V	2011	1 count	830m
Cuckoo (<i>Cuculus canorus</i>)	Farnham	Walk Barn, Farnham Hall	TM35U	2010	1 probable count of breeding	1.4km
	Saxmundham	Saxmundham	TM36R	2010	1 possible count of breeding	1.7km
Blue tit (<i>Cyanistes caeruleus</i>)	Sternfield		TM36V	2011	1 confirmed count of breeding	830m
	Stratford St Andrew		TM36K	2011		1.3km
	Benhall		TM36Q	2010	1 confirmed count of breeding	20m

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Stratford St Andrew	Stratford St. Andrew	TM358601	2010	10 counts	200m
	Benhall		TM36R	2010	9 counts	1.7km
	Benhall		TM383614	2009		1.2km
	Benhall		TM371614	2009		770m
	Benhall		TM385613	2009		1.3km
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
	Sternfield		TM382603	2009		901m
	Benhall		TM384609	2009		1.1km
	Benhall		TM382615	2009		1.2km
	Benhall		TM384618	2009		1.5km
	Benhall		TM383612	2009		1.1km
	House martin (<i>Delichon urbicum</i>)	Sternfield		TM36V	2011	
Benhall			TM36R	2010	1 possible count of breeding	1.7km
Stratford St Andrew		Stratford St Andrew	TM36K	2010	1 confirmed count of breeding	1.3km
Benhall		Benhall Lodge	TM36Q	2010	1 confirmed count of breeding	20m

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Great spotted woodpecker (<i>Dendrocopos major</i>)	Sternfield		TM36V	2011	1 possible count of breeding	830m
	Benhall		TM36Q	2010	1 probable count of breeding	20m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 probable count of breeding	1.3km
	Saxmundham	Saxmundham	TM36R	2010	3 possible counts of breeding	1.7km
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Benhall		TM371614	2009		772m
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
	Benhall		TM385613	2009		1.3km
Little egret (<i>Egretta garzetta</i>)	Sternfield		TM36V	2011	1 count	832m
	Blaxhall		TM35U	2010	1 count	1.4km
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Yellowhammer	Benhall		TM36Q	2010	1 probable count of breeding	20m

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
<i>(Emberiza citronella)</i>	Benhall		TM36R	2010		1.7km
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 probable count of breeding	1.3km
Reed bunting <i>(Emberiza schoeniclus)</i>	Snape	Snape NVC	TM3814258269	2015	2 counts	2km
Robin <i>(Erithacus rubecula)</i>	Sternfield		TM36V	2011	1 confirmed count of breeding	832m
	Saxmundham	Saxmundham	TM36R	2010	9 possible counts of breeding	1.7m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 probable count of breeding	1.3m
	Farnham	Walk Barn, Farnham Hall	TM35U	2010	1 probable count of breeding	1.4m
	Stratford St Andrew	Stratford St. Andrew	TM358601	2010	6 counts	204m
	Benhall		TM36Q	2010	15 probable counts of breeding	20m
	Saxmundham		TM36W	2010	1 probable count of breeding	1.5km
	Benhall		TM383612	2009		1.1km
	Benhall		TM384609	2009		1.1km
Benhall		TM382615	2009		1.2km	

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Benhall		TM371614	2009		772m
	Benhall		TM384618	2009		1.6km
	Benhall		TM385613	2009		1.3km
	Benhall		TM383614	2009		1.2km
	Sternfield		TM382603	2009		902m
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
Kestrel (<i>Falco tinnunculus</i>)	Farnham		TM36V	2011		832m
	Great Glemham		TM36K	2010	1 count	1.3km
	Benhall		TM36Q	2010	1 possible count of breeding	20m
	Benhall		TM36R	2010	1 count	1.7km
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Farnham	Farnham Hall	TM35U	2009	1 probable count of breeding	1.4km
Brambling (<i>Fringilla montifringilla</i>)	Benhall		TM3761	2014	1 count	406m
	Benhall	Benhall (west)	TM3661	2011	200 counts	955m
	Sternfield	Bankside Sternfield	TM36V	2011		832m
	Great Glemham		TM36K	2010		1.3km
Swallow	Sternfield		TM36V	2011		832m

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
<i>(Hirundo rustica)</i>	Stratford St Andrew		TM36K	2011		1.3km
	Benhall		TM36Q	2010	1 confirmed count of breeding	20m
	Benhall		TM36R	2010	1 probable count of breeding	1.7km
	Stratford St Andrew	Stratford St Andrew	TM358601	2010	2 counts	204m
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Herring gull <i>(Larus argentatus)</i>	Sternfield		TM36V	2011	1 count	832m
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Benhall		TM36Q	2010	4 counts	20m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 count	1.3km
Black-tailed godwit <i>(Limosa limosa)</i>	Gromford Meadow	Gromford Marshes	TM381593	2010	180 counts	1.4km
Linnet <i>(Linaria cannabina)</i>	Farnham	Mollett's Farm, Farnham	TM3656760277	2016		279m
	Farnham	Mollett's Farm, Farnham	TM3669160230	2016		149m
	Stratford St Andrew	Stratford St Andrew	TM358601	2010	3 counts	204m

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Stratford St Andrew		TM36K	2010	3 possible counts of breeding	1.3km
	Benhall		TM36R	2010	1 probable count of breeding	1.7km
	Farnham	Farnham Hall	TM35U	2009	1 probable count of breeding	1.4km
Woodlark (<i>Lullula arborea</i>)	Farnham	Farnham Burnt House Farm	TM3758	2013	2 counts	1.5km
Red kite (<i>Milvus milvus</i>)	Stratford St Andrew	Stratford St Andrew	TM358601	2014		204m
	Benhall	Benhall Lodge Park	TM3760	2014	1 count	187m
Pied wagtail (<i>Motacilla alba</i>)	Sternfield		TM36V	2011	16 counts	832m
	Great Glemham		TM36K	2010	5 counts	1.3km
	Benhall		TM36Q	2009	2 counts	20m
	Benhall		TM384609	2009		1.1km
	Benhall		TM383612	2009		1.1km
	Benhall		TM383613	2009		1.2km
	Sternfield	Bankside Sternfield	TM36V	2010		832m
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Grey wagtail	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 count	1.3km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
(<i>Motacilla cinerea</i>)	Farnham		TM3660	2010	1 count	19m
Yellow wagtail (<i>Motacilla flava</i>)	Snape	Snape NVC	TM3814258269	2015	2 count	2km
Spotted flycatcher (<i>Muscicapa striata</i>)	Benhall		TM3761	2014	2 counts	406m
	Benhall	Benhall Saxmundham	TM36V	2010	1 confirmed count of breeding	832m
	Blaxhall	Langham Bridge	TM375582	2009	1 count	1.6km
Curlew (<i>Numenius arquata</i>)	Blaxhall		TM35U	2010	3 counts	1.4km
Wheatear (<i>Oenanthe oenanthe</i>)	Farnham		TM35U	2010	2 non- counts of breeding	1.4km
Great tit (<i>Parus major</i>)	Sternfield		TM36V	2011	1 probable count of breeding	832m
	Benhall		TM36Q	2010	1 probable count of breeding	20m
	Benhall		TM36R	2010	1 probable count of breeding	1.7km
	Stratford St Andrew		TM36K	2010	9 possible counts of breeding	1.3km
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Stratford St Andrew	Stratford St Andrew	TM358601	2010	9 counts	204m
	Benhall		TM371614	2009		772m
	Benhall		TM383614	2009		1.2km
	Benhall		TM385613	2009		1.3km
	Benhall		TM384618	2009		1.5
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
	Benhall		TM383612	2009		1.1km
	Benhall		TM383613	2009		1.2km
	Farnham	Farnham Hall	TM35U	2009	1 probable count of breeding	1.4km
	Stratford St Andrew	Stratford St Andrew	TM357602	2009		235m
	Benhall		TM384609	2009		1.1km
	Benhall		TM382615	2009		1.2km
	Sternfield		TM382603	2009		901m
	House sparrow (<i>Passer domesticus</i>)	Sternfield		TM36V	2011	1 probable count of breeding
Stratford St Andrew		Stratford St Andrew	TM358601	2010	10 counts	204m
Saxmundham			TM36W	2010	1 probable count of breeding	1.4km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	27 probable counts of breeding	1.3km
	Benhall		TM36R	2010	1 confirmed count of breeding	1.7km
	Benhall		TM36Q	2010	12 counts	20m
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
	Benhall		TM384609	2009		1.1km
	Benhall		TM384618	2009		1.5km
	Benhall		TM382615	2009		1.2km
	Benhall		TM385613	2009		1.3km
	Benhall		TM383614	2009		1.2km
	Benhall		TM383613	2009		1.1km
	Benhall		TM383612	2009		1.1km
Coal tit (<i>Periparus ater</i>)	Sternfield		TM36V	2011	1 probable count of breeding	832m
	Saxmundham	Saxmundham garden	TM36W	2010		1.4km
	Benhall		TM36Q	2010	1 count	19m
	Saxmundham	Saxmundham R	TM36R	2010	1 possible count of breeding	1.7km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 probable count of breeding	1.3km
	Benhall		TM384609	2009		1.1km
	Farnham	Farnham Hall	TM35U	2009	1 probable count of breeding	1.5km
	Benhall		TM371614	2009		772m
	Sternfield		TM382603	2009		901m
	Benhall		TM383614	2009		1.2km
Green woodpecker (<i>Picus viridis</i>)	Sternfield		TM36V	2011	1 count	832m
	Stratford St Andrew	Stratford St Andrew	TM358601	2010	2 counts	204m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 count	1.3km
	Benhall		TM36R	2010	1 probable count of breeding	1.7km
	Benhall		TM36Q	2010	1 probable count of breeding	20m
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Stratford St Andrew	Stratford St Andrew	TM357602	2009		235m
	Farnham	Walk Barn, Farnham Hall	TM35U	2009	1 probable count of breeding	1.4km
	Benhall		TM384609	2009		1.1km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
Marsh tit (<i>Poecile palustris</i>)	Benhall	Benhall Sewage Works	TM3860	2014	1 count	832m
	Benhall		TM36Q	2010	3 probable counts of breeding	20m
	Benhall		TM36R	2010	3 counts	1.7km
	Benhall	Benhall Church	TM3761	2010	3 counts	406m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 count	1.3km
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Dunnock (<i>Prunella modularis</i>)	Sternfield	Bankside Sternfield	TM36V	2011		832m
	Stratford St Andrew		TM36K	2011		1.3km
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Stratford St Andrew	Stratford St. Andrew	TM358601	2010	3 counts	204m
	Benhall		TM36Q	2010	1 probable count of breeding	20m
	Benhall		TM36R	2010	1 probable count of breeding	1.6km
	Benhall		TM371614	2009		772m
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
	Benhall		TM383614	2009		1.2km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Benhall		TM384618	2009		1.5km
	Farnham	Farnham Hall	TM35U	2009	1 probable count of breeding	1.4km
	Benhall		TM385613	2009		1.3km
	Benhall		TM384609	2009		1.1km
	Benhall		TM383612	2009		1.1km
	Sternfield		TM382603	2009		901m
Bullfinch (<i>Pyrrhula pyrrhula</i>)	Sternfield		TM36V	2011		832m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	2 probable counts of breeding	1.3km
	Benhall		TM36R	2010	1 probable count of breeding	1.7km
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Benhall		TM36Q	2009	4 counts	19m
Goldcrest (<i>Regulus regulus</i>)	Farnham	Walk Barn, Farnham Hall	TM35U	2011	1 probable count of breeding	1.4km
	Sternfield		TM36V	2011	1 probable count of breeding	832m
	Great Glemham		TM36K	2010	2 counts	1.3km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Benhall		TM36Q	2010	1 possible count of breeding	20m
	Saxmundham		TM36W	2010	5 confirmed counts of breeding	1.5km
Sand martin (<i>Riparia riparia</i>)	Sternfield		TM36V	2011		832m
	Benhall		TM36R	2010	1 possible count of breeding	1.7km
Whinchat (<i>Saxicola rubetra</i>)	Snape	Snape NVC	TM3820558445	2015		2km
Nuthatch (<i>Sitta europaea</i>)	Benhall		TM3761	2014	1 count	406m
	Benhall	Benhall Estate	TM385615	2014	1 count	1.4km
	Benhall	Benhall Lodge Park	TM3760	2010	1 count	187m
	Benhall		TM36Q	2010	1 possible count of breeding	20m
	Great Glemham		TM36K	2010	12 counts	1.3km
	Benhall		TM371614	2009		772m
	Saxmundham	Water Tower, Saxmundham	TM36R	2009		1.7km
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Siskin	Sternfield		TM36V	2011	21 counts	832m

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
<i>(Spinus spinus)</i>	Benhall		TM36Q	2010	20 counts	20m
	Great Glemham		TM36K	2010	81 counts	1.3km
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Turtle dove <i>(Streptopelia turtur)</i>	Benhall	Benhall Friday Street Farm	TM3760	2014	1 count	187m
	Benhall	Benhall (west)	TM3661	2010	1 count	955m
	Sternfield	Sternfield Bankside	TM36V	2010		832m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 possible count of breeding	1.3km
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km
Tawny owl <i>(Strix aluco)</i>	Sternfield	Sternfield Tetrad	TM36V	2010	1 count	832m
	Sternfield		TM3961	2010	1 count	1.7km
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
Starling <i>(Sturnus vulgaris)</i>	Sternfield		TM36V	2011		832m
	Stratford St Andrew		TM36K	2010	1 possible count of breeding	1.3km
	Benhall		TM36R	2010	1 possible count of breeding	1.7km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Stratford St Andrew	Stratford St. Andrew	TM358601	2010	1 count	204m
	Saxmundham	Saxmundham garden	TM36W	2010		1.5km
	Benhall		TM36Q	2010	1 confirmed count of breeding	20m
	Stratford St Andrew	Stratford St Andrew	TM352608	2009		935m
	Benhall		TM384609	2009		1.1km
	Benhall		TM383612	2009		1.1km
	Benhall		TM383613	2009		1.1km
Shelduck (<i>Tadorna tadorna</i>)	Gromford Meadow	Gromford Marshes	TM381593	2010	38 counts	1.4km
Greenshank (<i>Tringa nebularia</i>)	Snape	Snape NVC	TM3777558369	2015		1.7km
	Snape	Snape NVC	TM3814658401	2015	2 count	2km
	Snape	Snape NVC	TM3820558445	2015		2km
Green sandpiper (<i>Tringa ochropus</i>)	Snape	Snape NVC	TM3777558369	2015	4 counts	1.7km
Wren (<i>Troglodytes troglodytes</i>)	Stratford St Andrew		TM36K	2011		1.3km
	Sternfield		TM36V	2011	1 count	832m
	Benhall		TM36R	2010	1 probable count of breeding	1.7km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Benhall		TM36Q	2010	1 probable count of breeding	19m
	Saxmundham		TM36W	2010	1 possible count of breeding	1.5km
	Benhall		TM371614	2009		772m
	Benhall		TM385613	2009		1.3km
	Farnham	Farnham Hall	TM35U	2009	1 probable count of breeding	1.4km
Redwing (<i>Turdus iliacus</i>)	Sternfield		TM36V	2011	6 counts	832m
	Benhall	Benhall Church	TM3761	2010	100 counts	406m
	Benhall		TM36Q	2010	103 counts	20m
Song thrush (<i>Turdus philomelos</i>)	Sternfield		TM36V	2011	1 possible count of breeding	832m
	Saxmundham	Saxmundham garden	TM36W	2010		1.4km
	Stratford St Andrew	Stratford St Andrew	TM358601	2010	4 counts	204m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	1 probable count of breeding	1.3km
	Benhall		TM36Q	2010	2 counts	20m
	Saxmundham	Saxmundham R	TM36R	2010	1 possible count of breeding	1.7km

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
	Farnham	Walk Barn, Farnham Hall	TM35U	2009	1 confirmed count of breeding	1.4km
	Benhall		TM371614	2009		772m
Fieldfare (<i>Turdus pilaris</i>)	Stratford St Andrew		TM3560	2010	300 counts	357m
	Benhall		TM36R	2010		1.7km
	Benhall		TM36Q	2010	1 count	20m
	Stratford St Andrew	Stratford St Andrew	TM36K	2010	300 counts	1.3km
	Benhall		TM371614	2009		772m
Barn owl (<i>Tyto alba</i>)	Benhall		TM354613	2016		1.3km
	Stratford St Andrew	Stratford St Andrew	TM358601	2013	1 count	204m
	Benhall		TM3510561226	2012		1.4km
	Blaxhall		TM3740058000	2012		1.7km
	Farnham		TM3802759890	2011		916m
	Sternfield		TM36V	2010		832m
	Farnham	Walk Barn, Farnham Hall	TM35U	2010	1 count	1.4km
	Kelsale-cum-Carlton		TM36R	2009	1 probable count of breeding	1.7km
	Saxmundham	Saxmundham garden	TM36W	2009		1.5km



SIZEWELL C PROJECT – ENVIRONMENTAL STATEMENT

NOT PROTECTIVELY MARKED

Bird Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
Lapwing (<i>Vanellus vanellus</i>)	Saxmundham	Saxmundham garden	TM36W	2009		1.5km

1.6 Bats

1.6.1. **Table 1.5** below summarises the desk-study results for bats.

1.6.2. As detailed in **section 3** of **Appendix 7A Two Village Bypass Ecological Baseline**, the Zol for individual bat species has been identified based on the recommended Core Sustenance Zones (CSZ) identified by the Bat Conservation Trust (BCT)¹. The sole exception to this is for barbastelle (*Barbastella barbastellus*) for which the Zol has been extended to 10km based on radio-tracking information gathered on the Sizewell C main development site.

Table 1.5: Desk-study results for bats

Bat Species (Zol)	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
Barbastelle (10km)	Benhall		TM354613	1.445113911	52.19917568	2016		1.3km
	Great Glemham		TM35206152	1.442345342	52.20123557	2013		1.6km
	Little Glemham	Sink Farm Little Glemham	TM354583	1.443031151	52.17225008	2011	5	1.1km
Serotine (<i>Eptesicus serotinus</i>) (4km)	Benhall		TM354613	1.445113911	52.19917568	2016		1.3km
	Great Glemham		TM35206152	1.442345342	52.20123557	2013		1.6km
Unidentified Bat (<i>Myotis sp.</i>)	Benhall		TM354613	1.445113911	52.19917568	2016		1.3km
	Great Glemham		TM35206152	1.442345342	52.20123557	2013		1.6km

¹ J. Collins (ed.) Bat Surveys for Professional Ecologists: Good Practice Guidelines. 3rd edition. London: The Bat Conservation Trust, 2016.

NOT PROTECTIVELY MARKED

Bat Species (Zol)	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
(2km)								
Noctule bat <i>Nyctalus noctula</i> (4km)	Benhall		TM354613	1.445113911	52.19917568	2016		1.3km
	Great Glemham		TM35206152	1.442345342	52.20123557	2013		1.6km
Pipistrelle bat species <i>(Pipistrellus spp.)</i>	Sternfield	Brook Farm, Sandy Lane, IP17 1HW	TM3868061020	1.492824006	52.19525272	2014	1	1.4km
	Benhall		TM360610	1.453668788	52.19622667	2009		1.3km
Common pipistrelle <i>(Pipistrellus pipistrellus)</i>	Benhall		TM354613	1.445113911	52.19917568	2016		1.3km
	Great Glemham		TM35206152	1.442345342	52.20123557	2013		1.6km
Soprano pipistrelle <i>(Pipistrellus pygmaeus)</i> (3km)	Benhall		TM354613	1.445113911	52.19917568	2016		1.3km
	Great Glemham		TM35206152	1.442345342	52.20123557	2013		1.6km
Long-eared bat <i>(Plecotus)</i>	Benhall Churchyard	Benhall Church	TM37216186	1.471943175	52.20342593	2015		1.2km
	Benhall		TM372618	1.471755084	52.20289174	2015		1.1km
	Benhall		TM368602	1.464794066	52.18870372	2010		41m
Brown long-eared	Benhall		TM354613	1.445113911	52.19917568	2016		1.3km

Bat Species (Zol)	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
<i>(Plecotus auratus)</i>	Benhall Churchyard	St Marys Church Benhall	TM37216186	1.471943175	52.20342593	2015		1.2km
	Stratford St Andrew	Stratford St Andrew	TM353603	1.442958936	52.19024317	2013		470m
	Benhall	Harrow Corner Low Street Benhall IP17 1JE	TM362608	1.456450459	52.19434603	2010		700m
	Benhall		TM360610	1.453668788	52.19622667	2009		955m

1.7 Terrestrial mammals

1.7.1. **Table 1.6** below summarises the desk-study results for terrestrial mammals recorded within 2km Zol of the site.

Table 1.6: Desk-study results for terrestrial mammals

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
West European hedgehog (<i>Erinaceus europaeus</i>)	Stratford St Andrew	Mill Lane, Stratford Saint Andrew	TM3559460253	1.447219713	52.18969583	2016	4 counts	285m
	Benhall	A12, Saxmundham	TM3729560680	1.472358404	52.19279896	2016	2 counts	25m
	Benhall	Benhall Green, Benhall	TM3824861405	1.486785542	52.19889481	2016	2 counts	1.2km
	Farnham	The Street, Farnham	TM3621860205	1.456298685	52.18899815	2016	1 Count	240m
	Benhall	Benhall Green	TM3837461336	1.48857732	52.1982211	2015		1.2km
	Sternfield	Sandy Lane	TM3870661006	1.493193861	52.19511582	2015		1.4km
	Stratford St Andrew	Main Road	TM3581260077	1.45028081	52.18802305	2015		200m
	Benhall	Benhall Green	TM3836661347	1.488468214	52.19832328	2015		1.2km
	Stratford St Andrew	Mill Lane	TM3508260510	1.439920988	52.19222093	2015		725m

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
	Snape	Wadd Lane	TM3845059144	1.488145596	52.17851554	2015		1.7km
	Stratford St Andrew	Main Road, Saxmundham	TM3562659878	1.44742639	52.18631648	2014	4 counts	15m
	Stratford St Andrew	Stratford St Andrew	TM3508060900	1.440162301	52.19572212	2014	3 counts	1.1km
	Benhall	A1094, Saxmundham	TM3776160125	1.478774546	52.18761721	2014	1 count	565m
	Benhall	A1094, Saxmundham	TM3750060425	1.475173538	52.19042212	2014	1 count	200m
	Benhall		TM3566161919	1.449356817	52.2046198	2014	1 count	1.8km
	Benhall	A12, Saxmundham	TM3782261766	1.480816881	52.20231863	2014	1 count of dead	1.2km
	Benhall	Benhall Green, Saxmundham	TM3838261325	1.488686424	52.19811892	2014	1 count	1.2km
	Farnham	The Street, Saxmundham on the a12 in the middle of Farnham	TM3633860224	1.458064287	52.18911727	2014	1 count of dead	315m
	Farnham	The Street, Farnham	TM3630060211	1.457500311	52.18901687	2014	1 count of dead	280m

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
	Farnham	Friday Street, Farnham	TM374603	1.473625681	52.1893433	2009	1 count	175m
Brown hare (<i>Lepus europaeus</i>)	Benhall		TM374613	1.474326159	52.19831821	2016		635m
	Snape	Snape NVC	TM3814258269	1.483034923	52.17079556	2015		2km
	Farnham	Mollett's Farm, Benhall	TM367601	1.46326397	52.18784914	2015		80m
European otter (<i>Lutra lutra</i>)	Benhall	A12 north bound just before the turning to Snape	TM3661	1.453669	52.19623	2014	1 count of dead	955m
	Benhall		TM3788661231	1.481376	52.19749	2012		775m
	Snape	Abbey Farm, Snape	TM388597	1.493647	52.18335	2009	1 count	1.7km
Eurasian badger (<i>Meles meles</i>)	Benhall	A12	TM377619	1.479128861	52.20357388	2017		1.3km
	Farnham		TM3760	1.4675748	52.18682283	2016		185m
	Farnham	side of A12	TM360601	1.453042132	52.18814908	2016	1 count of male	120m
	Benhall		TM3761	1.468273996	52.1957978	2016		405.m
	Benhall		TM36956049	1.467187183	52.19124205	2015		Within red line boundary

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary*
	Farnham		TM363602	1.457492644	52.18891815	2015		270m
	Benhall	Benhall	TM379613	1.481628992	52.19810271	2013		835m
	Benhall		TM378615	1.480308807	52.19994082	2013		945m
	Great Glemham Park	Great Glemham House	TM3461	1.424457278	52.197079	2012		1.8km
	Farnham	by A12	TM36336019	1.45792376	52.18881554	2011	1 count of dead	280m
Eurasian water shrew (<i>Neomys fodiens</i>)	Benhall Green	near the Wadd, IP17 1HT	TM385612	1.490321883	52.19694605	2011		1.3km

VOLUME 5, CHAPTER 7, APPENDIX 7A: ANNEX 7A.2: DESK-STUDY, ANNEX 7A.2A DESIGNATED SITES CITATIONS

County Wildlife Site Citations

Ramsar Citation

Special Areas of Conservation:

- Citation
- Conservation Objectives
- Natura 2000 Data Forms

Special Protection Areas:

- Citation
- Conservation Objectives
- Natura 2000 Data Forms

Sites of Special Scientific Interest Citations

County Wildlife Site Citations

CWS Number Suffolk Coastal 68
Site Name FOXBURROW WOOD
Parish FARNHAM
District Suffolk Coastal
NGR TM370598

Description

This is an ancient wood on sandy soils with a variety of tree species including oak, ash and beech (some of which are very mature) in the canopy and also hazel, field maple, hawthorn and hornbeam coppice. In the shrub layer, elder and holly are also present. The perimeter of the wood is marked by a ditch and bank boundary with one very old oak pollard on the northern edge. The ground flora includes ferns and carpets of bluebell, with dog's-mercury dominant in parts.

RNR Number 0

Area 4.38

County Wildlife Site Citations

CWS Number	Suffolk Coastal 186
Site Name	FARNHAM CHURCHYARD
Parish	FARNHAM
District	Suffolk Coastal
NGR	TM362599
Description	<p>Farnham Churchyard provides a valuable refuge for wildlife in an intensively farmed landscape. In addition to many fairly common wild flowers the site also supports a number of scarce Suffolk plants. Orpine, which grows here in abundance is a declining species throughout Suffolk. Grass vetchling which is scattered throughout the churchyard is also uncommon in Suffolk and is mainly restricted to a few sites on the coast. Although parts of the churchyard are cut annually, the cuttings are left lying and a thatch has developed, smothering some of the less vigorous plants. The ideal form of management would be a late annual cut and raking up and removal of the hay.</p>
RNR Number	0
Area	0.38

County Wildlife Site Citations

CWS Number Suffolk Coastal 79
Site Name GREAT GLEMHAM WOOD
Parish STRATFORD ST ANDREW
District Suffolk Coastal
NGR TM338607

Description

Great Glemham Wood is a large woodland appearing in English Nature's Ancient Woodland Inventory. As with most of East Anglia's woods it was managed at one time as a coppice with standards system, although all woodland work has now ceased. The wood has been severely damaged by recent management. All the rides have been surfaced with tarmac or concrete, and four pig rearing units have been built inside the wood. Spoil from the surfacing and building has been heaped adjacent to the concrete areas. The composition of the tree species is typically ash, field maple and hazel, although there are good areas of hornbeam in the western areas, with coppice stools up to six feet across. Despite this treatment much of the wood remains intact and there is an excellent ground flora. There are a number of ancient woodland indicator plants, such as remote and wood sedges, wood spurge and barren strawberry. There are also a number of plants present which are not normally found in wood, such as reedmace, common sedge, glaucous sedge and water horsetail. On the edge of the wood is a large pond which is fringed by reed and more reedmace. On the western edge is a large area of abandoned pasture, seemingly unimproved. Most has now become semi-scrub with bramble, rose and hawthorn, but a small wet depression to the north remains marshy with spike-rush, false fox- sedge, gypsywort and reedmace.

RNR Number 0

Area 23.03

County Wildlife Site Citations

CWS Number Suffolk Coastal 158
Site Name DENNEYS GROVE
Parish STRATFORD ST ANDREW
District East Suffolk
NGR TM342611

Description

Denney's Grove is one of a number of small ancient woodlands situated in the Great Glemham area. The tree layer consists of oak (both pendunculate and Turkey oak), ash, field maple and hornbeam. Beneath the canopy is dense understorey composed mainly of hazel and hawthorn, with occasional dogwood, bramble and elder. Basically a dog's-mercury woodland, the ground flora also contains a number of other plants including violet, male fern, selfheal and wood sedge. The damp conditions of the woodland floor and numerous fallen trees provide suitable conditions for bryophytes and fungi to grow in profusion.

RNR Number 0

Area 3.29

County Wildlife Site Citations

CWS Number Suffolk Coastal 118

Site Name GREAT WOOD

Parish LITTLE GLEMHAM

District Suffolk Coastal

NGR TM339599

Description

A very fine ancient woodland surrounded by a ditch and bank and including internal ditch and banks. The structure is one of abandoned coppice with standards. The oak and ash standards have grown very large and are shading the undergrowth; which is principally hazel and ash but with some hornbeam, maple and willow also present. The rides too, have become overgrown, and no recent management has taken place. The ground flora is rich and a total of 87 species have been recorded. This includes early purple, twayblade and common spotted orchids, and a range of ancient woodland indicators.

RNR Number 0

Area 27.48

County Wildlife Site Citations

CWS Number	Suffolk Coastal 11
Site Name	BENHALL CHURCHYARD
Parish	BENHALL
District	Suffolk Coastal
NGR	TM372618
Description	<p>Benhall Churchyard provides a valuable refuge for plants and animals in an intensively farmed landscape. It is a good example of unimproved grassland (biodiversity priority habitat) supporting species such as Pignut, Bugle, Lady's Bedstraw, Ox-eye Daisy, Field Wood-rush, Pepper Saxifrage, Cowslip and Primrose. Slow-worms (biodiversity priority) have been seen.</p>
RNR Number	0
Area	0.52

County Wildlife Site Citations

CWS Number Suffolk Coastal 12
Site Name MANOR FARM MEADOWS
Parish BENHALL
District Suffolk Coastal
NGR TM381603

Description

These small wet meadows support a good wet grassland flora typical of lowland grazing meadows (biodiversity priority habitat). They are similar in composition to the larger Benhall Green Meadows to the north. With the latter, they form the only remaining areas of unimproved marsh in the Fromus Valley. Between the two meadows lies the sewage works. The southern meadow is contains a richer flora with good colonies of Southern Marsh Orchids and a greater diversity of marsh flowers. Typical wetland species include Brown and Hairy sedges, Meadowsweet, Ragged Robin and Water Mint. The floristic diversity has been maintained in the past by traditional grazing. Without such management it will become rank and overgrown and the diversity will decline. The wettest areas near the drains are fen with Common Reed, Reed Canary grass and Pond Sedge. They support good numbers of Reed and Sedge Warbler.

RNR Number 0

Area 1.43

County Wildlife Site Citations

CWS Number Suffolk Coastal 69
Site Name RIVER FROMUS MARSHES
Parish FARNHAM
District Suffolk Coastal
NGR TM387587

Description

This important County Wildlife Site consists of a complex of different habitats bordering the River Fromus at Gromford. The west side of the river is generally drier and is composed of open areas dominated with bracken and scattered oak standards. The banks of the watercourse are characterised by dense clumps of sallow and old overhanging willows some of which require repollarding. The area is managed to promote wildlife conservation; for example oak and field maple trees have been planted in some open areas, rides have been cut through the bracken and bird boxes have been erected in the trees. The eastern side of the river in contrast is composed of wet marshland, old willows and willow/alder carr. One area of wet meadow adjacent to this site is Gromford meadow, which has been scheduled as a SSSI. The meadow situated to the south of the SSSI supports a similar species-rich flora. Amongst the many wild flowers growing here are yellow rattle, ragged robin and purple loosestrife. A kingfisher was seen on one occasion darting along the river.

RNR Number 0

Area 7.85

County Wildlife Site Citations

CWS Number Suffolk Coastal 13
Site Name BENHALL GREEN MEADOWS
Parish BENHALL
District Suffolk Coastal
NGR TM387613

Description

This series of meadows forms one of the largest remaining areas of flower-rich marsh in the Alde catchment. They are bordered by the River Fromus and contain a wide range of wet meadow plants. Wild Angelica, Brown sedge, Lady's Smock, Marsh Thistle and Ragged Robin are abundant whilst Southern Marsh orchids and Greater Bird's-foot Trefoil are common. The ditches are not botanically rich, with Greater Pond Sedge, Fool's Water-cress and Lesser Water-parsnip dominating. Old records suggest there was a more diverse flora here in the past with species such as Bogbean found in the pond on the green. The floristic diversity has been maintained in the past by traditional grazing. Without such management it will become rank and overgrown and the diversity will decline. A combination of hay cutting and/or grazing, high water levels and avoidance of fertilisers and herbicides are required to maintain the considerable interest of these marshes.

RNR Number 0

Area 8.83

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

Joint Nature Conservation Committee

Monkstone House

City Road

Peterborough

Cambridgeshire PE1 1JY

UK

Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948

Email: RIS@JNCC.gov.uk

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DD MM YY

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

Designated: 04 October 1996

3. Country:

UK (England)

4. Name of the Ramsar site:

Alde–Ore Estuary

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

- i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* ☐;
- ii) **an electronic format** (e.g. a JPEG or ArcView image) *Yes*
- iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* ☐;

b) **Describe briefly the type of boundary delineation applied:**

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

52 04 58 N 01 33 03 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Woodbridge

Alde-Ore Estuary is located on the east coast of Suffolk, east of Woodbridge, stretching between Aldeburgh to the north and Bawdsey to the south.

Administrative region: Suffolk

10. Elevation (average and/or max. & min.) (metres): **11. Area** (hectares): 2546.99

Min.	-1
Max.	5
Mean	1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The site comprises the estuary complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. There are a variety of habitats including, intertidal mudflats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and grazing marsh. The Orfordness/Shingle Street landform is unique within Britain in combining a shingle spit with a cusped foreland. The site supports nationally-scarce plants, British Red Data Book invertebrates, and notable assemblages of breeding and wintering wetland birds.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 3, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates.

Ramsar criterion 3

The site supports a notable assemblage of breeding and wintering wetland birds.

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species regularly supported during the breeding season:

Lesser black-backed gull , *Larus fuscus graellsii*, 5790 apparently occupied nests, representing an average of 3.9% of the breeding population
W Europe/Mediterranean/W Africa (Seabird 2000 Census)

Species with peak counts in winter:

Pied avocet , *Recurvirostra avosetta*, 1187 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3)
Europe/Northwest Africa

Common redshank , *Tringa totanus totanus*, 2368 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.

See Sections 21/22 for details of noteworthy species

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	shingle, mud, nutrient-rich, sedimentary
Geomorphology and landscape	lowland, coastal, shingle bar, intertidal sediments (including sandflat/mudflat), estuary, lagoon
Nutrient status	mesotrophic
pH	no information
Salinity	saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent

Summary of main climatic features	Annual averages (Lowestoft, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/lowestoft.html) Max. daily temperature: 13.0° C Min. daily temperature: 7.0° C Days of air frost: 27.8 Rainfall: 576.3 mm Hrs. of sunshine: 1535.5
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General description of the Physical Features:

This estuary is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Alde-Ore Estuary comprises the estuarine complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness.

This estuary is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces

19. Wetland types:

Inland wetland, Marine/coastal wetland

Code	Name	% Area
E	Sand / shingle shores (including dune systems)	33.3
H	Salt marshes	23.6
G	Tidal flats	17.7
M	Rivers / streams / creeks: permanent	9.8
Sp	Saline / brackish marshes: permanent	5.9

Tp	Freshwater marshes / pools: permanent	3.9
U	Peatlands (including peat bogs swamps, fens)	3.8
J	Coastal brackish / saline lagoons	2

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The main habitat types of the Alde-Ore Estuary are: intertidal mudflats, saltmarsh, reedswamp, coastal freshwater, brackish lagoons, semi-improved grazing marsh, brackish ditches and vegetated shingle, the second-largest and best-preserved example in Britain.

A unique feature for East Anglian beaches is the abundance on the ground of normally epiphytic lichens.

There is a zonation of shingle vegetation from shifting to more stable areas of grassland and lichen communities.

Areas of saltmarsh succeed to higher saltmarsh and neutral grassland with ditches.

There is a series of brackish lagoons and ditches; and borrow pits.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

A range of nationally scarce plant species characteristic of freshwater, estuarine, and shingle habitats, and their transitions are present. These include: *Althaea officinalis*, *Frankenia laevis*, *Lathyrus japonicus*, *Lepidium latifolium*, *Medicago minima*, *Parapholis incurva*, *Puccinellia fasciculata*, *Ruppia cirrhosa*, *Sarcocornia perennis*, *Sonchus palustris*, *Trifolium suffocatum*, *Vicia lutea* and *Zostera angustifolia*.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Eurasian marsh harrier , <i>Circus aeruginosus</i> , Europe	3 pairs, representing an average of 1.9% of the GB population (5 year mean 1993-1997)
Mediterranean gull , <i>Larus melanocephalus</i> , Europe	6 apparently occupied nests, representing an average of 5.5% of the GB population (Seabird 2000 Census)
Sandwich tern , <i>Sterna</i> <i>(Thalasseus) sandvicensis sandvicensis</i> , W Europe	169 pairs, representing an average of 1.6% of the GB population (5 year mean 1991-1995)

Little tern , <i>Sterna albifrons albifrons</i> , W Europe	88 apparently occupied nests, representing an average of 4.5% of the GB population (Seabird 2000 Census)
Species with peak counts in spring/autumn:	
Black-tailed godwit , <i>Limosa limosa islandica</i> , Iceland/W Europe	283 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , <i>Tringa erythropus</i> , Europe/W Africa	44 individuals, representing an average of 32.3% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , <i>Tringa nebularia</i> , Europe/W Africa	29 individuals, representing an average of 4.8% of the GB population (5 year peak mean 1998/9-2002/3)
Species with peak counts in winter:	
Greater white-fronted goose , <i>Anser albifrons albifrons</i> , NW Europe	186 individuals, representing an average of 3.2% of the GB population (5 year peak mean for 1996/7-2000/01)
Common shelduck , <i>Tadorna tadorna</i> , NW Europe	1398 individuals, representing an average of 1.7% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian wigeon , <i>Anas penelope</i> , NW Europe	6851 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian teal , <i>Anas crecca</i> , NW Europe	2447 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)
Northern pintail , <i>Anas acuta</i> , NW Europe	556 individuals, representing an average of 1.9% of the GB population (5 year peak mean 1998/9-2002/3)
Northern shoveler , <i>Anas clypeata</i> , NW & C Europe	224 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

The highly specialised invertebrate fauna of the saline lagoons includes *Nematostella vectensis*, and *Gammarus insensibilis*, both species protected under Schedules 5 and 8 of the Wildlife and Countryside Act 1981 (as amended).

Other notable invertebrates on the site include: *Malacosoma castrensis*, *Campsicnemus magius*, *Cheilosia velutina*, *Empis prodomus*, *Dixella attica*, *Hylaeus euryscapus*, *Pseudamnicola confusa*, *Euophrys browni*, *Baryphyma duffeyi*, *Haplodrassus minor*, *Trichoncus affinis*.

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

- Aesthetic
- Aquatic vegetation (e.g. reeds, willows, seaweed)
- Archaeological/historical site
- Environmental education/ interpretation
- Fisheries production
- Livestock grazing
- Non-consumptive recreation

Scientific research
 Sport fishing
 Sport hunting
 Tourism
 Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
National/Crown Estate	+	
Private	+	+
Public/communal	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	
Collection of non-timber natural products: commercial	+	
Fishing: recreational/sport	+	
Marine/saltwater aquaculture	+	
Gathering of shellfish	+	
Permanent arable agriculture		+
Grazing (unspecified)	+	+
Hunting: recreational/sport	+	
Harbour/port		+
Flood control		+
Irrigation (incl. agricultural water supply)		+
Non-urbanised settlements		+

26. Factors (past, present or potential) adversely affecting the site’s ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Erosion	2		+		+

For category 2 factors only.

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
 Erosion - English Nature provides advice to the Environment Agency and coastal local authorities in relation to flood and coastal protection management. This will inform the development of the Suffolk Estuaries strategies and the second generation shoreline management plan.

A Management Scheme is required, taking into account the effects of erosion. A Coastal Habitat Management Plan will be produced for this site.

Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	+
Site management statement/plan implemented	+	
Other	+	
Area of Outstanding National Beauty (AONB)	+	
Environmentally Sensitive Area (ESA)	+	
Special Area of Conservation (SAC)	+	
Management plan in preparation	+	

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

Environment.

Monitoring estuarine processes.

Saline lagoon survey.

Study on the effects of guano-fication on shingle flora.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

None reported

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities.

The site is used informally for walking, boating and angling.

Facilities provided.

River moorings.

Seasonality.

Walking and boating activities are predominantly in spring and summer. Seasonal (winter) wildfowling occurs on the estuary.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs,

European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Site-relevant references

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone: +41 22 999 0170 • Fax: +41 22 999 0169 • email: ramsar@ramsar.org

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name: Alde, Ore and Butley Estuaries
Unitary Authority/County: Suffolk
SAC status: Designated on 1 April 2005
Grid reference: TM444509
SAC EU code: UK0030076
Area (ha): 1561.53
Component SSSI: Alde-Ore Estuary SSSI

Site description:

This estuary, made up of three rivers, is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents.

The smaller Butley River has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats. It flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north. There is a range of littoral sediment and rock biotopes (the latter on sea defences) that are of high diversity and species richness for estuaries in eastern England. Water quality is excellent throughout. The area is relatively natural, being largely undeveloped by man and with very limited industrial activity. The estuary contains large areas of shallow water over subtidal sediments, and extensive mudflats and saltmarshes exposed at low water. Its diverse and species-rich intertidal sand and mudflat biotopes grade naturally along many lengths of the shore into vegetated or dynamic shingle habitat, saltmarsh, grassland and reedbed.

The adjacent shingle and lagoon habitats are designated separately as the Orfordness-Shingle Street SAC.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats)

This citation relates to a site entered in the Register of European Sites for Great Britain.

Register reference number: UK0030076

Date of registration: 14 June 2005

Signed: [REDACTED]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

Alde, Ore and Butley Estuaries

Designated Special Area of Conservation (SAC)

Country	England
Unitary Authority	East Anglia
Centroid*	TM444509
Latitude	52.10166667
Longitude	1.568888889
SAC EU Code	UK0030076
Status	Designated Special Area of Conservation (SAC)
Area (ha)	1632.63

* This is the approximate central point of the SAC. In the case of large, linear or composite sites, this may not represent the location where a feature occurs within the SAC.



Location of Alde, Ore and Butley Estuaries
SAC

General site character

- Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins) (70%)
- Salt marshes, Salt pastures, Salt steppes (25%)
- Shingle, Sea cliffs, Islets (5%)

Download the [Natura 2000 standard data form](#) for this site as submitted to Europe (PDF <100kb)

Note When undertaking an appropriate assessment of impacts at a site, all features of European importance (both primary and non-primary) need to be considered.

Annex I habitats that are a primary reason for selection of this site

- **1130 Estuaries**

This **estuary**, made up of three rivers, is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north. There is a range of littoral sediment and rock biotopes (the latter on sea defences) that are of high diversity and species richness for estuaries in eastern England. Water quality is excellent throughout. The area is relatively natural, being largely undeveloped by man and with very limited industrial activity. The estuary contains large areas of shallow water over subtidal sediments, and extensive mudflats and saltmarshes exposed at low water. Its diverse and species-rich intertidal sand and mudflat biotopes grade naturally along many lengths of the shore into vegetated or dynamic shingle habitat, saltmarsh, grassland and reedbed.

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site

- **1140 Mudflats and sandflats not covered by seawater at low tide**
- **1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)**

Annex II species that are a primary reason for selection of this site

- Not Applicable

Annex II species present as a qualifying feature, but not a primary reason for site selection

- Not Applicable

Many designated sites are on private land: the listing of a site in these pages does not imply any right of public access.

European Site Conservation Objectives for Alde, Ore and Butley Estuaries Special Area of Conservation Site Code: UK0030076



With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats**
- **The structure and function (including typical species) of qualifying natural habitats, and**
- **The supporting processes on which qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1130. Estuaries

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the “Habitats Regulations”). They must be considered when a competent authority is required to make a ‘Habitats Regulations Assessment’, including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a [Special Area of Conservation \(SAC\)](#). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term ‘favourable conservation status’ is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the [Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011](#) (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the [SAC home page on the JNCC website](#). This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.



NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE UK0030076
SITENAME Alde, Ore and Butley Estuaries

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- [6. SITE MANAGEMENT](#)

1. SITE IDENTIFICATION

1.1 Type B	1.2 Site code UK0030076	Back to top
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1.3 Site name

Alde, Ore and Butley Estuaries

1.4 First Compilation date 2001-01	1.5 Update date 2015-12
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1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee
Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough
PE1 1JY
Email:

Date site proposed as SCI: 2001-01
Date site confirmed as SCI: 2004-12
Date site designated as SAC: 2005-04

National legal reference of SAC designation:

Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010
(<http://www.legislation.gov.uk/uksi/2010/490/contents/made>).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude
1.568888889

Latitude
52.10166667

2.2 Area [ha]:

1632.63

2.3 Marine area [%]

68.9

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code **Region Name**

UKH1	East Anglia
------	-------------

2.6 Biogeographical Region(s)

Atlantic (100.0
%)

3. ECOLOGICAL INFORMATION

3.1 Habitat types present on the site and assessment for them

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Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A B C D	A B C		
						Representativity	Relative Surface	Conservation	Global
1110			32.65		M	D			
1130			1142.84		G	B	C	C	B
1140			653.05		G	B	C	B	C
1330			408.16		G	C	C	C	C

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N02	70.0
N03	25.0
N05	5.0
Total Habitat Cover	100

Other Site Characteristics

2 Terrestrial: Geomorphology and landscape: coastal 3 Marine: Geology: mud,shingle,sand 4 Marine: Geomorphology: enclosed coast (including embayment),lagoon,estuary,islands,intertidal sediments (including sandflat/mudflat),open coast (including bay),subtidal sediments (including sandbank/mudbank)

4.2 Quality and importance

Estuaries for which this is considered to be one of the best areas in the United Kingdom. Mudflats and sandflats not covered by seawater at low tide for which the area is considered to support a significant presence. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i o b]
H	M01		B
H	M02		B
H	J02		B
H	G01		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i o b]
H	D05		I
H	A02		I
H	A06		I
H	A04		I
H	G03		I

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): <http://publications.naturalengland.org.uk/category/3212324>

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

<http://publications.naturalengland.org.uk/category/6490068894089216>

5. SITE PROTECTION STATUS (optional)

5.1 Designation types at national and regional level:

[Back to top](#)

Code **Cover [%]**

UK04	100.0
------	-------

Code **Cover [%]**

Code **Cover [%]**

6. SITE MANAGEMENT

6.1 Body(ies) responsible for the site management:

[Back to top](#)

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

Yes

No, but in preparation

No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the [official European Union guidelines for the Standard Data Form](#). The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippophila rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic resources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc.), trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

EC Directive 79/409 on the Conservation of Wild Birds:
Special Protection Areas

Alde-Ore Estuary (Suffolk)

The Alde-Ore Estuary proposed Special Protection Area (pSPA) is situated on the east coast of Suffolk between Aldeburgh in the north and Bawdsey in the south. The site comprises the estuary complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. The variety of habitats important for breeding and wintering birds includes vegetated shingle, intertidal mudflats, semi-improved grazing marsh, saltmarsh and saline lagoons.

The site includes the entire Alde-Ore Estuary SSSI, notified in 1985 (revised in 1992 under the Wildlife and Countryside Act, 1981). The Alde-Ore Estuary SSSI includes the Orfordness-Havergate NNR, the English Nature owned part of which has already been designated as Orfordness-Havergate SPA.

The site qualifies under Article 4.1 of the EC Birds Directive by sustaining nationally important numbers of the following Annex 1 species, marsh harrier *Circus aeruginosus* (breeding), avocet *Recurvirostra avosetta* (wintering and breeding) ruff *Philomachus pugnax* (wintering), sandwich tern *Sterna sandvicensis* (breeding) and little tern *Sterna albifrons* (breeding). Further Annex 1 species winter on site, including, bittern *Botaurus stellaris*, Bewick's Swan *Cygnus columbianus*, hen harrier *Circus cyaneus*, golden plover *Pluvialis apricaria*, and short-eared owl *Asio flammeus*. Mediterranean gull *Larus melanocephalus*, common tern *Sterna hirundo* and Arctic tern *Sterna paradisaea* breed on Havergate Island.

The site qualifies under Article 4.2 of the Directive by regularly supporting internationally important numbers of two migratory species. The Orfordness colony of breeding lesser black-backed gull *Larus fuscus graellsii*, represented in 1995, 12% of the British population and 8% of the world population of the *graellsii* race. The five year wintering peak mean 1989/90 to 1993/94 for redshank *Tringa totanus*, was 1,662 birds, representing 1.5 % of the British population and 1.1% of the east Atlantic flyway population.

The site supports over 1% of the British wintering population of the following (calculated from five year winter peak means 1989/90 to 1993/94), shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, black-tailed godwit *Limosa limosa*. In addition, the site supports over 1% of the British breeding population of, Gadwall *Anas strepera*, shoveler *Anas clypeata* and herring gull *Larus argentatus*.

The site also supports a notable assemblage of breeding and wintering wetland birds, in addition to the species mentioned above. Breeding species include, oystercatcher *Haematopus ostralegus*, ringed plover *Charadrius hiaticula*, lapwing *Vanellus vanellus* (also winter) black headed gull *Larus ridibundus* and barn owl *Tyto alba*. Wintering species include, cormorant *Phalacrocorax carbo*, European white-fronted goose *Anser abifrons albifrons*, brent goose *Branta bernicla*, pintail *Anas acuta*, grey plover *Pluvialis squatarola*, dunlin *Calidris alpina* and curlew *Numenius arquata*.

This citation / map relates to a site entered in
the Register of European sites for Great Britain
Register number [REDACTED]
Date of registration 1998

Signed [REDACTED]
on behalf of the Secretary of State for the Environment

SPA Citation
January 1996

EC Directive 79/409 on the Conservation of Wild Birds

Citation for Special Protection Area (SPA)

Name: Sandlings

Unitary Authority/County: Suffolk

Consultation proposal: All or parts of Blaxhall Heath Site of Special Scientific Interest (SSSI), Leiston - Aldeburgh SSSI, Sandlings Forest SSSI, Snape Warren SSSI, Sutton & Hollesley Heaths SSSI and Tunstall Common SSSI have been recommended as a Special Protection Area because of their European ornithological importance. In particular, for their breeding populations of Nightjars *Caprimulgus europaeus* and Woodlarks *Lullula arborea*.

Site description: The Sandlings SPA lies near the Suffolk Coast between the Deben Estuary and Leiston. In the 19th century, the area was dominated by heathland developed on glacial sandy soils. During the 20th century, large areas of heath were planted with blocks of commercial conifer forest and others were converted to arable agriculture. Lack of traditional management has resulted in the remnant areas of heath being subject to successional changes, with the consequent spread of bracken, shrubs and trees, although recent conservation management work is resulting in their restoration. The heaths support both acid grassland and heather-dominated plant communities, with dependant invertebrate and bird communities of conservation value. Woodlark *Lullula arborea* and Nightjar *Caprimulgus europaeus* have also adapted to breeding in the large conifer forest blocks, using areas that have recently been felled and recent plantation, as well as areas managed as open ground.

Size of SPA: The SPA covers an area of 3,391.80 ha.

Qualifying species:

The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Annex 1 species	Count and Season	Period	% of GB population
Nightjar <i>Caprimulgus europaeus</i>	109 males - breeding	Count as a 1992	3.2% GB
Woodlark <i>Lullula arborea</i>	154 pairs - breeding	Count as at 1997	10.3% GB

Bird figures from:

Morris, A., Burges, D., Fuller, R.J., Evans, A.D. & Smith, K.W. 1994. The status and distribution of nightjars *Caprimulgus europaeus* in Britain in 1992. A report to the British Trust for Ornithology. *Bird Study* **41**: 181-191.

Wotton, S.R. & Gillings, S. 2000. The status of breeding woodlarks in Britain in 1997. *Bird Study* **47**: 212-224.

Status of SPA

Sandlings was classified as a Special Protection Area on 10 August 2001.

European Site Conservation Objectives for Alde–Ore Estuary Special Protection Area Site Code: UK9009112



With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

- A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)
- A132 *Recurvirostra avosetta*; Pied avocet (Non-breeding)
- A132 *Recurvirostra avosetta*; Pied avocet (Breeding)
- A151 *Philomachus pugnax*; Ruff (Non-breeding)
- A162 *Tringa totanus*; Common redshank (Non-breeding)
- A183 *Larus fuscus*; Lesser black-backed gull (Breeding)
- A191 *Sterna sandvicensis*; Sandwich tern (Breeding)
- A195 *Sterna albifrons*; Little tern (Breeding)

This is a European Marine Site

This SPA is a part of the Alde Ore & Butley European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via [GOV.UK](https://www.gov.uk).

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a [Special Protection Area \(SPA\)](#).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

European Site Conservation Objectives for Sandlings Special Protection Area Site Code: UK9020286



With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A224 *Caprimulgus europaeus*; European nightjar (Breeding)

A246 *Lullula arborea*; Woodlark (Breeding)

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a [Special Protection Area \(SPA\)](#).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the [Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011](#) (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the [SPA home page on the JNCC website](#). This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.



NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE UK9009112
SITENAME Alde-Ore Estuary

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1. SITE IDENTIFICATION

1.1 Type A	1.2 Site code UK9009112	Back to top
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1.3 Site name

Alde-Ore Estuary

1.4 First Compilation date 1996-10	1.5 Update date 2015-12
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1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee
Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough
PE1 1JY
Email:

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1996-10
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/ukxi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/ukxi/2011/625/contents/made).

2. SITE LOCATION

2.1 Site-centre location [decimal degrees]:**Longitude**

1.5508

Latitude

52.0828

2.2 Area [ha]:

2403.5

2.3 Marine area [%]

48.6

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name**NUTS level 2 code****Region Name**

UKH1

East Anglia

2.6 Biogeographical Region(s)Atlantic (100.0
%)**3. ECOLOGICAL INFORMATION****3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them**

Species			Population in the site							Site assessment				
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A B C D		A B C	
						Min	Max				Pop.	Con.	Iso.	Glo
B	A081	Circus aeruginosus			r	3	3	p		G	C		B	
B	A183	Larus fuscus			r	14070	14070	p		G	A		C	
B	A151	Philomachus pugnax			w	3	3	i		G	C		C	
B	A132	Recurvirostra avosetta			w	766	766	i		G	A		B	
B	A132	Recurvirostra avosetta			r	104	104	p		G	A		B	
B	A195	Sterna albifrons			r	48	48	p		G	C		C	
B	A191	Sterna sandvicensis			r	170	170	p		G	C		C	
B	A162	Tringa totanus			w	1919	1919	i		G	C		C	

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles

- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see [reference portal](#))
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N05	25.0
N07	5.0
N03	20.0
N02	50.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: sedimentary, shingle, mud, nutrient-rich 2 Terrestrial: Geomorphology and landscape: coastal, lowland 4 Marine: Geomorphology: shingle bar, intertidal sediments (including sandflat/mudflat), lagoon, estuary

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) During the breeding season the area regularly supports: *Circus aeruginosus* at least 1.9% of the GB breeding population 5 year mean, 1993-1997 *Recurvirostra avosetta* (Western Europe/Western Mediterranean - breeding) 23.1% of the GB breeding population 5 year mean, 1990-1994 *Sterna albifrons* (Eastern Atlantic - breeding) 2% of the GB breeding population 5 count mean, 1993-4, 1996-8 *Sterna sandvicensis* (Western Europe/Western Africa) 1.2% of the GB breeding population 5 year mean, 1992-1996 Over winter the area regularly supports: *Philomachus pugnax* (Western Africa - wintering) 0.4% of the GB population 5 year peak mean 1991/92-1995/96 *Recurvirostra avosetta* (Western Europe/Western Mediterranean - breeding) 60.3% of the GB population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC) During the breeding season the area regularly supports: *Larus fuscus* (Western Europe/Mediterranean/Western Africa) 11.3% of the breeding population 5 year mean 1994-1998 Over winter the area regularly supports: *Tringa totanus* (Eastern Atlantic - wintering) 1.1% of the population 5 year peak mean 1991/92-1995/96

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i o b]
H	M01		B
H	G01		I
H	J02		B
H	M02		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i o b]
H	G03		I
H	D05		I
H	A04		I
H	A06		I
H	A02		I

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): <http://publications.naturalengland.org.uk/category/3212324>
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf
<http://publications.naturalengland.org.uk/category/6490068894089216>

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK01	4.5	UK04	100.0		

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

<input checked="" type="checkbox"/>	Yes	Name: Alde-Ore Estuary: The Orfordness-Havergate National Nature Reserve (NNR) Management Plan provides management information related to this site. This is available from Natural England. Link: _____
<input type="checkbox"/>	No, but in preparation	
<input type="checkbox"/>	No	

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

7. MAP OF THE SITES

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INSPIRE ID:

Map delivered as PDF in electronic format (optional)

Yes No

Reference(s) to the original map used for the digitalisation of the electronic boundaries (optional).

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the [official European Union guidelines for the Standard Data Form](#). The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippophila rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic resources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc.), trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the [Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011](#) (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the [SPA home page on the JNCC website](#). This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.



NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE UK9020286
SITENAME Sandlings

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- [1. SITE IDENTIFICATION](#)
- [2. SITE LOCATION](#)
- [3. ECOLOGICAL INFORMATION](#)
- [4. SITE DESCRIPTION](#)
- [5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES](#)
- [6. SITE MANAGEMENT](#)

1. SITE IDENTIFICATION

1.1 Type A	1.2 Site code UK9020286	Back to top
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1.3 Site name

Sandlings

1.4 First Compilation date 2001-08	1.5 Update date 2015-12
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1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee
Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:

1.7 Site indication and designation / classification dates

Date site classified as SPA:	2001-08
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude

1.4425

Latitude

52.07888889

2.2 Area [ha]:

3405.72

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code

Region Name

UKH1	East Anglia
------	-------------

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species			Population in the site							Site assessment				
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A B C D	A B C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A224	Caprimulgus europaeus			r	109	109	p		G	B		C	
B	A246	Lullula arborea			r	154	154	p		G	B		C	

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see [reference portal](#))
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N09	11.5
N07	0.9
N06	1.5
N17	57.6
N23	1.8
N16	10.6
N14	0.1
N08	14.6
N19	1.4
Total Habitat Cover	100.00000000000001

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) During the breeding season the area regularly supports: *Caprimulgus europaeus* 3.2% of the GB breeding population Count as at 1992 *Lullula arborea* 10.3% of the GB breeding population Count as at 1997

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i o b]
H	I02		B
H	H04		B
H	G01		I
H	M02		B
H	K02		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i o b]
H	B02		I
H	A02		I
H	A04		I
H	D05		I

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): <http://publications.naturalengland.org.uk/category/6490068894089216>

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

<http://publications.naturalengland.org.uk/category/3212324>

5. SITE PROTECTION STATUS (optional)

[Back to top](#)

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

[Back to top](#)

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No, but in preparation
<input checked="" type="checkbox"/>	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the [official European Union guidelines for the Standard Data Form](#). The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (<i>Spartinion maritimae</i>)	57
1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with <i>Empetrum nigrum</i>	57
2150	Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>)	57
2160	Dunes with <i>Hippophila rhamnoides</i>	57
2170	Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with <i>Juniperus</i> spp.	57
2330	Inland dunes with open <i>Corynephorus</i> and <i>Agrostis</i> grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i>	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.	57
3150	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic resources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc.), trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

Citation

County: Suffolk **Site name:** Alde-Ore Estuary
District: Suffolk Coastal

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 as amended.

Local Planning Authority: Suffolk County Council
Suffolk Coastal District Council

National grid reference: from TM 394 757 **Area:** 2,554.3 (ha) 6,311.7 (acres)
to TM 358 402

Ordnance Survey sheet: 1 : 50,000: 156, 159 **1:10,000:** TM 45 SE, TM 44 NW,
TM 34 SE, TM 45 SW,
TM 34 NE, TM 35 SW,
TM 44 NE, TM 45 NE,
TM /45 NW

Date notified (Under 1949 Act): 1952 **Date of last revision:** 1980

Date notified (under 1981 Act): 1985 **Date of last revision:** 1992

Other information

The site has been extended at the 1992 revision. It includes the Orfordness-Havergate NNR (part of which is designated as a Special Protection Area), and previously named Orfordness-Havergate SSSI and part of the previously named Snape Warren and Blackheath Wood SSSI. Orfordness and Gedgrave Cliff are listed as being of national importance in the Geological Conservation Review.

Description and reasons for notification

This site stretches along the coast from Bawdsey to Aldeburgh and inland to Snape. It includes Orfordness, Shingle Street, Havergate Island, and the Butley, Ore and Alde Rivers.

The scientific interests of the site are outstanding and diverse. The shingle structures of Orfordness and Shingle Street are of great physiographic importance whilst the cliff at Gedgrave is of geological interest. The site also contains a number of coastal formations and estuarine features including mud-flats, saltmarsh, vegetated shingle and coastal lagoons which are of special botanical and ornithological value.

Geomorphology

Orfordness, together with Shingle Street, is one of three major shingle landforms in the British Isles and is the only one which combines a shingle spit with a cusped foreland. This large feature comprises a complex sequence of shingle ridges deposited over a long period of time which record stages in the evolution of the landform. The distal end of the spit is still

subject to rapid changes and is dynamically related to events at Shingle Street on the mainland shore. This well documented site is of the highest educational and research value.

Geology

The cliff at Gedgrave is a small but renowned exposure of Coralline Crag about 3 m in height. Here the sandwave facies, which is characterised by large-scale cross stratification, overlies highly fossiliferous silty crag with marked unconformity. Clasts of the lower facies can be found in the sandwave facies and are evidence of contemporaneous erosion. A rich shell fauna is present in the lower facies which includes many species of molluscs and bryozoan. The site is also notable for the occasional occurrence of articulated specimens of the brachiopod *Terebratula maxima*, the world's largest species of terebratulid. The site is of great historical as well as palaeontological interest and is one of the only Coralline Crag localities to show the lower erosional contact of the sandwave facies.

Botany

The botanical interest of this site is enriched by the variety of habitats present, including mudflats, saltmarsh, brackish lagoons, shingle beach, reedbeds, grassland, freshwater and brackish ditches.

Mudflats of mixed clay, silt and shingle border the Ore, Butley and Alde rivers and Havergate Island within a tidal range of up to 2 metres. In places this supports the rare intertidal flowering plant *Zostera angustifolia*. Narrow fringes of saltmarsh occur along the length of the rivers with wider expanses at Shingle Street, Havergate Island, Stony Ditch, the upper reaches of the Butley river and in places by the Alde river. These are mostly dominated by sea purslane *Halimione portulacoides* and sea lavender *Limonium vulgare*, but a wide range of other saltmarsh species also occur, including sea-heath *Frankenia laevis*, glasswort *Salicornia pusilla*, small cord-grass *Spartina maritima* and Borrer's saltmarsh-grass *Puccinellia fasciculata*. It is representative of the *Halimione portulacoides* community as described in the National Vegetation Classification. Saltmarsh elements also occur around the lagoons and borrowpits on Shingle Street, Havergate Island and the Kings and Lantern Marshes on Orfordness. These also contain the rare tasselpondweeds *Ruppia spiralis* and *R. maritima*.

The site contains the second largest and best preserved area of vegetated shingle in Britain. This is a nationally rare and delicate habitat which supports a highly specialised flora. Species typical of exposed, shifting shingle such as sea pea *Lathyrus japonicus* and sea kale *Crambe maritima* are abundant whilst extensive areas of sea campion *Silene maritima* and stonecrops *Sedum acre* and *S. anglicum* occur on more stable ground. Orfordness contains one of the best examples of zonation in the shingle vegetation. Above the high water mark *Rumex crispus* and *Glaucium flavum* give a highly distinctive character to the mainly bare shingle, with *Lathyrus japonicus* becoming much more abundant within the matrix further inland. This vegetation gives way in turn to grassland dominated by *Arrhenatherum elatius* and *Silene maritima*. A wide range of rare or local species also occur including yellow vetch *Vicia lutea* and the dwarf clovers *Trifolium suffocatum*, *T. glomeratum*, *T. striatum*, *T. scabrum* and bur medick *Medicago minima*. Lichen communities are also well developed here with extensive areas of *Cladonia* heath. A unique feature for East Anglia beach formations is the abundance on the ground of normally epiphytic lichens *Parmelia caperata* and *Evernia prunastre*.

Higher saltmarsh blending to neutral grassland, dominated by sea couch grass, *Elymus pungens*, occurs on former grazing marsh on Havergate Island and Orfordness and on the extensive system of clay embankments throughout the site. There are small areas of reedbed at the head of the Butley River and at Iken.

Ornithology

The site is of national importance for its birdlife. Havergate Island holds the largest breeding colony of avocets in Britain, and they also feed in large numbers of Hazelwood Marshes and the Alde mudflats. Other breeding birds on the Island and elsewhere on the site include gadwall, shoveler, oystercatcher, ringed plover, common tern, Arctic tern, sandwich tern and little tern, common gull, short-eared owl, wheatear and marsh harrier. There are also very large breeding colonies of black-headed gull, lesser-black-backed gull and herring gull on Orfordness.

In winter and during migration the site is visited by nationally important numbers of wildfowl and shore-birds, including Bewick's swan, shelduck, teal, wigeon, redshank and avocet.

Invertebrates

The lagoons at Shingle street are notable for a number of brackish water species particularly the rare anthozoan *Nematostella vectensis* and the site is also noted for a number of rare spiders. Several nationally rare and scarce insects are found within ditches running through Hazelwood Marshes.

COUNTY: SUFFOLK SITE NAME: BLAXHALL HEATH

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: SUFFOLK COASTAL DISTRICT COUNCIL

National Grid Reference: TM 380564 Area: 44.4 (ha.) 109.7 (ac.)

Ordnance Survey Sheet 1:50,000: 156 1:10,000: TM 35 NE

Date Notified Under 1949 Act): N/A Date of Last Revision: N/A

Date Notified Under 1981 Act): 1987 Date of Last Revision: –

Other Information:

A new site.

Reasons for Notification:

Blaxhall Heath is one of the few fragments of the once extensive 'Sandlings' heath of coastal Suffolk and is a good example of this type of dry lowland heath. Substantial losses of lowland heath have occurred in the Sandling area and elsewhere in lowland England this century.

The heath slopes down towards a central valley through which a road passes, dividing the site into two halves. The northern half of the site has sizeable stands of mature and degenerate Heather *Calluna vulgaris* which support a variety of Cladonia lichens and mosses. Bell Heather *Erica cinerea* occurs locally amongst a mosaic of Heather and acid grassland. Bordering the road are large areas of Sand Sedge *Carex arenaria*, but elsewhere acid grassland is composed chiefly of Common Bent and Sheep's Fescue grasses with characteristic herb species such as Heath Bedstraw *Galium saxatile* and Harebell *Campanula rotundifolia*. Bracken *Pteridium aquilinum* dominates the remaining area with scattered Gorse and Silver Birch. Similar heathland communities occur south of the road, although Heather is less extensive. To the north-west, short rabbit-grazed acid grassland contains a rich variety of herbs including Bird's-foot Trefoil *Lotus corniculatus*, Spring Vetch *Vicia lathyroides*, Common Storksbill *Erodium cicutarium* and Mouse-eared Hawkweed *Hieracium pilosella*. There is some invasion of Pine originating from adjacent plantations, but management action has been taken in recent years to control this encroachment.

The heath is of considerable historical interest with a well preserved ancient bank and ditch along the southern boundary and a number of internal earthworks dating from the Iron Age. Of additional interest is a broad anti-glider ditch whose exposed sandy sides provide an excellent habitat for lizards and solitary bees. A number of heathland birds on the site including nightjar and tree pipit.

COUNTY: SUFFOLK SITE NAME: CRANSFORD MEADOW

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: SUFFOLK COASTAL DISTRICT COUNCIL

National Grid Reference: TM 323640 Area: 4.11 (ha.) 10.16 (ac.)

Ordnance Survey Sheet 1:50,000: – 1:10,000: TM 36 SW

Date Notified (Under 1949 Act): 1972 Date of Last Revision: –

Date Notified (Under 1981 Act): 1984 Date of Last Revision:–

Other Information:

Suffolk Trust for Nature Conservation reserve (by agreement).

Reasons for Notification:

This site consists of two unimproved species-rich meadows which have developed in a shallow valley close to the headwaters of a tributary of the River Alde.

The sward supports a wide variety of grasses and herbs including Creeping Bent *Agrostis stolonifera*, Meadow Foxtail *Alopecurus pratensis*, Sweet Vernal-grass *Anthoxanthum odoratum*, Crested Dog's-tail *Cynosurus cristatus*, Meadow and Red Fescues *Festuca pratensis* and *F. rubra*, Perennial Rye-grass *Lolium perenne* and Rough-Stalked Meadow-grass *Poa trivialis* as the co-dominant grasses. Meadow Vetchling *Lathyrus pratensis*, Pepper Saxifrage *Silaum silaus*, Quaking-grass *Briza media*, Adder's Tongue Fern *Ophioglossum vulgatum*, Twayblade *Listera ovata*, Green-winged Orchid *Orchis morio* and Common Spotted Orchid *Dactylorhiza fuchsii* also occur with Lesser Spearwort *Ranunculus flammula* growing in wetter areas.

The site is notable for Sulphur Clover *Trifolium ochroleucon* and Lady's Mantle *Alchemilla filicaulis vestita* and is one of only two known sites in East Anglia for the latter species.

The meadows also contain scattered oak trees and a pond surrounded by trees and scrub.

COUNTY: SUFFOLK SITE NAME: GROMFORD MEADOW, SNAPE

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: SUFFOLK COASTAL DISTRICT COUNCIL

National Grid Reference: TM 386588 Area: 1.57 (ha.) 3.73 (ac.)

Ordnance Survey Sheet 1:50,000: 156 1:10,000: TM 35 NE

Date Notified (Under 1949 Act): 1972 Date of Last Revision: –

Date Notified (Under 1981 Act): 1984 Date of Last Revision: –

Other Information:

Reserve managed by Suffolk Trust for Nature Conservation.

Reasons for Notification:

Gromford Meadow is a good example of an unimproved base-rich marsh on an alluvial soil with a high organic content. It borders the River Alde and is fed by springs. It is species-rich and contains a variety of characteristic fen meadow and marshland plants.

The sward is species-rich with Meadowsweet dominant. Other commonly occurring plants include Meadow Foxtail, Ragged Robin, Yellow Rattle, Marsh Thistle and several species of Rush. Lesser Spearwort, Valerians *Valeriana officinalis* and *V dioica*, Devil's Bit Scabious, Bog Bean, Adder's Tongue fern and Marsh Orchids *Dactylorhiza praetermissa* and *D incarnata* also occur. There is also a small colony of Grass of Parnassus on the south-easterly edge of its British distribution.

COUNTY: SUFFOLK SITE NAME: IKEN WOOD

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: SUFFOLK COASTAL DISTRICT COUNCIL

National Grid Reference: TM 396566 Area: 5.4 (ha.) 13.3 (ac.)

Ordnance survey Sheet 1:50,000: 156 1:10,000: TM 35 NE

Date Notified (Under 1949 Act): – Date of Last Revision: –

Date Notified (Under 1981 Act): 1986 Date of Last Revision: –

Other Information:

A new site.

Description and Reasons for Notification:

Iken Wood lies close to the banks of the River Alde and may well be the only ancient coppice wood on blown sand in Britain. It is the most interesting example of lowland coppice oakwood in Suffolk and has a distinctive flora typical of woods on light soils.

The wood is almost entirely of the lowland hazel-pedunculate oak stand-type with a small area of invasive elmwood, which is unusual for such an acidic soil. Huge Oak *Quercus robur* standards are dominant with scattered Silver Birch *Betula pendula*, Holly *Ilex aquifolium* and Rowan *Sorbus aucuparia*. The oak was last coppiced over a century ago and now forms part of the canopy with some stools of 9 feet diameter. Beneath the widely spaced oaks are discrete stands of holly and Hazel *Corylus avellana* coppice.

Bracken *Pteridium aquilinum* covers most of the wood with occasional Bramble *Rubus fruticosus* and Butcher's Broom *Ruscus aculeatus*. Beneath is abundant Bluebell *Hyacinthoides non-scripta*, White Climbing Fumitory *Corydalis claviculata*, Greater Stitchwort *Stellaria holostea* and Three-nerved Sandwort *Moehringia trinervia*. A marked transition occurs beneath the elmwood where characteristic associates include Ground Ivy *Glechoma hederacea*, Rough Meadow Grass *Poa trivialis*, Cow Parsley *Anthriscus sylvestris* and Bur Chervil *A. caucalis*.

COUNTY: SUFFOLK

SITE NAME: SANDLINGS FOREST SSSI

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 as amended.

Local Planning Authority: Suffolk County Council, Suffolk Coastal District Council

National Grid Reference: TM 345497

Area: 2473.91 (ha.)

Ordnance Survey Sheet 1:50,000: 156, 169

1:10,000: TM 24 NE, TM 34 NW,
TM 34 NE, TM 35 SW,
TM 35 NE, TM 35 SE,
TM 44 NW, TM 45 SW,
TM 45 SE, TM 45 NW,
TM 45 NE, TM 46 SE

Date Notified (Under 1949 Act): Not Applicable

Date Notified (Under 1981 Act): 8 August 2000

Reasons for Notification:

This site is notified for its coniferous woodland which supports internationally important populations of woodlark *Lullula arborea* and nightjar *Caprimulgus europaeus*.

General Description:

The Sandlings Forest SSSI lies between Snape and Woodbridge and is comprised of the areas known as Tunstall Forest and Rendlesham Forest. The site is dominated by commercial forestry plantations on sandy soils which once supported extensive heathland. The plantations were first established between the 1920s and the 1940s. The initial plantations were largely of Scot's pine *Pinus sylvestris* but on second rotation have been replaced by Corsican pine *P. maritima ssp laricio*. Ten to twelve percent of trees are broadleaves. Small areas have been taken out of timber production and reversion to open, heathy habitat is being undertaken. Unplanted areas of heathland lie adjacent to the forest within separate SSSIs.

The main conservation interest of the forest lies in the open areas such as young plantations and rotational clearfell which provide suitable habitat for breeding woodlark and nightjar. The storm of 1987 affected a very large area, particularly in Rendlesham Forest, and this led to an increase in the extent of open habitat. Subsequent tree growth is reducing its suitability but stable populations of woodlark and nightjar can be sustained through a combination of clearfell forestry management and heathland reversion.

The 1992 national survey of nightjars recorded 81 singing males within the Sandling Forest SSSI, representing approximately 2% of the British population. In 1997 a national survey of woodlarks recorded 71 woodlark territories in the Sandling Forest SSSI, representing approximately 5% of the British population.

Other Information:

Woodlark is specially protected by being listed on Schedule 1 of the Wildlife and Countryside Act 1981 as amended.

Nightjar and woodlark are both included on Annex 1 of the European Directive 79/409/EEC Directive on the Conservation of Wild Birds.

Nightjar and woodlark are priority species of the UK Biodiversity Action Plan.

COUNTY: SUFFOLK SITE NAME: SNAPE WARREN

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981.

Local Planning Authority: SUFFOLK COASTAL DISTRICT COUNCIL

National Grid Reference: TM 404577 Area: 47.2 (ha.) 116.6 (ac.)

Ordnance Survey Sheet 1:50,000: 156 1:10,000: TM 45 NW

Date Notified (Under 1949 Act): 1954 Date of Last Revision: 1965

Date Notified (Under 1981 Act): 8.11.89. Date of Last Revision: –

Other Information:

Description and Reasons for Notification:
Snape Warren

Snape Warren is an important remnant of the once extensive 'Sandlings' heaths of coastal Suffolk. It is situated on sandy soils sloping down to the Alde Estuary and lies about one mile east of the village of Snape.

The site is a fine example of the lowland heathland of eastern England, which has been subject to considerable loss in the last 40 years. The vegetation is characterised by extensive areas of *Calluna* heath interspersed with acid grass-land dominated by Common Bent *Agrostis capillaris*.

The heather areas are dominated by Ling *Calluna vulgaris* which has a varied age structure and includes pioneer, building, mature and degenerate stages of development. The latter stages support a variety of *Cladonia* lichens and mosses. However, Bell Heather *Erica cinerea* and Western Gorse *Ulex gallii* also occur occasionally.

The acid grassland present is dominated by Common Bent *Agrostis capillaris* and Sheep's Fescue *Festuca ovina*, with characteristic species such as Heath Bedstraw *Gilium saxatile*, Sheep's Sorrel *Rumex acetosella* and Harebell *Campanula rotundifolia*. Where this grassland adjoins the Alde Estuary, the saline influence can be seen in the presence of species such as Bucks-horn Plantain *Plantago coronopus* and Common Saltmarsh-grass *Puccinellia maritima*.

The heathland shows some invasion by Bracken *Pteridium aquilinum*, Gorse *Ulex europaeus* and secondary Birch *Betula* sp. and Pedunculate Oak *Quercus robur* woodland, which now occupy substantial areas.

Trackways across the site support populations of the uncommon Mossy Stonecrop *Crassula tillaea*.

The site supports a number of reptile and bird species characteristic of heathland, including Common Lizard, Adder and Nightjar.

COUNTY: SUFFOLK SITE NAME: TUNSTALL COMMON

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: SUFFOLK COASTAL DISTRICT COUNCIL

National Grid Reference: TM 378549 Area: 35.25 (ha.) 87.10 (ac.)

Ordnance Survey Sheet 1:50,000: 156 1:10,000: TM 35 SE
TM 35 NE

Date Notified (Under 1949 Act): 1972 Date of Last Revision: –

Date Notified (Under 1981 Act): 1984 Date of Last Revision: –

Other Information:

Boundary change at re-notification.

Description and Reasons for Notification:

Tunstall Common is a fragment of the once extensive 'sandlings' heath of coastal Suffolk and is a good example of this dry lowland heath type. Substantial losses of lowland heathland have occurred in the Sandling area and elsewhere in lowland England.

Most of the site is dominated by Heather *Calluna vulgaris* but Bell Heather *Erica cinerea* occurs locally especially in stands of young heather and on heather to grassland margins. Mature and degenerating stands of heather support a variety of heathland, lichens and mosses. Impoverished acid grassland characterised by Common Bent and Sheep's Fescue grasses occurs to the north, west and south but is subject to invasion by gorse and bracken which now occupies substantial areas. Pine scrub originating from adjacent plantations has invaded part of the eastern boundary.



VOLUME 5, CHAPTER 7, APPENDIX 7A: ANNEX 7A.3:
PRIMARY DATA

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Figure 7.3: Two village bypass Phase 1 habitat survey

Figure 7.4: National vegetation classification results for two village bypass

Figure 7.5: Invertebrate survey locations for two village bypass

Figure 7.6: Two village bypass great crested newt eDNA results

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Figure 7.9 to 7.11: Bat survey locations for two village bypass

Figure 7.12 to 7.14: Bat tree survey results for two village bypass

Figure 7.15: Otter and water vole survey results for two village bypass

1. Primary Data

1.1 Introduction

1.1.1 This annex provides details of the primary data collected for the two village bypass (hereafter referred to as the ‘proposed development’). The two village bypass site (herein referred to as the ‘site’) would bypass the villages of Farnham and Stratford St Andrew with a new single carriageway road to the south.

1.1.2 The extended Phase 1 habitat and protected species survey identified small pockets of poorly connected sub-optimal habitat for reptiles. Therefore, no targeted surveys were undertaken for reptiles. Low reptile potential within the site boundary was estimated from the habitat assessment combined with the desk study data. A low population of common species of reptile was therefore inferred for the assessment.

1.2 Plants and Habitats

a) Methodology

i. Extended Phase 1 habitat and protected species survey

1.2.1 An extended Phase 1 habitat and protected species survey was undertaken in 2019. The survey area consisted of the entire alignment of the site, with a 50m buffer either side of the alignment where access was possible (see **Figure 7.3** in **Annex 7A.1**).

1.2.2 The survey involved identifying and mapping the dominant habitat types following the Phase 1 habitat survey methodology recommended by Natural England (Joint Nature Conservation Committee (JNCC) (Ref 1.1)). Dominant plant species were noted, as were any uncommon species or species indicative of particular habitat types. Botanical names follow ‘New Flora of the British Isles’ (Ref 1.2). Any non-native invasive species present within and adjacent to the site (for example Japanese Knotweed (*Fallopia japonica*) were also recorded.

1.2.3 Particular attention was paid to the hedgerows and trees, and the status of each hedgerow with regard to the Hedgerows Regulations (Ref 1.3) was also assessed using the Wildlife and Landscape Criteria. Further detail of the assessment of hedgerows is detailed in **section 2.1b**).

1.2.4 The survey was extended to involve a critical assessment of the value of the habitats present for their use by protected species or species of conservation interest, as outlined below:

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- the value of the site for invertebrates was assessed and any habitats or features of particular value were identified;
- the value of the site for reptiles was assessed and any habitats or features of particular value for reptiles were identified;
- the value of the site for breeding birds was assessed;
- an external inspection of all trees within the site was carried out to assess their suitability for occupancy by roosting and/or hibernating bats. The likely value of the various habitat features for foraging and commuting bats was also critically assessed;
- the site was investigated for its use by badgers (*Meles meles*) by searching for the characteristic signs of badger activity including setts, latrines, paths, footprints, hairs, and feeding signs. The survey area was extended where necessary in order to search adjacent areas for badger setts;
- the site was assessed for its potential to be used by dormice (*Muscardinus avellanarius*) and the connectivity of the site to areas of woodland habitat in the surrounding area;
- the value of the site for otter (*Lutra lutra*) and water vole (*Arvicola amphibius*) was assessed and any habitats or features of particular value of otter and water vole were identified;
- the value of the site for terrestrial mammals was assessed and any habitats or features of particular value for terrestrial mammals were identified.

ii. Hedgerow Regulations

1.2.5 These regulations only apply to hedgerows adjacent to land in agricultural/horticultural use. A hedgerow may be classified as ‘important’ for archaeological/historical reasons, or according to the Wildlife and Landscape criteria. To be classified as ‘important’ under the Wildlife and Landscape criteria, the hedgerow must be over 30 years old and should comprise one of the following:

- at least seven woody species/30m¹;
- at least six woody species/30m and at least three features¹;
- at least six woody spp/30m including any one of Pn/Sot/Tic/Tip (see **Table 1.1**)¹;
- *at least five woody species and at least four features; and
- or if adjacent to a bridleway/footpath, at least four woody species and at least two features.

1.2.6 Note that a hedgerow may also be classified as ‘important’ due to the presence/recorded presence of particular animal and plant species (see Criteria 6 sub-paragraphs (1)-(4) of the Hedgerows Regulations for details (Ref 1.3).

1.2.7 The woody species ‘recognised’ by the Hedgerows Regulations (Ref 1.3) are listed in **Table 1.1** below, along with the species codes to be used on the record sheet:

Table 1.1: Woody species recognised by Hedgerows Regulations.

Spp code	Latin name	English name	Spp code	Latin name	English name
Ac	<i>Acer campestre</i>	Field Maple	Pa	<i>Prunus avium</i>	Wild Cherry
Ag	<i>Alnus glutinosa</i>	Alder	Pp	<i>Prunus padus</i>	Bird Cherry
Bpe	<i>Betula pendula</i>	Silver Birch	Ps	<i>Prunus spinosa</i>	Blackthorn
Bpu	<i>Betula pubescens</i>	Downy Birch	Pyc	<i>Pyrus communis</i>	Pear
Bxs	<i>Buxus sempervirens</i>	Box	Qp	<i>Quercus petraea</i>	Sessile Oak
Cb	<i>Carpinus betulus</i>	Hornbeam	Qr	<i>Quercus robur</i>	Pedunculate Oak
Cos	<i>Cornus sanguinea</i>	Dogwood	Rc	<i>Rhamnus cathartica</i>	Buckthorn

¹ If the hedgerow is situated wholly or partly in one of the counties listed in Criteria 7 sub-paragraph (2) of the Hedgerows Regulations, the number of woody species should be reduced by one. Note that Suffolk is not one of the counties listed in Criteria 7 sub-paragraph (2) of the Hedgerows Regulations and therefore is not subject to this reduction.

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Spp code	Latin name	English name	Spp code	Latin name	English name
Ca	<i>Corylus avellana</i>	Hazel	Ruv	<i>Ribes uva-crispa</i>	Gooseberry
Cla	<i>Crataegus laevigata</i>	Midland Hawthorn	Ros	<i>Rosa</i> spp	Rose
Cm	<i>Crataegus monogyna</i>	Hawthorn	Rac	<i>Ruscus aculeatus</i>	Butcher's-broom
Cys	<i>Cytisus scoparius</i>	Broom	Sx	<i>Salix</i> spp	Willow
DI	<i>Daphne laureola</i>	Spurge-laurel	Sxv	<i>Salix viminalis</i>	Osier
Ee	<i>Euonymus europaeus</i>	Spindle	Sn	<i>Sambucus nigra</i>	Elder
Fs	<i>Fagus sylvatica</i>	Beech	Sac	<i>Sorbus aucuparia</i>	Rowan
Fa	<i>Frangula alnus</i>	Alder Buckthorn	Sor	<i>Sorbus</i> spp	Whitebeam
Fe	<i>Fraxinus excelsior</i>	Ash	Sot	<i>Sorbus torminalis</i>	Wild Service-tree
Hr	<i>Hippophae rhamnoides</i>	Sea-buckthorn	Tb	<i>Taxus baccata</i>	Yew
la	<i>Ilex aquifolium</i>	Holly	Tic	<i>Tilia cordata</i>	Small-leaved Lime
Jr	<i>Juglans regia</i>	Walnut	Tip	<i>Tilia platyphyllos</i>	Large-leaved Lime
Jc	<i>Juniperus communis</i>	Common Juniper	Ue	<i>Ulex europaeus</i>	Gorse
Liv	<i>Ligustrum vulgare</i>	Wild Privet	Ug	<i>Ulex gallii</i>	Western Gorse
Ms	<i>Malus sylvestris</i>	Crab Apple	Umi	<i>Ulex minor</i>	Dwarf Gorse
Pal	<i>Populus alba</i>	White Poplar	Um	<i>Ulmus</i> spp	Elm
Pn	<i>Populus nigra sub-species betulifolia</i>	Black-poplar	VI	<i>Viburnum lantana</i>	Wayfaring-tree
Pot	<i>Populus tremula</i>	Aspen	Vop	<i>Viburnum opulus</i>	Guelder Rose
an	<i>Populus x canescens</i>	Grey Poplar			

1.2.8 The presence of several features along a hedgerow influences the classification under the Hedgerows Regulations (Ref 1.3). The terms used on the record sheet are explained in Table 1.2 and their presence in the hedgerow is indicated by a ‘✓’ on the record sheet.

Table 1.2: Explanation of terms used on the Hedgerows Regulations record sheet.

Term	Description
Bank/wall	The hedgerow is supported along at least half of its length by a bank/wall.
Bridleway/path	The hedgerow runs parallel to a designated bridleway/footpath.
Connections ≥4 points	A hedgerow must score four or more ‘connections points’, where connections with an adjoining hedgerow(s) score one point each, and a connection with a pond or woodland (in which the majority of the trees are broad-leaved) scores two points each. A hedgerow is connected if it meets the feature, or if it has a point within 10m of it and would meet it if the line of the hedgerow continued.
Ditch	There is a ditch along at least half of the length of the hedgerow.
Ground flora spp.	A list of the dominant and any notable ground flora species recorded along the hedgerow.
Hedge No.	Hedgerow number (within survey area/site).
Important	Would the hedgerow be classified as ‘important’ under the Hedgerows Regulations?
Intact	The hedgerow contains less than 10% gaps along its length.
Parallel hedge	A parallel hedgerow is present within 15m.
Pn/Sot/Tic/Tip	The presence of these trees within the hedgerow influences the classification. An explanation of the species codes is given above.
Three flora spp.	The hedgerow supports at least three of the valuable ground flora species defined by the Hedgerows Regulations. The hedgerow is considered to support a plant if it is rooted within 1m (in any direction) of the hedgerow.
Trees	The hedgerow supports at least one standard tree per 50m length of hedgerow (standard trees are defined as those which when measured at 1.3m above ground level have a diameter of at least 20cm, or 15cm for multi-stemmed trees).
Woody species	A list of the woody species found along the hedgerow (this is likely to list more species than are present along 30m length(s)).

1.2.9 **Table 1.3** details valuable ground flora species with regard to the Hedgerows Regulations (Ref 1.3), while **Table 1.4** details species codes for other species often found in hedgerows.

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Table 1.3: Valuable ground flora species with regard to the Hedgerows Regulations (Ref 1.3).

Spp code	Latin name	English name
Amos	<i>Adoxa mochatellina</i>	Moschatel
Ajr*	<i>Ajuga reptans</i>	Bugle
Alu*	<i>Allium ursinum</i>	Ramsons
An*	<i>Anemone nemorosa</i>	Wood Anemone
Amac	<i>Arum maculatum</i>	Lord's-and-Ladies
Aff*	<i>Athyrium filix-femina</i>	Lady-fern
Bsp*	<i>Blechnum spicant</i>	Hard-fern
Bs*	<i>Brachypodium sylvaticum</i>	False Brome
Bram	<i>Bromopsis ramosa</i>	Hairy Brome
Clat	<i>Campanula latifolia</i>	Giant Bellflower
Ctra	<i>Campanula trachelium</i>	Nettle-leaved Bellflower
Cxsy	<i>Carex sylvatica</i>	Wood Sedge
Cl*	<i>Circaea lutetiana</i>	Enchanter's Nightshade
Cmaj	<i>Conopodium majus</i>	Pignut
Daff	<i>Dryopteris affinis</i>	Scaly Male-fern
Dcar	<i>Dryopteris carthusiana</i>	Narrow Buckler-fern
Dfm	<i>Dryopteris filix-mas</i>	Male-fern
Ehel	<i>Epipactis helleborine</i>	Broad-leaved Helleborine
Esyl	<i>Equisetum sylvaticum</i>	Wood Horsetail
Eamy	<i>Euphorbia amygdaloides</i>	Wood Spurge
Fgig	<i>Festuca gigantea</i>	Giant Fescue
Fv*	<i>Fragaria vesca</i>	Wild Strawberry
Godo	<i>Galium odoratum</i>	Woodruff
Gsx*	<i>Galium saxatile</i>	Heath Bedstraw
Gro*	<i>Geranium robertianum</i>	Herb-Robert
Gu*	<i>Geum urbanum</i>	Wood Avens
Hn*	<i>Hyacinthoides non-scripta</i>	Bluebell
Lgal	<i>Lamium galeobdolon</i>	Yellow Archangel
Lsqu	<i>Lathraea squamaria</i>	Toothwort
Ls*	<i>Luzula sylvatica</i>	Greater Wood-rush
Lnem	<i>Lysimachia nemorum</i>	Yellow Pimpernel
Mpra	<i>Melampyrum pratense</i>	Common Cow-wheat
Msyl	<i>Melampyrum sylvaticum</i>	Small Cow-wheat

NOT PROTECTIVELY MARKED

Spp code	Latin name	English name
Muni	<i>Melica uniflora</i>	Wood Melick
Mp*	<i>Mercurialis perennis</i>	Dog's Mercury
Meff	<i>Milium effusum</i>	Wood Millet
Omas	<i>Orchis mascula</i>	Early –purple Orchid
Oxa*	<i>Oxalis acetosella</i>	Wood-sorrel
Pqua	<i>Paris quadrifolia</i>	Herb Paris
PSCO	<i>Asplenium scolopendrium</i>	Hart's-tongue
Pnem	<i>Poa nemoralis</i>	Wood Meadow-grass
Pvul	<i>Polypodium vulgare</i>	Polypody
Pacu	<i>Polystichum aculeatum</i>	Hard Shield-fern
Pset	<i>Polystichum setiferum</i>	Soft Shield-fern
Pere	<i>Potentilla erecta</i>	Tormentil
Pste	<i>Potentilla sterilis</i>	Barren Strawberry
Pela	<i>Primula elatior</i>	Oxlip
Pvul	<i>Primula vulgaris</i>	Primrose
Raur	<i>Ranunculus auricomus</i>	Goldilocks Buttercup
Sne*	<i>Sanicula europaea</i>	Sanicle
Tsn*	<i>Teucrium scorodonia</i>	Wood Sage
Vmon	<i>Veronica montana</i>	Wood Speedwell
Vodo	<i>Viola odorata</i>	Sweet Violet
Vrei	<i>Viola reichenbachiana</i>	Early Dog-violet
Vriv	<i>Viola riviniana</i>	Common Dog-violet

*Denotes code taken from Phase 1 handbook.

Table 1.4: Species codes for other species often found in hedgerows.

Spp code	Latin name	English name
Ae	<i>Arrhenatherum elatius</i>	False Oat-grass
Agt	<i>Agrostis stolonifera</i>	Creeping Bent
Apet	<i>Alliaria petiolata</i>	Garlic Mustard
Aste	<i>Anisantha sterilis</i>	Barren Brome
Asy*	<i>Anthriscus sylvestris</i>	Cow Parsley
At	<i>Agrostis capillaris</i>	Common Bent
Car*	<i>Cirsium arvense</i>	Creeping Thistle
Cha	<i>Chamerion angustifolium</i>	Rosebay Willowherb

NOT PROTECTIVELY MARKED

Spp code	Latin name	English name
Cop*	<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage
Cxrm	<i>Carex remota</i>	Remote Sedge
Cyc	<i>Cynosurus cristatus</i>	Crested dog's-tail
Ddl*	<i>Dryopteris dilatata</i>	Broad Buckler-fern
Dp*	<i>Digitalis purpurea</i>	Foxglove
Ephir	<i>Epilobium hirsutum</i>	Greater Willowherb
Fu*	<i>Filipendula ulmaria</i>	Meadowsweet
Gap*	<i>Galium aparine</i>	Cleavers
Gh*	<i>Glechoma hederacea</i>	Ground-ivy
Gmol	<i>Galium mollugo</i>	Hedge Bedstraw
Gro	<i>Geranium robertianum</i>	Herb-Robert
Hh*	<i>Hedera helix</i>	Ivy
Hl*	<i>Holcus lanatus</i>	Yorkshire-fog
Hlup	<i>Humulus lupulus</i>	Hop
Ig*	<i>Impatiens glandulifera</i>	Indian Balsam
Lped	<i>Lotus pedunculatus</i>	Greater Bird's-foot-trefoil
Lpc*	<i>Lonicera periclymenum</i>	Honeysuckle
Ocro	<i>Oenanthe crocata</i>	Hemlock Water-dropwort
Oreg	<i>Osmunda regalis</i>	Royal Fern
Pt*	<i>Pteridium aquilinum</i>	Bracken
Pver	<i>Primula veris</i>	Cowslip
Rf*	<i>Rubus fruticosus</i> agg.	Bramble
Sd	<i>Solanum dulcemara</i>	Bittersweet
Shol	<i>Stellaria holostea</i>	Greater Stitchwort
Ssyl	<i>Stachys sylvatica</i>	Hedge Woundwort
So	<i>Smyrniolum olusatrum</i>	Alexanders
Hand	<i>Hypericum androsaemum</i>	Tutsan
Ud*	<i>Urtica dioica</i>	Common Nettle
Vio	<i>Viola</i> spp	Violet species
Vm	<i>Vaccinium myrtillus</i>	Bilberry
Vriv	<i>Viola riviniana</i>	Common Dog-violet

*Denotes code taken from Phase 1 handbook.

iii. National Vegetation Classification

- 1.2.10 A National Vegetation Classification (NVC) habitat survey was undertaken in June 2019 of ditches and the River Alde (see **Figure 7.4** in **Annex 7A.1**).
- 1.2.11 The survey involved identifying and assigning NVC plant communities following the NVC Users Handbook (Joint Nature Conservation Committee) (JNCC) (Ref 1.4). A standard 1 x 4 metre (m) square quadrat was used to survey aquatic emergent and marginal ditch vegetation. As per the JNCC guidance, five representative 2m x 2m quadrats were placed within each survey location. All species were recorded within the quadrats, with each species given a score using the Domin scale, a ten-point scale of abundance/cover used to record the extent of species in NVC samples.
- 1.2.12 A comprehensive list of species with Dominant, Abundant, Frequent, Occasional and Rare (DAFOR) scores (Ref 1.5) was also recorded for the homogeneous stand of floodplain grassland vegetation either side of the River Alde. This included species absent from the quadrats but present within other areas of the stand. Although not part of NVC survey protocol, this provided additional information to help fully assess the botanical value of the survey area

b) Results

i. Extended Phase 1 habitat and protected species survey

- 1.2.13 **Table 1.5** details the Target Notes (TN) of the extended Phase 1 habitat and protected species survey. Full results are presented on **Figure 7.3, Annex 7A.1**.

Table 1.5: Extended Phase 1 habitat and protected species survey Target Notes.

Target Note (TN) number	Description
1	An area of species-poor floodplain grassland.
2	A young broadleaved woodland with a canopy of Beech (<i>Fagus sylvatica</i>), Alder and Sweet Chestnut (<i>Castanea sativa</i>) and a sparse understory. The ground flora is dominated by Bluebell, Cleavers, Red Campion (<i>Silene dioica</i>), Ground-ivy and Wood-sorrel.
3	A broadleaved semi-natural woodland (Whin Covert) with a canopy of Ash and Field Maple and an understory of Elder and Hawthorn. The ground flora consists of Cow Parsley, Cleavers, Garlic Mustard, Bluebell, Lord's-and-Ladies and Dog's Mercury.

Target Note (TN) number	Description
4	A woodland strip (The Belt) with a canopy of oak (<i>Quercus</i> spp.), Hawthorn, Field Maple and Elder without an understory. The ground flora includes Bluebell, Dog’s Mercury, Ivy, Common Nettle and Lord’s-and-Ladies.
5	A woodland (Nuttery Belt) that has not been surveyed due to not having been granted access.
6	A broadleaved semi-natural woodland dominated by Ash and with a ground flora of Bluebell and Cleavers.
7	A broadleaved semi-natural woodland (Pond Wood) with a canopy of Field Maple, Oak and Beech and an understory of Field Maple, Hazel and Elder. The ground flora is dominated by Bluebell, Red Campion, Cleavers, Ramsons and Dog’s Mercury.
8	A small ancient woodland copse (Foxburrow Wood) with a canopy dominated by English Oak and a sparse understory of Elder and Hawthorn. The ground flora is dominated by Bluebell.
9	A broadleaved semi-natural woodland with a canopy of Ash, oak, Beech and Sweet Chestnut and an understory of Hawthorn and Cherry Laurel (<i>Prunus laurocerasus</i>). The ground flora is dominated by grasses with Common Nettle, Cow Parsley, Cleavers and Bramble.

ii. Hedgerows Regulations

1.2.14 All hedgerows assessed under the Hedgerows Regulations (Ref 1.3) are target-noted with ‘hedgerow numbers’ (e.g. H1) on **Figure 7.3 (Annex 7A.1)**. Species abbreviations follow the ‘Handbook for Phase 1 habitat survey’ (Ref 1.1). **Table 1.6** details the Hedgerow Regulations record sheets.

NOT PROTECTIVELY MARKED

Table 1.6: Hedgerows Regulations record sheets.

Hedge No.	H45	H49	H54	H55	H56	H58
Important	✓	✓				
Bridleway/path	✓	✓				
Pn/Sot/Tic/Tip		0	0	0	0	
No. woody spp./30m	7	8	2	5	5	
Bank/wall	✓	✓			✓	
Intact						
Trees	✓	✓	✓		✓	✓
3 flora spp.						
Ditch				✓		
Connect >4 points					✓	
Parallel hedge		✓				
Woody spp present	Qr, Ros, Ps, Ac, Fe, Um, Cm	Cm, Ac, Fe, Qr	Um, Ps	Ps, Um, Ros, Ca, Ac	Qr, Um, Cm, Sn, Fs	Ms, Sn, Cm, Ros
	Qr, Fe, Ros, Ac, Um, Cm, Sn, Ps	Fe, Cm, Ps, Ros, Fs, Sx, Ac, Ca	Cm, Fs, Sn, Qr		Cm, Fs, Sn, Qr	
Woody spp present		Cm, Ros, Ps, Fe, Qr, Ac				
Ground flora (dominant)	Tall ruderals and grasses	Ruderals Apet, Gap	Tall ruderals	Tall ruderals	Ruderals including. Hogweed, thistle species, Gap, Ud	Ruderals including Ud, White Dead-nettle, Hogweed
Other ground flora (including notable species)		Amac	None	None	None	

NOT PROTECTIVELY MARKED

Hedge No.	H59	H61	H62	H63	H66	H67
Important		✓			✓	
Bridleway/path					✓	✓
Pn/Sot/Tic/Tip	0	0	0	0	0	0
No. woody spp./30m	4	7	3	2	6	4
Bank/wall				Yes		
Intact		✓				
Trees	✓	✓	✓		✓	✓
3 flora spp.						
Ditch	✓	✓				✓
Connect >4 points	✓					
Parallel hedge					✓	
Woody spp present	Sx, Sn, Ag, Cm	Qr, Cm, Ps, Ag, Sn, Ros, Fe	Qr, Cm	Cm, Um	Fe, Cm, Ps, Ros, Fs, Sx, Ac, Ca	Ag, Sn, Ca, Cm
	Sx	Cm, Ps, Qr, Fe, Ros, Sx	Cm, Qr, Sn	Cm		
Woody spp present	Sx, Ag		Cm, Qr, Sn			
Ground flora (dominant)	Ditch with sedges, Ud	Grass including Ae and ditch habitat inc. reeds	Tall ruderals	Tall ruderals	Tall ruderals	Ud
Other ground flora (including notable species)	None	None	None	None	Mp, Amac, Hn,	

NOT PROTECTIVELY MARKED

Hedge No.	H46	H42	H47	H50	H53	H62
Important	✓			✓	✓	
Bridleway/path	✓			✓		
Pn/Sot/Tic/Tip						
No. woody spp./30m	8	2	4	6	6	2
Bank/wall			✓		✓	
Intact					✓	
Trees	✓	✓	✓	✓	✓	✓
3 flora spp.				✓		
Ditch	✓		✓		✓	
Connect >4 points			✓			
Parallel hedge				✓		
Woody spp present	Ac, Ca, Um, Sn, Cm, Qr, Ros, Cos	Um, Ps	Cm, Ps, Ac, Sn	Fe, Cm, Ac, Qr, Sn, Ps	Ps, Um, Fe, Ac, Ros, Cos	Qr, Cm
	Um, Sn, Cm, Qr, Ca, Ac, Fe		Sn, Cm, Ac, Ps, Qr, Fe		Ac, Ps, Fe, Cm, Ros	Cm, Qr, Sn
Woody spp present	Ros, Ca, Ac, Cm		Ps, Fe, Qr, Ia		Sn, Ps, Ros, Um	Qr, Cm, Sn
Ground flora (dominant)	Tall ruderals	Tall ruderals	Ud	Tall ruderals	Ruderals	Tall ruderals
Other ground flora (including notable species)			Amac, Mp	Mp, Amac, Hn	Amac, Mp	

iii. National Vegetation Classification

1.2.15 **Tables 1.7 to 1.11** detail species present within quadrats recorded for each watercourse surveyed and provides either a Domin scale or DAFOR scale of vegetation coverage

1.2.16 The location of survey quadrats are presented on Figure 7.4, Annex 7A.1.

1.2.17 Ditches 9, 14, 18, 20 and 21 were not surveyed due to them being dry at the time of survey with little or no aquatic vegetation present (Figure 7.4, Annex 7A.1).

Floodplain Grassland (G1)

1.2.18 One NVC community was recorded within the area of Floodplain grassland MG7 *Lolium perenne* - *Trifolium repens*. The grassland was mown short and comprised abundant Perennial Rye-grass (*Lolium perenne*) and White Clover (*Trifolium repens*).

River Alde (Watercourse 1 and 13)

1.2.19 One NVC community was recorded within the River Alde - S14 *Sparganium erectum* swamp community. The vegetation present within the southern five quadrats were assigned to the *Phalaris arundinacea* sub-community given the increased presence of Reed Canary-grass (*Phalaris arundinacea*) with relatively few forbe species, although, a higher abundance of Water Mint (*Mentha aquatica*) was recorded in some of the quadrats.

1.2.20 The vegetation present within the northern five quadrats were assigned to the *Sparganium erectum* sub-community due to the dominance of Branched Bur-reed (*Sparganium erectum*) and the absence of other species. The bankside was dominated by tall ruderal species including False Oat-grass (*Arrhenatherum elatius*), Common Nettle (*Urtica dioica*), dock species (*Rumex* sp.), Reed canary-grass and Common Reed (*Phragmites australis*), with many areas having a thick layer of dead leaf litter.

Ditches 10,11 and 22

1.2.21 Two NVC communities were recorded within Ditches 10 and 11, S7 - *Carex acutiformis* community and M23 - *Juncus effusus/acutiflorus*. The ditches were shallow with little water present and evidence of poaching was recorded.

1.2.22 One community was recorded within Ditch 22, S7 - *Carex acutiformis* community. The ditch contained slow flowing, shallow water. The bankside vegetation comprised predominately tall ruderal species.

- 1.2.23 The vegetation present within the S7 *Carex acutiformis* community comprised abundant Lesser Pond-sedge (*Carex acutiformis*). Other species associated with this community such as Soft-rush (*Juncus effuses*) and Water Mint were also present, albeit at lower frequencies. Although Lesser Pond-Sedge is a lowland species, this community is still considered uncommon in the south of Britain. However, this community is degraded with other common species such as *Juncus* species.
- 1.2.24 The vegetation present within the M23 - *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture community was dominated by Hard Rush (*Juncus inflexus*) however, other species such as Soft Rush associated with this community were also present in abundance.

Table 1.7: Species present within Floodplain grassland G1 - MG7 *Lolium perenne* - *Trifolium repens*.

Scientific Name	Common Name	DAFOR ²
<i>Lolium perenne</i>	Perennial Rye-grass	A
<i>Bromus hordeaceus</i>	Common Soft-brome	O
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	O
<i>Dactylis glomerata</i>	Cock's-foot	O
<i>Trifolium repens</i>	White Clover	O
<i>Alopecurus pratensis</i>	Meadow Foxtail	R
<i>Rumex obtusifolius</i>	Broad-leaved Dock	R
<i>Heracleum sphondylium</i>	Hogweed	R
<i>Taraxacum officinale</i> agg.	Dandelion	R
<i>Cirsium arvense</i>	Creeping Thistle	R La

² DAFOR (Ref. 2) – Dominant, Abundant, Frequent, Occasional and Rare. 'L' denotes 'Locally' in the case of LD, LA, etc.

Table 1.8: Species present within River Alde - S14 *Sparganium erectum* swamp community.

Scientific Name	Common Name	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Frequency ³	Domin Range ⁴	DAFOR ⁵
Emergent vegetation														
<i>Sparganium erectum</i>	Branched Bur-reed	7	5	5	4		3	5	3	3	8	IX	3-8	F la
<i>Phalaris arundinacea</i>	Reed Canary-grass	5	8	6	5		3					V	3-8	F la
<i>Mentha aquatica</i>	Water Mint	6	3		8							III	3-8	O lf
<i>Agrostis stolonifera</i>	Creeping Bent	3	3	3								III	3	O
<i>Apium nodiflorum</i>	Fool's-water-cress		2	1								II	1-2	O
<i>Epilobium hirsutum</i>	Great Willowherb			2			2					II	2	O
<i>Phragmites australis</i>	Common Reed							8				I	8	O lf
<i>Myosotis scorpioides</i>	Water Forget-me-not		3									I	3	R
<i>Veronica beccabunga</i>	Brooklime			2								I	2	R
<i>Impatiens capensis</i>	Orange Balsam	1										I	1	R
<i>Veronica catenata</i>	Pink Water-Speedwell		1									I	1	R
<i>Scrophularia auriculata</i>	Water Figwort							1				I	1	R
<i>Lythrum salicaria</i>	Purple-loosestrife							1				I	1	R
<i>Glyceria maxima</i>	Reed Sweet-grass												0	O lf
<i>Sagittaria sagittifolia</i>	Arrowhead												0	O lf

³ Frequency (Ref. 1) – signifies how often a species is encountered across the quadrat irrespective of the abundance within each quadrat.

⁴ Domin Range (Ref. 1) – signifies the lowest and highest domin score for which the species was recorded.

⁵ DAFOR (Ref. 2) – Dominant, Abundant, Frequent, Occasional and Rare. 'L' denotes 'Locally' in the case of LD, LA, etc.

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Scientific Name	Common Name	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Frequency ³	Domin Range ⁴	DAFOR ⁵
<i>Glyceria fluitans</i>	Floating Sweet-grass												0	R
<i>Solanum dulcemara</i>	Bittersweet												0	R
<i>Juncus effusus</i>	Soft-rush												0	R
<i>Juncus inflexus</i>	Hard Rush												0	R
<i>Iris pseudacorus</i>	Yellow Iris												0	R
Floating Vegetation														
<i>Sparganium erectum</i>	Branched Bur-reed		3				3		2	4		IV	2-4	F
<i>Algae</i>							4		3	3		III	3-4	F
<i>Lemna minor</i>	Common Duckweed		3	3								II	3	O If
<i>Glyceria maxima</i>	Reed Sweet-grass						3					I	3	R
<i>Nuphar lutea</i>	Yellow water-lily												0	O
<i>Sagittaria sagittifolia</i>	Arrowhead												0	O If
Submerged Vegetation														
<i>Open water</i>						10	9	5	10	10	5	VI	5-10	
<i>Callitriche stagnalis</i>	Common Water-starwort								4			I	4	O

NOT PROTECTIVELY MARKED

Table 1.9: Species present within Ditch 10 - S7 *Carex acutiformis* community.

Scientific Name	Common Name	Community 3 DAFOR ⁶	Community 4 DAFOR ⁷
<i>Juncus inflexus</i>	Hard Rush	F	A
<i>Juncus effusus</i>	Soft-rush	F	F
<i>Mentha aquatica</i>	Water Mint	F	O
<i>Rumex crispus</i>	Curled Dock	F	O
<i>Apium nodiflorum</i>	Fool's-water-cress	O	O
<i>Agrostis stolonifera</i>	Creeping Bent	O	O
<i>Glyceria fluitans</i>	Floating Sweet-grass	F	O la
<i>Berula erecta</i>	Lesser Water-parsnip		R
<i>Epilobium palustre</i>	Marsh Willowherb		R
<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup		R
<i>Veronica beccabunga</i>	Brooklime		R
<i>Iris pseudacorus</i>	Yellow Iris		R
<i>Carex acutiformis</i>	Lesser Pond-sedge	A	
<i>Carex riparia</i>	Greater Pond-sedge	F	
<i>Galium palustre</i>	Marsh-bedstraw	O	
<i>Juncus acutiflorus</i>	Sharp-flowered Rush	R	

⁶ DAFOR (Ref. 2) – Dominant, Abundant, Frequent, Occasional and Rare. 'L' denotes 'Locally' in the case of LD, LA, etc.

⁷ DAFOR (Ref. 2) – Dominant, Abundant, Frequent, Occasional and Rare. 'L' denotes 'Locally' in the case of LD, LA, etc.

Table 1.10: Species present within Ditch 11 - S7 *Carex acutiformis* community.

Scientific Name	Common Name	Community 1 DAFOR ⁸	Community 2 DAFOR ⁹
Emergent vegetation			
<i>Juncus inflexus</i>	Hard Rush	Lf	A
<i>Mentha aquatica</i>	Water Mint	F	F
<i>Apium nodiflorum</i>	Fool's-water-cress	F	F
<i>Juncus effusus</i>	Soft-rush	O	F
<i>Berula erecta</i>	Lesser Water-parsnip	F	O
<i>Galium palustre</i>	Marsh-bedstraw	O	O
<i>Juncus acutiflorus</i>	Sharp-flowered Rush		O
<i>Agrostis stolonifera</i>	Creeping Bent		O
<i>Scrophularia auriculata</i>	Water figwort	R	R
<i>Lythrum salicaria</i>	Purple-loosestrife	R	R
<i>Epilobium palustre</i>	Marsh willowherb		R
<i>Carex otrubae</i>	False Fox-sedge		R
<i>Carex acutiformis</i>	Lesser Pond-sedge	A	
<i>Agrostis stolonifera</i>	Creeping Bent	O	
<i>Equisetum palustre</i>	Marsh Horsetail	O	

⁸ DAFOR (Ref. 2) – Dominant, Abundant, Frequent, Occasional and Rare. 'L' denotes 'Locally' in the case of LD, LA, etc.

⁹ DAFOR (Ref. 2) – Dominant, Abundant, Frequent, Occasional and Rare. 'L' denotes 'Locally' in the case of LD, LA, etc.



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Scientific Name	Common Name	Community 1 DAFOR ⁸	Community 2 DAFOR ⁹
<i>Sparganium erectum</i>	Branched Bur-reed	O lf	
Floating Vegetation			
<i>Lemna minor</i>	Common duckweed	O	O

Table 1.11: Species present within Ditch 22 - S7 *Carex acutiformis* community.

Scientific Name	Common Name	DAFOR ¹⁰
<i>Carex acutiformis</i>	Lesser Pond-sedge	A
<i>Mentha aquatica</i>	Water Mint	F
<i>Juncus inflexus</i>	Hard Rush	Lf
<i>Agrostis stolonifera</i>	Creeping Bent	O
<i>Apium nodiflorum</i>	Fool's-water-cress	O
<i>Berula erecta</i>	Lesser Water-parsnip	O
<i>Galium palustre</i>	Marsh-bedstraw	O
<i>Juncus effusus</i>	Soft-rush	O
<i>Lythrum salicaria</i>	Purple-loosestrife	O
<i>Rumex crispus</i>	Curled Dock	O
<i>Epilobium palustre</i>	Marsh Willowherb	R
<i>Hypericum maculatum</i>	Imperforated St John's-wort	R

¹⁰ DAFOR (Ref. 2) – Dominant, Abundant, Frequent, Occasional and Rare. 'L' denotes 'Locally' in the case of LD, LA, etc.

1.3 Amphibians

a) Methodology

- 1.3.1 A review of Ordnance Survey (OS) maps and aerial photos (from the Bing maps website) of land associated with each of the AD sites was carried out to identify any waterbodies within 500m of the site boundary (see **Figure 7.6** in **Annex 7A.1**).
- 1.3.2 A site visit to each pond was made by Arcadis ecologists between 1 April and 30 June 2019, for each pond where access was granted. During these visits, detailed site descriptions were taken for each waterbody, including photographs, measurements of the area and depth, descriptions of marginal, aquatic and surrounding vegetation, and a note was made of suitable survey methods for the waterbody.
- 1.3.3 Where appropriate, a Habitat Suitability Index (HSI) assessment for great crested newts (*Triturus cristatus*) (Ref 1.6) was calculated for each waterbody. The HSI scores a waterbody against ten habitat suitability indices, which include water quality and the likely presence/absence of fish and aquatic plant cover. From these ten suitability indices, a geometric mean is calculated, which gives an overall numerical index ranging between zero and one. A score of near zero indicates highly sub-optimal habitat, whilst a score near one represents optimal habitat. HSI scores are then used to define pond suitability for great crested newts on a categorical scale, from 'poor' to 'below average', 'average', 'good', and 'excellent'.
- 1.3.4 The HSI for each pond was used to compare the general suitability of the ponds present for great crested newts. However, the HSI is not a substitute for undertaking newt surveys and, if a waterbody is awarded a high HSI score, this does not guarantee that great crested newts will be present, only that they are likely to be present.
- 1.3.5 Great crested newt eDNA surveys were undertaken at ponds identified as being potentially suitable for breeding amphibians during the scoping surveys. Sampling methodologies followed details in Briggs *et al.* 'Analytical and methodological development for improved surveillance of Great Crested Newt, Appendix 5, Technical advice note for field and laboratory sampling of great crested newt environmental DNA' (Ref 1.7). As required by Natural England, samples were collected by a licensed surveyor and took place between 15 April and 30 June 2019.
- 1.3.6 The samples were sent to FERA's eDNA testing service for analysis. The analysis method detects pond occupancy from great crested newts using traces of eDNA shed into the pond environment. The detection of great

crested newt eDNA is carried out using real-time Polymerase Chain Reaction (PCR) to amplify part of the cytochrome 1 gene found in mitochondrial DNA. The method followed details in Briggs *et al.* (Ref 1.7).

- 1.3.7 There are a number of limitations with this method as follows: (1) the results are based on analyses of the samples received by the laboratory; (2) any variation between the characteristics of the sample and a batch will depend on the sampling procedure used; (3) the method is qualitative and therefore the levels given in the score are for information only, they do not constitute the quantification of great crested newt DNA against a calibration curve; (4) a 'not detected' result does not exclude the presence at levels below the limit of detection.
- 1.3.8 Suitable aquatic vegetation at the pond margins was also checked at this time for the presence/absence of newt eggs.
- 1.3.9 Appropriate biosecurity measures were adopted whilst undertaking the surveys to avoid the inadvertent spreading of chytridiomycosis. This is a fungal disease which can have a devastating effect on amphibian populations. Measures implemented the application of Virkon antiseptic solution to survey equipment, wading poles and surveyor's waders between visits, where ponds are separated by a distance of over 1km.
- 1.3.10 The waterbodies occasionally exhibited conditions rendering certain survey methods impractical or unsafe. For example, certain ponds had banks too steep to safely allow the completion of eDNA collection. Occasionally, bank vegetation and conditions restricted access to sections of the water body, rendering surveying the entire perimeter of a pond impossible.

b) Results

- 1.3.11 Twenty-five waterbodies were identified within approximately 500m of the site boundary (**Table 1.12**). **Figure 7.6 (Annex 7A.1)** shows the locations of these ponds classified as follows: ponds which were scoped out as requiring further surveys (e.g. no longer extant, or dry at the time of survey); ponds where access was not granted for survey; ponds where great crested newt eDNA surveys were carried out; and ponds that were found to contain great crested newt populations.

Table 1.12: Ponds identified 2019.

Pond ID	Scoped in/out		Access	eDNA Surveyed
	In	Out		
P014	Yes		Yes	Yes

Pond ID	Scoped in/out		Access	eDNA Surveyed
	In	Out		
P015	Yes		Yes	No
P016	Yes		Yes	Yes
P017	Yes		Yes	Yes
P018	Yes		No	No
P019	Yes		No	No
P020	Yes		Yes	Yes
P021	Yes		Yes	Yes
P022	Yes		Yes	Yes
P023		Yes	N/A	No
P024		Yes	N/A	No
P025		Yes	N/A	No
P026	Yes		No	No
P077	Yes		Yes	No
P097	Yes		No	No
P098	Yes		Yes	Yes
P099	Yes		No	No
P100	Yes		No	No
P101		Yes	N/A	No
P102		Yes	N/A	No
P155		Yes	Yes	No
P156		Yes	Yes	No
P157		Yes	Yes	No
P162	Yes		Yes	Yes
P300	Yes		Yes	Yes

1.3.12 Of the 25 ponds identified, eight were scoped out as they were located north of the A12 (Ponds P023, P024, P025, P101, P102, P155, P156 and P157). Access was not granted to six of the remaining 17 ponds (Ponds P018, P019, P026, P097, P099 and P100). Eleven ponds were subject to an eDNA survey; however, eDNA samples could only be taken from nine of these (P014, P016, P017, P020, P021, P022, P098, P162 and P300) as one was dry (P015) and one pond no longer existed (P077) at the time of survey.

1.3.13 **Table 1.13** and **Table 1.14** presents the results of the HSI assessments and eDNA surveys carried out for ponds surveyed.

Table 1.13: HSI for Ponds surveyed in 2019.

Feature	P014	P016	P017	P020	P021
Location	1	1	1	1	1
Pond area	1	0.2	0.4	0.4	0.4
Pond drying	0.5	0.5	0.9	0.1	0.5
Water quality	0.67	0.67	0.67	0.33	0.67
Shade	1	0.4	1	0.2	0.5
Fowl	0.67	1	1	1	0.67
Fish	0.67	1	0.67	1	0.67
Ponds	0.8	1	1	0.93	0.85
Terrestrial habitat	0.67	1	1	0.67	0.67
Macrophytes	0.65	0.3	0.45	0.3	0.3
HSI Score	0.75	0.62	0.77	0.44	0.59
Suitability for Great Crested Newt	Good	Average	Good	Poor	Below Average

NOT PROTECTIVELY MARKED

Feature	P022	P162	P300	P098
Location	1	1	1	1
Pond area	0.2	0.4	0.2	0.4
Pond drying	0.1	0.5	0.5	0.1
Water quality	0.33	0.33	0.33	0.67
Shade	0.4	1	0.4	0.2
Fowl	0.67	0.01	1	0.67
Fish	1	0.33	1	0.67
Ponds	0.85	0.85	1	No value
Terrestrial habitat	0.67	0.67	1	0.67
Macrophytes	0.3	0.3	0.35	0.3
HSI Score	0.44	0.36	0.58	0.55
Suitability for Great Crested Newt	Poor	Poor	Below Average	Below Average

1.3.14 **Table 1.14** presents the results of the eDNA sampling survey. Great crested newt eDNA was not detected in any ponds surveyed.


Table 1.14: eDNA survey results for ponds surveyed in 2019.

Pond	Date sampled	GCN detection	GCN score	Inhibition	Degradation
P014	15/05/2019	Negative	0	No	No
P016	28/06/2019	Negative	0	No	No
P017	28/06/2019	Negative	0	No	No
P020	14/05/2019	Negative	0	No	No
P021	16/05/2019	Negative	0	No	No
P022	16/05/2019	Negative	0	No	No
P098	15/05/2019	Negative	0	No	No
P162	16/05/2019	Negative	0	No	No
P300	28/06/2019	Negative	0	No	No

1.3.15 Analysis was conducted in the presence of the following controls: (1) extraction blank; and, 20 appropriate positive and negative PCR controls for each of the TaqMan assays (Great Crested Newt, Inhibition and Degradation). All controls performed as expected.

1.3.16 Detailed pond descriptions are presented in **Table 1.15**

Table 1.15: Detailed Pond Descriptions.

Pond P014	
	
Grid reference	TM365593
Description	Medium size, moderately shaded farm pond within woodland. Dense <i>Typha latifolia</i> around pond edges.
Area	601-700m ²
Scoped in/out	In

Pond P015



Grid reference	TM366593
Description	Dry farm pond within woodland.
Area	0
Scoped in/out	Out

Pond P016



Grid reference	TM365596
Description	Small, heavily shaded woodland pond.
Area	101-150 m ²
Scoped in/out	In

Pond P017



Grid reference	TM364598
Description	Medium size garden pond with steep sides and small amount of shading.
Area	201-250 m ²
Scoped in/out	In

Pond P020



Grid reference	TM364600
Description	Small, heavily shaded farm pond with minimal aquatic vegetation within woodland.
Area	101-150 m ²
Scoped in/out	In

Pond P021



Grid reference	TM371600
Description	Medium size, moderately shaded farm pond with minimal aquatic vegetation within woodland.
Area	201-250 m ²
Scoped in/out	In

Pond P022



Grid reference	TM371602
Description	Small woodland pond with minimal aquatic vegetation.
Area	101-150 m ²
Scoped in/out	In

Pond P098



Grid reference	TM353594
Description	Medium size, completely shaded farm pond with minimal aquatic vegetation within woodland.
Area	210-250 m ²
Scoped in/out	In

Pond P162



Grid reference	TM371600
Description	Medium size, moderately shaded farm pond with minimal aquatic vegetation within woodland.
Area	201-250 m ²
Scoped in/out	In

Pond P300



Grid reference	TM365596
Description	Small, heavily shaded woodland pond.
Area	101-150 m ²
Scoped in/out	In

1.4 Invertebrates

a) Methodology

1.4.1 Targeted sampling of ditches and other waterbodies and riparian habitat was undertaken to assess the importance of the waterbodies within the study area for aquatic invertebrates. Two survey visits were conducted (one in June 2019 and one in August 2019). **Table 1.16** details the survey methodology used at each survey location.

Table 1.16: Survey location and methodology used.

Date	Survey Point	Habitat Type	Sample Method Used
Survey Visit 1			
4th June 2019	A	River Alde	Aquatic sampling – 3/1 stream sampling method (kick sampling)
	B	River Alde	Aquatic sampling – 3/1 stream sampling method (kick sampling)
	C	Drainage ditch	Aquatic sampling – 3/1 stream sampling method (kick sampling)
	D	Riparian semi-improved grassland / neutral grassland	Sweep net – 10 minutes Vacuum samples – 2 minutes
	E	River Alde bank - Semi-improved grassland	Sweep net – 10 minutes Vacuum samples – 2 minutes
	F	River Alde bank - Semi-improved grassland	Sweep net – 10 minutes Vacuum samples – 2 minutes
Survey Visit 2			
13th August 2019	G	River Alde and surrounding riparian habitat	Sweep net – 10 minutes Vacuum samples – 4 minutes Aquatic sampling – 3/1 method
	H	Drainage ditch	Aquatic sampling – 3/1 stream sampling method (kick sampling)

Date	Survey Point	Habitat Type	Sample Method Used
	I	River Alde	Aquatic sampling – 3/1 stream sampling method (kick sampling)
	J	Drainage ditch	Aquatic sampling – 3/1 stream sampling method (kick sampling)
14th August 2019	K	Drainage ditch	Sweep net – 20 minutes Aquatic sampling – 3/1 stream sampling method (kick sampling)
	L	Drainage ditch	Sweep net – 20 minutes

- 1.4.2 Each aquatic invertebrate sample was collected in accordance with the Murray Bligh (Ref 1.8) three-minute sweep net method (as used by the Environment Agency). Each sample was collected from a sufficient range of different representative meso-habitats to adequately cover the main invertebrate niches of the waterbody in question. The total sample time per waterbody was timed for three minutes, the sampling time divided between the different meso-habitats and the watch stopped after each sweeping to enable the contents of the net to be deposited in the sample tray.
- 1.4.3 Each sample was transferred to a sealed plastic sample pot, preserved and transported to the laboratory for identification.
- 1.4.4 Terrestrial invertebrate sampling was also undertaken within the riparian habitat, alongside the River Alde, to provide an indication of the conservation value of the wetland assemblage on site.
- 1.4.5 In accordance with Drake *et al* (Ref 1.9), terrestrial sampling was undertaken using a combination of standard capture methods recommended for Common Standards Monitoring of different habitats types (**Table 1.17**). In accordance with CSM protocol, data was collected using repeatable techniques enabling subsequent analysis using Pantheon.

Table 1.17: Invertebrate sampling methods used in 2019.

Sample Method	Description
Sweep-net	A standard sweep net was used to collect specimens. Timed sweeps were undertaken in representative habitat, in accordance with Drake et al (2007) (Ref 1.9).
Suction sampling	A suction sampler was used to collect ground-dwelling specimens not easily retrieved by other sampling methods. Suction sampling can be timed, enabling repeatable surveys to be undertaken.

- 1.4.6 Sampling was undertaken over only two survey events. For surveys of terrestrial fauna, Natural England (Ref 1.9) recommend four sample events spaced over the field season as a minimum to reasonably represent the invertebrate fauna of a site; however, a pragmatic compromise of three is generally considered acceptable. Aquatic invertebrate surveys using standard techniques can generally be undertaken over two sampling events, as was the case during the current survey.
- 1.4.7 The recorded weather during the first sampling event was suboptimal due to ‘rain throughout the previous night’ resulting in ‘wet ground conditions for much of the day’. The recorded temperature of 17 degrees Celsius during the first survey event and second day of the second survey event was borderline, but acceptable for terrestrial invertebrate survey. During the first day of the second survey event, the conditions were described as ‘dry- wet ground conditions’ however, the temperature was at 21 degrees, sufficiently warm for terrestrial invertebrate surveys. Whilst on both occasions, the weather was suitable for aquatic sampling, the suboptimal conditions for terrestrial sampling, coupled with the limited number of sampling events, may have compromised the diversity of species recorded.
- 1.4.8 Whilst some sweeping of scrub habitat may have been undertaken incidentally, no dedicated sampling of riparian wooded or scrub habitat using standard beating techniques was undertaken during the survey. The site supported some riparian willow scrub and other trees. Riparian scrub and trees can support species of conservation importance.
- 1.4.9 Where practical, species were identified on site without undue disturbance, however many species cannot be adequately identified in the field, and it is necessary for samples to be taken for *ex situ* identification using a binocular microscope and appropriate taxonomic keys, as required.
- 1.4.10 Aquatic and terrestrial invertebrate survey data was analysed using Pantheon, an analytical package developed by Natural England.
- 1.4.11 Invertebrate species from both aquatic and terrestrial samples were identified using a binocular microscope and where necessary, appropriate taxonomic keys including those produced by the Royal Entomological Society (RES), the Freshwater Biological Association (FBA) and the Field Studies Council (FSC). In addition, a range of other recognised entomological publications were used, both for the purpose of identification and provision of species-specific, biological information. In relation to conservation status, recently produced species-status reviews, such as the Natural England published species-status reports were also consulted.
- 1.4.12 Subsequent to identification, all recorded species were collated in a Microsoft Excel spreadsheet ready for analysis and interpretation.

- 1.4.13 Analysis of the whole site dataset was undertaken using ‘Pantheon’; an online invertebrate analytical recording and analytical tool developed by Natural England and the Centre for Ecology and Hydrology as a standard method for the conservation evaluation of British invertebrate communities.
- 1.4.14 Pantheon enables invertebrate datasets to be analysed using an updated version of the Invertebrate Species-habitat Information System (ISIS), an Excel-based analytical programme developed originally for Common Standards Monitoring of invertebrate features in Sites of Special Scientific Interest (SSSI’s) in England. The programme has also been used increasingly as a tool for Ecological Assessment of invertebrate data for Environment Impact Assessment. In Pantheon, species are assigned to habitat and/or resource specific assemblages and importantly, in relation to the current project, Pantheon can be used to evaluate the conservation value of both terrestrial and aquatic invertebrate assemblages. There are three hierarchical categories:
- Biotope level: A very broad division which classifies species according to their affinity to ‘Open habitat’, ‘Wetland’, ‘Tree-associated’ and ‘Coastal’ biotopes
 - Habitat level: An intermediate classification, where species are grouped according to their affinity to more tangible habitats. Examples include: ‘Tall sward and scrub’; ‘Short sward and bare ground’ (nested within the ‘Open habitat’ biotope category); ‘Marshland’ and ‘Peatland’ (nested within the ‘Wetland’ biotope category) and ‘Arboreal’ and ‘Decaying wood’ (nested within the ‘Tree-associated’ biotope category).
 - Specific Assemblage Type (SAT) level: SATs include species with restricted habitat associations and therefore, the presence of a high-scoring SAT on a site indicates the presence of invertebrate features of higher conservation value. Besides the habitat-related SATs, examples of which include: ‘Bare sand and chalk’ and ‘Reedfen and pools’ (nested within the ‘Short sward and bare ground’ and ‘Peatland’ habitat-level assemblages, respectively), there are a small number of resource-based SATs. Resource-based SATs such as the ‘Rich flower resource’ are less constrained by habitat.
- 1.4.15 In addition to Pantheon analysis, invertebrate species from the aquatic samples collected during the 2019 survey were analysed using standard freshwater metrics, including Biological Monitoring Working Party Score (BMWP); Average Score Per Taxon (ASPT) and Community Conservation Index (CCI). Both BMWP and ASPT analysis are techniques developed for water quality assessment (in relation to organic pollution); whilst CCI

provides a means of assessing the conservation value of aquatic invertebrate assemblages. Species Quality Index (SQI) and BMWP scores are combined to produce an overall score in CCI. It should be noted that CCI was developed prior to the development of ISIS or Pantheon and unlike, these methods, CCI does not discriminate between different freshwater habitats.

1.4.16 Walley and Hawkes (Ref 1.10) updated version of BMWP was used in the current analysis and consequently, ASPT (which is merely based on the average of BMWP scores) results are also based on this version.

1.4.17 CCI analysis of survey data was based on the method outlined in the original paper by Chadd and Extence (Ref 1.11). A list of recognised species with assigned species scores is included within the original CCI manuscript; however, due to changes in species status, in accordance with Chadd and Extence (Ref. 1.11) protocol, it was necessary to reassign updated scores to certain species. (e.g. *Anacaena bipustulata* was classed as Nationally Scarce at the time of publication, and therefore scored 7 in the original document, but was subsequently, downgraded to 'Local' by Foster (Ref 1.12) in a review of the species status of UK water beetles).

1.4.18 To enable a semi-quantitative evaluation of invertebrate conservation value on a site-level, the entire dataset was analysed using SQI. The method follows that used by Harvey (Ref 1.13) in relation to a site in Essex. The use of an overarching SQI score alongside Pantheon is required in evaluation of sites for EA under the Essex Standard. Whilst this is not prerequisite for EA related invertebrate surveys in Suffolk, or other English counties, the SQI provides a single figure, making it possible for a site's overall value to be assessed alongside the results of Pantheon and other metrics.

b) Results

1.4.19 The general habitat recorded within the survey area included grazing marsh, comprising seasonally inundated meadows and a network of field drains within the floodplain of the River Alde. The habitat broadens to form the River Alde Estuary around 4.2km south-east of the survey area reaching the coast immediately south of Aldeburgh, approximately 11km southeast of the survey area. The habitat currently forms a more or less continuous corridor of floodplain grazing-marsh.

1.4.20 Habitats specific to each sample site is described in **Table 1.18**:

Table 1.18: Survey location habitat descriptions.

Survey Location	Habitat Description	Indictive Plant species
	<p>Slow flowing river (River Alde), flow north-south. Channel width 3m. Depth unknown. Bankside steep on west side, shallower on east, heavily vegetated. Some in channel vegetation. Survey area 10m of east bank along very shallow meander.</p>	<p>In channel vegetation; Water Mint (<i>Mentha aquatica</i>), Pondweed sp. (<i>Potamogeton</i> sp.), Common Reed (<i>Phragmites australis</i>), Lily sp., Bur-reed sp. (<i>Sparganium</i> sp.). Bankside vegetation; Common Reed, Water Figwort (<i>Scrophularia auriculata</i>), Great Willowherb (<i>Epilobium hirsutum</i>), Marsh Thistle (<i>Cirsium palustre</i>), Cow Parsley (<i>Anthriscus sylvestris</i>), Cleavers (<i>Galium aparine</i>), Cock's-foot (<i>Dactylis glomerata</i>).</p>
	<p>River Alde, flowing north to south. Surveyed section 3-5m wide. Depth 0.3-1m, shallower sections result in more flow than other section downstream. West bank steep 1.5m high, east bank steep - shallow 1.5m. Unmown semi-improved grassland on either side of river. Bank side heavily vegetated with grass and tall ruderal. 70% in channel vegetation.</p>	<p>In channel vegetation; Water Mint, Pondweed sp. Common Reed. Lily sp., Bur-reed sp. Bank side vegetation; Common Reed, Water Figwort, Great Willowherb, Marsh Thistle, Cow Parsley, Cleavers, Cock's-foot.</p>
	<p>Ditch width 1m. Depth 30cm. Ditch is running between two pasture fields. Shallow banks. 90% in channel vegetation.</p>	<p>In channel vegetation: Sedge sp. (<i>Carex</i> sp.), Hard Rush (<i>Juncus inflexus</i>). Bank side vegetation: Species-poor grassland comprised predominantly grass species with few forbes.</p>

NOT PROTECTIVELY MARKED

Survey Location	Habitat Description	Indictive Plant species
	<p>Sample area on west bank of River Alde where grassland merges with bankside vegetation.</p> <p>Sward height quite homogenous throughout (approximately 30cm) but varies with rabbit grazing closer to the River Alde.</p> <p>Grassland dominated by graminoids with few forb species and some tall ruderal vegetation.</p>	<p>Yorkshire-fog (<i>Holcus lanatus</i>), Brome sp. (<i>Bromus</i> sp.), Cock's-foot, Meadow Foxtail (<i>Alopecurus pratensis</i>), Meadow-grass sp. (<i>Poa</i> sp.), Cow Parsley, Fescue sp. (<i>Festuca</i> sp.), Common Nettle (<i>Urtica dioica</i>), Great Willowherb, Cleavers, Sow-thistle sp. (<i>Sonchus</i> sp.), Cut-leaved Crane's-bill (<i>Geranium dissectum</i>), White Dead-nettle (<i>Lamium album</i>).</p>
	<p>Sample area along west bank of River Alde where semi improved grassland dominated by grasses meets the river bank. sward height is homogenous with a few taller ruderals nearer the watercourse. Rare patches of bare ground adjacent to watercourse were vacuum sampled</p>	<p>Fescue sp., Brome sp., Cock's-foot, Yorkshire-fog, Hedge Mustard (<i>Sisymbrium officinale</i>), Yellow Iris (<i>Iris pseudacorus</i>), Cow Parsley, Cut-leaved Crane's-bill, Cleavers, Hawkweed sp., Marsh Thistle, Creeping Cinquefoil (<i>Potentilla reptans</i>).</p>
	<p>East bank and surrounding habitat of River Alde, sample area slipped bank which has created patches of bare soil and a north-west facing bare earth vertical face.</p> <p>Bank and the grassland are well vegetated with homogenous sward height of approximately 30cm, comprised predominantly of grass species, with a few patches of shorter forb species.</p>	<p>Creeping Bent (<i>Agrostis stolonifera</i>), Fescue sp., Meadow Foxtail, Cock's-foot, Sweet-grass sp. (<i>Glyceria</i> sp.), Hawkweed sp. (<i>Hieracium</i> sp.), Lesser Trefoil (<i>Trifolium dubium</i>), White Clover (<i>Trifolium repens</i>), Broad-leaved Dock (<i>Rumex obtusifolius</i>), Cut-leaved Crane's-bill, Common Nettle.</p>
	<p>River Alde, slow flowing to almost stagnant at this location, sample area on a wide bend with heavily vegetated channels either side.</p> <p>Open water present to over 1m deep.</p> <p>Steep banks, 1m high and vegetated.</p> <p>Riparian habitat small strip before mown, grazed fields on either bank.</p> <p>Standing dead wood present.</p>	<p>Common Reed, Bulrush (<i>Typha latifolia</i>), Arrowhead sp. (<i>Sagittaria</i> sp.) Pondweed sp., Sweet-grass sp. Branched Bur-reed (<i>Sparganium erectum</i>)</p> <p>Bankside vegetation: Sweet-grass sp., Sedge sp., Purple-loosestrife (<i>Lythrum salicaria</i>), Common Nettle, Broad-leaved Dock, Creeping Thistle (<i>Cirsium arvense</i>), Great Willowherb, Water Mint, Water Figwort.</p>

NOT PROTECTIVELY MARKED

Survey Location	Habitat Description	Indictive Plant species
	Ditch running east to west. 1m wide. Depth 5m. Banks are steep and about 1.2m high. Some in channel vegetation but mostly bankside vegetation. Ditch is bordered on each side by mown, cattle grazed fields. A line of trees runs along the south side of ditch with a hedgerow present on the west end. Ditch is quite shaded.	Sweet-grass sp., Great Willowherb, Gypsywort (<i>Lycopus europaeus</i>), Bramble (<i>Rubus fruticosus</i>), Bindweed sp. (<i>Calystegia</i> sp.), Creeping Buttercup (<i>Ranunculus repens</i>), Creeping Thistle, Soft-rush (<i>Juncus effusus</i>), Alder (<i>Alnus glutinosa</i>), White Willow (<i>Salix alba</i>), Ash (<i>Fraxinus excelsior</i>), Yellow Iris, Meadowsweet (<i>Filipendula ulmaria</i>), Bittersweet (<i>Solanum dulcemara</i>), Hawthorn (<i>Crataegus monogyna</i>).
	Slow moving watercourse (River Alde) flowing north to south. Sample area is wide meander 10m across leading into less wide vegetated channel 4m across. Bank is steep in places with some bankside vegetation. Trees overhang the watercourse in places.	Water-lily sp., Bur-reed sp., Duckweed sp., Water Mint, Hemp-agrimony (<i>Eupatorium cannabinum</i>), Common Nettle, Bindweed sp., Great Willowherb, Hedge Woundwort (<i>Stachys sylvatica</i>), Wild Angelica (<i>Angelica sylvestris</i>), Blackthorn (<i>Prunus spinosa</i>), Elder (<i>Sambucus nigra</i>), White Willow, Alder.
	Heavily vegetated drainage ditch dominated by cow grazed sedges, some areas of more open water where mammals have crossed the watercourse. Shallow bank 1m high. Depth 0.5m. Dissects heavily grazed pasture.	Soft-rush, Purple-loosestrife, Sedge sp. (<i>Carex</i> sp.), Willowherb sp. (<i>Epilobium</i> sp.), Clustered Dock (<i>Rumex conglomeratus</i>), Lesser Water-parsnip (<i>Berula erecta</i>), Hard Rush.
	Ditch with very slow flow from west to east. Ditch width is 1m. Ditch bank is less than 1m. Heavily vegetated, some <i>Salix</i> sp. on bank along the west side but mostly open. Both sides of ditch consist of grazed pasture.	Sedge sp., Soft-rush, Hard Rush, Water Mint, Purple-loosestrife, Clustered Dock, Cock's-foot, Yorkshire-fog, Field Horsetail (<i>Equisetum arvense</i>), St John's-wort sp. (<i>Hypericum</i> sp.), Lesser Water-parsnip.
	Drainage ditch network with very slow flow towards the River Alde. Heavily vegetated. Dissects grazed pasture.	Sedge sp., Soft-rush, Hard Rush, Water Mint, Purple-loosestrife, Clustered Dock, Cock's-foot, Yorkshire-fog, Field Horsetail, St John's-wort sp., Lesser Water-parsnip.

1.4.21 From samples collected during the survey, together with incidental recordings, a total of 332 invertebrate species were recorded. Of these, 246 species were collected primarily using terrestrial survey techniques and 86 species were collected using mainly aquatic methods. However, a proportion of the species collected using aquatic techniques included incidental species with affinity to more terrestrial habitats and vice-versa.

1.4.22 **Table 1.19** details the number of species representative of different taxonomic orders identified from combined terrestrial and aquatic samples.

Table 1.19: Aquatic and terrestrial taxonomic orders recorded during surveys.

Order/higher taxon	Vernacular	Number of species per taxon
Coleoptera	Beetles	104
Diptera	Two-winged Flies	86
Hemiptera	True Bugs	50
Araneae	Spiders	30
Odonata	Dragonflies and damselflies	10
Aculeate Hymenoptera	Bees, Ants, Wasps	9
Gastropoda	Freshwater snails	8
Orthoptera	Grasshoppers and Crickets	6
Trichoptera	Caddisflies	6
Isopoda	Woodlice, slaters and hoglice	4
Lepidoptera	Butterflies and moths	4
Amphipoda	Freshwater shrimps	3
Opiliones	Harvestmen	3
Ephemeroptera	Mayflies	2
Bivalvia	Freshwater mussels	1
Hirudinea	Leeches	1
Megaloptera	Alderflies	1
Plecoptera	Stoneflies	1

1.4.23 A complete list of invertebrate species recorded during the survey is included in **Table 1.20** and includes the current conservation status of recorded species. In addition, species of recognised conservation status are included in **Table 1.21** and includes conservation status and Pantheon assemblage affinity fields as well as a description of the known distribution and conservation biology of each species.

Table 1.20: All invertebrate species recorded during the 2019 surveys.

Species	Family	Order	Conservation status (as of 2019)
Freshwater shrimps (Amphipoda)			
A freshwater shrimp (<i>Crangonyx pseudogracilis</i>)	Crangonyctidae	Amphipoda	Widespread (introduced)
A freshwater shrimp (<i>Gammarus lacustris</i>)	Gammaridae	Amphipoda	Widespread
A freshwater shrimp (<i>Gammarus pulex</i>)	Gammaridae	Amphipoda	Widespread
Spiders (Araneae)			
An orb-web spider (<i>Agalenatea redii</i>)	Araneidae	Araneae	Local
Garden Spider (<i>Araneus quadratus</i>)	Araneidae	Araneae	Widespread
An orb-web spider (<i>Larinioides cornutus</i>)	Araneidae	Araneae	Widespread
A clubionid spider (<i>Cheiracanthium erraticum</i>)	Clubionidae	Araneae	Local
A clubionid spider (<i>Clubiona phragmitis</i>)	Clubionidae	Araneae	Locally common
A clubionid spider (<i>Clubiona sp.</i>)	Clubionidae	Araneae	Unknown
A linyphiid spider (<i>Bathyphegantes gracilis</i>)	Linyphiidae	Araneae	Widespread
A linyphiid spider (<i>Erigonella hiemalis</i>)	Linyphiidae	Araneae	Widespread
A linyphiid spider (<i>Hypomma bituberculatum</i>)	Linyphiidae	Araneae	Widespread
A linyphiid spider (<i>Palliduphantes insignis</i>)	Linyphiidae	Araneae	Nationally Scarce
A linyphiid spider (<i>Tenuiphantes flavipes</i>)	Linyphiidae	Araneae	Widespread
A linyphiid spider (<i>Tenuiphantes mengei</i>)	Linyphiidae	Araneae	Widespread
A linyphiid spider (<i>Tenuiphantes tenuis</i>)	Linyphiidae	Araneae	Widespread
A linyphiid spider (<i>Tenuiphantes zimmermanni</i>)	Linyphiidae	Araneae	Widespread
A lycosid spider (<i>Alopecosa barbipes</i>)	Lycosidae	Araneae	Local
A lycosid spider (<i>Pardosa amentata</i>)	Lycosidae	Araneae	Widespread
A lycosid spider (<i>Pardosa palustris</i>)	Lycosidae	Araneae	Widespread
A lycosid spider (<i>Pardosa prativaga</i>)	Lycosidae	Araneae	Widespread
A lycosid spider (<i>Pardosa sp.</i>)	Lycosidae	Araneae	Unknown
A lycosid spider (<i>Pirata latitans</i>)	Lycosidae	Araneae	Local
A lycosid spider (<i>Pirata piraticus</i>)	Lycosidae	Araneae	Widespread
Nursery Web Spider (<i>Pisaura mirabilis</i>)	Pisauridae	Araneae	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A tetragnathid spider (<i>Pachygnatha clercki</i>)	Tetragnathidae	Araneae	Widespread
A tetragnathid spider (<i>Pachygnatha degeeri</i>)	Tetragnathidae	Araneae	Widespread
A tetragnathid spider (<i>Tetragnatha extensa</i>)	Tetragnathidae	Araneae	Widespread
A tetragnathid spider (<i>Tetragnatha montana</i>)	Tetragnathidae	Araneae	Widespread
A tetragnathid spider (<i>Tetragnatha obtusa</i>)	Tetragnathidae	Araneae	Local
A theridiid spider (<i>Enoplognatha ovata</i>)	Theridiidae	Araneae	Widespread
A thomisid spider (<i>Xysticus cristatus</i>)	Thomisidae	Araneae	Widespread
A thomisid spider (<i>Xysticus kochi</i>)	Thomisidae	Araneae	Local
Leeches (Hirudinea)			
A leech (<i>Erpobdella octoculata</i>)	Erpobdellidae	Arynchobdellida	Widespread
Freshwater mussels (Bivalvia)			
Horny Orb Mussel (<i>Sphaerium corneum</i>)	Sphaeriidae	Bivalvia	Widespread
Beetles (Coleoptera)			
Monoceros Beetle (<i>Notoxus monoceros</i>)	Anthicidae	Coleoptera	Local
An apionid weevil (<i>Apion frumentarium</i>)	Apionidae	Coleoptera	Widespread
An apionid weevil (<i>Ceratapion carduorum</i>)	Apionidae	Coleoptera	Local
An apionid weevil (<i>Perapion hydrolapathi</i>)	Apionidae	Coleoptera	Widespread
An apionid weevil (<i>Protapion fulvipes</i>)	Apionidae	Coleoptera	Widespread
A soldier beetle (<i>Cantharis cryptica</i>)	Cantharidae	Coleoptera	Widespread
A soldier beetle (<i>Cantharis fusca</i>)	Cantharidae	Coleoptera	Nationally Scarce
A soldier beetle (<i>Cantharis lateralis</i>)	Cantharidae	Coleoptera	Widespread
A soldier beetle (<i>Cantharis rufa</i>)	Cantharidae	Coleoptera	Widespread
A soldier beetle (<i>Cantharis rustica</i>)	Cantharidae	Coleoptera	Widespread
A soldier beetle (<i>Rhagonycha fulva</i>)	Cantharidae	Coleoptera	Widespread
A soldier beetle (<i>Rhagonycha limbata</i>)	Cantharidae	Coleoptera	Widespread
A ground beetle (<i>Amara aenea</i>)	Carabidae	Coleoptera	Widespread
A ground beetle (<i>Bembidion guttula</i>)	Carabidae	Coleoptera	Widespread
A ground beetle (<i>Bembidion lampros</i>)	Carabidae	Coleoptera	Widespread
A ground beetle (<i>Bembidion obtusum</i>)	Carabidae	Coleoptera	Widespread
A ground beetle (<i>Ocys harpaloides</i>)	Carabidae	Coleoptera	Widespread
A ground beetle (<i>Paradromius linearis</i>)	Carabidae	Coleoptera	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A ground beetle (<i>Poecilus cupreus</i>)	Carabidae	Coleoptera	Widespread
A ground beetle (<i>Trechus obtusus</i>)	Carabidae	Coleoptera	Widespread
A flea beetle (<i>Chaetocnema concinna</i>)	Chrysomelidae	Coleoptera	Widespread
A leaf beetle (Chrysomelidae sp.)	Chrysomelidae	Coleoptera	Unknown
A reed beetle (<i>Donacia simplex</i>)	Chrysomelidae	Coleoptera	Widespread
A leaf beetle (<i>Galerucella sagittariae</i>)	Chrysomelidae	Coleoptera	Widespread
Dock Beetle (<i>Gastrophysa viridula</i>)	Chrysomelidae	Coleoptera	Widespread
A flea beetle (<i>Longitarsus atricillus</i>)	Chrysomelidae	Coleoptera	Local
Flax Flea Beetle (<i>Longitarsus parvulus</i>)	Chrysomelidae	Coleoptera	Local
A flea beetle (<i>Neocrepidodera ferruginea</i>)	Chrysomelidae	Coleoptera	Widespread
A flea beetle (<i>Neocrepidodera transversalis</i>)	Chrysomelidae	Coleoptera	Widespread
A leaf beetle (<i>Oulema melanopus</i>)	Chrysomelidae	Coleoptera	Widespread
A leaf beetle (<i>Phaedon tumidulus</i>)	Chrysomelidae	Coleoptera	Widespread
A flea beetle (<i>Phyllotreta atra</i>)	Chrysomelidae	Coleoptera	Widespread
A flea beetle (<i>Psylliodes chrysocephala</i>)	Chrysomelidae	Coleoptera	Terrestrial
A flea beetle (<i>Psylliodes picina</i>)	Chrysomelidae	Coleoptera	Local
A ladybird beetle (<i>Coccidula rufa</i>)	Coccinellidae	Coleoptera	Widespread
Seven-spot Ladybird (<i>Coccinella septempunctata</i>)	Coccinellidae	Coleoptera	Widespread
Harlequin Ladybird (<i>Harmonia axyridis</i>)	Coccinellidae	Coleoptera	Introduced
14-spot Ladybird (<i>Propylea quatuordecimpunctata</i>)	Coccinellidae	Coleoptera	Widespread
24-spot Ladybird (<i>Subcoccinella 24-punctata</i>)	Coccinellidae	Coleoptera	Widespread
16-spot Ladybird (<i>Tytthaspis sedecimpunctata</i>)	Coccinellidae	Coleoptera	Widespread
A ceutorhynchine weevil (<i>Ceutorhynchus contractus</i>)	Curculionidae	Coleoptera	Widespread
A ceutorhynchine weevil (<i>Ceutorhynchus obstrictus</i>)	Curculionidae	Coleoptera	Widespread
A ceutorhynchine weevil (<i>Ceutorhynchus pallidactylus</i>)	Curculionidae	Coleoptera	Widespread
A ceutorhynchine weevil (<i>Ceutorhynchus typhae</i>)	Curculionidae	Coleoptera	Widespread
A broad-nosed weevil (<i>Exomias araneiformis</i>)	Curculionidae	Coleoptera	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A broad-nosed weevil (<i>Exomias pellucidus</i>)	Curculionidae	Coleoptera	Widespread
A hyperine weevil (<i>Hypera rumicis</i>)	Curculionidae	Coleoptera	Widespread
A broad-nosed weevil (<i>Liophloeus tessulatus</i>)	Curculionidae	Coleoptera	Local
A ceutorhynchine weevil (<i>Nedys quadrimaculatus</i>)	Curculionidae	Coleoptera	Widespread
Green Nettle Weevil (<i>Phyllobius pomaceus</i>)	Curculionidae	Coleoptera	Widespread
A ceutorhynchine weevil (<i>Rhinoncus pericarpus</i>)	Curculionidae	Coleoptera	Widespread
A pea weevil (<i>Sitona lineatus</i>)	Curculionidae	Coleoptera	Widespread
A long-toed water beetle (<i>Dryops</i> sp.)	Dryopidae	Coleoptera	Unknown
A diving beetle (<i>Dytiscus</i> sp.)	Dytiscidae	Coleoptera	Unknown
A diving beetle (<i>Hydroporus erythrocephalus</i>)	Dytiscidae	Coleoptera	Widespread
A diving beetle (<i>Hyphidrus ovatus</i>)	Dytiscidae	Coleoptera	Widespread
A diving beetle (<i>Ilybius fuliginosus</i>)	Dytiscidae	Coleoptera	Widespread
A diving beetle (<i>Platambus maculatus</i>)	Dytiscidae	Coleoptera	Widespread
A diving beetle (<i>Stictotarsus duodecimpustulatus</i>)	Dytiscidae	Coleoptera	Widespread
A click beetle (<i>Agriotes obscurus</i>)	Elateridae	Coleoptera	Widespread
A click beetle (<i>Agriotes sputator</i>)	Elateridae	Coleoptera	Widespread
A click beetle (<i>Aplotarsus incanus</i>)	Elateridae	Coleoptera	Local
A click beetle (<i>Athous haemorrhoidalis</i>)	Elateridae	Coleoptera	Widespread
A riffle beetle (<i>Elmis aenea</i>)	Elminthidae	Coleoptera	Widespread
A whirligig beetle (<i>Gyrinus substriatus</i>)	Gyrinidae	Coleoptera	Widespread
Hairy Whirligig Beetle (<i>Orectochilus villosus</i>)	Gyrinidae	Coleoptera	Widespread
A crawling water beetle (<i>Halipus lineatocollis</i>)	Haliplidae	Coleoptera	Widespread
A crawling water beetle (<i>Halipus ruficollis</i> group)	Haliplidae	Coleoptera	Unknown
A crawling water beetle (<i>Halipus sibiricus</i>)	Haliplidae	Coleoptera	Widespread
A hydraenid beetle (<i>Ochthebius minimus</i>)	Hydraenidae	Coleoptera	Widespread
A water scavenger beetle (<i>Anacaena bipustulata</i>)	Hydrophilidae	Coleoptera	Widespread
A water scavenger beetle (<i>Anacaena globulus</i>)	Hydrophilidae	Coleoptera	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A water scavenger beetle (<i>Anacaena limbata</i>)	Hydrophilidae	Coleoptera	Widespread
A helophorid beetle (<i>Helophorus brevipalpis</i>)	Hydrophilidae	Coleoptera	Widespread
A water scavenger beetle (<i>Hydrobius fuscipes</i>)	Hydrophilidae	Coleoptera	Widespread
Great Silver Water Beetle (<i>Hydrophilus piceus</i>)	Hydrophilidae	Coleoptera	Near Threatened (post-2001 IUCN criteria)
A water scavenger beetle (<i>Laccobius bipunctatus</i>)	Hydrophilidae	Coleoptera	Widespread
A water scavenger beetle (<i>Sphaeridium scarabaeoides</i>)	Hydrophilidae	Coleoptera	Local
A malachite beetle (<i>Cordylepherus viridis</i>)	Malachiidae	Coleoptera	Local
A malachite beetle (<i>Malachius bipustulatus</i>)	Malachiidae	Coleoptera	Widespread
Thick-kneed Flower Beetle (<i>Oedemera nobilis</i>)	Oedemeridae	Coleoptera	Widespread
A scirtid beetle (<i>Cyphon coarctatus</i>)	Scirtidae	Coleoptera	Widespread
A scirtid beetle (<i>Cyphon variabilis</i>)	Scirtidae	Coleoptera	Widespread
A scirtid beetle (<i>Odeles minuta</i>)	Scirtidae	Coleoptera	Local
A silphid beetle (<i>Silpha atrata</i>)	Silphidae	Coleoptera	Widespread
A rove beetle (<i>Anotylus rugosus</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Anotylus sculpturatus</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Drusilla canaliculate</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Hygronoma dimidiata</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Lithocharis nigriceps</i>)	Staphylinidae	Coleoptera	Local (Introduced S. Asia)
A rove beetle (<i>Philonthus splendens</i>)	Staphylinidae	Coleoptera	Local
A rove beetle (<i>Rugilus orbiculatus</i>)	Staphylinidae	Coleoptera	Local
A rove beetle (<i>Stenus brunripes</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Stenus canaliculatus</i>)	Staphylinidae	Coleoptera	Local
A rove beetle (<i>Stenus fulvicornis</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Stenus ossium</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Stenus pallipes</i>)	Staphylinidae	Coleoptera	Local
A rove beetle (<i>Stenus pallitarsis</i>)	Staphylinidae	Coleoptera	Local

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A rove beetle (<i>Stenus solutus</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Tachinus rufipes</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Tachyporus chrysomelinus</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Tachyporus hypnorum</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Tachyporus nitidulus</i>)	Staphylinidae	Coleoptera	Widespread
A rove beetle (<i>Xantholinus linearis</i>)	Staphylinidae	Coleoptera	Widespread
Two-winged flies (Diptera)			
A wood gnat (<i>Sylvicola punctatus</i>)	Anisopodidae	Diptera	Widespread
An anthomyiid fly (<i>Hylemya urbica</i>)	Anthomyiidae	Diptera	Local
An anthomyiid fly (<i>Hylemya variata</i>)	Anthomyiidae	Diptera	Widespread
An anthomyiid fly (<i>Lasiomma seminitidum</i>)	Anthomyiidae	Diptera	Widespread
An anthomyiid fly (<i>Pegomya cunicularia</i>)	Anthomyiidae	Diptera	Local
Violet Black-legged Robberfly (<i>Dioctria atricapilla</i>)	Asilidae	Diptera	Local
Common Red-legged Robberfly (<i>Dioctria rufipes</i>)	Asilidae	Diptera	Widespread
An asteid fly (<i>Asteia amoena</i>)	Asteiidae	Diptera	Widespread
A bibionid fly (<i>Dilophus femoratus</i>)	Bibionidae	Diptera	Widespread
A bibionid fly (<i>Dilophus humeralis</i>)	Bibionidae	Diptera	Local
A calliphorid fly (<i>Bellardia pandia</i>)	Calliphoridae	Diptera	Local
A calliphorid fly (<i>Melanomya nana</i>)	Calliphoridae	Diptera	Widespread
A calliphorid fly (<i>Pollenia rudis</i>)	Calliphoridae	Diptera	Widespread
A non-biting midge (<i>Chironomidae</i> sp.)	Chironomidae	Diptera	Unknown
A grass fly (<i>Chlorops frontosus</i>)	Chloropidae	Diptera	Local
A grass fly (<i>Dicraeus vagans</i>)	Chloropidae	Diptera	Widespread
A grass fly (<i>Elachiptera cornuta</i> agg.)	Chloropidae	Diptera	Widespread
A grass fly (<i>Incertella nigrifrons</i>)	Chloropidae	Diptera	Unknown
A grass fly (<i>Lasiochaeta pubescens</i>)	Chloropidae	Diptera	Local
A grass fly (<i>Meromyza</i> sp.)	Chloropidae	Diptera	Unknown
A grass fly (<i>Oscinella frit</i>)	Chloropidae	Diptera	Widespread
A mosquito larva (<i>Cuculidae</i> sp.)	Culcidae	Diptera	Unknown
A mosquito (<i>Culex pipiens</i> agg.)	Culcidae	Diptera	Widespread
A diastatid fly (<i>Diastata adusta</i>)	Diastatidae	Diptera	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A long-legged fly (<i>Chrysotus gramineus</i>)	Dolichopodidae	Diptera	Widespread
A long-legged fly (<i>Dolichopus plumipes</i>)	Dolichopodidae	Diptera	Widespread
A long-legged fly (<i>Rhaphium caliginosum</i>)	Dolichopodidae	Diptera	Local
A long-legged fly (<i>Sympycnus desoutteri</i>)	Dolichopodidae	Diptera	Widespread
A long-legged fly (<i>Syntormon pallipes</i>)	Dolichopodidae	Diptera	Widespread
A lesser fruit fly (<i>Drosophila subobscura</i>)	Drosophilidae	Diptera	Widespread
A lesser fruit fly (<i>Scaptomyza pallida</i>)	Drosophilidae	Diptera	Widespread
A dance fly (<i>Empis caudatula</i>)	Empididae	Diptera	Widespread
A dance fly (<i>Empis livida</i>)	Empididae	Diptera	Widespread
A dance fly (<i>Hemerodromia raptorial</i>)	Empididae	Diptera	Local
A dance fly (<i>Hilara curtisi</i>)	Empididae	Diptera	Widespread
A shore fly (<i>Coenia palustris</i>)	Ephydriidae	Diptera	Widespread
A shore fly (<i>Notiphila riparia</i>)	Ephydriidae	Diptera	Widespread
A shore fly (<i>Scatella tenuicosta</i>)	Ephydriidae	Diptera	Widespread
A dance fly (<i>Platypalpus minutus</i>)	Hybotidae	Diptera	Widespread
A fungus gnat (<i>Orfelia nemoralis</i>)	Keroplastidae	Diptera	Widespread
A fungus gnat (<i>Orfelia nemoralis</i>)	Keroplastidae	Diptera	Widespread
A lauxaniid fly (<i>Minettia fasciata</i>)	Lauxaniidae	Diptera	Widespread
A lauxaniid fly (<i>Sapromyza quadripunctata</i>)	Lauxaniidae	Diptera	Widespread
A short-palped crane fly (<i>Erioconopa trivialis</i>)	Limoniidae	Diptera	Widespread
A short-palped crane fly (<i>Molophilus obscurus</i>)	Limoniidae	Diptera	Widespread
A short-palped crane fly (<i>Phylidorea ferruginea</i>)	Limoniidae	Diptera	Widespread
A short-palped crane fly (<i>Pilaria discicollis</i>)	Limoniidae	Diptera	Widespread
A lance fly (<i>Setisquamalonchaea fumosa</i>)	Lonchaeidae	Diptera	Widespread
A pointed-wing fly (<i>Lonchoptera lutea</i>)	Lonchopteridae	Diptera	Widespread
A house fly (<i>Coenosia antennata</i>)	Muscidae	Diptera	Local
A house fly (<i>Coenosia tigrine</i>)	Muscidae	Diptera	Widespread
A house fly (<i>Helina confinis</i>)	Muscidae	Diptera	Unknown
A house fly (<i>Helina reversio</i>)	Muscidae	Diptera	Widespread
A house fly (<i>Hydrotaea albipuncta</i>)	Muscidae	Diptera	Widespread
A house fly (<i>Phaonia halterata</i>)	Muscidae	Diptera	Local

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A house fly (<i>Spanochaeta dorsalis</i>)	Muscidae	Diptera	Widespread
An opomyzid fly (<i>Geomyza balachowskyi</i>)	Opomyzidae	Diptera	Widespread
An opomyzid fly (<i>Geomyza subnigra</i>)	Opomyzidae	Diptera	Nationally Scarce
An opomyzid fly (<i>Geomyza tripunctata</i>)	Opomyzidae	Diptera	Widespread
An opomyzid fly (<i>Opomyza florum</i>)	Opomyzidae	Diptera	Widespread
An opomyzid fly (<i>Opomyza germinationis</i>)	Opomyzidae	Diptera	Widespread
An opomyzid fly (<i>Opomyza petrei</i>)	Opomyzidae	Diptera	Widespread
Yellow Dung Fly (<i>Scathophaga stercoraria</i>)	Scathophagidae	Diptera	Widespread
A snail-killing fly (<i>Ilione albisetia</i>)	Sciomyzidae	Diptera	Widespread
A snail-killing fly (<i>Pherbellia schoenherri</i>)	Sciomyzidae	Diptera	Widespread
A snail-killing fly (<i>Pherbina coryleti</i>)	Sciomyzidae	Diptera	Widespread
A sepsid fly (<i>Sepsis punctum</i>)	Sepsidae	Diptera	Widespread
A lesser dung fly (<i>Copromyza stercoraria</i>)	Sphaeroceridae	Diptera	Widespread
A lesser dung fly (<i>Leptocera nigra</i>)	Sphaeroceridae	Diptera	Widespread
Common Orange Legionnaire (<i>Beris vallate</i>)	Stratiomyidae	Diptera	Widespread
A hoverfly (<i>Eupeodes corollae</i>)	Syrphidae	Diptera	Widespread
A hoverfly (<i>Melanostoma mellinum</i>)	Syrphidae	Diptera	Widespread
A hoverfly (<i>Melanostoma scalare</i>)	Syrphidae	Diptera	Widespread
A hoverfly (<i>Neoascia tenur</i>)	Syrphidae	Diptera	Widespread
A hoverfly (<i>Platycheirus albimanus</i>)	Syrphidae	Diptera	Widespread
A hoverfly (<i>Platycheirus clypeatus</i>)	Syrphidae	Diptera	Widespread
A hoverfly (<i>Sphaerophoria</i> sp.)	Syrphidae	Diptera	Unknown
A parasite fly (<i>Eriothrix rufomaculata</i>)	Tachinidae	Diptera	Widespread
A parasite fly (<i>Lydella grisescens</i>)	Tachinidae	Diptera	Widespread
A parasite fly (<i>Phasia pusilla</i>)	Tachinidae	Diptera	Widespread
A picture-winged fly (<i>Tephritis formosa</i>)	Tephritidae	Diptera	Widespread
A picture-winged fly (<i>Tephritis vespertina</i>)	Tephritidae	Diptera	Widespread
A long-palped crane fly (<i>Tipula fascipennis</i>)	Tipulidae	Diptera	Widespread
A long-palped crane fly (<i>Tipula lateralis</i>)	Tipulidae	Diptera	Widespread
A long-palped crane fly (<i>Tipula vernalis</i>)	Tipulidae	Diptera	Widespread
An opomyzid fly (<i>Opomyza florum</i>)	Opomyzidae	Diptera	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
An opomyzid fly (<i>Opomyza germinationis</i>)	Opomyzidae	Diptera	Widespread
Mayflies (Ephemeroptera)			
A mayfly larva (<i>Baetidae</i> sp.)	Baetidae	Ephemeroptera	Unknown
A mayfly larva (<i>Caenis horaria</i>)	Caenidae	Ephemeroptera	Widespread
Freshwater snails (Gastropoda)			
Common Bithynia (<i>Bithynia tentaculata</i>)	Bithyniidae	Gastropoda	Widespread
Great Pond Snail (<i>Lymnaea stagnalis</i>)	Lymnaeidae	Gastropoda	Widespread
Wandering Snail (<i>Radix balthica</i>)	Lymnaeidae	Gastropoda	Widespread
Marsh Snail (<i>Stagnicola palustris/fuscus/corvus</i> agg.)	Lymnaeidae	Gastropoda	Widespread
Common Bladder Snail (<i>Physa fontinalis</i>)	Physidae	Gastropoda	Widespread
A bladder snail (<i>Physella acuta</i>)	Physidae	Gastropoda	Widespread
Whirlpool Ramshorn (<i>Anisus vortex</i>)	Planorbidae	Gastropoda	Widespread
White Ramshorn (<i>Gyraulus albus</i>)	Planorbidae	Gastropoda	Widespread
True bugs (Hemiptera)			
A froghopper (<i>Neophilaenus lineatus</i>)	Aphrophoridae	Hemiptera	Widespread
Common Froghopper (<i>Philaenus spumarius</i>)	Aphrophoridae	Hemiptera	Widespread
Red-and-black froghopper (<i>Cercopis vulnerata</i>)	Cercopidae	Hemiptera	Widespread
A leafhopper (<i>Adarrus ocellaris</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Aphrodes makarovi</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Arthaldeus pascuellus</i>)	Cicadellidae	Hemiptera	Widespread
Green leafhopper (<i>Cicadella viridis</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Conosanus obsoletus</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Deltocephalus pulicarius</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Eupteryx aurata</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Euscelis incisus</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Megophthalmus scanicus</i>)	Cicadellidae	Hemiptera	Widespread
Dock Bug (<i>Coreus marginatus</i>)	Coreidae	Hemiptera	Widespread
A lesser waterboatman (<i>Hesperocorixa sahlbergi</i>)	Corixidae	Hemiptera	Widespread
A lesser waterboatman (<i>Hesperocorixa linnaei</i>)	Corixidae	Hemiptera	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A lesser waterboatman (<i>Sigara dorsalis</i>)	Corixidae	Hemiptera	Widespread
A planthopper (<i>Conomelus anceps</i>)	Delphacidae	Hemiptera	Widespread
A planthopper (<i>Javesella dubia</i>)	Delphacidae	Hemiptera	Widespread
A planthopper (<i>Javesella pellucida</i>)	Delphacidae	Hemiptera	Widespread
A water skater (<i>Gerris lacustris</i>)	Gerridae	Hemiptera	Widespread
A ground bug (<i>Cymus melanocephalus</i>)	Lygaeidae	Hemiptera	Widespread
A ground bug (<i>Drymus sylvaticus</i>)	Lygaeidae	Hemiptera	Widespread
European Clinchbug (<i>Ischnodemus sabuleti</i>)	Lygaeidae	Hemiptera	Widespread
Birch Catkin Bug (<i>Kleidocerys resedae</i>)	Lygaeidae	Hemiptera	Widespread
A ground bug (<i>Peritrechus geniculatus</i>)	Lygaeidae	Hemiptera	Widespread
A ground bug (<i>Scolopostethus thomsoni</i>)	Lygaeidae	Hemiptera	Widespread
A mirid bug (<i>Capsus ater</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Deraeocoris lutescens</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Dicyphus epilobii</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Lygus rugulipennis</i>)	Miridae	Hemiptera	Widespread
A grass bug (<i>Megaloceraea recticornis</i>)	Miridae	Hemiptera	Widespread
A grass bug (<i>Notostira elongata</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Phytocoris varipes</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Pithanus maerkeli</i>)	Miridae	Hemiptera	Widespread
A grass bug (<i>Stenodema calcarata</i>)	Miridae	Hemiptera	Widespread
A grass bug (<i>Stenodema laevigata</i>)	Miridae	Hemiptera	Widespread
Grey Damselbug (<i>Himacerus major</i>)	Nabidae	Hemiptera	Widespread
Ant Damselbug (<i>Himacerus mirmicoides</i>)	Nabidae	Hemiptera	Widespread
Broad Damselbug (<i>Nabis flavomarginatus</i>)	Nabidae	Hemiptera	Widespread
Marsh Damselbug (<i>Nabis limbatus</i>)	Nabidae	Hemiptera	Widespread
Common Damselbug (<i>Nabis rugosus</i>)	Nabidae	Hemiptera	Widespread
A backswimmer (<i>Notonecta glauca</i>)	Notonectidae	Hemiptera	Widespread
A backswimmer (<i>Notonecta viridis</i>)	Notonectidae	Hemiptera	Widespread
Bishop's Mitre Shieldbug (<i>Aelia acuminata</i>)	Pentatomidae	Hemiptera	Widespread
Brassica Bug (<i>Eurydema oleracea</i>)	Pentatomidae	Hemiptera	Widespread
Turtle Shieldbug (<i>Podops inuncta</i>)	Pentatomidae	Hemiptera	Local
A rhopalid bug (<i>Corizus hyoscyami</i>)	Rhopalidae	Hemiptera	Local

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A rhopalid bug (<i>Rhopalus subrufus</i>)	Rhopalidae	Hemiptera	Widespread
Water Cricket (<i>Velia caprai</i>)	Veliidae	Hemiptera	Widespread
A lesser waterboatman (Corixidae sp.)	Corixidae	Hemiptera: Heteroptera	Unknown
A froghopper (<i>Neophilaenus lineatus</i>)	Aphrophoridae	Hemiptera	Widespread
Common Froghopper (<i>Philaenus spumarius</i>)	Aphrophoridae	Hemiptera	Widespread
Red-and-black froghopper (<i>Cercopis vulnerata</i>)	Cercopidae	Hemiptera	Widespread
A leafhopper (<i>Adarrus ocellaris</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Aphrodes makarovi</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Arthaldeus pascuellus</i>)	Cicadellidae	Hemiptera	Widespread
Green leafhopper (<i>Cicadella viridis</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Conosanus obsoletus</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Deltocephalus pulicarius</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Eupteryx aurata</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Euscelis incisus</i>)	Cicadellidae	Hemiptera	Widespread
A leafhopper (<i>Megophthalmus scanicus</i>)	Cicadellidae	Hemiptera	Widespread
Dock Bug (<i>Coreus marginatus</i>)	Coreidae	Hemiptera	Widespread
A lesser waterboatman (<i>Hesperocorixa sahlbergi</i>)	Corixidae	Hemiptera	Widespread
A lesser waterboatman (<i>Hesperocorixa linnaei</i>)	Corixidae	Hemiptera	Widespread
A lesser waterboatman (<i>Sigara dorsalis</i>)	Corixidae	Hemiptera	Widespread
A planthopper (<i>Conomelus anceps</i>)	Delphacidae	Hemiptera	Widespread
A planthopper (<i>Javesella dubia</i>)	Delphacidae	Hemiptera	Widespread
A planthopper (<i>Javesella pellucida</i>)	Delphacidae	Hemiptera	Widespread
A water skater (<i>Gerris lacustris</i>)	Gerridae	Hemiptera	Widespread
A ground bug (<i>Cymus melanocephalus</i>)	Lygaeidae	Hemiptera	Widespread
A ground bug (<i>Drymus sylvaticus</i>)	Lygaeidae	Hemiptera	Widespread
European Clinchbug (<i>Ischnodemus sabuleti</i>)	Lygaeidae	Hemiptera	Widespread
Birch Catkin Bug (<i>Kleidocerys resedae</i>)	Lygaeidae	Hemiptera	Widespread
A ground bug (<i>Peritrechus geniculatus</i>)	Lygaeidae	Hemiptera	Widespread
A ground bug (<i>Scolopostethus thomsoni</i>)	Lygaeidae	Hemiptera	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A mirid bug (<i>Capsus ater</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Deraeocoris lutescens</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Dicyphus epilobii</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Lygus rugulipennis</i>)	Miridae	Hemiptera	Widespread
A grass bug (<i>Megaloceraea recticornis</i>)	Miridae	Hemiptera	Widespread
A grass bug (<i>Notostira elongata</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Phytocoris varipes</i>)	Miridae	Hemiptera	Widespread
A mirid bug (<i>Pithanus maerkeli</i>)	Miridae	Hemiptera	Widespread
A grass bug (<i>Stenodema calcarata</i>)	Miridae	Hemiptera	Widespread
A grass bug (<i>Stenodema laevigata</i>)	Miridae	Hemiptera	Widespread
Grey Damselbug (<i>Himacerus major</i>)	Nabidae	Hemiptera	Widespread
Ant Damselbug (<i>Himacerus mirmicoides</i>)	Nabidae	Hemiptera	Widespread
Broad Damselbug (<i>Nabis flavomarginatus</i>)	Nabidae	Hemiptera	Widespread
Marsh Damselbug (<i>Nabis limbatus</i>)	Nabidae	Hemiptera	Widespread
Common Damselbug (<i>Nabis rugosus</i>)	Nabidae	Hemiptera	Widespread
A backswimmer (<i>Notonecta glauca</i>)	Notonectidae	Hemiptera	Widespread
A backswimmer (<i>Notonecta viridis</i>)	Notonectidae	Hemiptera	Widespread
Bishop's Mitre Shieldbug (<i>Aelia acuminata</i>)	Pentatomidae	Hemiptera	Widespread
Brassica Bug (<i>Eurydema oleracea</i>)	Pentatomidae	Hemiptera	Widespread
Turtle Shieldbug (<i>Podops inuncta</i>)	Pentatomidae	Hemiptera	Local
A rhopalid bug (<i>Corizus hyoscyami</i>)	Rhopalidae	Hemiptera	Local
A rhopalid bug (<i>Rhopalus subrufus</i>)	Rhopalidae	Hemiptera	Widespread
Water Cricket (<i>Velia caprai</i>)	Veliidae	Hemiptera	Widespread
A lesser waterboatman (Corixidae sp.)	Corixidae	Hemiptera: Heteroptera	Unknown
Bees, ants and wasps (Aculeate Hymenoptera)			
Coppice Mining Bee (<i>Andrena helvola</i>)	Andrenidae	Hymenoptera	Widespread
Common Carder Bee (<i>Bombus pascuorum</i>)	Apidae	Hymenoptera	Widespread
Buff-tailed Bumblebee (<i>Bombus terrestris</i>)	Apidae	Hymenoptera	Widespread
Slender Wood Borer Wasp (<i>Trypoxylon attenuatum</i>)	Crabronidae	Hymenoptera	Widespread
Jet Ant (<i>Lasius fuliginosus</i>)	Formicidae	Hymenoptera	Local
Black Ant (<i>Lasius niger</i>)	Formicidae	Hymenoptera	Widespread

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A myrmicine ant (<i>Myrmica sabuleti</i>)	Formicidae	Hymenoptera	Widespread
A myrmicine ant (<i>Myrmica scabrinodis</i>)	Formicidae	Hymenoptera	Widespread
Long-faced Furrow Bee (<i>Lasioglossum punctatissimum</i>)	Halictidae	Hymenoptera	Local
Woodlice (Isopoda)			
Common Pill Woodlouse (<i>Armadillidium vulgare</i>)	Armadillidiidae	Isopoda	Widespread
Water Hog-louse (<i>Asellus aquaticus</i>)	Asellidae	Isopoda	Widespread
Common Striped Woodlouse (<i>Philoscia muscorum</i>)	Philoscidae	Isopoda	Widespread
Common Rough Woodlouse (<i>Porcellio scaber</i>)	Porcellionidae	Isopoda	Widespread
Butterflies and moths (Lepidoptera)			
Cinnabar Moth (<i>Tyria jacobaeae</i>)	Erebidae	Lepidoptera	S41 'research only'; Widespread
Peacock (<i>Inachis io</i>)	Nymphalidae	Lepidoptera	Widespread
Red Admiral (<i>Vanessa atalanta</i>)	Nymphalidae	Lepidoptera	Widespread (partial migrant)
Large White (<i>Pieris brassicae</i>)	Pieridae	Lepidoptera	Widespread
Alderflies (Megaloptera)			
An alder fly larva (<i>Sialis lutaria</i>)	Sialidae	Megaloptera	Widespread
Dragonflies and damselflies (Odonata)			
Southern Hawker (<i>Aeshna cyanea</i>)	Aeshnidae	Odonata	Widespread
Migrant Hawker (<i>Aeshna mixta</i>)	Aeshnidae	Odonata	Widespread
Hairy Dragonfly (<i>Brachytron pratense</i>)	Aeshnidae	Odonata	Local
Banded Demoiselle (<i>Calopteryx splendens</i>)	Calopterygidae	Odonata	Widespread
Beautiful Demoiselle (<i>Calopteryx virgo</i>)	Calopterygidae	Odonata	Widespread
Common Blue-tailed Damselfly (<i>Ischnura elegans</i>)	Coenagrionidae	Odonata	Widespread
Large Red Damselfly (nymphs) (<i>Pyrrhosoma nymphula</i>)	Coenagrionidae	Odonata	Widespread
Willow Emerald Damselfly (<i>Chalcolestes viridis</i>)	Lestidae	Odonata	Local (Recent UK colonist)
A damselfly larva (<i>Lestidae</i> sp.)	Lestidae	Odonata	Unknown

NOT PROTECTIVELY MARKED

Species	Family	Order	Conservation status (as of 2019)
A dragonfly larva (<i>Libellula</i> sp.)	Libellulidae	Odonata	Unknown
Ruddy Darter (<i>Sympetrum sanguineum</i>)	Libellulidae	Odonata	Local
Common Darter (<i>Sympetrum striolatum</i>)	Libellulidae	Odonata	Widespread
Segmented worms (Oligochaeta)			
A segmented worm (<i>Oligochaeta</i> sp.)	n/a	Oligochaeta	Unknown
Harvestmen (Opiliones)			
A harvestman (<i>Paroligolophus agrestis</i>)	Phalangiidae	Opiliones	Widespread
A harvestman (<i>Phalangium opilio</i>)	Phalangiidae	Opiliones	Widespread
A harvestman (<i>Platybunus triangularis</i>)	Phalangiidae	Opiliones	Widespread
Grasshoppers, crickets and groundhoppers (Orthoptera)			
Lesser Marsh Grasshopper (<i>Chorthippus albomarginatus</i>)	Acrididae	Orthoptera	Widespread
Field Grasshopper (<i>Chorthippus brunneus</i>)	Acrididae	Orthoptera	Widespread
Meadow Grasshopper (<i>Chorthippus parallelus</i>)	Acrididae	Orthoptera	Widespread
Short-winged Conehead (<i>Conocephalus dorsalis</i>)	Conocephalidae	Orthoptera	Local
Common Groundhopper (<i>Tetrix undulata</i>)	Tetrigidae	Orthoptera	Widespread
Roesel's Bush-cricket (<i>Metrioptera roeselii</i>)	Tettigoniidae	Orthoptera	Widespread
Stoneflies (Plecoptera)			
A stonefly nymph (<i>Nemoura avicularis</i>)	Nemouridae	Plecoptera	Widespread
Caddisflies (Trichoptera)			
A caddis fly larva (<i>Athipsodes bilineatus</i>)	Leptoceridae	Trichoptera	Widespread
A caddis fly larva (<i>Mystacides azurea</i>)	Leptoceridae	Trichoptera	Widespread
A caddis fly larva (<i>Limnephilidae</i> sp.)	Limnephilidae	Trichoptera	Unknown
A caddis fly larva (<i>Limnephilus lunatus</i>)	Limnephilidae	Trichoptera	Widespread
A caddis fly larva (<i>Phryganea bipunctata</i>)	Phryganeidae	Trichoptera	Widespread
A caddis fly larva (<i>Sericostoma personatum</i>)	Sericostomatidae	Trichoptera	Widespread

Table 1.21: Uncommon and Section 41 invertebrate species recorded during the 2019 surveys.

Species	Order:	Conservation status (as of 2019)	Recorded habitat	Pantheon Specific Assemblage Type (SAT) (where relevant)
Great Silver Water Beetle (<i>Hydrophilus piceus</i>)	Coleoptera	Nationally Scarce; Near threatened (post-2001 IUCN criteria)	Riparian grassland habitat	Open habitats; Tall sward and scrub
A linyphiid spider (<i>Palliduphantes insignis</i>)	Araneae	Nationally Scarce	Riparian grassland habitat and seasonally dried out drainage ditches	Open habitats; Tall sward and scrub
A soldier beetle (<i>Cantharis fusca</i>)	Coleoptera	Nationally Scarce	Riparian grassland habitat	Open habitats; Tall sward and scrub
An opomyzid fly (<i>Geomyza subnigra</i>)	Diptera	Nationally Scarce	Riparian grassland habitat	Open habitats; Tall sward and scrub
Cinnabar (<i>Tyria jacobaeae</i>)	Lepidoptera	S41 'research only'; Widespread	Riparian grassland habitat	Open habitats; Tall sward and scrub

1.4.24 Of the 332 species obtained from combined terrestrial and aquatic samples, input into Pantheon, 301 were analysed. **Table 1.22:** Recorded invertebrate species per broad biotope-level assemblage presents the broad biotope-level assemblage and the number of invertebrate species associated with each of these as well as the percentage of typical species of these broad biotope-level assemblages found during the surveys and SQI per broad biotope-level assemblage as attributed and calculated by Pantheon.

Table 1.22: Recorded invertebrate species per broad biotope-level assemblage.

Broad biotope	Number of species	% representation	SQI	Conservation status	Species with conservation status
Open habitats	158	4	104	1 Section 41 Priority Species - research only; 2 Nationally scarce	
Wetland	106	4	106	1 Nationally scarce, 1 Near threatened	
Tree-associated	27	<1	100		

Broad biotope	Number of species	% representation	SQI	Conservation status	Species with conservation status
Coastal	2	<1	100		

1.4.25 Of the 332 species obtained from combined terrestrial and aquatic samples, input into Pantheon, 301 were analysed. **Table 1.23** recorded invertebrate species per habitat-level assemblage presents the broad biotope-level assemblage and the number of invertebrate species associated with each habitat-level assemblage within these broad habitat-level assemblages of these as well as the percentage of typical species of these habitat-level assemblages found during the surveys and SQI per habitat-level assemblage as attributed and calculated by Pantheon. Of 13 habitat-level assemblages represented within the dataset, six; ‘Tall sward and scrub’, ‘Marshland’, ‘Peatland’, ‘Shaded woodland floor’, ‘Running water’ and ‘Short sward and bare-ground’ assemblages contained sufficient species to produce robust SQI scores.

Table 1.23: Recorded invertebrate species per habitat-level assemblage.

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
open habitats	tall sward & scrub	131	5	1 Section 41 Priority Species – (research only); 2 Nationally scarce	105	3
wetland	marshland	63	8		100	
wetland	Peatland	30	3	1 Near threatened; 1 nationally scarce	119	1
tree-associated	shaded woodland floor	21	2		100	
wetland	running water	20	2		100	
open habitats	short sward &	20	2		100	

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
	bare ground					
wetland	Lake	7	6		100 (not robust)	
tree-associated	wet woodland	6	2		100 (not robust)	
wetland	wet woodland	5	2		100 (not robust)	
tree-associated	decaying wood	4	<1		100 (not robust)	
tree-associated	arboreal	3	<1		100 (not robust)	
open habitats	upland	1	<1		100 (not robust)	
coastal	saltmarsh	1	<1		100 (not robust)	
coastal	brackish pools & ditches	1	<1		100 (not robust)	

1.4.26 Of the 332 species obtained from combined terrestrial and aquatic samples, input into Pantheon, 301 were analysed. **Table 1.24** presents the broad biotope-level assemblage the habitat-level assemblage and the number of invertebrate species associated with each Specific Assemblage Type (SAT) within these habitat-level assemblages of these as well as the percentage of typical species of these SATs found during the surveys and SQI per SAT as attributed and calculated by Pantheon, their code and reported condition.

1.4.27 In Pantheon, Specific Assemblage Type (SAT) assemblages are considered to be the most important in terms of site assessment for conservation evaluation. This is due to these assemblages being comprised of habitat specialists, often including less common species. SATs tend to only be represented on sites supporting habitat of conservation value for invertebrates. SATs achieving scores exceeding their corresponding threshold scores generally indicate assemblages of national importance. However, the conservation value of SATs should also be considered in relation to the rarity value of the contributing species. SQI scores for SATs, however, are rarely of use in assessing the value of SATs as they are infrequently attributed with sufficient species to be considered robust. From the Pantheon output for the 2019 Sizewell TVB site, none of the 11 SATs represented achieved scores approaching their corresponding favourable condition threshold.

Table 1.24: Recorded invertebrate species per Specific Assemblage Type (SAT).

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
open habitats		scrub edge	6	3	100 (not robust)			F001	Unfavourable (6 of 11 species)
open habitats	short sward & bare ground	bare sand & chalk	4	<1	100 (not robust)			F111	Unfavourable (4 of 19 species)
open habitats		rich flower resource	4	2	100 (not robust)			F002	Unfavourable (4 of 15 species)
open habitats	short sward & bare ground	open short sward	3	2	100 (not robust)			F112	Unfavourable (3 of 13 species)
wetland	peatland	reed-fen & pools	2	2	250 (not robust)	1 Near threatened; 1 nationally scarce	1	W314	Unfavourable (2 of 11 species)
wetland	marshland	open water on disturbed mineral sediments	2	5	100 (not robust)			W211	Unfavourable (2 of 6 species)

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
tree-associated	decaying wood	bark & sapwood decay	1	<1	100 (not robust)			A212	Unfavourable (1 of 19 species)
wetland	running water	stream & river margin	1	2	100 (not robust)			W114	Unfavourable (1 of 6 species)
tree-associated	decaying wood	heartwood decay	1	<1	100 (not robust)			A211	Unfavourable (1 of 6 species)
wetland	marshland	undisturbed fluctuating marsh	1	3	100 (not robust)			W221	Unfavourable (1 of 4 species)
open habitats		scrub-heath & moorland	1	<1	100 (not robust)			F003	Unfavourable (1 of 9 species)

1.4.28 Results of Biological Monitoring Working Party Score (BMWP), Average Score Per Taxon (ASPT) and Community Conservation Index (CCI) for each three-minute aquatic sample collected during the 2019 survey are summarised within **Table 1.25** Sample numbers and their corresponding BMWP, ASPT and CCI analysis results. Besides scores for individual samples, combined scores are also provided for comparison between samples collected within the field drains and the River Alde respectively and in addition, scores for total combined sites are also included. It should be noted that BMWP scores were developed to be calculated for single three-minute samples only. As such water quality calculations using ASPT are considered more reliable for the combined scores. ASPT scores are simply the average score of the overall total BMWP score. According to Chadd and Extence (2004), robust CCI scores can be calculated from combined samples. The CCI scores are, therefore, considered robust both at an individual sample and combined level.

Table 1.25: Sample numbers and their corresponding BMWP, ASPT and CCI analysis results.

Sample No.	Site	BMWP score	No. scoring families (BMWP)	ASPT	CCI score	No. scoring species (CCI)	Significance of BMWP/ASPT and CCI scores per sample site
AQ01.1	River Alde	72.4	15	4.8	7.8	18	The BMWP score for sample AQ01.1 was 72.4 (71 to 100 = Good water)

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Sample No.	Site	BMWP score	No. scoring families (BMWP)	ASPT	CCI score	No. scoring species (CCI)	Significance of BMWP/ASPT and CCI scores per sample site
							quality); The CCI score for sample AQ01.1 was 7.8 (>5.0 to 10.0 = Moderate conservation value)
AQ02.1	River Alde	107.1	21	5.1	9.3	21	The BMWP score for sample AQ02.1 was 107.1 (>100 = Very good water quality); The CCI score for sample AQ02.1 was 9.3 (>5.0 to 10.0 = Moderate conservation value)
AQ03.1	Field drain	56.2	12	4.7	3.9	10	The BMWP score for sample AQ03.1 was 56.2 (41-70 = Moderate water quality); The CCI score for sample AQ03.1 was 3.9 (0.0 to 5.0 = Low conservation value)
AQ01.2	River Alde	82.2	16	5.1	16.9	22	The BMWP score for sample AQ01.2 was 82.2 (71 to 100 = Good water quality); The CCI score for sample AQ01.2 was 16.9 (>15.0 to 20.0 = High conservation value)
AQ02.2	Field drain	49.5	10	4.95	8.3	12	The BMWP score for sample AQ02.2 was 49.5 (41 to 70 = Moderate water quality); The CCI score for sample AQ02.2 was 8.3 (>5.0 to 10.0 = Moderate conservation value)
AQ03.2	River Alde	47.6	10	4.76	10.9	12	The BMWP score for sample AQ03.2 was 47.6 (41 to 70 = Moderate water quality); The CCI score for sample AQ03.2 was 10.8 (>10.0 to 15 = Fairly high conservation value)

Sample No.	Site	BMWP score	No. scoring families (BMWP)	ASPT	CCI score	No. scoring species (CCI)	Significance of BMWP/ASPT and CCI scores per sample site
AQ04.2	Field drain	59.2	12	4.9	9.3	15	The BMWP score for sample AQ04.2 was 59.2 (41 to 70 = Moderate water quality); The CCI score for sample AQ04.2 was 9.3 (>5.0 to 10.0 = Moderate conservation value)
AQ05.2	Field drain	22.1	6	3.7	4.5	6	The BMWP score for sample AQ05.2 was 22.1 (11 to 40 = Poor water quality); The CCI score for sample AQ05.2 was 4.5 (0.0 to 5.0 = Low conservation value)
River Alde (combined)	River Alde	149.6	31	4.8	15.3	47	The ASPT score for Combined River Alde 2019 aquatic samples indicated Good water quality; the CCI score for Combined 2019 aquatic samples was 15.3 (>10.0 to 15 = High conservation value)
Field drains (combined)	Field drains	99.8	22	4.5	8.6	28	The ASPT score for Combined field drain 2019 aquatic samples indicated fairly good water quality; the CCI score for Combined 2019 aquatic samples was 8.6 (>5.0 to 10.0 = Moderate conservation value)

1.4.29 For the purpose of evaluation, it is required by local authorities such as Essex, for example, to calculate an overall SQI score, independently of the Pantheon analysis. Whilst no such analysis is required in appraising Suffolk sites, an overall SQI score has been calculated, to bypass the potential undervaluing of the overall conservation value of a site, due to the data being spread between a disparate range of habitat types.

1.4.30 The overall SQI calculated for the Sizewell TVB site is based on a method used by Harvey (2014) in relation to survey areas in Essex. The SQI score

of 3.5 calculated from the entire dataset indicates that the site overall is of moderate conservation value. Harvey (2014) describes (in relation to Essex sites) a site achieving a score of at least '5' as being a 'good' invertebrate site; one of 7.5 as being 'excellent' and one with a score approaching 10 as being 'almost certainly of national significance'. Importantly, Essex is known to support a particularly rich invertebrate fauna with many species recorded in the county being rare or absent from other areas of the UK. Whilst the invertebrate fauna of Suffolk is arguably higher than in many other UK counties and indeed, a number of species rare or absent elsewhere in the UK occur in the county, the average survey score from a conservation evaluation is likely to be if anything, lower than that typically recorded in the neighbouring county of Essex.

1.5 Ornithology

a) Methodology

- 1.5.1 To establish the bird assemblage supported by the site, bird surveys were undertaken during the breeding season. Bird surveys were undertaken on a monthly basis during the breeding season between April and June 2019 (inclusive). The surveys aimed to identify any important breeding birds of nature conservation interest within the site and its surroundings using transect based bird surveys.
- 1.5.2 The surveys were undertaken in accordance with best practice survey guidance (Ref 1.14).
- 1.5.3 The surveys extended along field boundaries, tractor-tracks, woodland edges and woodland tracks within the site boundary (where land access was permitted). Particular focus was placed upon species of nature conservation importance (Schedule 1 species of the Wildlife and Countryside Act (W&CA) (Ref 1.15), Red and Amber List species of Birds of Conservation Concern (BoCC) (Ref 1.16) and National Environment and Rural Communities (NERC) Act (Ref 1.17) listed species), with these species being mapped and recorded using standard British Trust for Ornithology (BTO) species and behaviour codes. All other species (Green List species on BoCC) were recorded and an inventory was produced, but these records were not mapped.
- 1.5.4 The surveys were timed to take place during the morning, commencing approximately one hour after sunrise, with each transect lasting for approximately two hours. The surveys were timed to avoid poor weather conditions (i.e. heavy rain, mist/fog and strong winds), wherever possible. Further details regarding the timing and frequency of transect surveys, as well as the associated weather conditions, are presented below.

b) Survey timings and weather conditions

1.5.5 **Table 1.26** provides the survey timing and weather conditions for the breeding bird surveys.

Table 1.26: Breeding bird survey visits timings and weather conditions.

Date	Start	Finish	Transect	Weather	Wind speed	Wind direction	Cloud cover (Oktas)
03/04/2019	06:30	12:07	TVB	Ground frost, Fine	Calm	N/A	8/8
15/05/2019	05:15	11:00	TVB	Fine	Light Air	East	0/8
05/06/2019	05:15	07:25	TVB	Fine	Calm	N/A	8/8

c) Results

1.5.6 The results of the breeding bird surveys are detailed in **Table 1.27** and shown on **Figures 7.7** and **7.8** in **Annex 7A.1**.

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Table 1.27: All bird species recorded, and peak counts recorded during the breeding bird surveys.

Species	Schedule 1 W&CA	Conservation status (BoCC)	Section 41 NERC Act	Present in breeding season	Breeding season peak count
Herring Gull (<i>Larus argentatus</i>)		Red List	✓	✓	31
Song thrush (<i>Turdus philomelos</i>)		Red List	✓	✓	6
Marsh tit (<i>Poecile palustris</i>)		Red List	✓	✓	2
Linnet (<i>Linaria cannabina</i>)		Red List	✓	✓	61
Mistle thrush (<i>Turdus viscivorus</i>)		Red List		✓	4
House sparrow (<i>Passer domesticus</i>)		Red List	✓	✓	15
Skylark (<i>Alauda arvensis</i>)		Red List	✓	✓	17
Nightingale (<i>Luscinia megarhynchos</i>)		Red List		✓	1
Black-headed gull (<i>Chroicocephalus ridibundus</i>)		Amber list		✓	110
Bullfinch (<i>Pyrrhula pyrrhula</i>)		Amber list	✓	✓	2
Dunnock (<i>Prunella modularis</i>)		Amber list	✓	✓	16
Mallard (<i>Anas platyrhynchos</i>)		Amber list		✓	17
Meadow pipit (<i>Anthus pratensis</i>)		Amber list		✓	1
Mediterranean gull (<i>Ichthyaetus melanocephalus</i>)		Amber list		✓	2
Snipe (<i>Gallinago gallinago</i>)		Amber list		✓	2
Reed bunting (<i>Emberiza schoeniclus</i>)		Amber list	✓	✓	2
Willow warbler (<i>Phylloscopus trochilus</i>)		Amber list		✓	1
Stock dove (<i>Columba oenas</i>)		Amber list		✓	7

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Species	Schedule 1 W&CA	Conservation status (BoCC)	Section 41 NERC Act	Present in breeding season	Breeding season peak count
House martin (<i>Delichon urbicum</i>)		Amber list		✓	6
Lesser black-backed gull (<i>Larus fuscus</i>)		Amber list		✓	74
Kestrel (<i>Falco tinnunculus</i>)		Amber list		✓	2
Teal (<i>Anas crecca</i>)		Amber list		✓	2
Blackbird (<i>Turdus merula</i>)		Green list		✓	10
Blackcap (<i>Sylvia atricapilla</i>)		Green list		✓	12
Blue tit (<i>Cyanistes caeruleus</i>)		Green list		✓	42
Buzzard (<i>Buteo buteo</i>)		Green list		✓	4
Carrion crow (<i>Corvus corone</i>)		Green list		✓	10
Chiffchaff (<i>Phylloscopus collybita</i>)		Green list		✓	6
Chaffinch (<i>Fringilla coelebs</i>)		Green list		✓	27
Coal tit (<i>Periparus ater</i>)		Green list		✓	1
Collared dove (<i>Streptopelia decaocto</i>)		Green list		✓	1
Feral pigeon (<i>Columba livia domestica</i>)		Green list		✓	1
Green woodpecker (<i>Picus viridis</i>)		Green list		✓	2
Goldcrest (<i>Regulus regulus</i>)		Green list		✓	2
Goldfinch (<i>Carduelis carduelis</i>)		Green list		✓	11
Great tit (<i>Parus major</i>)		Green list		✓	11
Great spotted woodpecker (<i>Dendrocopos major</i>)		Green list		✓	3

NOT PROTECTIVELY MARKED

Species	Schedule 1 W&CA	Conservation status (BoCC)	Section 41 NERC Act	Present in breeding season	Breeding season peak count
Greenfinch (<i>Chloris chloris</i>)		Green list		✓	1
Grey heron (<i>Ardea cinerea</i>)		Green list		✓	1
Jay (<i>Garrulus glandarius</i>)		Green list		✓	3
Jackdaw (<i>Corvus monedula</i>)		Green list		✓	15
Little owl (<i>Athene noctua</i>)		Green list		✓	1
Long-tailed tit (<i>Aegithalos caudatus</i>)		Green list		✓	10
Lesser whitethroat (<i>Sylvia curruca</i>)		Green list		✓	3
Magpie (<i>Pica pica</i>)		Green list		✓	2
Moorhen (<i>Gallinula chloropus</i>)		Green list		✓	2
Nuthatch (<i>Sitta europaea</i>)		Green list		✓	1
Pheasant (<i>Phasianus colchicus</i>)		Green list		✓	15
Pied wagtail (<i>Motacilla alba</i>)		Green list		✓	7
Robin (<i>Erithacus rubecula</i>)		Green list		✓	12
Red-legged partridge (<i>Alectoris rufa</i>)		Green list		✓	11
Rook (<i>Corvus frugilegus</i>)		Green list		✓	125
Swallow (<i>Hirundo rustica</i>)		Green list		✓	2
Treecreeper (<i>Certhia familiaris</i>)		Green list		✓	4
Wheatear (<i>Oenanthe oenanthe</i>)		Green list		✓	7
Whitethroat (<i>Sylvia communis</i>)		Green list		✓	9

NOT PROTECTIVELY MARKED

Species	Schedule 1 W&CA	Conservation status (BoCC)	Section 41 NERC Act	Present in breeding season	Breeding season peak count
Wood Pigeon (<i>Columba palumbus</i>)		Green list		✓	104
Wren (<i>Troglodytes troglodytes</i>)		Green list		✓	21

1.6 Bats

a) Methodology

- 1.6.1 During the 2019 extended Phase 1 habitat and protected species survey, an external inspection of all trees on site was carried out to assess their suitability for occupancy by roosting and/or hibernating bats. Potential roost features were observed from the ground with binoculars and scrutinised for their suitability to be used by bats, alongside searching for any evidence of use, such as staining, feeding remains or droppings. The likely value of the various habitat features for foraging and commuting bats was also critically assessed.
- 1.6.2 Any trees that were assessed from the ground as being moderate or high suitability for roosting bats, were then climbed by qualified tree climbers to further assess the potential and confirm bat presence.
- 1.6.3 Activity transect surveys were undertaken across 3 transect routes along the proposed development alignment on a monthly basis between April and October 2019. Each transect route was undertaken simultaneously by two surveyors using Pettersson D240x time-expansion bat detectors, one listening at 35kHz and one at 50 kHz. Each transect was undertaken from dusk for one and a half to two hours after sunset and undertaken for two hours prior to dawn until sunrise. Every transect had a dusk and dawn survey within a 24-hour period every monthly visit. The routes for transects are illustrated on **Figure 7.8 to 7.11**.
- 1.6.4 Data collected during activity transects were analysed in BatSound by experienced analysts and a measure of relative activity in the form of the number of bat passes per hour (B/h)¹¹ calculated.
- 1.6.5 Ten static detectors (Wildlife Acoustic Song Meter SM2BAT+), making full-spectrum recordings, were deployed within areas of suitable habitat (hereafter referred to as Monitoring Stations (MSs)). The location of these MSs are illustrated on **Figure 7.9 to 7.11**. Static detectors were deployed on seven occasions, monthly, between April and October 2019). On each occasion static detectors were deployed for a period of seven consecutive

¹¹ A measure of relative bat activity has been calculated in the form of the number of bat passes per hour. This measure has been calculated to reflect both the total number of calls experienced over a complete transect for all bat species on each survey visit, and the total number of calls by a given species over a complete transect for all survey visits undertaken in 2014, combined. It is important to note that not all areas of the transect are recorded throughout; that calculations have been based on survey effort rounded to the nearest quarter of an hour and that the passes per hour value has been provided to the nearest tenth, As such this measure of relative bat activity is an approximation.

nights and were set to record between 20 minutes before sunset until 20 minutes after sunrise.

Table 1.28: Static detector survey periods in 2019 .

Survey visit	Survey Dates 2019
1	3 April – 8 April
2	14 May – 19 May 15 May – 20 May
3	18 June – 23 June 19 June – 24 June 20 June – 25 June
4	9 July – 14 July 10 July – 15 July 11 July – 16 July
5	TBC
6	TBC
7	TBC

1.6.6 Data collected during static detector surveys was analysed using SonoChiro auto-identification software and the results grouped into six species groups ((*Myotis* spp., ‘big bat’¹² spp., *Pipistrellus* spp.¹³, Nathusius’ pipistrelle (*Pipistrellus nathusii*), barbastelle (*Barbastella barbastellus*) and *Plecotus* spp. (assumed to be brown long-eared bat(*Plecotus auritus*)¹⁴),) and the mean number of passes per night calculated for further analysis.

1.6.7 Full details of the analysis process, as well as the trials undertaken to determine the suitability of SonoChiro as an analysis method, and the manual verifications undertaken, are provided in Arcadis (Ref 1.18). The trials in the manual verification that is detailed in the report referenced refers to data that was collected prior to 2019. Due to the same software being used in similar environments it is considered appropriate that this would also be applicable to the 2019 survey data, and no further verification has been undertaken. Therefore, the result provided follow the conclusions found in this report.

¹² The ‘big bat’ species group includes calls identified specifically to noctule or serotine as well as those identified to the ‘big bat’ group (noctule, Leisler’s bat, and serotine).

¹³ The *Pipistrellus* spp. group includes calls identified specifically to common or soprano pipistrelle as well as those identified to the common/soprano pipistrelle group. This group excludes calls identified as Nathusius’ pipistrelle.

¹⁴ All long-eared bat recordings are considered to relate to brown long-eared bat echolocation calls due to the absence of grey long-eared bat from Suffolk based on their current known distribution (Ref 1.20).

b) Results

i. Activity transect surveys results

1.6.8 Three activity transects were undertaken. All transects, as well as including areas within the site, also included areas of land adjacent to but not within the site boundary, where this habitat was considered suitable for bats. The location of the transect routes are illustrated on **Figure 7.9** to **7.11**.

1.6.9 The results of surveys across Transects TVB 1, 2 and 3 are detailed by species/species group in **Tables 1.29** to **1.31** respectively below.

Table 1.29: Summary of all activity recorded during activity Transect 1 in 2019.

Species	Number of passes recorded per species per survey visit and survey effort (hours)								Total	Bat passes per hour (B/h) **
	02.04.19 (2.25)	13.05.19 (2)	19.06.19 (1.75)	11.07.19 (2.25)	13.08.19 (2.25)	19.09.19 (2.25)	19.09.19 (2.25)	10.10.19 (2.25)		
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)		9	17							26.4
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)		8	6							14.8
Noctule (<i>Nyctalus noctula</i>)			3							1.4
<i>Nyctalus</i> spp.		1								0.9
Big bat spp.										0.5
Barbastelle		1								1.9
Myotis spp.		1								1.9
Brown long-eared			3							1.9
Total	0	20	29							
Bat passes per hour (B/h)	0	10	16.6							

*All long-eared bat recordings are considered to relate to brown long-eared bat echolocation calls due to the absence of grey long-eared bat from Suffolk based on their current known distribution (Ref 1.19 and Ref 1.20).
 ** This calculation of B/h has been calculated across survey visits which may have experienced differences in a range of factors including weather conditions. As such, this provides only a broad indication of the level of bat activity.

Table 1.30: Summary of all activity recorded during activity Transect 2 in 2019.

Species	Number of passes recorded per species per survey visit and survey effort (hours)								Total	Bat passes per hour (B/h) **
	03.0419 (2.25)	14.05.19 (2.25)	17.06.19 (2.25)	10.07.2019 - dawn (2.25)	10.07.19 - dusk (2.25)	22.08.19 (2.25)	18.09.19 (2.25)	10.10.19 (2)		
Common pipistrelle		20	13	20	18		9	4	84	37.8
Soprano pipistrelle		6	13	20	8	14	4	7	72	32.4
Big bat spp.		2	4	2	3	1			12	5.4
Pipistrelle spp.			1		1				2	0.9
Serotine (<i>Eptesicus serotinus</i>)			3						3	1.4
<i>Nyctalus</i> spp.			1						1	0.5
<i>Myotis</i> spp.				1	3		1		5	2.3
Barbastelle							5		5	2.3
Total	0	28	35	43	33	15	19	11		
Bat passes per hour (B/h)	0	12.4	15.6	19.1	14.7	6.7	8.4	5.5		

* This calculation of B/h has been calculated across survey visits which may have experienced differences in a range of factors including weather conditions. As such, this provides only a broad indication of the level of bat activity.

Table 1.31: Summary of all activity recorded during activity Transect 3 in 2019.

Species	Number of passes recorded per species per survey visit and survey effort (hours)							Total	Bat passes per hour (B/h) **
	04.04.19 (2.25)	15.05.19 (2)	18.06.19 (1.75)	08.07.19 (2.25)	20.08.19 (2.25)	16.09.19 (2.25)	10.10.19 (2)		
Common pipistrelle		7	8	11	15	2	1	44	20.9
Soprano pipistrelle	1	3	3	6	11	1	1	26	12.3
Pipistrelle spp.	1							1	0.5
Big bat spp.		2		10				12	5.7
Noctule			3	3				6	2.8
Nyctalus spp.				4				4	1.9
Barbastelle			2	3	1	2		8	3.8
Brown long-eared		1		1				1	0.5
Total	2	13	16	38	27	5	2		
Bat passes per hour (B/h)	0.9	6.5	9.1	16.9	12	2.2	1		

*All long-eared bat recordings are considered to relate to brown long-eared bat echolocation calls due to the absence of grey long-eared bat from Suffolk based on their current known distribution (Ref 1.19 and Ref 1.20).
 ** This calculation of B/h has been calculated across survey visits which may have experienced differences in a range of factors including weather conditions. As such, this provides only a broad indication of the level of bat activity.

ii. Static detector surveys

- 1.6.10 Full details of the results of static detector surveys in the form of mean number of passes per night (mppn) across the red line boundary are provided in **Table 1.32** below. Recorded data has been grouped into six species groups (barbastelle, Nathusius' pipistrelle, *Myotis* spp., 'big bat' spp., long-eared bat spp., and Pipistrelle spp.).
- 1.6.11 Peak activity levels across all survey occasions for each species group are indicated in green.

Table 1.32: Summary of static detector results on the proposed development in 2019.

Survey dates	Monitoring location	Mean passes per night					
		Barbastelle	Myotis spp. *	Big Bat spp. **	Nathusius' pipistrelle ***	Pipistrelle spp. ****	Long-eared bat spp. *****
April 2019							
03/04/2019 (pm) – 08/04/2019 (am)	1	0.6	2.2	0	0	1.6	0.4
03/04/2019 (pm) – 08/04/2019 (am)	2	3.4	11.4	0	0	6.6	1.6
03/04/2019 (pm) – 08/04/2019 (am)	3	8.4	13.4	0.8	0	47.8	0.2
03/04/2019 (pm) – 08/04/2019 (am)	4	9.6	1.8	0.8	0	15	0.6
03/04/2019 (pm) – 08/04/2019 (am)	5	0	0.4	0	0	0.4	0
03/04/2019 (pm) – 08/04/2019 (am)	6	4.4	3.4	0	0	28	0
03/04/2019 (pm) – 08/04/2019 (am)	7	0	0.8	0	0.2	3.8	0

NOT PROTECTIVELY MARKED

Survey dates	Monitoring location	Mean passes per night					
		Barbastelle	Myotis spp. *	Big Bat spp. **	Nathusius' pipistrelle ***	Pipistrelle spp. ****	Long-eared bat spp. *****
03/04/2019 (pm) – 08/04/2019 (am)	8	8	1	0	0.2	1.8	0.4
03/04/2019 (pm) – 08/04/2019 (am)	9	1.4	0.2	0.2	0	6	0
03/04/2019 (pm) – 08/04/2019 (am)	10	0.2	9	0.8	0	1	0
May 2019							
15/05/2019 (pm) – 20/05/2019 (am)	1	15.4	1	3.2	0	801	1
15/05/2019 (pm) – 20/05/2019 (am)	2	2.8	10	0.4	0.2	53.8	4.4
15/05/2019 (pm) – 20/05/2019 (am)	3	58.6	1.6	1.8	0.4	470	3.4
	4	51.6	3.8	0.8	0.6	577.8	2.2

NOT PROTECTIVELY MARKED

Survey dates	Monitoring location	Mean passes per night					
		Barbastelle	Myotis spp. *	Big Bat spp. **	Nathusius' pipistrelle ***	Pipistrelle spp. ****	Long-eared bat spp. *****
15/05/2019 (pm) – 20/05/2019 (am)	5	0.2	0.2	0	0	32.8	0
15/05/2019 (pm) – 20/05/2019 (am)	6	10	1	2.6	0.8	650.2	0.6
15/05/2019 (pm) – 20/05/2019 (am)	7	0.4	0.2	0.4	0.4	110	0.6
15/05/2019 (pm) – 20/05/2019 (am)	8	15.8	0	1.6	0.2	57.6	1
14/05/2019 (pm) – 19/05/2019 (am)	9	0.2	9.8	0.4	0	446.2	0
14/05/2019 (pm) - 19/05/2019 (am)	10	2.2	1.4	1.4	0.4	486.8	1.6
June 2019							
19/06/2019 (pm) – 24.06.2019 (am)	1	215	6	6.4	19.2	815.6	7.2

NOT PROTECTIVELY MARKED

Survey dates	Monitoring location	Mean passes per night					
		Barbastelle	Myotis spp. *	Big Bat spp. **	Nathusius' pipistrelle ***	Pipistrelle spp. ****	Long-eared bat spp. *****
19/06/2019 (pm) – 24.06.2019 (am)	2	0.2	6.2	9	0.2	39.8	0.2
19/06/2019 (pm) – 24.06.2019 (am)	3	0.4	4.2	5.4	0.8	428.8	0
19/06/2019 (pm) – 24.06.2019 (am)	4	2.4	4.8	13.2	15.6	514.8	0
19/06/2019 (pm) – 24.06.2019 (am)	5	1	1.6	2.4	1.2	43	0
19/06/2019 (pm) – 24.06.2019 (am)	6	7.2	35.8	10.6	1.2	692.6	0.8
19/06/2019 (pm) – 24.06.2019 (am)	7	0.2	3.4	1	0.4	27.2	0
19/06/2019 (pm) – 24.06.2019 (am)	8	0.2	0.6	0.6	0.6	50.8	0

NOT PROTECTIVELY MARKED

Survey dates	Monitoring location	Mean passes per night					
		Barbastelle	Myotis spp. *	Big Bat spp. **	Nathusius' pipistrelle ***	Pipistrelle spp. ****	Long-eared bat spp. *****
18.06.2019 (pm) – 23.06.2019 (am)	9	7.6	8.2	1	1.2	407	0
18.06.2019 (pm) – 23.06.2019 (am)	10	6.8	3.4	11.6	0.2	141.8	0
July 2019							
11.07.19 (pm) - 16.07.19 (am)	1	323.4	11	16	9.4	837.4	0
11.07.19 (pm) - 16.07.19 (am))	2	1.4	6.2	74.4	0	172	0
11.07.19 (pm) - 16.07.19 (am))	3	38.8	12.4	184.4	1.8	342.4	0
	4	Not deployed due to technical difficulties					
	5	Not deployed due to technical difficulties					

NOT PROTECTIVELY MARKED

Survey dates	Monitoring location	Mean passes per night					
		Barbastelle	Myotis spp. *	Big Bat spp. **	Nathusius' pipistrelle ***	Pipistrelle spp. ****	Long-eared bat spp. *****
10.07.2019 (pm)- 15.07.2019 (am)	6	0.6	9.6	6	1.2	216.8	0
10.07.2019 (pm)- 15.07.2019 (am)	7	0.8	10.4	7.2	1.4	100.4	0
10.07.2019 (pm)- 15.07.2019 (am)	8	0.6	2	6.6	2.1	73.4	0
10.07.2019 (pm)- 15.07.2019 (am)	9	0	0	0	0	0	0
09.07.2019 (pm) – 14.07.2019 (pm)	10	5.8	3.4	10.4	0.8	79.8	0

* *Myotis* spp. includes those calls identified by SonoChiro specifically as Natterer's and Bechstein's in addition to those identified to a group level as *Myotis* sp.

** Big Bat spp. includes those calls identified by SonoChiro specifically as Noctule, Serotine and Northern Bat in addition to those identified to a group level as *Eptesicus/Nyctalus*

*** Nathusius' Pipistrelle includes those calls identified by SonoChiro specifically as Nathusius' pipistrelle in addition to those identified as Nathusius'/Kuhl/Savi pipistrelle and those as Kuhl pipistrelle but which manual checks showed to be Nathusius' pipistrelle

**** Pipistrelle Sp. includes those calls identified by SonoChiro specifically as Common and Soprano pipistrelles in addition to those identified to a group level as common/soprano pipistrelle

***** Long-eared Bats include those calls identified by SonoChiro specifically as Brown or Grey Long-eared bats in addition to those identified to a group level as Long-eared bats.

iii. Tree assessment results

- 1.6.12 A detailed ground assessment identified 114 trees as requiring further survey for their bat roost potential.
- 1.6.13 Full details of the features identified during the tree assessment survey are provided in **Table 1.33**. Trees with bat potential are shown on **Figure 7.12** to **7.14**.

NOT PROTECTIVELY MARKED

Table 1.33 Results of tree assessment surveys in 2019.

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
1	Field Maple, Mature, Diameter at Breast Height (DBH): 25cm, Height: 10m, Multi-stem	Limb, Type: Tear Outs, Height: 2m, Aspect: West, at top of limb, top dead	Moderate	Moderate
2	Hawthorn, Mature, DBH: 15cm, Height: 8m, Multi-stem	Stem, Type: Wounds, Height: 1m, Aspect: North	Low	Low
3	Field Maple, Mature, DBH: 20cm, Height: 5m, Multi-stem	Stem, Type: Butt Rot, Height: 0m, Aspect: East	Moderate	Moderate
4	Field Maple, Mature, DBH: 30cm, Height: 10m, Single-stem	Stem, Type: Wounds, Height: 1.5m, Aspect: East, Small tear shaped wound	Low	High
		Stem, Type: Knot Hole, Height: 3m, Aspect: West	High	
		Limb, Type: Tear Outs, Height: 5m, Aspect: West, Snapped off limb	Moderate	
5	Field Maple, Mature, DBH: 30cm, Height: 10m, Single-stem	Limb, Type: Tear Outs, Height: 7m, Aspect: West	Low	High
		Stem, Type: Knot Hole, Height: 2m, Aspect: North	Negligible	
		Stem, Type: Tear Outs, Height: 1m, Aspect: North	High	
6	Other, Unknown ivy covered, Mature, DBH: 50cm, Height: 10m, Single-stem	Stem, Type: Ivy, Height: all	Low	Low
7	Ash, Mature, DBH: 25cm, Height: 10m, Single-stem	Stem, Type: Tear Outs, Height: 8m, Aspect: North, Two tear outs at top	Moderate	Moderate

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
8	Ash, Mature, DBH: 25cm, Height: 10m, Single-stem	Stem, Type: Woodpecker hole, Height: 6m, Aspect: North	Moderate	Moderate
		Stem, Type: Wounds, Height: 7m, Aspect: South, Above woodpecker hole	Moderate	
9	Ash, Mature, DBH: 30cm, Height: 10m, Single-stem	Stem, Type: Wounds, Height: 2m, Aspect: South, Crack wound from about 1m to 3m	Low	Low
10	Field Maple, Mature, DBH: 25cm, Height: 7m, Multi-stem	Stem, Type: Fluting, Height: 0.5mm, Aspect: South	Low	Low
11	Ash, Mature, DBH: 25cm, Height: 7m, Single-stem	Stem, Type: Tear Outs, Height: 6m, Aspect: East, At top of tree	Moderate	Moderate
12	Ash, Mature, DBH: 30cm, Height: 10m, Single-stem	Stem, Type: Knot Hole, Height: 5m, Aspect: North, Opened by woodpecker	High	High
		Stem, Type: Wounds, Height: 5m, Aspect: South	High	
13	Field Maple, Mature, DBH: 20cm, Height: 6m, Single-stem	Stem, Type: Tear Outs, Height: 0.5m, Aspect: South,	Low	Low
14	Ash, Semi-Mature, DBH: 15cm, Height: 6m, Single-stem	Stem, Type: Woodpecker hole, Height: 3m, Aspect: North, 3 hole one above the other	High	High
15	Ash, Mature, DBH: 30cm, Height: 10m, Multi-stem	Stem, Type: Tear Outs, Height: 7m, Aspect: West,	High	High
		Stem, Type: Tear Outs, Height: 6m, Aspect: West,	Low	

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
16	Ash, Mature, DBH: 20cm, Height: 7m, Single-stem	Stem, Type: Woodpecker hole, Height: 6m, Aspect: South,	High	High
17	Field Maple, Mature, DBH: 25cm, Height: 10m, Multi-stem	Stem, Type: Tear Outs, Height: 1.5m, Aspect: South,	Low	Low
18	Field Maple, Mature, DBH: 30cm, Height: 10m, Single-stem	Stem, Type: Tear Outs, Height: 2m, Aspect: South,	Moderate	Moderate
		Stem, Type: Tear Outs, Height: 3m, Aspect: South, X2	Negligible	
19	Field Maple, Mature, DBH: 20cm, Height: 10m, Multi-stem	Stem, Type: Knot Hole, Height: 2m, Aspect: South,	Negligible	Moderate
		Stem, Type: Transverse Snap, Height: 2m, Aspect: South,	Negligible	
		Stem, Type: Tear Outs, Height: 3m, Aspect: South, On dead limb	Moderate	
		Limb, Type: Tear Outs, Height: 5m, Aspect: South	High	
20	Field Maple, Mature, DBH: 30cm, Height: 10m, Single-stem	Limb, Type: Tear Outs, Height: 2m, Aspect: South	Negligible	Negligible
		Stem, Type: Knot Hole, Height: 2.5m, Aspect: South	Negligible	
21	Pedunculate Oak, Mature, DBH: 60cm, Height: 13m, Single-stem	Limb, Type: Knot Hole, Height: 4m, Aspect: East	Moderate	Moderate

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
22	Pedunculate Oak, Mature, DBH: 60cm, Height: 13m, Single-stem	Limb, Type: Tear Outs, Height: 5m, Aspect: East,	Moderate	Moderate
		Limb, Type: Lifting Bark, Height: 2m, Aspect: East, Dead limb crack and bark	Moderate	
23	Field Maple, Mature, DBH: 30cm, Height: 10m, Multi-stem	Stem, Type: Tear Outs, Height: 1.5m, Aspect: South,	Low	Low
24	Pedunculate Oak, Mature, DBH: 50cm, Height: 10m, Single-stem	Type: Ivy	Low	Low
		Stem, Type: Butt Rot, Height: 0m, Aspect: East,	Low	
25	Pedunculate Oak, Mature, DBH: 60cm, Height: 13m, Single-stem	Type: Wounds, Aspect: multiple	Low	Low
26	Hawthorn, Mature, DBH: 30cm, Height: 8m, Single-stem	Stem, Type: Butt Rot, Height: 0m, Aspect: South	Low	Low
27	Other, Dead, DBH: 25cm, Height: 8m, Single-stem	Stem, Type: Lifting Bark, Height: <1m	Low	Low
28	Ash, Mature, DBH: 70cm, Height: 13m, Single-stem	Stem, Type: Ivy	Moderate	Moderate
29	Ash, Mature, DBH: 30cm, Height: 10m, Single-stem	Stem, Type: Tear Outs, Height: 5m, Aspect: North	High	High
30	Ash, Mature, DBH: 30cm, Height: 7m, Single-stem	Stem, Type: Woodpecker hole, Height: 6m, Aspect: North, Top snapped off tree	High	High
		Stem, Type: Tear Outs, Height: 6m, Aspect: East	High	

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
30A	Ash, Mature, DBH: 50cm, Height: 13m, Single-stem	Stem, Type: Tear Outs, Height: 7m, Aspect: South	High	High
30B	Ash, Mature, DBH: 31cm, Height 12m, Single-stem	Limb, Type: Tear Outs, Height: 7m, Aspect: West	Moderate	High
		Limb, Type: Tear Outs, Height: 8m, Aspect: West	Low	
		Stem, Type: Woodpecker Holes, Height: 8m, Aspect: East, X2	High	
30C	Cherry, Over-mature, DBH: 28cm, Height: 6m, Single-stem	Stem, Type: Lifting Bark, Height: 4m, Aspect: East	Moderate	Moderate
30D	Field Maple, Mature, DBH: X, Height: 10m, Multi-stem	Stem, Type: Fluting, Height: 1m, Aspect: North	Moderate	Moderate
30E	Ash, Mature, DBH: 20cm, Height: 8m, Single-stem	Stem, Type: Woodpecker Holes, Height: 5m, Aspect: South	High	High
30F	Ash, Mature, DBH: 25cm, Height: 8m, Single-stem	Stem, Type: Knot Hole, Height: 4m, Aspect: West	High	High
30G	Cherry, Dead, DBH: 30cm, Height: 5m, Single-stem	Stem, Type: Lifting Bark, Height: All bark	Moderate	Moderate
30H	Ash, Dead (Fallen), DBH: 30cm, Height: 5m, Single-stem	Stem, Type: Wounds, Height: End of Stem, Aspect: South	Moderate	Moderate
31	Other, Alder, Mature, DBH: 40cm, Height: 13m, Multi-stem	Stem, Type: Wounds, Height: 1m, Aspect: South, where two stems meet	High	High

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
32	Elder, Mature, DBH: 10cm, Height: 5m, Multi-stem	Stem, Type: Knot Hole, Height: 1m, Aspect: South, Cluster of trees all with knot hole prf, approx. 5 meter stretch of elder with features	Moderate	Moderate
33	Other, Alder, Mature, DBH: 30cm, Height: 10m, Multi-stem	Stem, Type: Wounds, Height: 2m, Aspect: West, Hole where limb snapped off, visible from fence	Moderate	Moderate
		Stem, Type: Knot Hole, Height: 1.5m, Aspect: South	Low	
		Limb, Type: Knot Hole, Height: 4m, Aspect: West,	Moderate	
		Stem, Type: Tear Outs, Height: 5m, Aspect: West,	Moderate	
35	Pedunculate Oak, Mature, DBH: 80cm, Height: 13m, Single-stem	Limb, Type: Lifting Bark, Height: 2m, Aspect: Multiple dead limbs, lifting bark,	Moderate	Moderate
		Limb, Type: Wounds, Aspect: Multiple	Moderate	
36	Ash, Mature, DBH: 30cm, Height: 10m, Multi-stem	Stem, Type: Butt Rot, Height: 0m, Aspect:	Low	Low
37	Willow, Mature, DBH: 50cm, Height: 13m, Single-stem	Stem, Type: Fluting, Height: 2m, Aspect: North, Too close to ditch	High	High
		Stem, Type: Fluting, Height: 2m, Aspect: South,	High	
38	Willow, Mature, DBH: 50cm, Height: 13m, Single-stem	Stem, Type: Subsistence Split, Height: 2m, Aspect: West,	Moderate	Moderate

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
39	Willow, Mature, DBH: 60cm, Height: 13m, Multi-stem	Stem, Type: Fluting, Height: 3m, Aspect: South,	High	High
40	Willow, Mature, DBH: 80cm, Height: 13m, Single-stem	Limb, Type: Fluting, Height: 5m, Aspect: South,	High	High
41	Willow, Mature, DBH: 70cm, Height: 13m, Multi-stem	Limb, Type: Fluting, Height: 6m, Aspect: North,	High	High
42	Willow, Mature, DBH: 60cm, Height: 13m, Multi-stem	Stem, Type: Butt Rot, Height: 0-2m, Aspect: East	Moderate	Moderate
		Stem, Type: Wounds, Height: 1m, Aspect: North, where stems separate	Moderate	
43	Ash, Mature, DBH: 80cm, Height: 10m, Single-stem	Limb, Type: Impact Shatter, Height: 3m, Aspect: Several limbs broken off need investigating	Moderate	Moderate
		Stem, Type: Butt Rot, Height: 0m, Aspect: South	Moderate	
44	Other, Alder, Mature, DBH: 60cm, Height: 10m, Multi-stem	Stem, Type: Wounds, Height: 1m, Aspect: South	Moderate	Moderate
		Stem, Type: Tear Outs, Height: 0.5m, Aspect: North	Moderate	
		Limb, Type: Knot Hole, Height: 2m, Aspect: North	Low	
45	Willow, Mature, DBH: 100cm, Height: 13m, Multi-stem	Limb, Type: Impact Shatter, Height: 6m, Aspect: West	Moderate	Moderate

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
46	Ash, Mature, DBH: 60cm, Height: 8m, Single-stem	Stem, Type: Knot Hole, Height: 3m, Aspect: South	Moderate	High
		Stem, Type: Impact Shatter, Height: 5m	High	
47	Willow, Mature, DBH: 40cm, Height: 10m, Multi-stem	Stem, Type: Lifting Bark, Height: 5m, Aspect: South	High	High
		Limb, Type: Pruning Cut, Height: 2m, Aspect: West	High	
		Type: Butt Rot, Height: 0m, Aspect: West	Moderate	
48	Willow, Mature, DBH: 50cm, Height: 10m, Single-stem	Stem, Type: Fluting, Height: 1m, Aspect: North	Moderate	Moderate
49	Other, Alder, Mature, DBH: 40cm, Height: 10m, Multi-stem	Stem, Type: Butt Rot, Height: 0m, Aspect: South,	Low	Moderate
		Type: Lifting Bark, Aspect: On dead stem	Moderate	
		Type: Wounds, Aspect: Multiple, Few limbs broken off leaving potential features, cannot be assessed from ground	Moderate	
50	Willow, Mature, DBH: 80cm, Height: 10m, Single-stem	Limb, Type: Impact Shatter, Height: 4m, Aspect: West, One east side and west side	Moderate	Moderate
51	Willow, Mature, DBH: 70cm, Height: 13m, Single-stem	Limb, Type: Lifting Bark, Height: 5m, Aspect: South, On dead limbs	High	High
		Limb, Type: Tear Outs, Height: 4m, Aspect: North, On dead limbs	Moderate	

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
52	Willow, Mature, DBH: 60cm, Height: 13m, Single-stem	Limb, Type: Pruning Cut, Height: 3m, Aspect: East, Split on cut limb	High	High
		Stem, Type: Subsistence Split, Height: 3m, Aspect: North	High	
53	Willow, Mature, DBH: 60cm, Height: 13m, Single-stem	Limb, Type: Tear Outs, Height: 5m, Aspect: West	Low	Moderate
		Limb, Type: Subsistence Split, Height: 4m, Aspect: North, Been cut	Moderate	
		Limb, Type: Hazard Beam, Height: 5m, Aspect: East	Moderate	
54	Willow, Mature, DBH: 60cm, Height: 13m, Single-stem	Limb, Type: Tear Outs, Height: 4m, Aspect: West	High	High
55	Willow, Mature, DBH: 60cm, Height: 13m, Single-stem	Limb, Type: Transverse Snap, Height: 8m, Aspect: North	High	High
56	Pedunculate Oak, Mature, DBH: 70cm, Height: 10m, Single-stem	Stem, Type: Wounds, Height: 0.25m, Aspect: North	Moderate	Moderate
		Limb, Type: Wounds, Height: 4m, Aspect: South, Dead limb, looks like bark could be lifted.	Low	
57	Elder, Mature, DBH: 15cm, Height: 3m, Single-stem	Stem, Type: Tear Outs, Height: 0.5m, Aspect: South,	Moderate	Moderate
58	Ash, Mature, DBH: 70cm, Height: 10m, Single-stem	Stem, Type: Wounds, Height: 1m, Aspect: South, Where stems separate	High	High

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
59	Pedunculate Oak, Mature, DBH: 80cm, Height: 13m, Single-stem	Stem, Type: Ivy	Moderate	Moderate
60	Pedunculate Oak, Mature, DBH: 80cm, Height: 13m, Single-stem	Stem, Type: Knot Hole, Height: 3m, Aspect: West	Moderate	Moderate
61	Willow, Mature, DBH: 200cm, Height: 10m, Single-stem	Stem, Type: Impact Shatter, Aspect: Over mature willow that has fallen, lots of crevices and ivy	High	High
62	Hawthorn, Mature, DBH: 25cm, Height: 7m, Multi-stem	Stem, Type: Tear Outs, Height: 1m, Aspect: East	Negligible	Negligible
63	Willow, Mature, DBH: 80cm, Height: 13m, Multi-stem	Limb, Type: Hazard Beam, Height: 2m, Aspect: North, One over water, few others higher up	High	High
		Stem, Type: Wounds, Height: 3m, Aspect: North, where limb coming away	Moderate	
		Limb, Type: Knot Hole, Height: 5m, Aspect: North, Dead branch still present	Low	
64	Willow, Mature, DBH: 30cm, Height: 8m, Multi-stem	Limb, Type: Lifting Bark, Height: 0.25m, Aspect: North	Low	Low
65	Willow, Mature, DBH: 100cm, Height: 8m, Single-stem	Type: Wounds, Aspect: Few wounds, large hollow dead fallen stem	High	High
66	Willow, Mature, DBH: 80cm, Height: 8m, Single-stem	Stem, Type: Hazard Beam, Height: 0.25m, Aspect: West	High	High
		Stem, Type: Wounds, Height: m, Aspect:	Low	

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
67	Willow, Mature, DBH: 80cm, Height: 13m, Single-stem	Limb, Type: Tear Outs, Height: 2m, Aspect: East, On partially fallen limb	High	High
68	Willow; Mature; DBH: 80cm, Height: 13m, Single-stem	Stem, Type: Wounds, Height: 3m, Aspect: West, Hollow stem extends to smaller cavity upwards	High	High
		Stem, Type: Wounds, Height: m, Aspect: multiple, Also ivy	Moderate	
69	Pedunculate Oak, Mature, DBH: 100cm, Height: 10m, Single-stem	Stem, Type: Tear Outs, Height: 1m, Aspect: South	High	High
		Stem, Type: Impact Shatter, Height: 2m, Aspect: North, Fallen limb	Low	
70	Pedunculate Oak, Mature, DBH: 100cm, Height: 10m, Single-stem	Limb, Type: Wounds, Aspect: Few dead limbs but needs to be assessed climbing properly as can't see to determine	Low	Low
71	Pedunculate Oak, Mature, DBH: 80cm, Height: 10m, Single-stem	Limb, Type: Transverse Snap, Height: 8m, Aspect: North	Low	Low
72	Pedunculate Oak, Mature, DBH: 80cm, Height: 10m, Single-stem	Limb, Type: Transverse Snap, Height: 8m, Aspect: North	Low	Low
73	Ash, Mature, DBH: 60cm, Height: 8m, Single-stem	Stem, Type: Butt Rot, Height: 0.5m, Aspect: North	High	High
74	Willow, Mature, DBH: 100cm, Height: 10m, Single-stem	Stem, Type: Subsistence Split, Height: 1m, Aspect: South, Limb split away from main stem, remnants of old bee nest	Low	Low

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
95	Pedunculate Oak, Mature, DBH: 60cm, Height: 8m, Single-stem	Stem, Type: Knot Hole, Height: 1m, Aspect: East, Multiple	Negligible	Moderate
		Type: Lifting Bark, Height: <1m, Aspect: Multiple	Negligible	
		Limb, Type: Tear Outs, Height: 4m, Aspect: East, Multiple	Moderate	
		Stem, Type: Knot Hole, Height: 6m, Aspect: East	Low	
		Stem, Type: Knot Hole, Height: 6m, Aspect: West	Low	
		Limb, Type: Lifting Bark, Height: 8m, Aspect: East	Low	
96	Field Maple, Mature, DBH: 20cm, Height: 8m, Multi-stem	Stem, Type: Tear Outs, Height: 2-3m, Aspect: North, Multiple	Low	Low
97	Pedunculate Oak, Mature, DBH: 120cm, Height: 8m, Single-stem	Limb, Type: Wounds, Height: 4m, Aspect: North, Dead limb looks hollow	High	High
		Stem, Type: Knot Hole, Height: 2m, Aspect: South,	Low	
98	Pedunculate Oak, Mature, DBH: 150cm, Height: 8m, Single-stem	Stem, Type: Lighting Strike, Aspect: Numerous prf all around tree	High	High
99	Ash, Mature, DBH: 25cm, Height: 8m, Multi-stem	Stem, Type: Lifting Bark, Height: <1m	Negligible	Negligible
100	Field Maple, Semi-Mature, DBH: 10cm, Height: 2m, Single-stem	Stem, Type: Hazard Beam, Height: 0.5m, Aspect: West	Negligible	Negligible

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
101	Field Maple, Mature, DBH: 20cm, Height: 8m, Multi-stem	Stem, Type: Knot Hole, Height: 1m, Aspect: West, One dead stem, only enough room for one bat	Low	Low
		Stem, Type: Lifting Bark, Height: <2m	Low	
102	Other, Dead, Mature, DBH: 15cm, Height: 7m, Multi-stem	Stem, Type: Lifting Bark, Height: <2m	Low	Low
103	Pedunculate Oak, Burnt out, Mature, DBH: 120cm, Height: 8m, Single-stem	Type: Wounds, Aspect: Multiple lifted bark and snapped limbs and hazard beam with potential	High	High
104	Pedunculate Oak, Mature, DBH: 100cm, Height: 10m, Single-stem	Type: Wounds, Aspect: Multiple lifted bark on dead limbs and 3 knot holes	High	High
105	Ash, Mature, DBH: 50cm, Height: 8m, Single-stem	Stem, Type: Tear Outs, Height: 2m, Aspect: West	Low	Low
106	Other, Pine, Mature, DBH: 25cm, Height: 4m, Multi-stem	Limb, Type: Hazard Beam, Height: 2m, Aspect: East	Negligible	Negligible
107	Pedunculate Oak, Mature, DBH: 40cm, Height: 10m, Single-stem	Limb, Type: Hazard Beam, Height: 5m, Aspect: West	Negligible	Negligible
108	Pedunculate Oak, Mature, DBH: 30cm, Height: Fallen partially, Single-stem	Stem, Type: Lifting Bark, Height: 1m, Aspect: North	Low	Low
110	Field Maple, Mature, DBH: 30cm, Height: 8m, Multi-stem	Limb, Type: Tear Outs, Height: 1m, Aspect: East	Negligible	Negligible
111	Pedunculate Oak, Mature, DBH: 60cm, Height: 10m, Single-stem	Stem, Type: Lifting Bark	Moderate	Moderate
112	Ash, Mature, DBH: 30cm, Height: 8m, Single-stem	Stem, Type: Woodpecker hole, Height: 7m, Aspect: Both sides of stem	High	High

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
		Stem, Type: Knot Hole, Height: 6m	High	
113	Ash, Mature, DBH: 40cm, Height: 10m, Single-stem	Stem, Type: Wounds, Height: m, Aspect: Two features where tree contacts other stem, one from ground one from ladder	Low	Low
114	Field Maple, Mature, DBH: 15cm, Height: 7m, Multi-stem	Stem, Type: Knot Hole, Height: 1m, Aspect: West,	Low	Low
115	Pedunculate Oak, Mature, DBH: 100cm, Height: 13m, Single-stem	Type: Wounds, Multiple lifted bark around dead limbs, and tear out	Moderate	Moderate
116	Dead tree, DBH: 20cm, Height: 6m, Multi-stem	Stem, Type: Lifting Bark, Height: 4m, Aspect: South.	Low	Low
117	Dead tree, DBH: 20cm, Height: 8m, Single-stem	Stem, Type: Lifting Bark, Height: 3m, Aspect: North.	Moderate	Moderate
118	Elm, Mature, DBH: 125cm, Height: 12m, Single-stem	Stem, Type: Cankers, Height: 4m, Aspect: South-west	Low	Low
119	Pedunculate Oak, Mature, DBH: 200cm, Height: 10m, Single-stem.	Limb, Type: Tear out, Height: 4m, Aspect: North	Moderate	Moderate
120	Ash, Mature, DBH: 115cm, Height: 10cm, Single-stem	Stem, Type: Ivy, Height: 1m, Aspect: North.	Low	Low
121	Ash, Semi-mature, DBH: 30cm, Height: 8cm, Single-stem	Limb, Type: Tear out, Height: 3.5m, Aspect: North	Moderate	Moderate
122	Ash, Mature, DBH: 85cm, Height: 12cm, Single-stem	Limb, Type: Woodpecker hole, Height: 5m, Aspect: South-west	Moderate	Moderate

NOT PROTECTIVELY MARKED

Tree Number	Tree Species and general tree description	Description of Feature	Potential of Feature	Overall tree potential
		Limb, Type: Tear-out, Height: 4m, Aspect: South-west	Moderate	
123	Ash, Mature, DBH: 50cm, Height: 10cm, Single-stem	Stem, Type: Tear out, Height: 3m, Aspect: South-East	Moderate	Moderate
124	Ash, Semi-mature, DBH: 30cm, Height: 10cm, Single-stem	Stem, Type: Woodpecker hole, Height: 4m, Aspect: South-east	Moderate	Moderate
125	Ash, Semi-mature, DBH: 45cm, Height: 10cm, Multi-stem	Stem, Type: Knot hole, Height: 6m, Aspect: East	Moderate	Moderate
		Stem, Type: Tear-out, Height: 4m, Aspect: North-east	Moderate	
126	Pedunculate Oak, Mature, DBH: 125cm, Height: 12m, Single-stem.	Limb, Type: Hazard beam, Height: 8m, Aspect: South-west	Moderate	Moderate
		Limb, Type: Tear-out, Height: 6m, Aspect: South.	Moderate	
127	Ash, Mature, DBH: 90cm, Height: 10m, Multi-stem	Stem, Type: Butt-rot, Height: 1m, Aspect: North	Moderate	Moderate
		Stem, Type: Tear-out, Height 4m, Aspect: North	Moderate	
128	Pedunculate Oak, Mature, DBH: 100cm, Height: 12cm, Single-stem	Limb, Type: Tear-out, Height: 8m, Aspect: West.	Moderate	Moderate

1.7 Otter and Water Vole

a) Methodology

1.7.1 Otter and water vole surveys were undertaken in June, August and September 2019 of the ditches and the watercourses (including the River Alde) within 250m of the site.

1.7.2 Each watercourse was assessed for its suitability for water voles. The survey also involved a search of the banks to identify water vole field signs. Water vole latrines and other field signs (such as burrows, droppings, feeding signs and runs) were mapped using Global Positioning System (GPS) to allow for an estimation of the population size. This survey work was conducted in accordance with the 'Water Vole Conservation Handbook' (Ref 1.21).

1.7.3 Surveyors also assessed habitats for suitability for otters. Signs for otter, including spraints, paw prints, otter paths, slides, food remains, holts, and places used for shelter, were also looked for and recorded.

b) Results

i. Water vole

1.7.4 Evidence of recent water vole activity was found along the River Alde (watercourses 1 and 13) which enters south of the site and watercourse 12 towards the north of the site. Both watercourses were assessed as having low water vole population densities. The evidence of water vole activity found is summarised in **Table 1.34**:

Table 1.34: Water vole field signs identified on Two Village Bypass.

Watercourse Reference	Water vole signs found					Notes
	Burrow	Path in vegetation	Latrines/droppings	Cropped grass around tunnel	Feeding remains	
1	✓		✓		✓	Slow flowing river with earth banks and some emergent vegetation.
2						Not suitable, dry and barely a ditch
3						Dry ditch
5						

Watercourse Reference	Water vole signs found					Notes
	Burrow	Path in vegetation	Latrines/droppings	Cropped grass around tunnel	Feeding remains	
6						
7						
8						No access
9						Dry ditch choked with vegetation
10						Partially dry field channel
11						Partially wet ditch
12			✓		✓	
13						Slow flowing river with earth banks and some emergent vegetation
14						
15						Dry for much of the ditch
16						
17						No access
18						
19						No access
22						

ii. Otter

1.7.5 Evidence of recent otter activity, a footprint, was found along the River Alde. This was the only otter sign found throughout the 2019 surveys. The River Alde was assessed as suitable to support otter with the surrounding areas of woodland suitable to support otter resting sites.

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VOLUME 5, CHAPTER 7, APPENDIX 7A: ANNEX 7A.4:
BIODIVERSITY NET GAIN REPORT

SIZEWELL C PROJECT ENVIRONMENTAL STATEMENT

Biodiversity Metric Calculations – Two Village Bypass

JANUARY 2020



Sizewell C Two Village Bypass – Biodiversity Metric Calculations

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FIGURES
None Provided

Executive summary

Arcadis Consulting (UK) Limited has been commissioned on behalf of SZC Co., to undertake Biodiversity Metric calculations. This is to support the Environmental Statement for Sizewell C Project.

Under current proposals it is estimated that there is a predicted increase in biodiversity unit values for habitats of 12.55%, and an increase in hedgerow unit values of 15.01%. The large increase in hedgerow units is largely due to the quantity of on-site hedgerows approximately doubling from 3.79km in the baseline to a predicted 7.43km.

In addition to the Two Village Bypass, the main development site and a series of other off-site associated developments were also assessed via the biodiversity metric (Sizewell link road and Yoxford roundabout) and these are presented in separate reports. These sites were chosen for assessment via the metric as they were considered to have potential for permanent habitat loss. When considered as a whole there is predicted to be an approximate 18% increase in biodiversity net gain across the main development site and three associated developments.

An increase in area is predicted for the most valuable habitats on the site; grassland and woodland and forest. An increase in the biodiversity unit value of grassland is also predicted. Cropland is predicted to undergo reductions in area and unit value. However, this was considered to be the most acceptable habitat to replace in terms of biodiversity value.

The achievement of these units scores is reliant upon achieving the target condition for created habitats, which will require creation and management plans.

It is recommended that post planning, additional surveys are undertaken through the planning process to update the report and to inform the necessary detailed design, habitat creation and management plans.

1 INTRODUCTION

1.1 Overview

Arcadis Consulting (UK) Limited has been commissioned on behalf of SZC Co., to undertake Biodiversity Metric calculations. This is to support the Environmental Statement for Sizewell C Project, which includes main development site and associated development sites.

This report focusses on the two village bypass which will comprise a new bypass road around Stratford St Andrew and Farnham. The red line boundary is presented in Plate 1. 1. Two other associated developments and the main development site were assessed via the biodiversity metric, presented in separate reports. These sites were chosen for assessment via the metric as they were considered to have potential for permanent habitat loss. In addition to the two village bypass these other assessed associated developments are:

- A permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’ (SLR)) to alleviate traffic from the B1122 through Theberton and Middleton Moor (Volume 6 Annex 7.4); and
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’ (Yoxford) (Volume 7 Annex 7.4).

Plate 1. 1: Aerial imagery of the site and redline boundary



1.2 Site overview

The proposed development sits approximately 12km inland from the east coast. The site, presented in Plate 1. 1 and in Figure 7.3 in Appendix 7A of Volume 5, comprises intensively managed arable fields with small areas of heavily grazed semi-improved grassland, species-poor semi-improved floodplain grassland and interspersed patches of tall ruderal and scattered scrub. The arable fields are bounded by fences and hedgerows. Several woodland blocks are identified, within and adjacent to the site. No designated sites are present within the site, however, Foxburrow Wood County Wildlife Site (CWS) an area of ancient woodland is located immediately adjacent to the site.

1.3 Proposed scheme

The proposed development, shown in Figures 2.1-2.4 in Chapter 2 of Volume 5, would comprise a new single carriageway, approximately 2.4km in length. The proposed route of the two village bypass would be 7.3 metres (m) in width, with additional 1m hardstrips and 2.5m grassed verges. Swales approximately 3-3.5m wide would also be proposed along the earthworks for the length of the proposed route of the two village bypass for highway

drainage. The side roads off the two village bypass would be approximately 6m in width and are sufficient in width such that laybys would not be required for vehicles to pass one another.

1.4 Biodiversity Targets

This report has been prepared in response to SZC Co., government and stakeholder interest around quantifying biodiversity. Defra (Department for Environment Food and Rural Affairs) has presented their intentions for biodiversity, in their summary of responses to the biodiversity net gain consultations published in July 2019 (Defra, 2019).

A requirement to commit to a 10% increase in biodiversity units to achieve net gain for new developments is likely to be mandated through the upcoming Environment Bill, although it is unclear that this would include Nationally Significant Infrastructure Projects (NSIPs).

The scope of this report and analysis is to present the biodiversity unit change due to the proposed development. The ecological impacts and associated mitigation to ensure legislative and policy compliance are presented in the ES (ES Volume 2, Chapter 14) and its associated documents.

2 METHODOLOGY

2.1 Biodiversity metric 2.0

The purpose of this document is to evaluate the potential of the proposed development to achieve biodiversity net gain. This approach utilises information on the habitats and features of the site before and after the Development to calculate a biodiversity value, utilising this information to calculate a change in the biodiversity value of the Outline Planning Area (OPA). These calculations were undertaken using the Biodiversity Metric 2.0 issued by Defra and Natural England (details can be found at Crosher et al., 2019 a and b) a spreadsheet-based tool into which data can be entered to carry out biodiversity net gain calculations. The version used for these calculations is that updated in October 2019, an updated version of the tool was released in late December 2019, however these were not material to these calculations. A connectivity tool released after the updated metric, but this was not functional due to the number of bugs present within it. As such, the approach detailed in 2.2.3 for connectivity was taken.

When considering baseline conditions, the metric takes account of several factors, detailed below. The numbers in brackets show the multipliers used by the metric for each category.

- Habitat type;
- Size of habitat parcel;
- The distinctiveness of the habitat type:
 - Value predetermined for each habitat type on a scale of Very Low (0), Low (2), Medium (4), High (6) and Very High (8).
 - Distinctiveness considers the rarity of the habitat, the amount of the percentage of habitat protected in SSSIs, the UK Priority Habitat Status and the European Red List Categories for the habitat.
- The condition of each habitat parcel;
 - Value assigned based on a scale of Poor (1), Fairly Poor (1.5), Moderate (2), Fairly Good (2.5) and Good (3). For some habitat types this is pre-determined.
 - Condition sheets (provided in Crosher et al., 2019b) were used where possible to assess the condition.
- How ecologically connected the parcels are; and
 - Value assigned based on a scale of Low (1), Medium (1.1) and High (1.15).
- Whether the parcels are in locations identified as local nature priorities.
 - Value assigned based on a scale of Low (1), Medium (1.1) and High (1.15) strategic importance.

Data is entered into the metric under the UK habitat classification typologies. Baseline data was largely collected under Phase 1 Habitat survey Typologies. A conversion was carried out using a table within the tool and using the guidance document produced by UK Habitat Classification Working Group (2018).

2.2 Valuation of habitats

To calculate the biodiversity value of the site, a 'value' of each of the habitats is formulated and multiplied by the size of this habitat, as described within the Defra metric (Crosher et al., 2019a). The 'value' is based upon the habitat's distinctiveness, condition, ecological connectivity and strategic significance. For non-linear habitats, such as woodland or grassland, the area of the habitat is used to assess its size, whereas length is used for linear habitats, such as hedgerows and rivers. The biodiversity values of area-based habitats, hedgerows and rivers are separate and cannot be summed. As such they should be evaluated separately. Area based habitats and hedgerows are largely assessed in the same way and any differences are highlighted below.

This section describes how this value has been applied to the existing 'before' habitats and the proposed 'after' (post-development) habitats. Full details of the Biodiversity Metric 2.0 can be found in Crosher et al. (2019a and b).

2.2.1 Habitat distinctiveness

The metric assigns a distinctiveness band to each of the habitats and linear features. These are based upon different criteria, so are considered separately below.

2.2.1.1 Area based habitats

As detailed in Crosher et al. (2019a), this assessment is based upon “species richness, rarity (at local, regional, national and international scales), and the degree to which a habitat supports species rarely found in other habitats”. Table 1 provides detail of the bandings to which each area-based habitat is assigned.

Table 1: Area based habitat distinctiveness valuation bandings

Distinctiveness band	Multiplier	Typical habitats
Very High	8	Priority habitats as defined in Section 41 of the Natural Environment and Rural Communities (NERC) Act that are highly threatened, internationally scarce and require conservation action e.g. blanket bog
High	6	Priority habitats as defined in Section 41 of the NERC Act requiring conservation action e.g. lowland fens
Medium	4	Semi-natural habitats not classed as a Priority Habitat
Low	2	Habitat of low biodiversity value. Temporary grass and clover ley; intensive orchard; rhododendron scrub
Very low	0	Little or no biodiversity value e.g. hard standing or sealed surface

2.2.1.2 Hedgerows

The distinctiveness of hedgerows is based upon their physical structure, the woody species composition and any association with physical features, such as banks and ditches. An assessment of ground flora is not included within the metric. 2 details the distinctiveness categories of each of the types of hedgerows and line of trees. Further detail is provided in Crosher et al. (2019a).

Table 2: Hedgerow distinctiveness categories and multipliers

Associated features	Woody plant structural composition				
	Species rich hedgerow (inc. hedgerow with trees)	Native species hedgerow	Other hedgerow (ornamental / non-native species)	Line of trees (ecologically valuable)	Line of trees
Associated earth bank or ditch	High 6	Medium 4	Low 2	Medium 4	Low 2
None	Medium 4	Low 2	Very Low 1	Medium 4	Low 2

2.2.2 Habitat condition assessment

The condition of the habitat is defined as: “the biological ‘working-order’ of a habitat type judged against the perceived ecological optimum state for that particular habitat.” (Crosher et al., 2019b). This provides a measure of variation in the quality of areas of the same habitat type.

2.2.2.1 Area based habitats

A habitat condition assessment sheet is provided for each habitat type within Crosher et al. (2019b), which is used to assign each habitat parcel to each of the categories detailed in Table 3. Each condition sheet is composed of a list of pass/fail criteria. The ratio of ‘passes’ to ‘fails’ is used to determine the habitat condition.

Table 3: Condition bandings for the habitats on the site

Category	Multiplier
Good	3
Fairly good	2.5
Moderate	2
Fairly poor	1.5
Poor	1
N/A – Agriculture	1
N/A – other	0

2.2.2.2 Hedgerows

A single condition sheet is provided for hedgerows, lines of trees have a separate sheet. Both of these can be found in Crosher et al. (2019a), along with the pass/fail ratios for both types of linear feature. The condition categories and multipliers are the same as shown in Table 3, but ‘fairly good’ and ‘fairly poor’ are not options.

2.2.3 Ecological connectivity assessment

Version 2.0 of the metric includes a valuation of ‘ecological connectivity’. The connectivity factor relates to the relationship of a “particular habitat patch to other surrounding similar or related semi-natural habitats facilitating flows of species and ecosystem services” (Crosher et al., 2019b). Increased connectivity with the surrounding area corresponded to a higher value for the ecological connectivity factor. Higher habitat connectivity increases the value of a habitat, all else being equal. For example, a well-connected area of woodland will likely have a higher biodiversity than an equivalent, unconnected woodland. A tool for assessing connectivity was released in December 2019, but it was found to be non-functional due to bugs within it. As such, professional judgement was utilised to assign a connectivity score to each habitat parcel. This was based upon the location of similar habitats and the potential for movement of animals and plants between them. The connectivity categories are shown in Table 4.

Table 4: Connectivity categories and multipliers

Connectivity	Multiplier
High	1.15
Medium	1.1
Low	1

2.2.4 Strategic significance assessment

Strategic significance assesses the value of habitats from the point of view of environmental objectives and preferred locations for biodiversity. Local and national policy was reviewed to quantify the strategic significance of each habitat area. Table 5, based upon Table 5-5 in Crosher et al. (2019a), was used to assist with this assessment.

Table 5: Strategic significance categories and multipliers

Category	Description	Multiplier
High	Within area formally identified in local strategy	1.15
Medium	Location ecologically desirable but not in local strategy	1.1
Low	Area/compensation not in local strategy/ no local strategy	1

2.3 Pre-development calculations

The number of biodiversity units provided by each habitat currently within the proposed development site is calculated by multiplying the values for Distinctiveness, Condition, Connectivity, Strategic location and the size of each habitat in hectares (ha). Hedgerows are evaluated in the same way, but base upon their length (in km), rather than area. This value represents the baseline condition of the site, in terms of biodiversity units. Further detail can be found in Crosher et al. (2019a and b). The Phase 1 habitat map presented in Figure 7.3 in Appendix 7A and satellite imagery were used to inform these baseline calculations.

2.4 Post-development calculations

The site is then reassessed for the post-development conditions that will be present after the landscape treatments are implemented. The number of biodiversity units provided by each habitat within the proposed development site is calculated in the same way as the baseline habitats, but with the additional multipliers detailed in Table 6. Further detail regarding these multipliers is presented in section 2.5.

Table 6: Risk components included in post-developments calculations

Risk factor	Description
Difficulty of creating or restoring a habitat	A standard score based on how difficult the habitat type is to create.
Temporal risk	A standard score based on how long the habitat type takes to establish.

The following sources were used to assess the on-site conditions after the landscape treatments are implemented:

- Illustrative Masterplan of the Two Village Bypass (Figures 2.1-2.4 in Chapter 2)

2.5 Post-Development delivery risks

2.5.1 Difficulty of creating or restoring a habitat

This 'risk' relates to the difficulty of the habitat restoration or recreation. There are four bands from Low difficulty, to Very high difficulty, with the value multiplier shown below in Table 7.

Table 7: Difficulty categories and multiplier

Category	Multiplier
Very high	0.1
High	0.33
Medium	0.67
Low	1

There is also different terminology and different treatment for the mechanism by which habitat are created. For example, different biodiversity change scenarios carry different levels of risk and the multipliers are applied differently to reflect this. Three distinct biodiversity habitat change scenarios are recognised in the biodiversity metric 2.0:

- **Habitat creation.** Where one habitat type is replaced by another or the habitat is destroyed (e.g. by development works) and the same habitat is recreated.
- **Habitat enhancement** of an existing habitat to improve its distinctiveness and / or condition. An example of restoration would be the transformation of a derelict chalk grassland dominated by scrub and coarse grasses to a continuous area of chalk grassland with isolated woody species and an abundance of fine-leaved grasses.
- **Accelerated habitat succession.** This recognises that certain interventions are comparable with ecological succession processes which result in a more distinctive habitat type (for example, grassland changing into scrub and ultimately woodland). The biodiversity value of the original habitat is not abruptly lost, but gradually changes as the new habitat type emerges. Accelerated succession interventions are subject to ‘trading down’ principles. Accelerated succession is a purposeful sustained intervention and it is envisaged that there are a limited number of situations where this would apply. For example, the planting of an existing grassland with thorny shrubs to facilitate natural tree regeneration to establish a woodland without removing the grassland.

Habitat creation and accelerate succession have the greatest risk, while enhancement carries less risk. It should be noted that accelerated succession is not recognised as an option for hedgerows.

2.5.2 Temporal risk

Many factors influence how long a habitat takes to go from the point of creation or restoration to the desired end point condition. Factors are often site dependent but can include soil nutrient status, soil types and pH, site preparation, climate and the neighbouring habitats and species matrix available to colonise the new or restored habitat. The timeframe is also resource dependent. With sufficient time and money most habitats can be recreated more rapidly but allowing a more gradual process may be more beneficial to wildlife in the longer term.

For the purposes of the Defra Biodiversity Metric 2.0 average time estimates need to be used, accepting that there will be variation from this central estimation. For example, some sites will take longer, where conditions are more nutrient enriched or higher altitude or north facing. Average estimates of the time to target condition were largely expert driven and build upon the considerations that shaped judgements of the difficulty to create or restore a habitat. They were additionally informed by field experience, industry case studies and a body of practical experience. The time to target condition varies between 0 and greater than 32 years, with 0 years having a multiplier of 1. The multiplier decreases by 3.5% per year.

2.5.3 Spatial risk

A separate risk multiplier is applied to post-development sites outside of the main development site. This incentivizes the utilisation of sites nearby to the development, for ecological and social reasons. Sites within the same local planning authority area (LPA) or National Character Area (NCA), it is deemed sufficiently close to address ecological and social concerns. Higher multipliers are assigned to more distant sites, as shown in Table 8.

Table 8: Off-site risk categories (LPA – local planning authority area, NCA – National Character Area)

Category	Multiplier
Compensation inside LPA or NCA of impact site.	1
Compensation outside LPA or NCA of impact site but in neighbouring LPA or NCA.	0.75
Compensation outside LPA or NCA of impact site and beyond neighbouring LPA or NCA.	0.5

This multiplier does not apply to the calculations carried out here as no off-site areas were included.

2.6 Double counting areas

The total area input into the tool can be greater than the total area of the site. This is due to the three-dimensional nature of certain habitats. For example, the area covered by a tree is approximately the area

covered by its canopy, but if an area of grassland is underneath, both should be included in the metric. As such the area under the tree is ‘counted’ twice and can result in the area in the metric being larger than the area of the site.

2.7 Calculation of gains or losses

The net change in biodiversity or hedgerow units on and off-site is calculated within the tool by subtracting the baseline units from the post-development units. The overall net change is the sum of the change in units on-site and off-site. The percentage net gain is then calculated by dividing this overall net change by the number of baseline units on the site, as shown in the equation below:

$$\text{overall percentage net gain} = \frac{\text{change in units on site} + \text{change in units off site}}{\text{baseline units on site}} \times 100$$

A positive value indicates a net gain has been made and a negative value indicates a net loss has been made.

2.8 Changes in broad habitat type calculations

The UK habitat classification system is hierarchical in structure, so specific habitat types can be grouped into broad habitat types. The changes in area and biodiversity units associated with each of these broad habitat types was calculated using the baseline and post-development data.

2.9 Areas excluded from the assessment

The metric is not designed to assess impacts to habitats within statutory designated sites or “irreplaceable” habitats, as defined in Baker (2019). There are no irreplaceable habitats, such as ancient woodland, or statutory designated sites present on the proposed development.

2.10 Rivers assessment

An approximately 300m section of the River Alde is present within the site, but it will not be impacted by the proposed development. As such the credit values would be the same pre and post-development so an assessment is not included within this report.

2.11 Assumptions and limitations

The following assumptions, were made to complete the assessment:

- The difficulty factors applied currently significantly reduce credits calculations for habitats such as acid grassland, calcareous grassland and heathland, resulting in a lower overall unit values when attempting to create or enhance to these habitats. In the main development site dry acid grassland is a large component of the target community and has resulted in such a credit reduction. The Beta version of the metric tool may be amended in the future to more evenly weight these units.
- Arcadis have used third party data as part of the assessments of the post-development and off-site habitats.
- Assumptions on the condition of the baseline habitats are inferred from existing data. No specific surveys or assessments were undertaken. Further, access was not available to all areas within the red line boundary. As such assumptions were made regarding the habitats present and their condition. It is recommended that ground truthing surveys are undertaken to confirm these habitat and condition assessment assumptions.
- Should a target be set for percentage net gain of biodiversity units, it is recommended that the condition scores of habitats to be created and enhanced are part of any subsequent management plan so that the conditions are appropriately targeted within the works as achieving net gain will be reliant on achieving the set condition scores.
- The tool released by Natural England for assessing ecological connectivity was released in December 2019, but it was found to be non-functional. As such previous guidance on professional judgement was used to assess available habitat data and satellite mapping to evaluate the connectivity of each habitat parcel.
- Baseline data was largely collected in the format of a Phase 1 Habitat Survey, but a conversion was required to UK habitat classification typology to enter this data into the metric.

It is not considered that these assumptions introduce a level of uncertainty into the assessment that would affect the veracity of the assumptions.

3 BASELINE CONDITIONS AND VALUATION (PRE-CONSTRUCTION)

The Two Village Bypass is approximately 55ha in area. This section describes each of the habitats listed on site, shown in Figure 7.3 in Appendix 7A of Volume 5. Codes utilised in this section are those from the JNCC Phase 1 Habitat Survey Handbook (JNCC, 2010). Table 9 details the UK habitat classification types used in the Defra Metric 2.0 and how they relate to the Phase 1 Habitat Types. Also presented are the valuations of the condition, ecological connectivity and strategic significance of each habitat type. The baseline currently delivers 133.29 biodiversity units for habitats. When data was entered into the tool, some of the habitat parcels were divided up for the purposes of data handling.

Hedgerows are assessed separately to habitats by the metric. Table 10 follows the same format as Table 9, but details lengths of hedgerows, rather than areas of habitat. The baseline currently delivers 33.93 hedgerow units from 3.79km of hedgerows.

Table 9: Baseline biodiversity units for areas of habitat within the Sizewell C Two Village Bypass site, detailing the Phase 1 habitat and UK habitat conversions

Phase 1 habitat type	UK habs/ broad habitat	UK habs/habitat type	Area (ha)	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Habitat units
Arable fields	Cropland	Cropland - Cereal crops	37.91	Low	N/A - Agricultural	Low	Area/compensation not in local strategy/ no local strategy	75.82
Species-poor semi- improved grassland	Grassland	Grassland - Modified grassland	5.57	Low	Poor	Low	Area/compensation not in local strategy/ no local strategy	11.14
Improved grassland	Grassland	Grassland - Modified grassland	6.87	Low	Poor	Low	Area/compensation not in local strategy/ no local strategy	13.74
Tall ruderal	Sparsely vegetated land	Sparsely vegetated land - Ruderal/Ephemeral	0.55	Low	Moderate	Low	Area/compensation not in local strategy/ no local strategy	2.20
Scattered scrub	Heathland and shrub	Heathland and shrub - Mixed scrub	0.07	Medium	Poor	Low	Area/compensation not in local strategy/ no local strategy	0.28
Ditches	Lakes	Lakes - Ditches	0.08	Medium	Poor	Medium	Area/compensation not in local strategy/ no local strategy	0.35
Dense scrub	Heathland and shrub	Heathland and shrub - Mixed scrub	0.04	Medium	Fairly Poor	Low	Area/compensation not in local strategy/ no local strategy	0.24
Semi-natural broadleaved woodland	Woodland and forest	Woodland and forest - Lowland mixed deciduous woodland	0.71	High	Fairly Good	Medium	Location ecologically desirable but not in local strategy	12.89
Amenity grassland	Urban	Urban - Amenity grassland	0.3	Low	Fairly Poor	Low	Area/compensation not in local strategy/ no local strategy	0.90
Introduced shrub	Urban	Urban - Introduced shrub	0.01	Low	Poor	Low	Area/compensation not in local strategy/ no local strategy	0.02
Hardstanding	Urban	Urban - Developed land; sealed surface	1.78	V. Low	N/A - Other	N/A	Area/compensation not in local strategy/ no local strategy	0.00

Sizewell C Two Village Bypass – Biodiversity Metric Calculations

Phase 1 habitat type	UK habs/ broad habitat	UK habs/habitat type	Area (ha)	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Habitat units
Broadleaved scattered trees	Woodland and forest	Woodland and forest - Wood-pasture and parkland	0.55	High	Moderate	Medium	Location ecologically desirable but not in local strategy	7.99
Coniferous scattered trees	Woodland and forest	Woodland and forest - Other coniferous woodland	0.01	Low	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	0.04
Bare ground	Urban	Urban - Vacant/derelict land/ bare ground	0.21	Low	Moderate	Low	Area/compensation not in local strategy/ no local strategy	0.84
Dry ditch	Lakes	Lakes - Ditches	0.09	Medium	Poor	Medium	Area/compensation not in local strategy/ no local strategy	0.40
No access, but appears to be pasture.	Grassland	Grassland - Modified grassland	0.07	Low	Fairly Poor	Medium	Area/compensation not in local strategy/ no local strategy	0.23
No access – semi-natural broadleaved woodland	Woodland and forest	Woodland and forest - Lowland mixed deciduous woodland	0.19	High	Fairly Good	Medium	Area/compensation not in local strategy/ no local strategy	3.14
No access – hardstanding	Urban	Urban - Developed land; sealed surface	0.52	V. Low	N/A - Other	N/A	Area/compensation not in local strategy/ no local strategy	0.00
No access – hardstanding	Urban	Urban - Developed land; sealed surface	0.76	V. Low	N/A - Other	N/A	Area/compensation not in local strategy/ no local strategy	0.00
No access – species-poor semi-improved grassland	Grassland	Grassland - Modified grassland	0.96	Low	Poor	Low	Area/compensation not in local strategy/ no local strategy	1.92
No access – scattered broadleaved trees	Woodland and forest	Woodland and forest - Wood-pasture and parkland	0.19	High	Poor	Low	Area/compensation not in local strategy/ no local strategy	1.14
No access – arable	Cropland	Cropland - Cereal crops	0.01	Low	N/A - Agricultural	N/A	Area/compensation not in local strategy/ no local strategy	0.02
Totals			57.45					133.29

Sizewell C Two Village Bypass – Biodiversity Metric Calculations

Table 10: Baseline biodiversity units for hedgerows within Sizewell C Two Village Bypass site, detailing the Phase 1 habitat and UK habitat conversions

Phase 1 habitat type	Hedgerow type	Length (km)	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Hedgerow units
Defunct hedge species poor	Native Hedgerow	0.203	Low	Poor	Medium	Area/compensation not in local strategy/ no local strategy	0.45
Defunct hedge species rich hedgerow	Native Species Rich Hedgerow with trees	0.221	Medium	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	1.94
Hedge with trees native species rich	Native Species Rich Hedgerow with trees - Associated with bank or ditch	0.63	High	Good	Medium	Area/compensation not in local strategy/ no local strategy	12.47
Hedge with trees native species rich	Native Species Rich Hedgerow with trees	0.134	Medium	Good	Medium	Area/compensation not in local strategy/ no local strategy	1.77
Hedge with trees species poor	Native Hedgerow with trees	0.408	Low	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	1.80
Intact hedge species poor	Native Hedgerow	0.325	Low	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	1.43
Intact hedge native species rich	Native Species Rich Hedgerow - Associated with bank or ditch	0.326	High	Good	Medium	Area/compensation not in local strategy/ no local strategy	6.45
Hedge with trees species poor	Native Hedgerow with trees - Associated with bank or ditch	0.189	Medium	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	1.66
Defunct hedge species poor	Native Hedgerow - Associated with bank or ditch	0.297	Medium	Poor	Medium	Area/compensation not in local strategy/ no local strategy	1.31
Un-surveyed hedges	Native Hedgerow	1.055	Low	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	4.64
Total		3.79					33.93

4 POST-DEVELOPMENT CONDITIONS AND VALUATION

The illustrative masterplan, shown in Figures 2.1-2.4 in Chapter 2, was used as the basis for these calculations.

The sources used to assess the biodiversity value of each of these habitat compartments are presented in Section 2.4.

The on-site post development biodiversity units total 150.02, representing an increase of 16.73 biodiversity units from the baseline 133.29 units. This is a 12.55% increase. Further details of the biodiversity units delivered is presented in Table 11.

A total of 39.02 hedgerow units would be delivered from 7.43km of hedgerows post-development from a baseline of 33.93 hedgerow units resulting in an increase of 5.09 units. This is a 15.01% increase. Further details of the hedgerow units delivered is presented in Table 12.

Sizewell C Two Village Bypass – Biodiversity Metric Calculations

Table 11: Biodiversity units for Sizewell C Two village bypass from habitats post-development

Habitat type	UK habs/ broad habitat	UK habs/habitat type	Area (ha)	Habitat scenario for creation	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Time to target condition	Difficulty	Biodiversity units
Ditches	Lakes	Ditches	0.06	Retention	Medium	Poor	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	0.26
Semi-natural broadleaved woodland	Woodland and forest	Lowland mixed deciduous woodland	0.34	Retention	High	Fairly Good	Medium	Location ecologically desirable but not in local strategy	N/A	N/A	6.17
Hardstanding	Urban	Developed land; sealed surface	0.52	Retention	V. Low	N/A - Other	N/A	Area/compensation not in local strategy/ no local strategy	N/A	N/A	0.00
Broadleaved scattered trees	Woodland and forest	Wood-pasture and parkland	0.1	Retention	High	Moderate	Medium	Location ecologically desirable but not in local strategy	N/A	N/A	1.45
Bare ground	Urban	Vacant/derelict land/ bare ground	0.21	Retention	Low	Moderate	Low	Area/compensation not in local strategy/ no local strategy	N/A	N/A	0.84
Dry ditch	Lakes	Ditches	0.01	Retention	Medium	Poor	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	0.04

Sizewell C Two Village Bypass – Biodiversity Metric Calculations

Habitat type	UK habs/ broad habitat	UK habs/habitat type	Area (ha)	Habitat scenario for creation	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Time to target condition	Difficulty	Biodiversity units
No access – hardstanding	Urban	Developed land; sealed surface	0.06	Retention	V. Low	N/A - Other	N/A	Area/compensation not in local strategy/ no local strategy	N/A	N/A	0.00
Hardstanding	Urban	Developed land; sealed surface	9.08	Creation	V. Low	N/A - Other	N/A	Area/compensation not in local strategy/ no local strategy	0	Low	0.00
Grassed embankments /cuttings*	Grassland	Modified grassland	4.96	Creation	Low	Poor	Low	Area/compensation not in local strategy/ no local strategy	1	Low	9.57
Proposed planting*	Woodland and forest	Other woodland; broadleaved	1.59	Creation	Medium	Moderate	Low	Area/compensation not in local strategy/ no local strategy	30	Medium	2.93
Grassed areas*	Grassland	Other neutral grassland	12.84	Creation	Medium	Moderate	Low	Area/compensation not in local strategy/ no local strategy	10	Low	71.93
Infiltration basin*	Urban	Sustainable urban drainage feature	0.96	Creation	Low	Good	Medium	Area/compensation not in local strategy/ no local strategy	5	Medium	3.55
Swale*	Urban	Bioswale	0.46	Creation	Low	Moderate	Medium	Area/compensation not in local strategy/	1	Medium	1.31

Sizewell C Two Village Bypass – Biodiversity Metric Calculations

Habitat type	UK habs/ broad habitat	UK habs/habitat type	Area (ha)	Habitat scenario for creation	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Time to target condition	Difficulty	Biodiversity units
								no local strategy			
Arable	Cropland	Cereal crops	16.66	Creation	Low	N/A - Agricultural	Low	Area/compensation not in local strategy/ no local strategy	1	Low	32.15
Species-poor semi-improved grassland	Grassland	Modified grassland	5.00	Creation	Low	Poor	Low	Area/compensation not in local strategy/ no local strategy	1	Low	9.65
Improved grassland	Grassland	Modified grassland	3.83	Creation	Low	Poor	Low	Location ecologically desirable but not in local strategy	1	Low	8.13
Tall ruderal	Sparsely vegetated land	Ruderal/Ephemeral	0.22	Creation	Low	Moderate	Low	Area/compensation not in local strategy/ no local strategy	3	Low	0.79
Scattered scrub	Heathland and shrub	Mixed scrub	0.02	Creation	Medium	Poor	Low	Area/compensation not in local strategy/ no local strategy	1	Low	0.08
Dense scrub	Heathland and shrub	Mixed scrub	0.02	Creation	Medium	Fairly Poor	Low	Area/compensation not in local strategy/ no local strategy	2	Low	0.11

Sizewell C Two Village Bypass – Biodiversity Metric Calculations

Habitat type	UK habs/ broad habitat	UK habs/habitat type	Area (ha)	Habitat scenario for creation	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Time to target condition	Difficulty	Biodiversity units
Semi-natural broadleaved woodland	Woodland and forest	Lowland mixed deciduous woodland	0.01	Creation	High	Fairly Good	Medium	Location ecologically desirable but not in local strategy	32+	High	0.02
Amenity grassland	Urban	Amenity grassland	0.23	Creation	Low	Fairly Poor	Low	Area/compensation not in local strategy/ no local strategy	2	Low	0.64
Broadleaved scattered trees	Woodland and forest	Wood-pasture and parkland	0.12	Creation	High	Fairly Good	Medium	Location ecologically desirable but not in local strategy	32+	Very High	0.07
No access, but appears to be pasture	Grassland	Modified grassland	0.05	Creation	Low	Fairly Poor	Medium	Area/compensation not in local strategy/ no local strategy	5	Low	0.14
No access – semi-natural broadleaved woodland	Woodland and forest	Lowland mixed deciduous woodland	0.1	Creation	High	Fairly Good	Medium	Area/compensation not in local strategy/ no local strategy	32+	High	0.17
Totals			57.45								150.02

*Habitats from the post-development plans (shown in Figures 2.1-2.4 in Chapter 2) that differ from Phase 1 typologies.

Sizewell C Two Village Bypass – Biodiversity Metric Calculations

Table 12: Biodiversity units for Sizewell C Two village bypass from hedgerows post-development

Hedgerow type	Length (km)	Habitat scenario for creation	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Time to target condition	Difficulty	Habitat units
Native Species Rich Hedgerow with trees - Associated with bank or ditch	0.347	Retained	High	Good	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	6.87
Native Species Rich Hedgerow with trees	0.060	Retained	Medium	Good	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	0.79
Native Hedgerow with trees	0.288	Retained	Low	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	1.27
Native Hedgerow	0.123	Retained	Low	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	0.54
Native Species Rich Hedgerow - Associated with bank or ditch	0.068	Retained	High	Good	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	1.35
Native Hedgerow with trees - Associated with bank or ditch	0.189	Retained	Medium	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	1.66
Native Hedgerow - Associated with bank or ditch	0.033	Retained	Medium	Poor	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	0.15
Native Hedgerow	0.985	Retained	Low	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	N/A	N/A	4.33
Native Species Rich Hedgerow with trees	5.209	Created	Medium	Moderate	Medium	Area/compensation not in local strategy/ no local strategy	10	Medium	21.51
Native Species Rich Hedgerow with trees	0.127	Created	Medium	Good	Medium	Area/compensation not in local strategy/ no local strategy	20	Medium	0.55
Total	7.43								39.02

5 CHANGES IN BROAD HABITAT TYPES

The development will result in changes to the amount and quality of the habitats on the site. The UK habitat classification system used within the metric contains a tiered system, grouping similar habitats into “Broad habitats” and more specific “Habitat types”. For example, “Grassland” is a “Broad habitat”, that can contain “Other lowland acid grassland” and “Other neutral grassland”, among others. The area and biodiversity unit changes in these broad habitat types are shown in Table 13 and

Table 14.

The highest value habitats, woodland and forest and grassland, are increasing in area. Despite the increase in area, a reduction in the biodiversity units associated with woodland and forest is predicted. This is due to the penalty paid in the metric to create woodland as the habitat is difficult to create and takes time to develop. Cropland is considered to be the least valuable habitat and therefore the most acceptable habitat to lose for this scheme. As a result, reductions in the area of cropland is predicted. For the remaining habitats only small changes in area and units are predicted.

Table 13: The changes in the total areas of the broad habitat types

Broad habitat type	On-site baseline	On-site post-development	Change in area
Cropland	37.92	16.66	-21.26
Grassland	13.47	26.68	13.21
Heathland and shrub	0.11	0.04	-0.07
Lakes	0.17	0.07	-0.1
Sparsely vegetated land	0.55	0.22	-0.33
Urban	3.58	11.52	7.94
Woodland and forest	1.65	2.26	0.61

Table 14: The changes in the total biodiversity unit values of the broad habitat types

Broad habitat type	On-site baseline	On-site post-development	Change in biodiversity units
Cropland	75.84	32.15	-43.69
Grassland	27.03	99.42	72.39
Heathland and shrub	0.52	0.19	-0.33
Lakes	0.75	0.31	-0.44
Sparsely vegetated land	2.20	0.79	-1.41
Urban	1.76	6.34	4.58
Woodland and forest	25.19	10.81	-14.38

6 AREAS EXCLUDED FROM ASSESSMENT

No statutory designated sites or 'irreplaceable' habitats were present within the site, so no areas were excluded from the assessment.

7 SUMMARY

The summary results of the assessment, using the Biodiversity metric 2.0 calculator are presented in Plate 2. 2 below.

Plate 2. 2: Summary results

On-site baseline	<i>Habitat units</i>	133.29
	<i>Hedgerow units</i>	33.93
	<i>River units</i>	0.00
On-site post-intervention (Including habitat retention, creation, enhancement & succession)	<i>Habitat units</i>	150.02
	<i>Hedgerow units</i>	39.02
	<i>River units</i>	0.00
Off-site baseline	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Off-site post-intervention (Including habitat retention, creation, enhancement & succession)	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Total net unit change (including all on-site & off-site habitat retention/creation)	<i>Habitat units</i>	16.73
	<i>Hedgerow units</i>	5.09
	<i>River units</i>	0.00
Total net % change (including all on-site & off-site habitat creation + retained habitats)	<i>Habitat units</i>	12.55%
	<i>Hedgerow units</i>	15.01%
	<i>River units</i>	0.00%

Under current plans, a 12.55% increase in biodiversity units and 15.01% increase in hedgerow units is predicted.

The changes in the area and biodiversity units of each broad habitat type are shown in Table 15. Only cropland is predicted to undergo a large decrease in area. Grassland is predicted to show increases in both area and biodiversity units. The remaining habitats show small changes in areas and biodiversity units, with the exception of woodland and forest. This broad habitat type is predicted to show reductions in biodiversity unit values, despite a predicted increase in area. This is due to the penalty paid due to the difficulty of creating woodland. Cropland is considered to be the least valuable habitat and therefore the most acceptable habitat to lose for this scheme. As a result, the largest losses are in cropland.

Table 15: Changes in area and biodiversity units of broad habitat types

Broad habitat type	Change in area	Change in biodiversity units
Cropland	-21.26	-43.69
Grassland	13.21	72.39
Heathland and shrub	-0.07	-0.33
Lakes	-0.1	-0.44
Sparsely vegetated land	-0.33	-1.41
Urban	7.94	4.58
Woodland and forest	0.61	-14.38

8 DEVELOPMENT OVERVIEW RESULTS

The results of this assessment can be considered within the context of the portion of the development that has been assessed using the Biodiversity metric (i.e. main development site and three of the AD sites). These AD sites were chosen for assessment via the metric as they were considered to have potential for permanent habitat loss. Table 16 shows the changes in biodiversity units for each of these assessed sections. An increase of 289.56 units is predicted across these main development site and associated developments, corresponding to an approximate 18% net gain. This net gain demonstrates that the portion of the development that has been assessed using the biodiversity metric, is predicted to have a positive impact on the biodiversity value of the Sizewell area.

Table 16: Overview of entire development results

Site	Baseline units	Change in units	Percentage change
Main development site	1265.25	129.03	10.20%
Two village bypass	133.29	16.73	12.55%
Sizewell Link Road	227.28	143.98	63.35%
Yoxford roundabout	5.55	-0.18	-3.24%
Net	1631.37	289.56	17.75%

9 CONCLUSION

Under current proposals it is estimated that there is a predicted increase in biodiversity unit values for habitats of 12.55%, and an increase in hedgerow unit values of 15.01%. The large increase in hedgerow units is largely due to the quantity of on-site hedgerows approximately doubling from 3.79km in the baseline to a predicted 7.43km.

In addition to the Two Village Bypass, the main development site and a series of other off-site associated developments were also assessed via the biodiversity metric (Sizewell Link Road and Yoxford Roundabout) and these are presented in separate reports. These sites were chosen for assessment via the metric as they were considered to have potential for permanent habitat loss. When considered as a whole there is predicted to be an approximate 18% increase in biodiversity net gain across the main development site and three associated developments.

An increase in area is predicted for the most valuable habitats on the site; grassland and woodland and forest. An increase in the biodiversity unit value of grassland is also predicted. Cropland is predicted to undergo reductions in area and unit value. However, as a habitat of low value, this was seen as the most acceptable habitat to replace.

The achievement of these units scores is reliant upon achieving the target condition for created habitats, which will require creation and management plans.

It is recommended that post planning, additional surveys are undertaken at an appropriate point in the planning process to update this report and to inform the necessary detailed design, habitat creation and management plans.

10 REFERENCES

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VOLUME 5, CHAPTER 7, APPENDIX 7A:

ANNEX 7A.5 - DRAFT PROTECTED SPECIES LICENCE

APPLICATIONS:

- ANNEX 7A.5A BADGER METHOD STATEMENT
(CONFIDENTIAL, provided separately)
- ANNEX 7A.5B WATER VOLE METHOD STATEMENT



VOLUME 5, CHAPTER 7, APPENDIX 7A: ANNEX 7A.5B
WATER VOLE METHOD STATEMENT

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1. Water Vole License Method Statement

1.1 Introduction

1.1.1 SZC Co is proposing to build a new nuclear power station at Sizewell in East Suffolk, known as Sizewell C. Located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

1.1.2 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.3 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction and a series of off-site associated development sites in the local area including:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the ‘northern park and ride’), and one to the south-west at Wickham Market (the ‘southern park and ride’) to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;
- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the ‘two village bypass’) to alleviate traffic on the A12 through the villages;

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- A permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’) to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’) and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site;
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site (‘the green rail route’) and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network; and
- Green rail route extension and rail improvements to the Saxmundham to Leiston branch line.

1.1.4 The components of the Project listed above are referred to collectively as the ‘Sizewell C Project’.

1.1.5 This water vole draft licence method statement is compiled in relation to the works related to the two village bypass only. Where required, mitigation and avoidance measures proposed in relation to the other aspects of the project are provided in support of the ES Chapters related to those components of the project.

1.1.6 Arcadis Consulting (UK) Limited (hereafter referred to as ‘Arcadis’) has been commissioned to write the prescriptions of this licence on behalf of the applicant (SZC Co).

1.1.7 A suitably qualified contractor will lead the delivery of the prescriptions of this water vole licence on behalf of the applicant (SZC Co).

1.1.8 This report presents methods to mitigate potential impacts on water vole (*Arvicola amphibius*) populations present within the two village bypass site. The purpose of this document is to provide a Method Statement for Water Vole displacement that can be used by SZC Co and any competent subcontractors, in relation to the proposal to build the two village bypass. See Figure 7A-5A.1 for construction areas and site layout respectively.

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1.1.9 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

a) **Description of the proposed works**

1.1.10 The two village bypass site is approximately 54.8 hectares (ha), and would be located to the south and south-east of Stratford St. Andrew, and to the south-west to south-east of Farnham (presented in Figure 7A-5A.1).

1.1.11 The proposed development would comprise a new permanent two-lane single carriageway road that would depart the A12, creating a new route around the south of Farnham and Stratford St Andrew, before re-joining the A12 east of Farnham.

1.1.12 Once operational, the two village bypass would be open to construction traffic associated with the construction of the Sizewell C project as well as to the general public. The proposed development would reduce the volume of construction traffic traveling through Farnham and Stratford St Andrew. As the proposed development is permanent, once construction of Sizewell C is completed, it will remain open for general use by the public and would provide legacy benefit to the residents of Farnham and Stratford St Andrew.

1.1.13 Two components of the bypass construction have the potential to impact upon water vole, the River Alde overbridge and the installation of any required flood mitigation areas. These are detailed below.

- Proposed River Alde overbridge:
 - The crossing of the River Alde would comprise an overbridge, 60m in length, and 7.5m in height. This would preserve the natural integrity of the banks of the river, bed and bankside and minimise shading effects and is of sufficient size and capacity to enable passage for otters and water vole to be maintained during construction and operation. The layout of the overbridge is presented in 7A-5A.4.
 - Flood arches would be within the embankment. Where these flood arches channel a water course, an otter ledge would be installed, if required, to allow passage at times of high flows. Fencing would be incorporated to guide otters to the crossing point.

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- Existing drains from the adjacent fields would be culverted so that their use would continue unchanged. Field drains located at the western end of the bypass, either side of the proposed River Alde embankment, would be diverted along the base of the embankment to the River Alde where possible.
- Flood mitigation areas
 - Any required flood compensation areas would comprise reprofiled topography within or at the edge of the River Alde floodplain; in defining their exact location and design, SZC Co would seek to minimise impacts to ditches and watercourses and so avoid interfering with suitable water vole habitats. A buffer distance of 10m would be maintained during construction and operation with the toe¹ of the bank of the River Alde and ditches, where feasible, to protect the integrity of the banks as well as the associated ecological features.
 - However, there may be the requirement to clear vegetation around the River Alde and install new or divert existing field drains in relation to the flood compensation areas.

b) Purpose of the works

- 1.1.14** During targeted surveys, numerous water vole field signs, including burrows, droppings, latrines and feeding signs were found along the River Alde (referred to as Ditch 1) located within the two village bypass site. This feature was found to support water vole populations indicative of a low population (survey results presented in 7A-5A.2). Water vole are protected under Schedule 5 of the W&CA (Ref 1.1), and are included under Section 41 of the NERC Act (Ref 1.2).
- 1.1.15** Water vole habitat has the potential to be impacted due to the construction of a bridge across the River and creation of flood compensation areas.
- 1.1.16** As a result, this licence is required to permit the project to proceed without triggering an offence under wildlife legislation.

c) Proposed licensable activities

- 1.1.17** Displacement activities are proposed under this draft Method Statement for Water Vole to mitigate potential impacts on water vole in relation to the proposal to build the two village bypass.

¹ The toe of the bank is defined as the area of the bank at, and immediately above, water level.

d) **Planning status**

1.1.18 The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

e) **Compliance with best practice**

1.1.19 Survey methodology, displacement techniques and monitoring requirements all comply with the guidance as set out in the latest Water Vole Mitigation Handbook by Dean et al. 2016 (Ref 1.3).

1.1.20 The appointed contractor should be members of the Chartered Institute of Ecology and Environmental Management (CIEEM) at the appropriate level and follow their code of professional conduct when undertaking ecological work.

f) **Structure of report**

1.1.21 This Draft Water Vole Method Statement has been set out as follows:

- Section 1: Background Information.
- Section 2: Site Information and Survey: provides a description of the results of the water vole surveys conducted on the application site
- Section 3: Impact Assessment before mitigation or compensation: likely impacts of the development: provides an assessment of the impacts of the works at the application site on water vole in the absence of any mitigation.
- Section 4: Mitigation Strategy: presents a methodology and timing schedule of the proposed mitigation for water vole on the application site.
- Section 5: Compensation
- Section 6: Monitoring and Management provides a description of the proposed monitoring of the impacted water vole population and maintenance of any associated ecological features; and.
- Section 7: Timetable.
- Section 8: Project Plan for Conservation Gain

- Appendices:
 - Appendix A: Figures.
 - References.

1.1.22 The layout of the two village bypass site is shown in Figure 7A-5A.1.

1.2 Site information and survey results

a) Introduction

1.2.1 This section briefly outlines the results of surveys conducted on the application site in 2019 (Figure 7A-5A.2) and updated surveys in XXXX [To be updated in due course].

b) Previous survey effort

1.2.2 Habitat suitable to support water vole is present within the site boundary. Surveys for water vole were completed in June, August and September 2019. The results of these surveys are presented in Annex 7A3 of the two village bypass Environmental Statement. A total of 19 ditches were surveyed within the site boundary and surrounding areas.

c) Previous survey results

1.2.3 Numerous water vole signs were recorded within the site boundary including burrows, latrines and feeding signs. These signs were found within Ditch 1 (the River Alde, centred on TM 358 593) and Ditch 12 (a drainage ditch centred on TM 358 598). Ditch 12 would not be impacted by the proposed works.

1.2.4 Within Ditch 1, five latrines were observed within a 350m stretch of the river. This is indicative of a small water vole population.

d) Updated survey results

1.2.5 The sections of all water bodies where impacts are foreseen and a 50m area upstream and downstream were surveyed in 2019. A summary of the results of the survey and an assessment of the potential density of the water vole populations are provided in Table 1.1. See Figure 7A-5A.3 for updated results [to be completed in due course].

Table 1.1: Update Results of Water Vole Surveys

Ditch/Pond Reference	OS Grid Reference	Frequency of Water Vole Activity Signs and Observations	Assessment of Potential Population Density
Ditch1 (River Alde)			

1.3 Impact assessment (before mitigation or compensation)

a) Introduction

1.3.1 This Section describes potential impacts of the two village bypass on water voles.

1.3.2 The surveys conducted at the site showed that the works could have an impact upon water vole and their habitats, namely the low population associated with Ditch 1 (the Rive Alde).

b) Habitat loss (Permanent)

1.3.3 Once the construction of the bypass is completed, any impacted areas will be reinstated. There will be no significant loss of habitat in Ditch 1 once the works are completed and vegetation has recolonised the site. The protection and reinstatement of these areas is outlined in more detail in **Volume 5 Chapter 7** of the ES.

c) Habitat impacts (Temporary)

1.3.4 The water vole population within Ditch 1 would could potentially experience temporary impacts to foraging habitat and destruction of burrows in areas immediately adjacent to the ditch.

1.3.5 Table 1.2 shows the size (area for reedbeds and ponds, length for ditches) of water vole habitat which is likely to be impacted due to the construction footprint. This is a maximum value which will be refined as construction plans are further developed, and further water vole survey work (to support any future Natural England derogation licence) is carried out.

Table 1.2: Components of water vole habitat to be temporarily impacted

Location	Length/area to be temporarily impacted	Reason for impact
Ditch 1	<50m	Impacts from bridge installation and drainage installation to create flood compensation areas.

1.3.6 As impacts from loss of habitat are not permanent or considered significant, no further consideration of this impact pathway is considered necessary.

d) **Habitat fragmentation**

1.3.7 There is not considered to be any significant impact upon the habitat connectivity during either the construction or operational phase of the development. No further consideration of this impact pathway is considered necessary.

e) **Incidental mortality and disturbance of burrows**

1.3.8 Water vole use a series of burrows with many entrances and interconnecting tunnels. They also occasionally build woven nests in the bases of sedges and reeds. Outside of their burrows, water vole activity is largely confined to runs in dense vegetation with 2-5m of the water's edge.

1.3.9 There is the potential for incidental injury or mortality to water vole from construction plant carrying out vegetation and ground clearance works, necessary to install the river Alde crossing over Ditch 1 and install drainage features associated with the flood compensation areas. Water vole would be particularly vulnerable when they are in their burrows.

1.3.10 This licence application is primarily associated with impacts to disturbance of water vole burrows and the potential for indirect mortality to occur.

1.4 **Mitigation strategy**

a) **Introduction**

1.4.1 This section outlines the selected mitigation strategy for water vole, a justification of why this strategy was chosen and an explanation of how this strategy will be implemented at the application site.

1.4.2 In summary, this draft Water Vole Method Statement involves:

- Preventing incidental mortality through displacement of water voles from the works areas;
- Displacement techniques and monitoring requirements are proposed with a maximum working area with maximum length of 50m (for watercourse this equates to 50m on each bank).
- Reinstatement of impacted areas after the works are completed.

- Improving the conservation status of water voles through habitat creation;
- Pre works, during works and post-construction monitoring of water vole populations will occur to ensure success of the mitigation approach.

1.4.3 All works that have the potential to impact water vole will be undertaken under licence from Natural England following an agreed Method Statement and would be overseen by an Ecological Clerk of Works (ECoW).

b) Displacement overview

1.4.4 In England, activities aimed at displacing water vole in the context of a development project have previously been routinely undertaken without a licence, with reliance on the ‘incidental result’ defence. It is now considered that such activities are not covered by this defence, and therefore require a licence. The development project must deliver a net benefit for water vole because the licence would be issued for the purpose of conservation.

1.4.5 Displacement will be used as the method for preventing incidental mortality. It is considered that the likely impacts of the project fall within the recommended restrictions of the project. According to the best practice guidelines (Ref 1.3) displacement can be employed under the following circumstances (the project response is listed below in italics):

- where there is a working area with a maximum length of 50m (for watercourses this equates to 50m on each bank), although a shorter maximum length would be appropriate in situations where water vole are at high density;

The works impacting upon Ditch 1 are each less than 50m in length. The water vole population is low.

- works are conducted between 15 February and 15 April inclusive (although some seasonal variation is accepted depending on weather and geographical location); and

The project is proposing to conduct the displacement in this time period

- where there is sufficient available alternative habitat for water vole to move into

Extensive areas of water vole habitat are available both upstream and downstream of any areas of impact.

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c) Displacement and destructive search methodology

1.4.6 Areas where impacts to water bodies supporting water vole are foreseen, displacement will be conducted followed by a destructive search. The protocol for this displacement and destructive search is presented below.

1.4.7 The following steps are taken from Dean et al. 2016 (Ref 1.3).

Table 1.3: Destructive search protocol

Step	Action
1	Before vegetation removal, identify and mark the position of all burrows in the working area so that these can be located later to ensure that they are not blocked. Confirm the absence of other constraints to the works, such as nesting birds.
2	Remove vegetation on the bank face within the area subject to development works, plus at least an additional 3m either side of the working area, and on the bank top (i.e. at least 3m back from the bank). This would be achieved using a strimmer until only bare earth remains. If feasible, also cut the emergent aquatic vegetation located along the water margin to below water level.
3	Rake off and remove any arisings from the cleared area.
4	Check that burrow entrances have not become blocked and remove any latrines or feeding remains.
5	If feasible and environmentally acceptable, combine with de-watering of the affected section of watercourse.
6	Leave the strimmed area intact for five days to allow animals time to relocate.
7	Re-survey the site for fresh evidence of water vole. If there is no evidence that water vole are still present, undertake a destructive search of the burrows (under the supervision of a suitably experienced ecologist) as follows.
7	a Excavate burrows to ensure that no animals are present. Hand tools would preferably be used, and excavation would extend as far as possible, bearing in mind practical health and safety constraints.
7	b Using an excavator with a toothed bucket, rake through the turf and topsoil on the bank face and top on the side that the excavator is positioned. Then with a second or third sweep of the bucket, remove the turf and topsoil to a depth beyond which any burrows would be present.
7	c Remove in-channel vegetation within 50cm of the toe of the bank to prevent regrowth.
7	d Smooth the surface of the bank using an excavator with a ditching bucket (or the back of the toothed bucket). Ensure that any lumps of topsoil that might provide a refuge for water vole are removed.

Step	Action
7	e Repeat the process for the opposite bank (if necessary).
8	<p>Ensure that water vole do not return prior to the development works commencing by:</p> <ul style="list-style-type: none"> • undertaking the works within five days of completing the destructive search; or • in-filling the channel immediately following the destructive search; or • maintaining the works area as bare ground until the works have taken place. This is likely to require a repeat scraping/smoothing of the banks; or • covering the ground with a suitable matting to ensure that vegetative regeneration cannot occur; or • installing suitable water vole resistant fencing to prevent water vole returning.

1.4.8 The project, if a licence is obtained, will conduct the displacement and destructive search as outlined within this report.

1.4.9 If monitoring after the displacement but prior to the destructive search finds evidence of water vole, steps 1 – 6 will need to be repeated. It is considered extremely unlikely that trapping would be required in relation to the project due to the small areas impacted by the works.

1.4.10 During destructive search the excavator will work in the direction that the water vole are being encouraged to move (towards retained habitat of good quality for water vole).

1.4.11 It is not foreseen that there will be any necessity to capture water vole by hand as a component of the works.

1.4.12 Throughout the construction period there will be monthly monitoring of active works areas along Ditch 1 to ensure that water voles have not recolonised these areas.

d) Works timetable

1.4.13 Table 1.4 outlines the indicative timescale for the licensable activities.

Table 1.4: Works timetable

Activity	Timeframe	Notes
Displacement as outlined in Table 1.3	TBC	
Destructive search as outlined in Table 1.3	TBC	To be conducted immediately following displacement

Activity	Timeframe	Notes
Construction period including installation of Alde River crossing and any Flood Compensation areas	TBC	Monitoring of the impacted areas to ensure that water voles have not recolonised will occur monthly throughout this period
Reinstatement of works areas to allow recolonization of vegetation to occur	TBC	Immediately following construction completion
Creation of new infiltration basins.	TBC	
Check of status of water voles in impacted works areas, status of habitat recolonization and status of habitat created in the infiltration basins	Annually until all targets are met	

1.5 Project plan for conservation gain

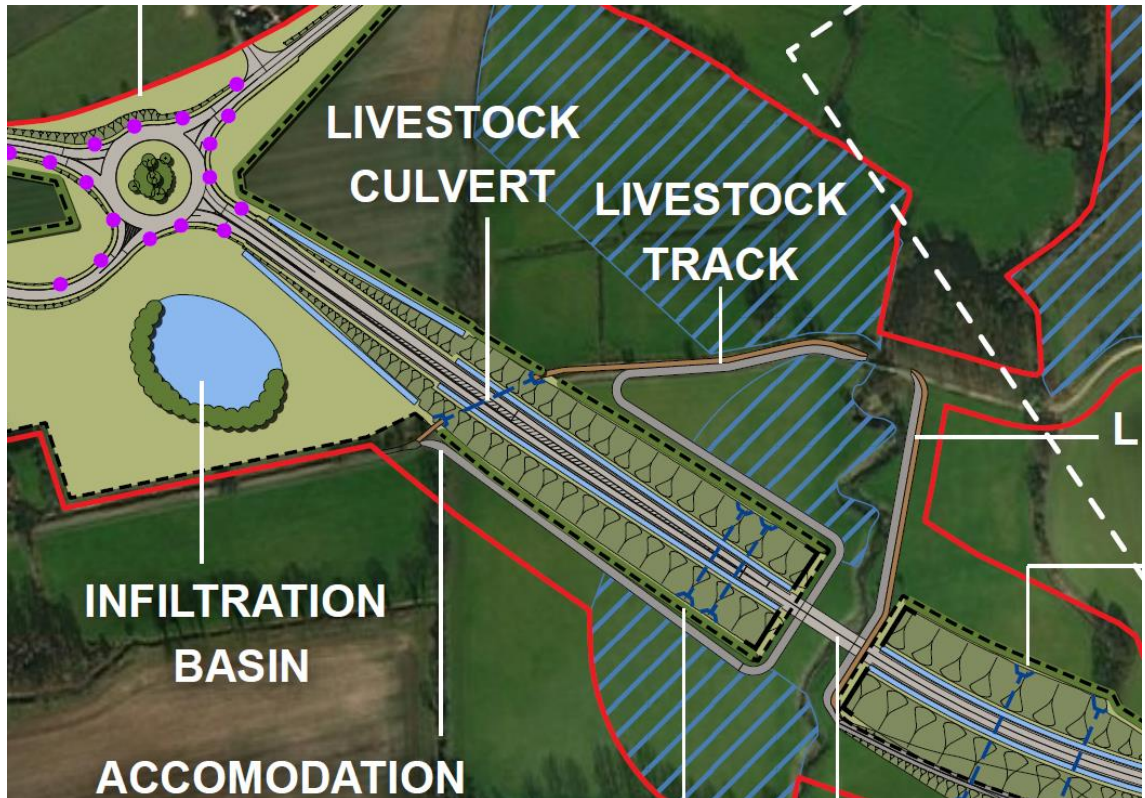
a) Net conservation gain

- 1.5.1 Macpherson & Bright (Ref 1.4) considered the landscape approach to water vole conservation. They demonstrated, from population modelling, the importance of creating (through habitat creation/restoration of large reedbeds and grazing marsh sites) ‘patches’ of core water vole habitat which can sustain water vole metapopulations in the surrounding landscape where conditions are less favourable.
- 1.5.2 The River Alde (‘Ditch 1’) provides an excellent water vole habitat (see Image 1 below), having varying bank profile suitable for burrowing and dense bankside vegetation. The River Alde (‘Ditch 1’) is likely to provide a core habitat for the water vole population present in the surrounding area.

Plate 1.1: River Alde with dense bankside vegetation

- 1.5.3 Once any works which impact Ditch 1 are completed, these areas will be reinstated. Due to the close proximity of riparian vegetation, it is considered that the vegetation will recolonise promptly and planting of the impacted areas will not be necessary.
- 1.5.4 In addition, the project will create new habitats for water vole, providing a conservation gain overall.
- 1.5.5 New swales are being created throughout the new two bypass development area. Although these swales will not be designed specifically to offer habitat for water vole, and will be intermittently wet, these swales will provide corridors for movement for water vole across the landscape. An example of the location of the new swales to be created is presented in Image 2, an excerpt from Figure 7A-5A.1.

Plate 1.2: Swales proposed adjacent to the new bypass

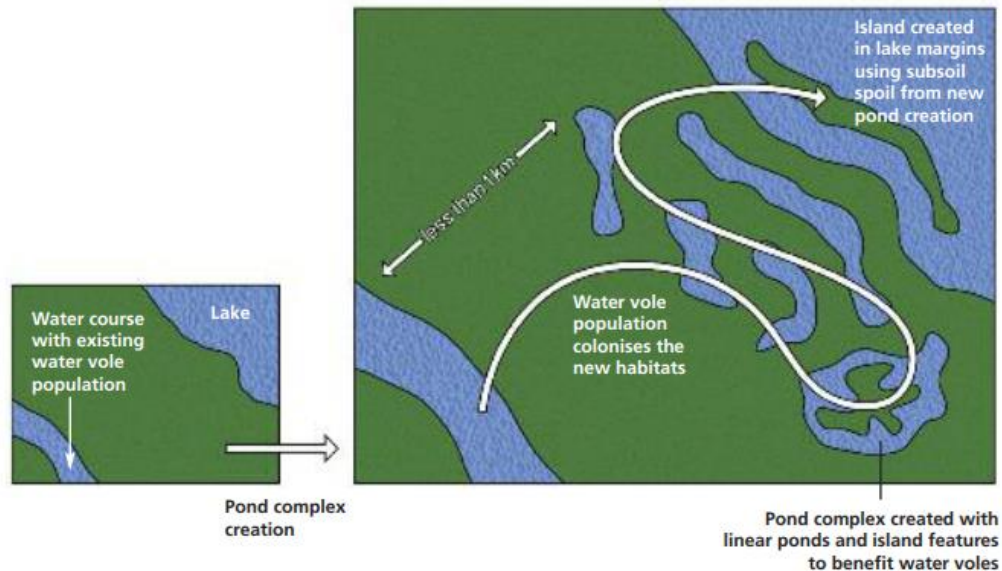


1.5.6

In addition, the swales will add complexity to the landscape, a key component of achieving successful conservation outcomes for water vole (as illustrated on Image 4). These features would provide the following enhancements for water vole within the landscape (as outlined within the Million Ponds Project Guidance 2010 (Ref 1.6) and The Water Vole Conservation Handbook (Ref 1.5).

- Extend or link existing water vole colonies, helping to encourage spread, increase the size of populations and enhance chance of colony survival.
- Add complexity to wetland landscapes, helping to confound hunting mink, which can eradicate water vole populations along simple linear features such as river banks.
- Provide a refuge for water vole during flood conditions, in particular ponds not connected to water courses.

Plate 1.3: Excerpt from Creating Ponds for Water Vole from the Million ponds project 2010 (Ref 1.6) showing how adding complexity is key to providing habitat for water vole



1.5.7 In summary, overall the project will provide a conservation gain for water vole, through minimising impacts from the River Alde crossing and any outflows impacting upon the ditches and providing an increase in water vole habitat in the vicinity of the River Alde.

1.5.8 In the event that flood compensation areas are determined to be required, the opportunity would be taken to create additional surface water features of value to water voles within these areas, subject to suitable ground conditions.

1.6 Monitoring and management

1.6.1 A regular monitoring programme, both during and after construction, would be required to:

- assess the effectiveness of the mitigation; and
- provide early warning of any changes in the population so that appropriate action can be taken.

1.6.2 This would ensure sure there is no short- or long-term impact on the water vole populations.

1.6.3 Monitoring would be undertaken at areas of impact upon Ditch 1, and 50 metres either side of any impact area.

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- 1.6.4 Surveys monitoring water vole signs would provide information on:
- colonisation of the reinstated areas impacted by the construction; and
 - reestablishment of suitable habitat in the impacted areas;
 - establishment of suitable habitat in the newly created infiltration ponds.
- 1.6.5 All monitoring surveys would be carried out during the breeding season (March to October) and at a time of year when field sign survey results can be compared with pre-construction survey data.
- 1.6.6 A single visit, one year after the completion of the construction project will be sufficient to fulfil the monitoring requirements for the impacts associated with the project. However, should any issues be identified during the monitoring visit (i.e. failure of habitats to establish, absence of water vole), additional visits should be conducted to ensure that these issues are addressed. Monitoring can cease once all Key Performance Indicators (KPIs) for the water vole licence have been achieved – i.e. the impacted areas have recovered a suitable vegetation community and have been recolonised by water vole and the newly created ponds have a habitat suitable for water vole.
- 1.6.7 Management of the newly created infiltration ponds will continue throughout the operational life of the project.

References

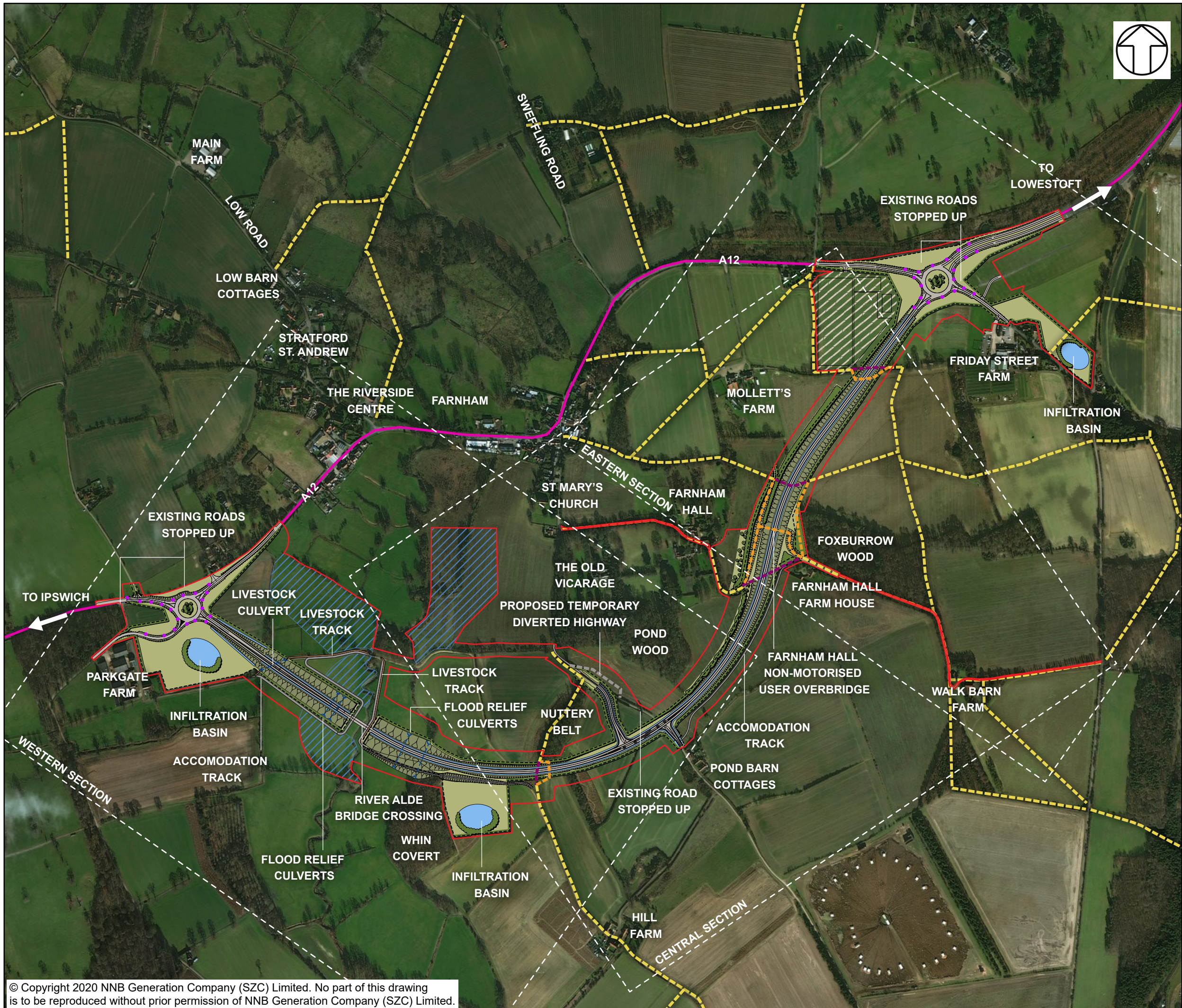
- 1.1 HMSO (1981) The Wildlife and Countryside Act 1981 (as amended) [Accessed online December 2019] <http://www.legislation.gov.uk/ukpga/1981/69>
- 1.2 HMSO (1996) The NERC Act [Accessed online December 2019] <http://www.legislation.gov.uk/ukpga/2006/16/contents>
- 1.3 Dean, M., Strachan, R. Gow, D. & Andrews, R. (2016) The Water Vole Mitigation Handbook. The Mammal Society Mitigation Guidance Series. The Mammal Society.
- 1.4 Macpherson, J. & Bright, P.W. (2011). Metapopulation dynamics and a landscape approach to conservation of lowland water vole (*Arvicola amphibius*). Landscape Ecology, 26: 1395-1404.
- 1.5 Strachan, R. Moorhouse, T. and Gelling, M (2011) Water Vole Conservation Handbook. Wild Cru.
- 1.6 Million Ponds Project (2010) Creating Ponds for Water Vole

Figures

Figure 7A-5B.1: Two villages bypass – layout overview

Figure 7A-5B.2: Results From 2019 Surveys

Figure 7A-5B.3: River Alde Overbridge Drawing



NOTES

KEY

- TWO VILLAGE BYPASS DEVELOPMENT SITE BOUNDARY
- BYPASS
- ACCOMODATION TRACK
- LIVESTOCK TRACK
- PROPOSED HIGHWAY BOUNDARY FENCE
- TEMPORARY CONTRACTOR COMPOUND
- LIGHTING COLUMNS
- GRASSED EMBANKMENTS/CUTTINGS
- PROPOSED PLANTING
- PROPOSED HEDGEROW
- GRASSED AREAS
- INFILTRATION BASIN
- SWALE
- PROPOSED CULVERT
- APPROXIMATE FLOOD COMPENSATION AREAS
- EXISTING PUBLIC RIGHT OF WAY
- PROPOSED PERMANENT DIVERTED PUBLIC RIGHT OF WAY
- PROPOSED PERMANENT STOPPING UP OF PUBLIC RIGHT OF WAY
- PROPOSED TEMPORARY DIVERTED HIGHWAY
- EXISTING A12

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DOCUMENT:
 SIZEWELL C
 TWO VILLAGE BYPASS
 WATER VOLE METHOD STATEMENT

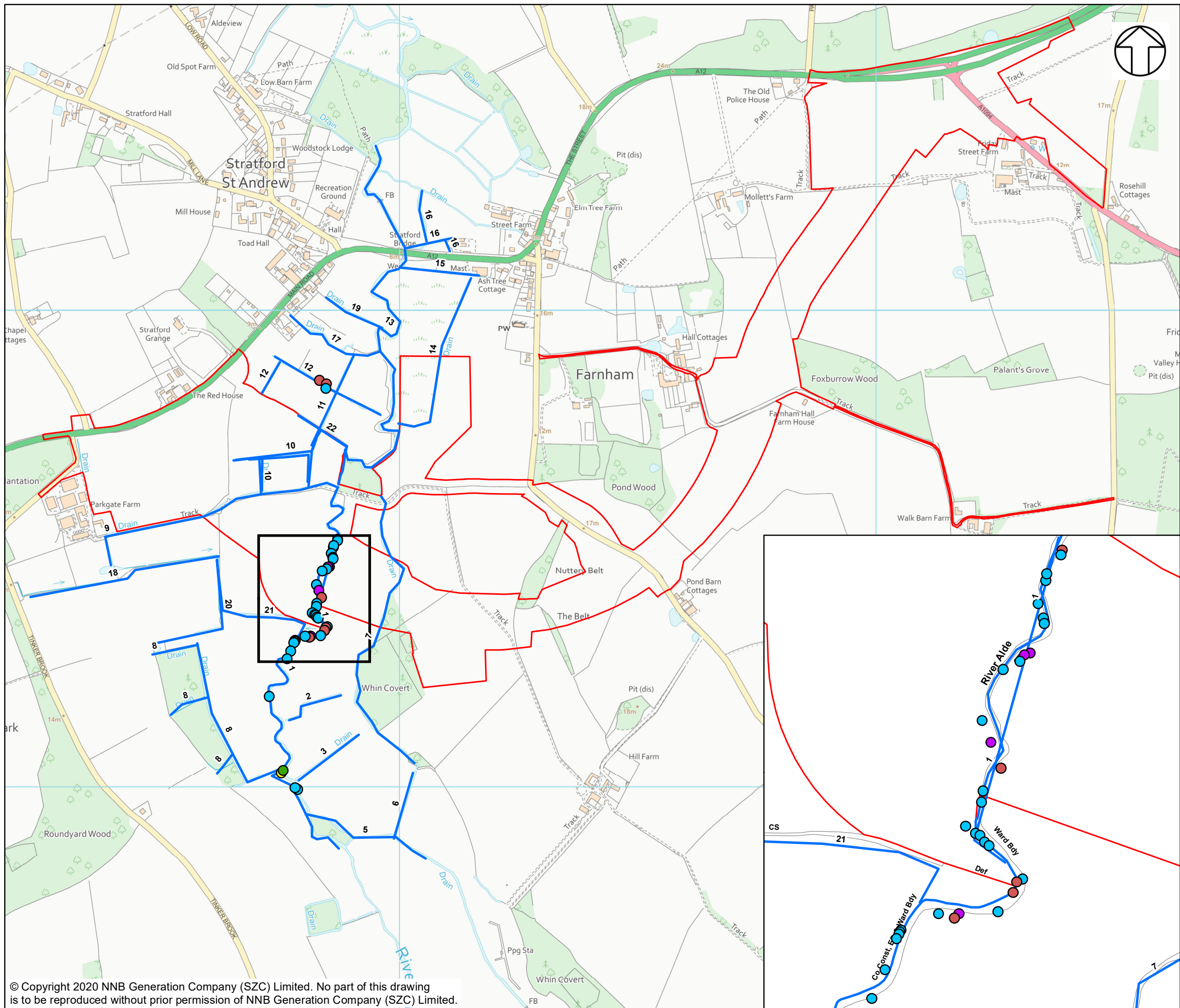
DRAWING TITLE:
 TWO VILLAGE BYPASS LAYOUT OVERVIEW

DRAWING NO.:
 FIGURE 7A-5B.1

DATE: JAN 2020 **DRAWN:** V.W. **SCALE:** 1:8,000 @A3



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NOTES

KEY

- TWO VILLAGE BYPASS DEVELOPMENT SITE BOUNDARY
- WATER VOLE FIELD SIGNS**
- BURROW
- FEEDING SIGN
- LATRINE
- SINGLE DROPPING
- OTTER FIELD SIGNS**
- FOOTPRINT
- WATERCOURSE
- 1 WATERCOURSE NUMBER

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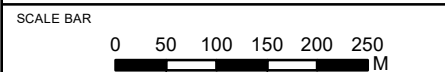


DOCUMENT:
 SIZEWELL C
 TWO VILLAGE BYPASS
 WATER VOLE METHOD STATEMENT

DRAWING TITLE:
 RESULTS FROM 2019 SURVEYS

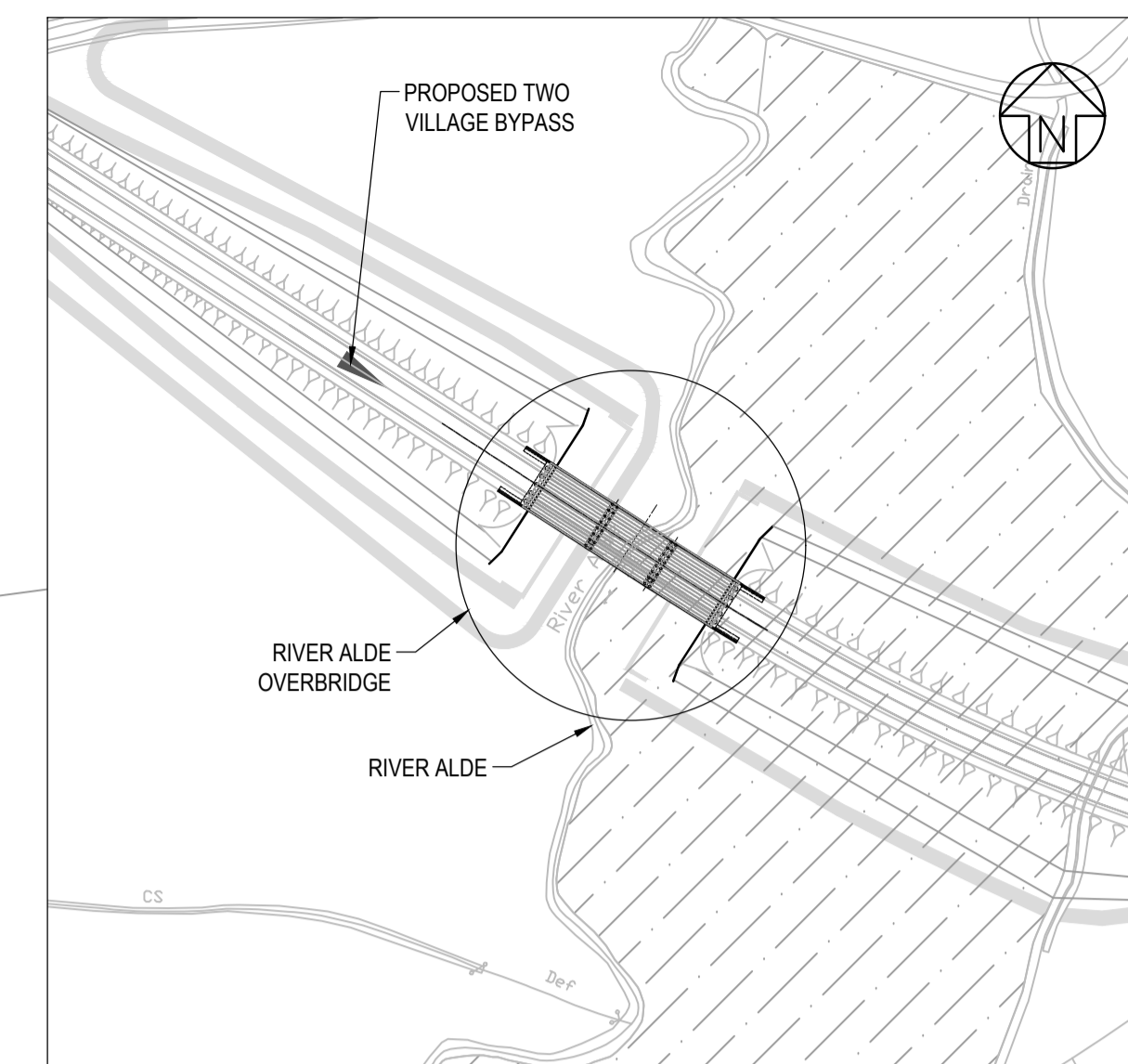
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 FIGURE 7A-5B.2

DATE: JAN 2020 **DRAWN:** R.G. **SCALE:** 1:7,500 @A3



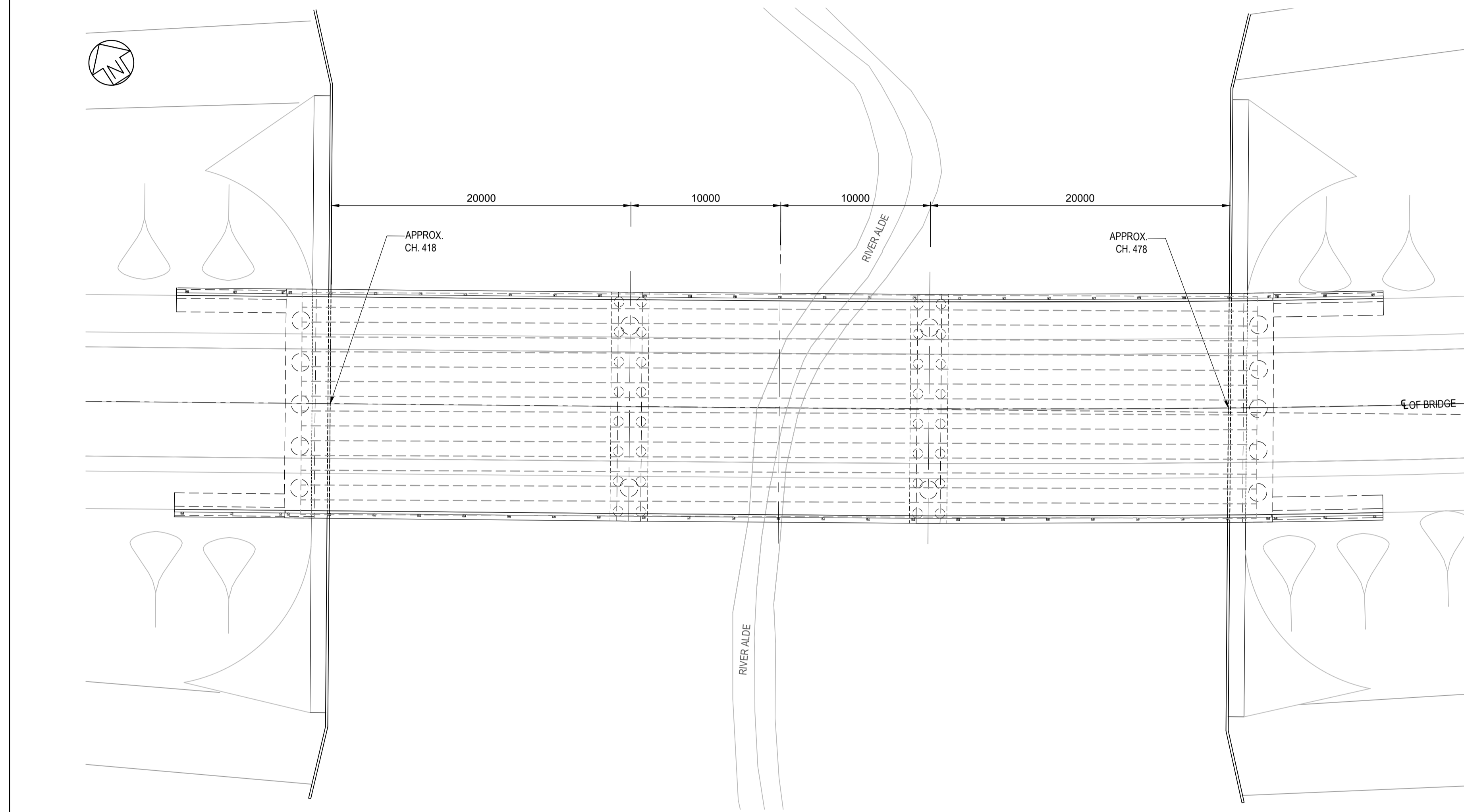
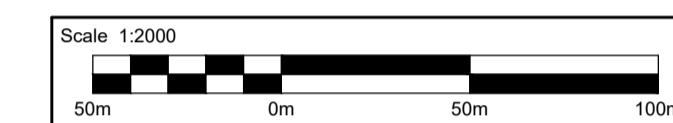
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2. THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND SHALL NOT BE USED FOR CONSTRUCTION OR ANY OTHER PURPOSE.
3. THE DEVELOPMENT SHALL BE PROVIDED AS SHOWN ON DRAWINGS, UNLESS ALTERNATIVE DETAILS ARE SUBMITTED AND APPROVED PURSUANT TO REQUIREMENT.
4. FOUNDATION DESIGN IS INDICATIVE ONLY.



LOCATION PLAN

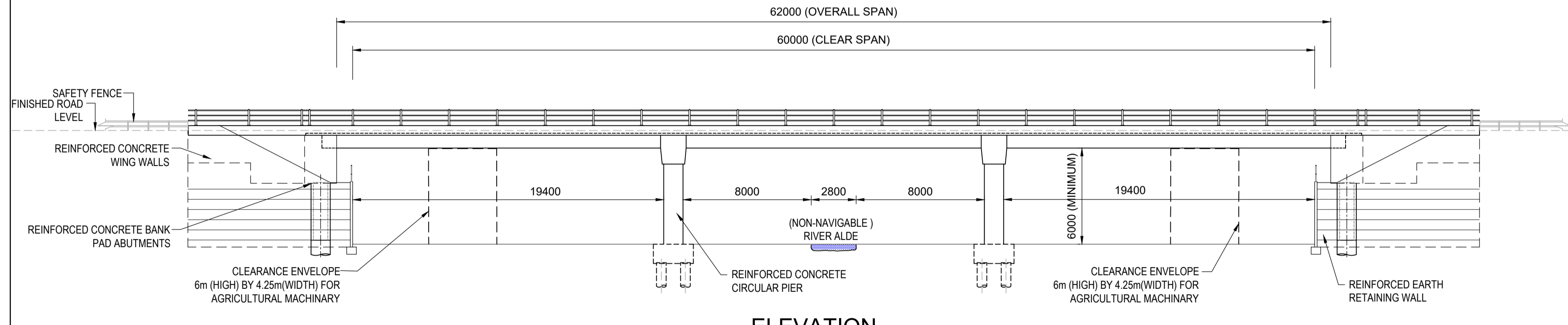
SCALE 1:2000



PLAN

SCALE 1:200

62000 (OVERALL SPAN)
60000 (CLEAR SPAN)



ELEVATION

SCALE 1:200

01	FEB 2020	KS	JL	DDO SUBMISSION	SZC CO
REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION / COMMENTS	APPROVED

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PROJECT:

SIZEWELL C

DOCUMENT:

SIZEWELL C
TWO VILLAGE BYPASS
WATER VOLE METHOD STATEMENT

DRAWING TITLE:

RIVER ALDE OVERBRIDGE
PROPOSED GENERAL ARRANGEMENT
AND ELEVATION

DRAWING NO.:

FIGURE 7A-5B.3

REVISION:

01

DATE:

FEB 2020

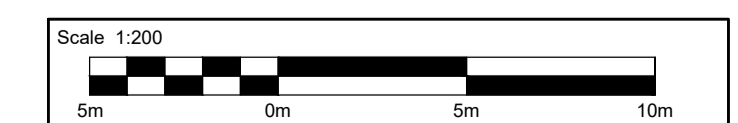
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VOLUME 5, CHAPTER 7, APPENDIX 7A:

ANNEX 7A.6 - NON-LICENSABLE METHOD STATEMENTS:

- ANNEX 7A.6A - BATS
- ANNEX 7A.6B - GREAT CRESTED NEWTS
- ANNEX 7A.6C - OTTERS
- ANNEX 7A.6D - REPTILES



VOLUME 5, CHAPTER 7, APPENDIX 7A ANNEX 7A.6A: BAT NON-LICENSABLE METHOD STATEMENT

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None provided.

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None provided.

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1 Bat Non-licensable Method Statement

1.1 Introduction

a) Background and scheme overview

1.1.1 SZC Co is proposing to build a new nuclear power station at Sizewell in East Suffolk, known as Sizewell C. Located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

1.1.2 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.3 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction and a series of off-site associated development sites in the local area including:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the ‘northern park and ride’), and one to the south-west at Wickham Market (the ‘southern park and ride’) to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;
- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the ‘two village bypass’) to alleviate traffic on the A12 through the villages;

- A permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’) to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’) and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site; and
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site (‘the green rail route’) and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network.

1.1.4 The components listed above are referred to collectively as the ‘Sizewell C Project’.

1.1.5 In order to enable the proposed development of the Two Village Bypass, as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the opportunities afforded to bats by the habitats present within the site, the proposed facilitating works have the potential to cause injury / mortality and indirect disturbance of bats that may be present. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by the ecological consultant, SZC Co and any relevant subcontractors, to ensure the safeguarding of bats during the facilitation works to be undertaken within the site.

b) **Site location and setting**

1.1.6 The Two Village Bypass (TVB) site measures approximately 54.8 hectares (ha) and is located to the south and south-east of Stratford St. Andrew, and to the south-west to south-east of Farnham. The proposed development comprises a new permanent two-lane single carriageway road that would depart the A12, creating a new route around the south of Farnham and Stratford St. Andrew, before re-joining the A12 east of Farnham.

1.1.7 Once operational, the TVB would be open to construction traffic associated with the construction of the Sizewell C project as well as to the general public. The proposed development would reduce the volume of construction traffic

traveling through Farnham and Stratford St. Andrew. As the proposed development is permanent, once construction of Sizewell C is completed, it will remain open for general use by the public and would provide legacy benefit to the residents of Farnham and Stratford St. Andrew.

1.1.8 The TVB site is dominated by arable land with field boundaries comprising native, species poor hedgerows and tree lines. The site also supports significant areas of semi-natural woodland. Scattered trees and a number of watercourses are present within the site, whilst the site also contains a number of buildings and associated areas of hardstanding. Whilst no ponds are present within the site itself, a number of waterbodies are present within the immediate 500m surrounding the site.

1.1.9 The area covered by this MS is presented in **Plate 1** below.

Plate 1: Site location



c) Proposed works

1.1.10 The purpose of the works is to create a permanent road to bypass Stratford St. Andrew and Farnham in order to alleviate the increased traffic on the A12 through the villages generated by the Sizewell C scheme.

1.1.11 The specific works covered by this method statement include vegetation clearance measures, and the lighting arrangements for the site.

1.1.12 A number of potential ecological constraints are associated with the proposed facilitating works, as are set out below.

d) **Key ecological constraints**

1.1.13 Within this site, the following are the predicted key potential legislative constraints associated with the facilitation works:

- bats;
- great crested newt;
- reptiles;
- water vole; and
- otter.

1.1.14 This method statement only covers bats, there are associated method statements and draft protected species licences for the other receptors.

1.1.15 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.2 **Site Reasonable Avoidance Measures (RAMs) method statements for Bats**

a) **Introduction**

1.2.1 This section provides a suite of dedicated RAMs Method Statements (MS) for the ecological constraints that may be encountered for bats during the facilitation works.

1.2.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality and disturbance of the protected species and avoid contravention of the relevant legislation. The ECoW will determine exactly when and where it is appropriate to apply the measures described in the RAMs MS. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.2.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) **Toolbox talk**

1.2.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (**Appendix 7A.6A.1**) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.

1.2.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.

1.2.6 There is a declaration (**Appendix 7A.6A.2**) for those present to sign to confirm they have understood the constraints and actions presented.

1.3 **Bats**

a) **Site status and potential impacts**

1.3.1 Habitats within the site boundary predominantly consist of open arable land, which is of limited value for bats. However, the site also includes habitat features such as hedgerows and blocks of woodland which provide suitable foraging, commuting and roosting habitat.

1.3.2 An assessment of trees within the woodland blocks identified 107 trees with bat roost potential (38 high potential, 42 moderate potential, 27 low potential).

1.3.3 Activity and static detector surveys recorded at least 13 bat species/species groups within the site (Natterer's, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*), serotine, barbastelle, noctule, brown long-eared, pipistrelle species, Myotis species, Nyctalus species, "big bat" and long-eared species (*Plecotus* spp). The activity surveys demonstrated that activity within the site and within adjacent habitats was

dominated by common and soprano pipistrelle with low levels of other species recorded.

1.3.4 Bats using the site are almost certainly not dependent on the sub-optimal habitats present and would also be using a range of additional habitats in the Zol. This includes the more valuable woodland blocks, external and adjacent to the site boundary.

1.3.5 The construction of the proposed development would result in the loss of primarily arable land as well as hedgerows, broadleaved woodland, and mature trees with bat potential. There would also be the loss of 51 trees with the potential to support roosting bats (18 with high potential, 18 with moderate potential, 15 with low potential). The loss of habitat would cause a reduction in foraging habitat available to bats and the loss of features suitable for bats to roost in.

1.3.6 The proposed development would result in the permanent loss of approximately 24.6ha of sub-optimal arable foraging habitat, 2.91ha floodplain grassland (better foraging habitat), 0.38ha broadleaved woodland and 1371m of hedgerow. During the construction phase there would be a temporary loss of habitat suitable to support foraging bats, this would be reinstated and new habitat planted upon the completion of the construction phase.

1.3.7 Bats are impacted by both increased noise levels and increased lighting at this site. Provided the proposed mitigation measures are implemented, no significant effects on bat populations are expected as a result of the proposed development and those habitats most suitable for bats are retained.

b) Legislation

1.3.8 All bat species in England are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (Ref 1.1) in respect of Section 9, which makes it an offence, inter alia, to:

- intentionally or recklessly kill, injure or take a bat;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place that a bat uses for shelter or protection; or
- intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.

1.3.9 The offence “recklessly” was added by the Countryside and Rights of Way Act 2000 (CRoW) (Ref 1.2).

1.3.10 All bat species in England receive further protection under Regulation 41 of The Conservation of Habitats and Species Regulations 2017 (Ref 1.4). They are listed on Schedule 2 of the Regulations, which makes it an offence, *inter alia*, to:

- deliberately capture, injure or kill a bat;
- deliberately disturb a bat, in particular any disturbance which is likely:
 - Impair their ability
 - to survive, to breed or reproduce, or to rear or nurture their young, or
 - to hibernate or migrate
 - affect significantly the local distribution or abundance of that bat species; or
- damage or destroy a breeding site or resting place of a bat.

1.3.11 Noctule (*Nyctalus noctule*), soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long-eared bat (*Plecotus auratus*) are also included on Section 41 of the NERC Act 2006 (Ref 1.3). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are ‘Species of Principal Importance for the conservation of biodiversity in England’ for which conservation steps should be taken or promoted.

c) [Toolbox talk for Bats](#)

1.3.12 Prior to commencement of the vegetation clearance works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to bats. Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by bats and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on reptiles that could occur within or in the vicinity of the working area.

d) Precautionary working methods

- 1.3.13 In order to control impacts, 15m buffer areas between the edge of the proposed development and Foxburrow Wood CWS and watercourse.
- 1.3.14 Erection of close-board fencing where the proposed development abuts woodland (such as along Whin Covert, Nuttery Belt, The Belt, Pond Wood and Foxburrow Wood CWS).
- 1.3.15 Construction lighting would be designed to minimise light spill and the potential for light disturbance on adjacent land. The lighting design for the proposed development would comply with the lighting strategy and use light fittings chosen to limit stray light. Guidance within the latest Institution of Lighting Professionals Guidance Note (Ref 1.5) would be followed as far as possible. These measures would minimise impacts on nocturnal species such as bats that may use the nearby tree lines or habitats for roosting or foraging.
- 1.3.16 In addition, although some activities may require 24 hour working, the majority of construction would take place Monday to Saturday 07:00 to 19:00 hours. This means night-time works would be avoided, which is when bats are most active. Incidental mortality associated with traffic movements would therefore not have a significant effect on the bat assemblage.
- 1.3.17 Initially all trees to be removed will be reassessed for bat roosting potential.
- 1.3.18 Any trees identified as having low bat roosting potential will be removed using a soft felling methodology with a suitability experienced, appropriately licensed, bat worker or bat worker assistant present. This is outlined below. It is recommended that trees are removed in October, thereby avoiding the sensitive maternity (April-September) and hibernation (November-February) periods for bats.
- 1.3.19 For any trees with moderate or high roosting potential, a pre works inspection for roosting bats will be undertaken. The methodology and required survey effort for these pre works checks will depend upon the status of the roosting features within the trees, but may include:
- a climbed or ground based tree inspection using an endoscope and / or torch; and
 - emergence / re-entry surveys.
- 1.3.20 Should any of the trees to be removed be found to support bat roosts, an EPS licence is likely to be required. The documents associated with this

licence will outline the required mitigation, and the required measures are not discussed further within this report.

1.3.21 If no roosts are found, the approach outlined below will be undertaken.

- All trees with PRFs should be soft felled using the following precautionary measures:
- Trees classed as having low potential to support roosting bats, shall be felled under the watching brief of the ECoW;
- Where PRFs cannot be exhaustively checked they should be section felled, with each section carefully lowered to the ground. Cuts should be made at least 50 cm beyond the extent of the potential roost feature;
- If limbs or large branches require felling, consideration should be given to cracks which may close (crushing any bats inside) once the weight of the limb has been removed. If the crack cannot be thoroughly inspected to ensure bats are not present, the crack should be wedged open prior to removal of the limb/branch;
- The stems of dense ivy should be cut at ground level at least 48 hours before the tree is felled; and
- Once the trees have been felled the potential roost features should be checked on the ground by a suitably experienced bat ecologist. If any potential roost feature can still not be exhaustively checked that section should be allowed a rest period of at least 24 hours to ensure that any individual bats that may have been missed are given the opportunity to relocate.

1.3.22 If any bats are encountered during the felling operations all works and activity must cease immediately, until the ECoW has advised on the most appropriate manner to deal with the situation.

1.3.23 All trees with PRFs should be soft felled using the following precautionary measures:

- where bat roosts have been, or are identified, the bats will be excluded under a European Protected Species Licence (EPSL) before felling;
- trees classed as having low potential to support roosting bats, shall be felled under the watching brief of the ECoW;

- where PRFs cannot be exhaustively checked they should be section felled, with each section carefully lowered to the ground. Cuts should be made at least 50cm beyond the extent of the potential roost feature;
- if limbs or large branches require felling, consideration should be given to cracks which may close (crushing any bats inside) once the weight of the limb has been removed. If the crack cannot be thoroughly inspected to ensure bats are not present, the crack should be wedged open prior to removal of the limb/branch;
- the stems of dense ivy should be cut at ground level at least 48 hours before the tree is felled; and
- once the trees have been felled the potential roost features should be checked on the ground by a suitably experienced bat ecologist. If any potential roost features can still not be exhaustively checked that section should be allowed a rest period of at least 24 hours to ensure that any individual bats that may have been missed are given the opportunity to relocate.

1.3.24 If any bats are encountered during the felling operations all works and activity must cease immediately, until the ECoW has advised on the most appropriate manner to deal with the situation.

1.3.25 To mitigate for the loss of the trees and potential roost resources, bat boxes would be installed on retained trees in suitable locations within the site boundary. One bat box would be installed per tree with moderate or high bat roost potential that is due to be lost, whether or not a roost has been identified. A variety of bat boxes would be used to support different species.

1.4 Facilitating work requirements

a) Vegetation clearance methods

1.4.1 As set out above, vegetation clearance works are required in order to facilitate the development of the site. Given that the works are to take place outside of the active bird breeding season (early March and late August inclusive), it is considered that no nesting bird checks are required prior to the commencement of works. Nevertheless, should vegetation clearance works take place within the core bird breeding season, a qualified ECoW will need to carry out a nesting bird check at least 48 hours before the commencement of works effecting the vegetation within the site. Once nesting birds have been confirmed absent, then the vegetation clearance contractors will carry out a habitat manipulation exercise in the form of a two

stage vegetation cut, with the initial cut reducing the vegetation to a height of 150mm before a second cut subsequently reduces it to ground level, with a minimum of two hours between cuts to allow reptiles or amphibians to move out of the cutting area.

- 1.4.2 Vegetation clearance which does not disturb the ground or vegetation below 150mm can be conducted year-round with a low risk of impacting upon reptiles. Any vegetation clearance likely to impact vegetation below 150mm or the removal of places of shelter/hibernation features would be undertaken outside of the reptile and amphibian hibernating period (October to February inclusive), during periods of warm, dry weather. If this is not possible, vegetation would be cut to the ground (to remove potential bird nesting habitat), but the roots would remain intact until hibernation is complete. The root system of vegetation would then be removed once the hibernation season is over. Clearing of vegetation would be undertaken under the supervision of the suitably experienced Ecological Clerk of Works (ECoW).
- 1.4.3 The vegetation arisings will be collected and used to create habitat piles in areas adjacent to the site (which are to be retained during the development works).
- 1.4.4 The habitats present within the site are largely sub-optimal for bats, being intensively managed for arable farming purposes. The sub-optimal arable land supports few invertebrates on which bats can forage.
- 1.4.5 Works should be undertaken outside of all tree and hedgerow root protection zones that would not be removed as part of the proposed development. Tree protective fencing as described in section 6.2 of British Standard 5837:2012 (Ref 1.6) should be installed (distance of fencing from tree trunk = 12x trunk diameter, distance from hedgerows = 1m from the spread of hedgerow canopy), where required, prior construction works commencing. The fencing should remain intact throughout the duration of the works and only be removed upon completion. Weather-proof notices should be attached to any protective fencing located adjacent to retained trees displaying the words 'Construction Exclusion Zone'. All personnel must be made aware of these restrictions. If works need to be undertaken within the root protection zones an Arboricultural survey would be required and any advice provided adhered to, to secure the long-term survival of the tree/hedgerow.

References

- 1.1 Her Majesties Stationary Office (HMSO) (1981). The Wildlife and Countryside Act (as amended). HMSO, London.
- 1.2 HMSO (2000) The Countryside Rights of Way (CRoW) Act. HMSO, London
- 1.3 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London
- 1.4 HMSO (2017). The Conservation of Habitats and Species Regulations. HMSO, London.
- 1.5 Institution of Lighting Professionals/Bat Conservation Trust (2018). Institution of Lighting Professionals. 2018. Bats and artificial lighting in the UK. Guidance Note 08/2018. ILP/BCT.
- 1.6 British Standards Institute (2012) British Standard for Trees in relation to design, demolition and construction (BS 5837:2012).

Appendix 7A.6A.1: Ecological Tool Box Talk

1.1. Legislation

1.1.1. Ecology surveys have been completed within the site and have identified the potential for the presence of a legally protected species. The Ecological Method Statement details the mitigation and working methods that should be adopted to avoid contravention of the legislation. If this is not followed, there is a risk that you could break the law by doing actions such as:

- Deliberately capture, injure or kill;
- Damage or destroy a resting place or breeding site;
- Deliberately or recklessly disturb an individual while it's in a structure or place of shelter or protection;
- Block access too structures or places of shelter or protection; or
- Possess, sell, control or transport live or dead individuals.

1.1.2. Any of the following could happen if you're found guilty of any offence:

- You could get an unlimited fine;
- You could be sent to prison for up to 6 months.

1.2. Species identification









Nesting Birds

The bird nesting season extends from March to August inclusive, although in mild climate nesting may start in February.

Nesting occurs in a variety of habitats including agricultural fields (ground nesting birds), dense bramble scrub, buildings and other man-made structures and trees.

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	<p><u>Reptiles (slow-worm, common lizard, grass snake and adder)</u></p> <p>They may be found sheltering in vegetation, under debris such as logs, ricks or piles of rubble or waste items. They may also bask in the open on sunny days.</p> <p>DO NOT leave materials in area where it might be colonised by reptiles. Any debris or materials should be moved with care or moved under direct supervision of a suitably qualified ecologist.</p>
	<p><u>Bats</u></p> <p>On site habitats where bats may roost include trees.</p> <p>If works involve trees with cavities, then check with the on-site ecologist that these have been inspected.</p>
	<p><u>Badgers</u></p> <p>It is unlikely that the animals would be seen but signs of their presence include:</p> <ul style="list-style-type: none"> • Setts (d shaped burrow with a large spoil heap); • Latrines or dung pits; and • Snuffle holes and runs.
	<p><u>Great Crested Newts</u></p> <p>It is possible that great crested newt may be present on site.</p> <p>Newts are associated with water bodies but during the winter they live / hibernate in terrestrial habitat.</p>

	<p>They can be harmed when clearing vegetation, moving debris such as log piles and ground works.</p>
	<p><u>Water Vole</u></p> <p>Water voles are associated with water courses. It is rare to see these animals, but their burrows are found in banks of ditches, rivers and ponds.</p>
	<p><u>Otter</u></p> <p>Otters are associated with water courses. It is rare to see these animals, but their holts and resting places are found in banks of ditches, streams and rivers and footprints can be easily seen</p>

1.3. Action

- If any species, or signs characteristic of protected species in the vicinity of the works are apparent, or if in any doubt, stop the works immediately and contact the Project ecologist;
- The species involved may then be identified and appropriate action such as further surveys or mitigation taken; and
- Do not attempt to move any species found unless instructed to do so by an ecologist.



VOLUME 5, CHAPTER 7, APPENDIX 7A ANNEX 7A.6B: GREAT CRESTED NEWT NON-LICENSABLE METHOD STATEMENT

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1. Great Crested Newt Non-licensable Method Statement

1.1 Introduction

a) Background and Scheme Overview

1.1.1 SZC Co is proposing to build a new nuclear power station at Sizewell in East Suffolk, known as Sizewell C. Located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

1.1.2 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.3 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction and a series of off-site associated development sites in the local area including:

- two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the ‘northern park and ride’), and one to the south-west at Wickham Market (the ‘southern park and ride’) to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;
- a permanent road to bypass Stratford St Andrew and Farnham (referred to as the ‘two village bypass’) to alleviate traffic on the A12 through the villages;
- a permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’) to alleviate traffic from the B1122 through Theberton and Middleton Moor;

- permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’) and other road junctions to accommodate Sizewell C construction traffic;
- a temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site; and
- a temporary extension of the existing Saxmundham to Leiston branch line into the main development site (‘the green rail route’) and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network.

1.1.4 The components listed above are referred to collectively as the ‘Sizewell C Project’. This method statement is compiled in relation to the two village bypass only.

1.1.5 This great crested newt Method Statement outlines the key approaches to mitigating potential impacts to the great crested newt (*Triturus cristatus*) populations present within or adjacent to the construction site for the two village bypass. It will be used by SZC Co and any relevant subcontractors, in relation to the proposal to build Sizewell C and its associated developments.

b) Site Location and Setting

1.1.6 The two village bypass site measures approximately 54.8ha in area and is located to the south and south-east of Stratford St. Andrew, and to the south-west to south-east of Farnham (presented in Plate 1). The proposed development comprises a new permanent two-lane single carriageway road that would depart the A12, creating a new route around the south of Farnham and Stratford St Andrew, before re-joining the A12 east of Farnham.

1.1.7 Once operational, the two village bypass would be open to construction traffic associated with the construction of the Sizewell C project as well as to the general public. The proposed development would reduce the volume of construction traffic traveling through Farnham and Stratford St Andrew. As the proposed development is permanent, once construction of Sizewell C is completed, it will remain open for general use by the public and would provide legacy benefit to the residents of Farnham and Stratford St Andrew.

1.1.8 The two village bypass site is dominated by arable land with field boundaries comprising native, species poor hedgerows and tree lines. The site also supports significant areas of semi-natural woodland. Scattered trees and a number of watercourses are present within the site, whilst the site also contains a number of buildings and associated areas of hardstanding. Whilst

no ponds are present within the site itself, a number of waterbodies are present within the immediate 500m surrounding the site.

1.1.9 The area covered by this method statement is presented in **Plate 1.1** below.

Plate 1.1: Site location



1.1.10 The purpose of the works is to create a permanent road to bypass Stratford St Andrew and Farnham in order to alleviate the increased traffic on the A12 through the villages by the Sizewell development scheme. However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as “facilitating works” within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below.

c) **Key Ecological Constraints**

1.1.11 Within this site, the following are the predicted key potential legislative constraints associated with the facilitation works:

- bats;
- great crested newt;
- reptiles
- water vole; and
- otter.

1.1.12 In order to enable the proposed development of the two village bypass site, detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Although not detected during recent surveys, given the habitats present, great crested newts could be present within the site and a number of waterbodies are within the immediate 500m surrounds of the site. The proposed works have the potential to cause injury/ mortality to this species should it be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by SZC Co and any relevant subcontractors, to ensure the safeguarding of great crested newt during the facilitation works to be undertaken within the site.

1.1.13 This method statement only covers guidance relating to great crested newt, however method statements and draft protected species licences for the above species have also been prepared.

This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.2 Site Reasonable Avoidance Measures (RAMS) Method Statements for great crested newt

a) Introduction

1.2.1 This section provides a suite of dedicated RAMs Method Statements (MS) for the ecological constraints that may be encountered for great crested newt during the facilitation works.

1.2.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The ECoW will determine exactly when and where it is appropriate to apply the measures described in the RAMs MS. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.2.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no

changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) **Toolbox Talk**

- 1.2.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (**Appendix 7A.6B.1**) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.
- 1.2.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.
- 1.2.6 There is a declaration (**Appendix 7A.6B.2**) for those present to sign to confirm they have understood the constraints and actions presented.

1.3 **Great Crested Newt**

a) **Site Status**

- 1.3.1 Given that the site supports field boundaries comprising native, species poor hedgerows and tree lines, in addition to significant areas of semi-natural woodland, it is considered that the site supports suitable terrestrial habitat for great crested newt. Moreover, a number of ponds are located within the nearby vicinity of the site, such that aquatic opportunities for this species group are present in close proximity to the site.
- 1.3.2 Whilst desk-study data received from the Suffolk Biodiversity Information Service returned no records of great crested newt within 2km of the site, given the presence of suitable terrestrial habitat within the site and suitable aquatic habitat present within the surrounds of the site, specific presence/absence eDNA surveys were undertaken with respect to great crested newt within the site. The eDNA surveys carried out with respect to the offsite ponds confirmed the absence of great crested newt within the vicinity of the site. However, access was not obtainable for a number of the offsite ponds, such that there is the potential for great crested newt to be present within the vicinity of the site and to make use of the terrestrial habitats within the site.

b) Legislation

1.3.3 Great crested newt (great crested newt) is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (Ref 1.1) in respect of Section 9, which makes it an offence, inter alia, to:

- intentionally or recklessly kill, injure or take (handle) a great crested newt;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place that a great crested newt uses for shelter or protection; or
- intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection.

1.3.4 The offence “recklessly” was added by the Countryside and Rights of Way Act 2000 (CRoW) (Ref 1.2)).

1.3.5 great crested newt receives further protection under Regulation 41 of The Conservation of Habitats and Species Regulations 2017 (Ref 1.3). They are listed on Schedule 2 of the Regulations, which makes it an offence, inter alia, to:

- deliberately capture, injure or kill a great crested newt;
- deliberately disturb a great crested newt, in particular any disturbance which is likely:
 - impair their ability to:
 - survive, to breed or reproduce, or to rear or nurture their young, or
 - hibernate or migrate
 - affect significantly the local distribution or abundance of great crested newt; or
- damage or destroy a breeding site or resting place of a great crested newt.

1.3.6 Great crested newt is included on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (Ref 1.4). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are ‘Species of Principal Importance for the conservation of biodiversity in England’ for which conservation steps should be taken or promoted.

- 1.3.7 The prescriptions of this method statement should be followed during works in any areas which offer terrestrial habitats for great crested newts. These areas include but are not limited to: tree roots, hedgerow bases, grassland areas, arable field margins, earth banks, log piles, rock piles and woodlands.
- 1.3.8 In areas which support sub optimal habitats for great crested newt (i.e. arable fields), these measures do not apply (with the exception of the toolbox talk, which should apply to all contractors working on the site).
- 1.3.9 When the precautionary methods of work described in this Method Statement are taken into account, the cumulative risks and effects on the local great crested newt population(s) will be not significant. It is therefore considered that a great crested newt licence is not required for the facilitation works outlined in this Method Statement.
- 1.3.10 The Ecological Clerk of Works (ECoW), will oversee and quality-control the implementation of the ecological tasks undertaken.
- c) **Toolbox talk**
- 1.3.11 Prior to commencement of the works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to great crested newt. This applies to contractors working in all habitats across the site, not only habitats likely to support great crested newt in the terrestrial phase.
- 1.3.12 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by great crested newt and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on great crested newt that could occur within or in the vicinity of the working area. The toolbox talk will stress that: potential great crested newt refugia / hibernation features should be left undisturbed; and great crested newt should not be handled by contractors.
- d) **Precautionary working methods**
- 1.3.13 A different precautionary working method will be utilised dependent upon whether the works are being undertaken in the great crested newt active or hibernation period. These periods are dependent upon weather conditions (temperature and rainfall) but are likely to be in the region of November to February inclusive (hibernation season) and March to October (active season). The ECoW will be responsible for determining the appropriate working methodology.

- 1.3.14 The prescriptions of this method statement should be followed during works in any areas with potential to support great crested newts. These areas include but are not limited to: tree roots, hedgerow bases, rough grassland areas, arable field margins, earth banks, log piles, rock piles and woodlands.
- 1.3.15 If possible, all impacts to terrestrial areas which may offer hibernation potential (i.e. log piles, embankments etc.) will be removed outside of the hibernation period, as great crested newt are more likely to be active and associated with ponds during this period. However, there are restrictions on certain works due to the potential to impact upon nesting birds (during the bird nesting season, generally March to August inclusive), and all works timings will need to consider this.
- 1.3.16 No ponds supporting great crested newt are to be directly impacted by the works therefore an approach to pond removal is not required. For clarity, the precautionary working methodologies have been split down into three scenarios:
- Vegetation clearance in the active season.
 - Vegetation clearance in the hibernation season.
 - Ground-breaking works in the active and hibernation season.

1.4 Approach to vegetation clearance

a) Vegetation clearance in the active season

- 1.4.1 Any clearance within the active season must also consider the potential to impact upon nesting birds. Suitable measures to prevent impacts to nesting birds should be employed, which are likely to include pre-works checks for nests. These measures in relation to birds are not outlined in full within this document.
- 1.4.2 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working area.
- 1.4.3 The precautionary working methods to safeguard great crested newt during vegetation clearance in the active season are set out below.
- The ECoW will work with the contractor to determine a cutting regime whereby any animals present are able to move away from the cutting into retained habitats and not isolated in an unsuitable area. This area will be walked by the ECoW to identify any areas offering great crested newt sheltering opportunities prior to works commencing.
 - Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist.

NOT PROTECTIVELY MARKED

These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). Any removal of sheltering habitats will be supervised by the ECoW. These will be dismantled by hand; this should be overseen by the ecologist.

- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.
- Vegetation is to be cleared at a minimum 150mm from the ground in the first pass.
- Subsequent to this, a suitable period of time as decided by the ECoW will be given to allow for any great crested newt present at the time of works to move away from the cut areas, this will also allow the ECoW to check the area for great crested newt, along with other species.
- The vegetation will then be cut to as close to ground level as possible;
- Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to great crested newt within the site.

b) Vegetation clearance in the hibernation season

1.4.4 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working area.

1.4.5 The precautionary working methods to safeguard great crested newt during vegetation clearance in the hibernation season are set out below.

- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). If possible, this removal should be undertaken by hand or slowly under close supervision by the ECoW.
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.
- The vegetation will then be cut to as close to ground level as possible.

- Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to great crested newt within the site.
- c) [Approach to ground-breaking works including top-soil stripping \(active season and hibernation period\)](#)

1.4.6 If possible, all impacts to terrestrial areas which may offer hibernation potential (i.e. log piles, embankments etc) will be removed outside of the hibernation period, as great crested newt are more likely to be active and associated with ponds during this period. However, there are restrictions on certain works due to the potential to impact upon nesting birds (during the bird nesting season, generally March to August inclusive), and all works timings will need to consider this.

1.4.7 Given that vegetation clearance works are to take place within the site prior to the commencement of any ground-breaking works, it is likely that the risk of encountering great crested newt will be reduced, due to the removal of suitable terrestrial habitat within the areas proposed for ground-breaking works. Ground-breaking works include any ground investigations, archaeology trenching, topsoil stripping etc.

1.4.8 Prior to commencement of the ground-breaking works, the ECoW will liaise with the contractor to clearly demarcate the required working area. The methodology outlined below assumes that all vegetation has previously been removed.

1.4.9 The precautionary working methods to safeguard great crested newt during ground-breaking works in the active season are set out below.

- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). If possible, this removal should be undertaken by hand or slowly under close supervision by the ECoW.
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.
- The topsoil will then be carefully removed using a toothed bucket (if permitted under the contractors RAMS) under close ecological supervision by the ECoW.

d) Action to take if great crested newts are found

1.4.10 Should any great crested newts be found during the facilitation works the following must be observed due to the strict level of protection afforded to this species:

- the works will stop;
- the great crested newt will not be handled or moved from its resting place; and
- the ECoW will assess the situation to determine whether a European Protected Species mitigation licence will be required before the works can continue; and if Natural England need to be informed.

References

- 1.1 Her Majesties Stationary Office (HMSO) (1981). The Wildlife and Countryside Act (as amended). HMSO, London.
- 1.2 HMSO (2000). The Countryside Rights of Way (CRoW) Act. HMSO, London
- 1.3 HMSO (2017). The Conservation of Habitats and Species Regulations 2017, London
- 1.4 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London

Appendix 7A.6B.1: Toolbox Talk

Great Crested Newt



Legal Protection
Great crested newts, their breeding habitat and their eggs are protected under the Habitats Directive 2017 (as amended).



Appendix 7A.6B.2: Declaration of Understanding

Toolbox talk title:	Ecology
Given by:	
Site:	
Date:	

Name	Company	Signature

Name	Company	Signature



VOLUME 5, CHAPTER 7, APPENDIX 7A ANNEX 7A.6C: OTTER NON- LICENSABLE METHOD STATEMENT

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None provided.

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1 Otter Non-licensable Method Statement

1.1 Introduction

a) Background and scheme overview

1.1.1 SZC Co is proposing to build a new nuclear power station at Sizewell in East Suffolk, known as Sizewell C. Located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

1.1.2 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.3 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction and a series of off-site associated development sites in the local area including:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the ‘northern park and ride’), and one to the south-west at Wickham Market (the ‘southern park and ride’) to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;
- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the ‘two village bypass’) to alleviate traffic on the A12 through the villages;

- A permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’) to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’) and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site; and
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site (‘the green rail route’) and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network.

1.1.4 The components listed above are referred to collectively as the ‘Sizewell C Project’. This method statement relates only to the two village bypass component of the proposals.

1.1.5 This Otter Method Statement outlines the key approaches to mitigating potential impacts to the Otter (*Lutra lutra*) populations present within or adjacent to the construction site the two village bypass. It will be used by the ecological consultant, SZC Co and any relevant subcontractors, in relation to the proposal to build the two village bypass.

b) Site location and setting

1.1.6 The two village bypass site is located in Sizewell, East Suffolk (site centre grid reference OS Grid Reference TM 36558 59908) and is approximately 54.8 hectares (ha) in area. The site is located to the south and south-east of Stratford St. Andrew, and to the south-west to south-east of Farnham.

1.1.7 The proposed development comprises a new permanent two-lane single carriageway road that would depart the A12, creating a new route around the south of Farnham and Stratford St Andrew, before re-joining the A12 east of Farnham.

1.1.8 Once operational, the two village bypass would be open to construction traffic associated with the construction of the Sizewell C project as well as to the general public. The proposed development would reduce the volume of construction traffic traveling through Farnham and Stratford St Andrew. As

the proposed development is permanent, once construction of Sizewell C is completed, it will remain open for general use by the public and would provide legacy benefit to the residents of Farnham and Stratford St Andrew.

1.1.9 The two village bypass site is dominated by arable land with field boundaries comprising native, species poor hedgerows and tree lines. The site also supports significant areas of semi-natural woodland. Scattered trees and a number of watercourses are present within the site, whilst the site also contains a number of buildings and associated areas of hardstanding.

1.1.10 The area covered by this method statement is presented in **Plate 1.1** below.

Plate 1.1: Site location



1.1.11 The purpose of the works is to create a permanent road to bypass Stratford St Andrew and Farnham in order to alleviate the increased traffic on the A12 through the villages by the Sizewell development scheme. However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as “facilitating works” within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below. .

c) **Key ecological constraints**

1.1.12 Within this site, the following are the predicted key potential legislative constraints associated with the facilitation works:

- bats;
- great crested newt;
- reptiles;
- water vole; and
- otter.

1.1.13 This method statement only covers guidance relating to otter, however, there are associated method statements and draft protected species licences for the other receptors listed above.

1.1.14 In order to enable the proposed development, as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the habitats present within the site, the proposed facilitating works have the potential to cause injury/ mortality to otters should any be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by the ecological consultant, SZC Co and any relevant subcontractors, to ensure the safeguarding of otters during the facilitation works to be undertaken within the site.

1.1.15 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.2 Site Reasonable Avoidance Measures (RAMs) method statements for otter

a) Introduction

1.2.1 This section provides a suite of dedicated RAMs Method Statements (MS) for the ecological constraints that may be encountered in relation to otters during the facilitation works.

1.2.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The Ecological Clerk of Works (ECoW) will determine exactly when and where it is appropriate to apply the measures described in the RAMs method statement. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.2.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Toolbox talk

1.2.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (**Appendix 7A.6C.1**) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.

1.2.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.

1.2.6 There is a declaration (**Appendix 7A.6C.2**) for those present to sign to confirm they have understood the constraints and actions presented.

1.3 Otter

a) Site status

- 1.3.1 Three otter records were identified by the desk study, one of which was located north of the site along a drain which connects to the River Alde which runs through the south of site. During the targeted otter and water vole surveys, an otter footprint was found along the River Alde within the site boundary. The habitat present within the site boundary was considered suitable to support otter, with areas of woodland and scrub suitable to provide resting areas. The most optimal habitat for otter within the site is the River Alde rather than the nearby ditches.
- 1.3.2 Construction of the proposed development would result in increased levels in light, noise and visual disturbance to any otters close to the construction footprint through construction activities, increased vehicle movements and increased human presence.
- 1.3.3 In terms of proportion of an average range size, suitable habitat to be lost is likely to be a small proportion of the overall habitat in Sizewell and Minsmere, most of which would be retained. Land take would have a negative minor, non-significant effect at the local level on the otter population.
- 1.3.4 In the absence of mitigation, the works proposed have the potential to impact otter through:
- habitat loss and habitat fragmentation (including connectivity);
 - disturbance effects on species population (comprising light, noise and visual effects); and
 - incidental mortality.
- 1.3.5 It is reasonable to conclude that disturbance would have a limited effect on the otter population, given that the area of otter habitat likely to be disturbed is small compared to an average otter territory. Disturbance effects could potentially last for the duration of the construction phase (up to 24 months).
- 1.3.6 Overall, it is considered that habitat loss and fragmentation would have a temporary negligible adverse effect on the species. The disturbance on otter would have short term, reversible, minor adverse effect. The habitat loss, fragmentation and potential disturbance to the species is considered not significant.

b) Legislation

- 1.3.7 Otter are protected under EC Directive (92/43/EEC). This is implemented in Britain under the Conservation of Habitats and Species Regulations (Ref 1.3). Under this legislation it is an offence to damage or destroy an otter's place of shelter, whether intentionally or accidentally and to deliberately disturb an otter.
- 1.3.8 Otter are also protected under the Wildlife and Countryside Act WCA (1981, as amended) (Ref 1.2) which makes a criminal offence to 'intentionally' kill, injure or take an otter without a licence. It is also illegal to damage, destroy or obstruct access to a place used for shelter or protection.

c) Toolbox talk

- 1.3.9 Prior to commencement of the vegetation clearance works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to otters. Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on the species that could occur within or in the vicinity of the working area.

d) Precautionary working methods

- 1.3.10 Pre-construction surveys will be undertaken to provide up-to-date information on otter activity and as to whether any holts or other resting places are present within the construction footprint. Otter breeding and resting places ("holts") are typically tunnels under waterside trees, and are legally protected. Natal or breeding holds may be used at any time of the year. Although no natal holts have been found within the site boundary, there remains the possibility that otter may set up a new natal den site.
- 1.3.11 A European Protected Species Licence application and Method Statement would be required to permit works that would otherwise disturb, injure or kill otter, and/or damage or restrict access to their holts, should an active holt be identified. If required, a detailed mitigation strategy for otter would be provided in a method statement, based on Natural England's standing advice and guidance in relation to otter and mitigation for development projects (Ref 1.4).

- 1.3.12 The locations of all holts and couches must be identified to contractors in confidence to ensure that they are not accidentally disturbed during the construction process.
- 1.3.13 Demarcation and of a 30m exclusion zone around otter holts.
- 1.3.14 Where possible, a minimum of a 20m buffer should be maintained between the construction activities and the toe of the bank of the River Alde and ditches to attenuate the impacts of lighting and noise from the construction activities.
- 1.3.15 Works compounds, storage sites and access roads must not be located between important areas of otter habitat. Potential water quality issues associated with the terrestrial (i.e. non-marine) environment, would be dealt with through embedded (primary) mitigation measures.
- 1.3.16 Prior to works commencing an appropriately experienced ECoW will undertake a toolbox talk to site staff covering the Precautionary Working Methods to be adhered to.
- 1.3.17 Where works are required in areas of otter activity (but not a place of shelter) the ECoW will demarcate and agree on site in which areas which activity is permitted.
- 1.3.18 If night-time working is required, the works around the areas with suitable habitat for otter, light spill would be minimised to reduce any possible impacts to the species.
- 1.3.19 Such precautions will be put in place to avoid an offence being committed during the proposed works and subsequent development with respect to otter.

1.4 Facilitating work requirements

a) Vegetation clearance methods

- 1.4.1 As set out above, vegetation clearance works are required in order to facilitate the development of the site. These works have the potential to impact the local otter population. Should vegetation clearance work occur within the proximity of the River Alde, a qualified ECoW will need to carry out a pre-construction check for signs of otter and otter activity within the footprint of the works.
- 1.4.2 A European Protected Species Licence application and Method Statement would be required to permit works that would otherwise disturb, injure or kill

otter, and/or damage or restrict access to their holts, should an active holt be identified.




1.4.3 Should otter signs be present the ECoW will demarcate and agree on site in which areas which activity is permitted.

b) **Vegetation clearance equipment**

1.4.4 The vegetation clearance contractors on site will utilise equipment specific to their clearance methods as per their RAMS. For example:

- John Deere 3 series compact with cut and collector flail;
- John Deere 4 series compact tractor with side arm flail; and
- brushcutter, rakes, pitchforks and other hand tools.

Plate 1.2: Vegetation clearance equipment

	
<p><i>John Deere 3 series compact tractor</i></p>	<p><i>John Deere 4 series tractor</i></p>
	
<p>Brushcutter</p>	

c) Ground-breaking works methods

- 1.4.5 As set out above, ground-breaking works are required in order to facilitate the development of the site. These works have the potential to impact the local otter population. Should ground-breaking works take occur (20m of the River Alde and within 10m of other watercourses), a qualified ECoW will need to carry out a pre-construction check for signs of otter and otter activity within the footprint of the works.
- 1.4.6 A European Protected Species Licence application and Method Statement would be required to permit works that would otherwise disturb, injure or kill otter, and/or damage or restrict access to their holts, should an active holt be identified.
- 1.4.7 Should otter signs be present the ECoW will demarcate and agree on site in which areas which activity is permitted. Demarcation and exclusion from holts within 30m of working areas, potentially with the use of Heras fencing.
- 1.4.8 Any excavations made during construction activities would be closed at the end of the day to prevent access by otter and other terrestrial nocturnal animals. If it is not be possible for excavations to be closed at night, a means of egress (i.e. a wooden plank or soil ramp) would be provided to ensure that any animals that may access these excavations have a means of escape.

References

- 1.1 EDF Energy (2018). Lighting Strategy for Construction and Operational Sites. Sizewell C Project.
- 1.2 Her Majesties Stationary Office (HMSO) (1981). The Wildlife and Countryside Act (as amended). HMSO, London.
- 1.3 HMSO (2017). The Conservation of Habitats and Species Regulations. HMSO, London.
- 1.4 Natural England (2014). Otters: surveys and mitigation for development projects. Available from: <https://www.gov.uk/guidance/otters-protection-surveys-and-licences#mitigation-compensation-methods-and-avoiding-impacts> .

Appendix 7A.6C.1: Ecological Tool Box Talk

1.1. Legislation

1.1.1. The Eurasian otter is the only native UK otter species. It's fully protected as a European protected species (EPS) and is also protected under sections 9 and 11 of the Wildlife and Countryside Act 1981 (Ref 1.2).

1.1.2. You're breaking the law if you:

- capture, kill, disturb or injure otter (on purpose or by not taking enough care)
- damage or destroy a breeding or resting place (deliberately or by not taking enough care)
- obstruct access to their resting or sheltering places (deliberately or by not taking enough care)
- possess, sell, control or transport live or dead otter, or parts of otter

1.1.3. If you're found guilty of an offence you could get an unlimited fine and up to 6 months in prison.

1.2. Species identification



Otter

Otter are associated with water courses. It is rare to see these animals but their holts and resting places are found in banks of ditches, streams and rivers and footprints can be easily seen.



Otter Habitat

Otter signs can be found:


- Under and near bridges
- On banksides
- On boulders or rocks either in river or near the river
- On old tree stumps or logs
- At either end of shortcut paths
- On gravel banks or sand and muddy areas
- Around ponds and lakes
- In marshes or reed beds
- At river junctions or intersections



Otter Spraint

Typically 2 – 7cm long, will contain fish bones and scales, be tarry and black but these will turn grey when old and naturally, they will smell very strongly of fish.



	<p><u>Otter Print</u></p> <p>The Otter prints can be found at the edge of river banks, in gravel, sand, mud and on tarmac if they have just left the river. They also have 5 toes which is a distinctive sign that it's an Otter print.</p>
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1.3. Action

- If any species, or signs characteristic of protected species in the vicinity of the works are apparent, OR IF IN ANY DOUBT, stop the works immediately and contact the Project ecologist;
- The species involved may then be identified and appropriate action such as further surveys or mitigation taken; and
- Do not attempt to move any species found unless instructed to do so by an ecologist.

Appendix 7A.6C.2: Declaration

By signing the register below you confirm that you have received the ECOLOGY TOOLBOX TALK (Appendix 1) AND METHOD STATEMENT briefing provided by the project ecologist for the Wickham Sizewell C Scheme.

Date	Name	Role on Site	Signature



VOLUME 5, CHAPTER 7, APPENDIX 7A ANNEX 7A.6D:
REPTILE NON-LICENSABLE METHOD STATEMENT

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None provided.

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None provided.

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1. Reptile Non-licensable Method Statement

1.1 Introduction

a) Background and scheme overview

1.1.1 SZC Co is proposing to build a new nuclear power station at Sizewell in East Suffolk, known as Sizewell C. Located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

1.1.2 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.3 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction and a series of off-site associated development sites in the local area including:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the ‘northern park and ride’), and one to the south-west at Wickham Market (the ‘southern park and ride’) to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;

- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the ‘two village bypass’) to alleviate traffic on the A12 through the villages;
- A permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’) to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’) and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site; and
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site (‘the green rail route’) and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network.

1.1.4 The components listed above are referred to collectively as the ‘Sizewell C Project’.

1.1.5 This Reptile Method Statement outlines the key approaches to mitigating potential impacts to the reptile populations present within or adjacent to the construction site for Sizewell C two village bypass. It will be used by the ecological consultant, SZC Co and any relevant subcontractors, in relation to the proposal to build the two village bypass.

b) [Site location and setting](#)

1.1.6 The two village bypass site measures approximately 54.8ha and is located to the south and south-east of Stratford St. Andrew, and to the south-west to south-east of Farnham (presented in Image 1). The proposed development comprises a new permanent two-lane single carriageway road that would depart the A12, creating a new route around the south of Farnham and Stratford St Andrew, before re-joining the A12 east of Farnham.

1.1.7 Once operational, the two village bypass would be open to construction traffic associated with the construction of the Sizewell C project as well as to the general public. The proposed development would reduce the volume of construction traffic traveling through Farnham and Stratford St Andrew. As

the proposed development is permanent, once construction of Sizewell C is completed, it will remain open for general use by the public and would provide legacy benefit to the residents of Farnham and Stratford St Andrew.

1.1.8 The two village bypass site is dominated by arable land with field boundaries comprising native, species poor hedgerows and tree lines. The site also supports significant areas of semi-natural woodland. Scattered trees and a number of watercourses are present within the site, whilst the site also contains a number of buildings and associated areas of hardstanding.

1.1.9 The area covered by this method statement is presented in **Plate 1.1** below.

Plate 1.1: Site location



1.1.10 The purpose of the works is to create a permanent road to bypass Stratford St Andrew and Farnham in order to alleviate the increased traffic on the A12 through the villages associated with the construction of Sizewell C. However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as “facilitating works” within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below.

c) **Key ecological constraints**

1.1.11 Within this site, the following are the predicted key potential legislative constraints associated with the facilitation works:

- bats;
- great crested newt;
- reptiles
- water vole; and
- otter.

1.1.12 This method statement only covers guidance relating to reptiles, however method statements and draft protected species licences for the above species have also been prepared.

1.1.13 In order to enable the proposed development of the two village bypass, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the habitats present within the site, the proposed facilitating works have the potential to cause injury/mortality to reptiles, should they be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by the ecological consultant, SZC Co and any relevant subcontractors, to ensure the safeguarding of reptiles during the facilitation works to be undertaken within the site.

1.1.14 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents.

1.2 Site Reasonable Avoidance Measures (RAMs) Method Statements for reptiles

a) Introduction

1.2.1 This section provides a suite of dedicated RAMs Method Statements (MS) for the ecological constraints that may be encountered for reptiles during the facilitation works.

1.2.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The Ecological Clerk of Works (ECoW) will determine exactly when and where it is appropriate to apply the measures described in the RAMs method statement. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.2.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Toolbox talk

1.2.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (**Appendix 7A.6D.1**) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.

1.2.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by reptiles and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.

1.2.6 There is a declaration (**Appendix 7A.6D.2**) for those present to sign to confirm they have understood the constraints and actions presented.

1.3 Reptiles

a) Site status

1.3.1 The majority of habitat present within the site boundary (arable fields) is considered sub-optimal for reptiles; however, the field margins are considered suitable to support foraging and sheltering common reptile species. Nevertheless, the extent of this habitat is quite limited such that it is unlikely that the site is of elevated potential to this species group. The desk-study data received from the Suffolk Biodiversity Information Service returned only four records of reptiles within 2km of the site.

1.3.2 Given the limited potential for reptiles within the site and the small number of records of this species within the area, no targeted reptile surveys were undertaken. However, a single incidental record of grass snake (*Natrix natrix*) was recorded in rough semi-improved grassland surrounding the nearby River Alde, located to the north of the site. This area is considered to provide suitable breeding and foraging opportunities for grass snake and other common reptiles species.

b) Legislation

1.3.3 There are four common and widespread species of reptile that are native to Britain, i.e. common or viviparous lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake. Grass snake is also listed on Schedule 5 of the Wildlife and Countryside Act (as amended) (Ref 1.1) in respect of Section 9, which makes it an offence, inter alia, to intentionally (or recklessly) kill or injure this species (recklessly as added by the Countryside and Rights of Way Act (CroW) Act (Ref 1.2)).

1.3.4 Common lizard, slow worm, adder and grass snake are also included on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (Ref 1.3). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are 'Species of Principal Importance for the conservation of biodiversity in England' for which conservation steps should be taken or promoted.

c) Toolbox talk

1.3.5 Prior to commencement of the works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview

of the life history, habitat requirements, identification and legal protection granted to reptiles.

1.3.6 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by reptiles and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on reptiles that could occur within or in the vicinity of the working area. The toolbox talk will stress that: potential reptile refugia / hibernation features should be left undisturbed; and reptiles should not be handled by contractors.

d) **Precautionary working methods**

1.3.7 The exact timings of the vegetation clearance works are currently unknown. However, these works will need to consider potential impacts to other receptors in addition to reptiles, particularly nesting birds, dependent upon the timings of the works.

1.3.8 Vegetation clearance which does not disturb the ground or vegetation below 150mm can be conducted year-round with a low risk of impacting upon reptiles, however there are seasonal constraints in relation to birds. Potential impacts to nesting birds will need to be considered of vegetation removal is required between March and August inclusive (generally considered to be the bird nesting season).

1.3.9 Any vegetation clearance likely to impact vegetation below 150mm or which is likely to impact the ground layer or features which offer reptiles shelter or protection should take place during the active reptile period (March to October (inclusive), although the exact timings are weather dependant). In order to avoid disturbing reptiles during hibernation (the period where reptiles are most vulnerable). Accordingly, with respect to the proposed clearance of suitable reptile habitat, it is proposed that a staged vegetation clearance exercise is undertaken under the direct supervision of the ECoW, in order to reduce the suitability of the habitats within the site.

1.3.10 Where it is necessary to undertake vegetation clearance in and around suitable reptile habitat the following precautionary measures will be put in place to avoid encountering and accidentally injuring reptiles:

- vegetation clearance (below 150mm) and ground-breaking works will only be conducted in the active season (March to October inclusive)

seasonally dependant)¹ and when the weather is suitable (i.e. it is warm, approximately 8°C should be the minimum temperature. The works should not be conducted early in the morning before reptiles have had a chance to ‘warm up’;

- the ECoW will work with the contractor to determine a cutting regime whereby any animals present are encouraged away from the cutting into retained habitats and not isolated in an unsuitable area. This area will be walked by the ECoW to disturb reptiles prior to works commencing;
- the ECoW will also consider any impacts to ground nesting birds, if appropriate and assess any risk;
- initially, vegetation is to be cleared to reduce cover for reptiles (at a minimum 150mm from the ground in the first pass);
- subsequent to this, a suitable period of time as decided by the ECoW will be given to allow for any reptiles present at the time of works to move away from the cut areas;
- the grassland / remaining vegetation will then be cut to as close to ground level as possible;
- vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to reptiles within the site;
- any suitable reptile sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). Any removal of sheltering habitats will be supervised by the ECoW. These will be dismantled by hand; this should be overseen by the ecologist. If a reptile is found the ecologist will decide whether or not it is appropriate to relocate the animal;
- shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential reptile shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the

¹ Advanced works approach would integrate vegetation clearance in relation to breeding birds, reptiles, water voles and bats as necessary; each having preferential periods for vegetation removal; an integrated approach could include cutting to near ground level during winter, then clearance of the lowest trunks and roots under supervision in spring

working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area; and

- if reptiles are found, the ECoW will move the animals out of the way to a place of safety. This location would be decided on a case-by-case basis, but it would be within the one designated reptile receptor areas (Kenton Hills, St. James Covert and Broom Covert) near to a suitable refuge or hibernation feature, surrounded by suitable foraging and basking habitat and judged to be a safe distance from the ongoing vegetation clearance works. Reptiles will not be handled by contractors, as common lizards and slow worms may shed their tails if handled inappropriately.

1.3.11 Should any reptiles be found on site during the works when the ECoW isn't present, the ECoW should be contacted immediately for advice.

1.4 Facilitating work requirements

a) Vegetation clearance methods

1.4.1 As set out above, vegetation clearance works are required in order to facilitate the development of the site. A staged vegetation clearance exercise at a suitable time of year will be undertaken in order to safeguard any reptiles present at the time of works. Such works will take place under the supervision of the ECoW. Such an approach will minimise the potential harm caused to reptiles within the site as it will avoid disturbing this species group during the hibernation period.

1.4.2 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working areas.

1.4.3 If shelter features are present (i.e. log and vegetation piles), those will be checked by the ECoW before their removal (should this be required).

1.4.4 If shelter features are present that require removal, those should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential reptile shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.

1.4.5 Should works be required in winter (November to February inclusive) or in cold weather (below 8°C overnight temperature) the ECoW will advise upon

bespoke working methods. Likely to require a hand search and a staged vegetation clearance approach under direct supervision.




1.4.6 The vegetation arisings will be collected and used to create habitat piles in areas adjacent to the site (which are to be retained during the development works).

b) **Vegetation clearance equipment**

1.4.7 The vegetation clearance contractors on site will utilise equipment specific to their clearance methods as per their RAMS. For example:

- John Deere 3 series compact with cut and collector flail;
- John Deere 4 series compact tractor with side arm flail; and
- brushcutter, rakes, pitchforks and other hand tools.

Plate 1.2: Vegetation clearance equipment

	
<p><i>John Deere 3 series compact tractor</i></p>	<p><i>John Deere 4 series tractor</i></p>
	
<p><i>Brushcutter</i></p>	

c) **Ground-breaking works methods**

1.4.8 Given that vegetation clearance works are to take place within the site prior to the commencement of any ground-breaking works, it is likely that the risk of encountering reptiles will be reduced, due to the removal of suitable habitat within the areas proposed for ground-breaking works.

1.4.9 Reptiles are known to enter hibernation by burrowing underground, by settling into tree root systems or by entering voids and crevices in the ground or surrounding material. Accordingly, should the works take place during the reptile hibernation period (the dormancy period runs from November to February (inclusive) and ideally should be avoided where possible), it is considered necessary for the ground-breaking works to be undertaken under direct supervision of the ECoW. Small sections of the topsoil removed and inspected by the ECoW. Hand-digging under ECoW supervision may also be required.

d) **Ground-breaking works equipment**

1.4.10 Contractors will utilise the equipment as per their RAMS, For example:

- JCB 16C-I new generation 1 tonne mini digger;
- spade;
- spill kits; and
- Chapter 8 barrier/ Heras fencing.

Plate 1.3: Ground-breaking works equipment

<p><i>JCB 16C-I New Generation 1 Tonne Mini Digger</i></p>	<p><i>Chapter 8 barrier/ Heras fencing</i></p>

References

- 1.1 Her Majesties Stationary Office (HMSO) (1981). The Wildlife and Countryside Act (as amended). HMSO, London.
- 1.2 HMSO (2000). The Countryside Rights of Way (CROW) Act. HMSO, London
- 1.3 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London

Appendix 7A.6D.1: Toolbox Talk Example

Reptiles

Reptiles in the UK



IF BITTEN SEEK MEDICAL HELP IMMEDIATELY.

Legal Protection
All reptile species are protected.

Likely to be found in:



Reptiles typically dormant between November and February. Sheltering/hibernation sites include log / brash piles, mammal burrows and tree / hedgerow roots.



Appendix 7A6D.2: Declaration of Understanding

Toolbox talk title:	Ecology
Given by:	
Site:	
Date:	

Name	Company	Signature

Name	Company	Signature