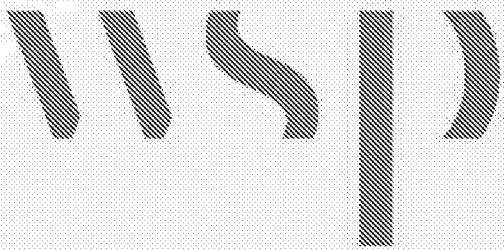




9.1 PRELIMINARY ECOLOGICAL APPRAISAL



West Sussex County Council

A29 REALIGNMENT

PRELIMINARY ECOLOGICAL APPRAISAL





West Sussex County Council

A29 REALIGNMENT

PRELIMINARY ECOLOGICAL APPRAISAL

CONFIDENTIAL

PROJECT NO. 70031782

OUR REF. NO. ECO1

DATE: SEPTEMBER 2020

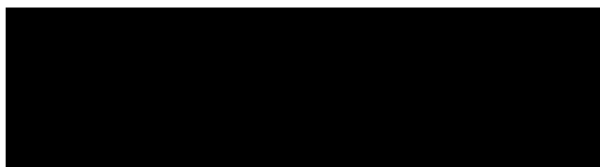
WSP

2 London Square

Cross Lanes

Guildford, Surrey

GU1 1UN





QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	First issue for comment	Revision following client comment	Revision to Phase 1 only	
Date	September 2018	October 2018	September 2020 ¹	
Prepared by	Rosie Pope	Rosie Pope	Charlotte Hewitt	
Signature				
Checked by	Hattie Spray	Luke Roberts	Verity Dickie	
Signature				
Authorised by	Adrian Hutchings	Hattie Spray	Owen Peat	
Signature				
Project number	70031782	70031782	70031782	
Report number	ECO1	ECO1	ECO1	
File reference	\\uk.wspgroup.com\central data\Projects\700317xx\70031782 - WSCC - A29 Prelim Design and O&M2 WIP\EC Ecology\2. Technical studies\1 Desk Study and Phase 1			

¹ This report was prepared in 2018 and re-issued in 2020 to only include Phase 1 of the Scheme. Therefore, all information contained within reflects the baseline as reported in the 2018 revision.



CONTENTS

1.	INTRODUCTION	2
1.1.	BACKGROUND	2
1.2.	SCOPE OF REPORT	2
1.3.	RELEVANT LEGISLATION AND POLICY	3
2.	METHODS	6
2.1.	OVERVIEW	6
2.2.	DESK STUDY	6
2.3.	HABITAT SURVEY	7
2.4.	PROTECTED SPECIES ASSESSMENT	8
2.5.	NOTES AND LIMITATIONS	8
3.	RESULTS	9
3.1.	DESIGNATED SITES	9
3.2.	HABITAT SURVEY	14
3.3.	PROTECTED AND NOTABLE SPECIES ASSESSMENT	17
4.	DISCUSSION AND RECOMMENDATIONS	22
4.1.	OVERVIEW	22
4.2.	STATUTORY DESIGNATED SITES	22
4.3.	NON-STATUTORY DESIGNATED SITES	23
4.4.	HABITATS	23
4.5.	PROTECTED AND NOTABLE SPECIES FURTHER ASSESSMENT	23 27
	FURTHER SURVEY REQUIREMENTS	27
4.6.	PRELIMINARY AVOIDANCE, MITIGATION AND COMPENSATION MEASURES	31
4.7.	ECOLOGICAL ENHANCEMENT OPPORTUNITIES	32

5.	CONCLUSIONS	34
6.	REFERENCES	35

FIGURES	37
---------	----

TABLES

Table 1 - Statutory designated sites of European or International importance within a 10km (and 30km for bat species) radius of the Site	9
Table 2 - Statutory designated sites of UK importance within a 2km radius of the Site	12
Table 3 - Non-statutory designated sites within a 2km search radius of the Site	12
Table 4 - Semi-Improved Grassland Parcel Descriptions	15
Table 5 - Hedgerow Descriptions	17
Table 6 - Key Ecological Constraints and Further Survey Requirements	28

FIGURES

Figure 1- Site Location Plan	378
Figure 2 - European Statutory Designated Sites for Bats within 30km	379
Figure 3 - European Statutory Designated Sites within 10km	40
Figure 4 - UK Statutory Designated Sites within 2km	41
Figure 5 - Non-Statutory Designated Sites within 2km	42
Figure 6 - Ancient Woodland and Habitats of Principal Importance (HPI) within 2km	43
Figure 7 - Waterbodies within 500m	44
Figure 8 - Phase 1 Habitat Map	45

APPENDICES

APPENDIX A

RELEVANT LEGISLATION AND PLANNING POLICY



APPENDIX B

SUMMARY OF ECOLOGICAL DESK STUDY DATA

APPENDIX C

PHOTOGRAPHS

EXECUTIVE SUMMARY

West Sussex County Council (WSCC) commissioned WSP to undertake a Preliminary Ecological Appraisal (PEA) of land around Eastergate and Westergate and Barnham, West Sussex where they propose to construct a new road to replace the existing A29 at this point (the Proposed Scheme) in two Phases. This report is concerned with Phase 1, which will see a single carriageway running to the north-east of Eastergate, which connects a new signalised junction or roundabout on the existing A29 Fontwell Avenue with a new signalised junction or roundabout on the existing Barnham Road.

A site survey was undertaken in July 2018 comprising an extended Phase 1 habitat survey of a Survey Area defined as the proposed route of Phase 1. Access was not granted to some parts of the Survey Area, however this is not considered to undermine the robustness of this report.

A desk study was carried out which identified several designated sites with the potential to be affected the Proposed Scheme. Outline mitigation measures are laid out to minimise the likelihood of most of the effects. Further survey for wintering birds is recommended to determine whether effects upon Pagham Harbour Ramsar and Special Protection Area (SPA), and Chichester and Langstone Harbour Ramsar and SPA (which are designated for their wintering and migratory bird populations), are likely as a result of the Proposed Scheme.

The Survey Area contains a range of habitats of varying ecological value. Whilst the hardstanding and cultivated land are generally of low ecological value, several habitats of greater importance are present including extensive orchards to the north and hedgerows all of which are Habitats of Principal Importance (HPI).

The Survey Area as a whole has the potential to support a range of protected and notable species, including bats, badger, hazel dormouse, wintering and breeding birds, great crested newt, reptiles and invertebrates, as detailed in Section 4 of this report.

The Proposed Scheme is likely to result in the loss of, or potential adverse effects upon, these habitats, and present risks to these protected species. In order to comply with relevant legislation and planning policy it will be necessary to undertake further assessment of the likely impacts of the Proposed Scheme and therefore, further surveys are recommended for bats, badger, hazel dormouse, breeding birds, wintering birds, reptiles, great crested newt and invertebrates.

A number of preliminary measures for avoidance and mitigation of adverse ecological effects, as well as compensation measures, have been proposed. In addition, feasible ecological enhancements have been laid out, in line with national and local planning policy. Avoidance of valuable features through adjustment of the route should be prioritised, and recommendations should be refined following any design adjustments, and following completion of further survey.

1. INTRODUCTION

1.1. BACKGROUND

- 1.1.1. West Sussex County Council (WSCC) commissioned WSP to undertake a Preliminary Ecological Appraisal (PEA) of land around Eastergate, Westergate and Barnham, West Sussex where they propose to construct a new road to replace the existing A29 at this point, in two Phases.

PROJECT BACKGROUND

- 1.1.2. The proposed A29 Realignment scheme will deliver a single carriageway to the east of Eastergate, Westergate and Woodgate villages. To the north it will link into the A29 (north of Eastergate), and to the south a new junction on the A29 Lidsey Road (south of Lidsey bends) will be provided. The scheme is being delivered in two phases. This report is concerned with Phase 1, which will see the construction of a single carriageway running to the north-east of Eastergate connecting a new signalised junction or roundabout on the existing A29 Fontwell Avenue with a new signalised junction or roundabout on the existing Barnham Road.
- 1.1.3. The Phase 1 proposals are hereafter referred to as the 'Proposed Scheme', and the route alignment of Phase 1 is hereafter referred to as 'the Site', which is shown on Figure 1.

ECOLOGICAL BACKGROUND

- 1.1.4. The Site is set within a semi-rural location amongst a series of small villages and runs through semi-natural and modified habitats, dominated by orchard in the north, with arable and grassland habitats to the south. The wider landscape is characterised by a similar patchwork of villages and arable land.
- 1.1.5. The south coast at Bognor Regis lies approximately 6km to the south, where the coastline comprises a sand and gravel intertidal zone bordered by a dense urban area.
- 1.1.6. In order to assess the ecological impacts of the Proposed Scheme, a 'Survey Area' was identified to include the Proposed Scheme footprint and areas set aside for landscape enhancements and mitigation works, the extent of which is shown on Figure 1. The Survey Area is traversed by several small footpaths and bisected by the A29 in the north and by Barnham Road in the south.
- 1.1.7. The Survey Area lies within the jurisdiction of West Sussex County Council and of Arun District Council.
- 1.1.8. Land within the Survey Area has also been subject to ecological survey in the recent past. An existing Phase 1 report for the Site (WYG, 2016) has been considered in the assessments within this report. Ongoing survey evidence was recorded (reptile refugia and dormouse nest tubes), but the reporting for this was not available.

1.2. SCOPE OF REPORT

- 1.2.1. The brief of the PEA commission was:
- To provide baseline ecological information about the Site and a surrounding study area with particular reference to whether legally protected and/or notable sites, species or habitats are present or likely to be present.

- ☞ To provide recommendations to enable compliance with relevant nature conservation legislation and planning policy.
- ☞ If necessary, to identify the need for avoidance, mitigation, compensation or enhancement measures and/or further ecological surveys.

1.3. RELEVANT LEGISLATION AND POLICY

1.3.1. The appraisal has been compiled with reference to the following relevant nature conservation legislation, planning policy and the UK Biodiversity Framework from which the protection of sites, habitats and species is derived in England. The context and applicability of each item is explained as appropriate in the relevant sections of the report and additional details are presented in Appendix A.

- ☞ The Conservation of Habitats and Species Regulations 2017 (Habitats Regulations);
- ☞ The Wildlife and Countryside Act 1981 (as amended) (WCA);
- ☞ Countryside Rights of Way Act 2000;
- ☞ The Natural Environment and Rural Communities (NERC) Act 2006;
- ☞ The Protection of Badgers Act 1992;
- ☞ The Hedgerow Regulations 1997;
- ☞ The Wild Mammals (Protection) Act 1996;
- ☞ The UK Post-2010 Biodiversity Framework (2011-2020) (J NCC and DEFRA, 2012);
- ☞ Biodiversity 2020: A strategy for England's wildlife and ecosystem services (DEFRA, 2011);
- ☞ UK Biodiversity Action Plan (UKBAP)²;
- ☞ The National Planning Policy Framework (NPPF) (2019);
- ☞ West Sussex Transport Plan 2011 - 2026 (WSCC, 2011);
- ☞ West Sussex Structure Plan 2001-2016 (WSCC, 2005); and
- ☞ Adopted Arun Local Plan (Arun District Council, 2018).

1.3.2. The NPPF provides a number of actions through which planning policies and decisions should contribute to and enhance the natural and local environment.

1.3.3. The West Sussex Transport Plan (2011) was subject to a Strategic Environmental Assessment (SEA) at the time of publishing which identified that;

:Mitigation is required to avoid negative impacts on biodiversity. This will include using green infrastructure to improve the connectivity of hedge lines to reconnect habitats, for example a :Notable Verge ~strategy is already in place;

and

The impact of the [Local Transport Plan] is dependent on taking opportunities to improve green infrastructure, particularly in new development, and in the [South Downs National Park] where existing green infrastructure can be disjointed. ~

² The UK BAP has now been replaced by the UK Post-2010 Biodiversity Framework, however, it contains useful information on how to characterise important species assemblages and habitats which is still relevant.

1.3.4. The West Sussex Structure Plan (WSCC, 2005) has been referenced. This document has no formal status, but :Though the Plan has no formal status in the current planning system, it remains our strategic policy statement for future development and land-use planning³. Policy ERA2 relates to Nature Conservation, stating;

:(a) Development should not be permitted unless the wide range of habitats, species and geological features of the County will be protected, conserved and, where possible, enhanced particularly through long-term management mechanisms and habitat creation schemes. A particularly high level of protection should be afforded to sites and features of national and international importance. Proposals for the extension or creation of new habitats should be permitted provided that they are consistent with wider environmental objectives.

(b) Local plans will include policies to:

(1) ensure that site evaluation is undertaken to establish the nature conservation importance of proposed development sites;

(2) protect sites or features of nature conservation importance, including those protected under legislation and prevent development unless there are no alternative solutions and there are overriding reasons which outweigh the need to safeguard the value of sites or features;

(3) ensure that where development would result in the loss of an important nature conservation resource, a new resource is provided which is of at least equivalent value, where possible;

(4) where appropriate, secure the restoration, creation and management of habitats through development proposals; and

(5) where necessary, ensure the investigation and recording of sites and features of nature conservation importance, and, where appropriate, the preservation of any finds.~

1.3.5. The Adopted Arun Local Plan (Arun DC, 2018) contains a number of policies relating to biodiversity, of which Policy ENV SP1 Natural Environment and Policy ENV DM5 Development and Biodiversity are the most pertinent.

1.3.6. Policy ENV SP1, Natural Environment states;

:Arun District Council will encourage and promote the preservation, restoration and enhancement of biodiversity and the natural environment through the development process and particularly through policies for the protection of both designated and non-designated sites. Where possible it shall also promote the creation of new areas for habitats and species. In relation to designated sites, development will be permitted where it protects sites listed in Tables 17.1-17.6 that are recognised for the species and habitats contained within them.~

³ <https://www.westsussex.gov.uk/about-the-council/policies-and-reports/environment-planning-and-waste-policy-and-reports/structure-plan/> [Accessed 05/09/2018]

1.3.7. Policy ENV DM5 Development and Biodiversity states;

Development schemes shall, in the first instance, seek to achieve a net gain in biodiversity and protect existing habitats on site. They shall also however incorporate elements of biodiversity including green walls, roofs, bat and bird boxes as well as landscape features minimising adverse impacts on existing habitats (whether designated or not). Development schemes shall also be appropriately designed to facilitate the emergence of new habitats through the creation of links between habitat areas and open spaces. Together, these provide a network of green spaces which serve to reconnect isolated sites and facilitate species movement.

Where there is evidence of a protected species on a proposed development site, planning applications shall include a detailed survey of the subject species, with details of measures to be incorporated into the development scheme to avoid loss of the species. This involves consideration of any impacts that will affect the species directly or indirectly, whether within the application site or in an area outside of the site, which may be indirectly affected by the proposals. All surveys shall be carried out at an appropriate time of year and shall be undertaken by a qualified and, where appropriate, suitably licensed person.

All developments shall have regard to Natural England's standing advice for protected species.~

2. METHODS

2.1. OVERVIEW

- 2.1.1. This appraisal has been prepared with reference to current good practice guidance published by the Chartered Institute for Ecology and Environmental Management (CIEEM, 2017a and 2018), and Joint Nature Conservation Committee (JNCC, 2010); and guidance contained in the British Standard - Code of Practice for Biodiversity and Development BS42020:2013 (British Standards Institute, 2013).
- 2.1.2. This PEA is based on the following data sources:
- an ecological desk study;
 - a habitat survey; and
 - a protected/notable species assessment.

2.2. DESK STUDY

- 2.2.1. The desk study was originally undertaken in March 2018 to review existing ecological baseline information available in the public domain and to obtain information held by relevant third parties. The desk study exercise was then updated in August 2020 to ensure the ecological baseline information for the Proposed Scheme was valid in advance of a planning application to be submitted in 2020. Where this has resulted in any change in assessment, this has been identified.
- 2.2.2. For the purpose of the desk study exercise, records were collated within various radii around the centre line of the Site. This approach is consistent with current CIEEM preliminary ecological appraisal guidelines (CIEEM, 2017b). To provide the baseline data for the ecological desk study, the following information was requested from Sussex Biodiversity Records Centre.
- Records of legally protected and notable species within 2km of the Site.
 - Bat records within a 5km radius of the Site.
 - Records of non-statutory sites designated for nature conservation value within 2km of the Site.
- 2.2.3. Freely downloadable corporate datasets (available from Natural England) were consulted for information regarding the presence of statutory designated habitats⁴ within 2km of the Site as drawn in August 2020. This search was extended to 10km for Natura 2000 sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) of European importance and internationally designated Ramsar sites. In addition, a further search area of 30km from the Site was undertaken for Natura 2000 sites which have bat species as qualifying interests. A Natural England

⁴ Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR).

corporate dataset was used to search for the presence of Habitat of Principal Importance (HPI)⁵ and woodland listed on the Ancient Woodland Inventory⁶.

- 2.2.4. Open source 1:25,000 Ordnance Survey mapping was used to identify any mapped water bodies and watercourses within 250m of the Survey Area (i.e. 500m of the Site in total).
- 2.2.5. In addition, the results of previous ecological reporting at the site have been reviewed as part of this desk study, namely the following reports.
 - WYG (2016) Eastergate, Extended Phase 1 Habitat Survey – survey work covering a portion of the area to the north of Barnham Road.
- 2.2.6. The findings of the desk study have been incorporated within Section 3 and Appendix B of this report and are shown on Figures 2-7.

2.3. HABITAT SURVEY

- 2.3.1. A Phase 1 habitat survey of the Survey Area was carried out over 11 and 12 July 2018 in hot, sunny conditions. The survey covered the entire accessible Survey Area, including boundary features. Several parts of the Survey Area were not accessible at the time of survey, as discussed in Section 2.5. The Phase 1 habitat survey was carried out by a graduate member of CIEEM with four years' professional experience, including over two years' undertaking extended Phase 1 habitat surveys of a range of sites, including large rural areas.
- 2.3.2. As detailed in Section 2.1, the Phase 1 habitat survey in 2018 covered a larger area (all accessible land within a 250m buffer of the Site) than the Survey Area presented in Figure 1. Only habitats recorded in 2018 within the present Survey Area are presented in the results to ensure that this report is relevant to the planning application for the Proposed Scheme.
- 2.3.3. Habitats were described and mapped following the standard Phase 1 habitat survey methodology (J NCC, 2010). Phase 1 habitat survey is a standard technique for classifying and mapping British habitats. The dominant plant species are recorded and habitats are classified according to their vegetation types. Where appropriate consideration was given to whether habitats qualify, or could qualify, as a Habitat of Principal Importance following habitat descriptions published by the Joint Nature Conservation Committee (J NCC, 2008).
- 2.3.4. Habitats were marked on a paper base map and were subsequently digitised using a Geographical Information System (GIS). The smallest area to be mapped was 0.003 ha which was selected as a suitable scale to sample the range of different vegetation types present on this large Survey Area.

⁵ Information on the HPI present within the area determined through review of Biodiversity Action Plan habitats defined within freely available Natural England GIS datasets. The former BAP habitats have been superseded, and now broadly match habitats listed as HPI's in response to the NERC Act 2006.

⁶ The ancient woodland inventory in England lists areas over two hectares in size which have been continuously wooded since at least 1600.

- 2.3.5. Target notes were made to provide information on specific features of ecological interest (e.g. a badger *Meles meles* sett) or habitat features too small to be mapped. These are included in Section 4 where relevant.
- 2.3.6. Any invasive plant species listed on Schedule 9 of the WCA 1981 (as amended) which were evident during the Phase 1 habitat survey were also target noted. Detailed mapping of such species; or a full survey of the Survey Area for all invasive plant species is beyond the scope of this commission.

2.4. PROTECTED SPECIES ASSESSMENT

- 2.4.1. The potential for the Survey Area to support legally protected and notable species was assessed using the desk study results and combined with field observations during the habitat survey. The assessment of habitat suitability for protected and notable species was based on professional experience and judgement. This was supplemented by standard sources of guidance on habitat suitability assessment for key faunal groups including: birds (Gilbert et al, 1998 and Bibby et al, 2000), great crested newt *Triturus cristata* (Gent and Gibson, 2003 and English Nature, 2001); reptiles (Froglife, 1999 and Gent and Gibson, 2003); bats (Collins, 2016 and Mitchell-Jones, 2004); badger *Meles meles* (Harris et al, 1991 and Roper, 2010); hazel dormouse *Muscardinus avellanarius* (English Nature, 2006); otter *Lutra lutra* (Chanin, 2003); water vole *Arvicola amphibius* (Dean et al, 2016) and invertebrates (Drake et al, 2007 and Kirby, P, 2001).

2.5. NOTES AND LIMITATIONS

- 2.5.1. Every effort has been made to provide a comprehensive description of the Survey Area; however, the following specific limitations apply to this assessment:
- ❖ Ecological survey data is typically valid for 18 months to 3 years unless otherwise specified, for example if conditions are likely to change more quickly due to ecological processes or anticipated changes in management. In this case, ongoing Site assessment and updating desk study indicates that this report remains an accurate Preliminary Ecological Appraisal suitable to inform decision making.
 - ❖ Records held by local biological record centres and local recording groups are generally collected on a voluntary basis; therefore, the absence of records does not demonstrate the absence of species, it may simply indicate a gap in recording coverage.
 - ❖ The Phase 1 Habitat survey was carried out over the period of two days, as such only a selection of all species that occur within the Survey Area will have been recorded. However, through use of desk study information to supplement survey data, it is considered that an accurate assessment of the potential for the Site to support protected species or those of conservation concern was possible.
 - ❖ The extended Phase 1 habitat map (Figure 8) has been reproduced from field notes and plans. Whilst this provides a sufficient level of detail to fulfil the requirements of a PEA, the maps are not intended to provide exact locations of key habitats.

3. RESULTS

3.1. DESIGNATED SITES

INTERNATIONALLY DESIGNATED STATUTORY SITES

- 3.1.1. The desk study identified seven statutory nature conservation sites (four within 10km and three within 30km designated for their bat interest of the centre of the Site) designated for their nature conservation value at the European or International scale. The nearest being Solent and Dorset Coast SPA, 5.5km south of the centre of the Site. A description of European or International importance sites are detailed in Table 1 below and shown in Figures 2 and 3⁷.

Table 1 - Statutory designated sites of European or International importance within a 10km (and 30km for bat species) radius of the Site

Site Name	Designation	Approximate Distance and Orientation from Site	Description
Solent and Dorset Coast	SPA	5.5km S	During the breeding season, the site supports: - Sandwich tern, <i>Sterna sandvicensis</i>; 441 pairs representing 4% of the breeding population in Great Britain - Common tern, <i>Sterna hirundo</i>; 492 pairs representing 5% of the breeding population in Great Britain- - Little tern, <i>Sternula albifrons</i>; 63 pairs representing 3% of the breeding population in Great Britain
Duncton to Bignor Escarpment	SAC	7.3 km NE	Annex I habitats that are a primary reason for selection of this site: - Asperulo-Fagetum beech forests

⁷ At the time of writing, the site boundary for Solent and Dorset Coast SPA was unavailable for download and therefore the site boundary for the site when it was designated as a proposed SPA (pSPA) is shown in Figure 3 to provide an indication of location.

Site Name	Designation	Approximate Distance and Orientation from Site	Description
Pagham Harbour	Ramsar	9.2km SW	Ramsar criterion 6 – species/populations occurring at levels of international importance: - Dark-bellied brent goose <i>Branta bernicla bernicla</i>, 2512 individuals, representing an average of 1.1% of the population (5-year peak mean during winter 1998/9-2002/3) Species/populations identified after designation for possible future consideration under criterion 6: - Black-tailed godwit <i>Limosa limosa islandica</i>, Iceland/W Europe 377 individuals, representing an average of 1% of the population (5-year peak mean during winter 1998/9- 2002/3)
Pagham Harbour	SPA	9.2km SW	Pagham Harbour is located on the south coast of England in West Sussex. It is an estuarine basin that comprises an extensive central area of saltmarsh and intertidal mud-flats, surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mud-flats are rich in invertebrates and algae, and provide important feeding areas for birds. The lower saltmarsh is dominated by Common Cord-grass <i>Spartina anglica</i>, with patches of Glasswort <i>Salicornia</i> spp. During the breeding season the site supports; - Little Tern <i>Sterna albifrons</i> 12 pairs representing 0.5% of the breeding population in Great Britain (Count as at 1995) Over winter the site supports; - Ruff <i>Philomachus pugnax</i> 160 individuals representing at least 22.9% of the wintering population in Great Britain - Pintail <i>Anas acuta</i> 628 individuals representing at least 1.0% of the wintering

Site Name	Designation	Approximate Distance and Orientation from Site	Description
			Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)
Singleton and Cocking Tunnels	SAC	10.8km NW	Annex II species present as a qualifying feature, but not a primary reason for site selection; - Barbastelle <i>Barbastella barbastellus</i> - Bechstein's bat <i>Myotis bechsteinii</i>
The Mens	SAC	17.5km NE	Annex II species present as a qualifying feature, but not a primary reason for site selection - Barbastelle <i>Barbastella barbastellus</i>
Ebernoe Common	SAC	19.4km N	Annex II species that are a primary reason for selection of this site: - Barbastelle <i>Barbastella barbastellus</i> A maternity colony of barbastelles utilises a range of tree roosts in this area of 91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles, which has a dense understorey of holly <i>Ilex aquifolium</i> as well as open glades and open water. Maternity roost sites are usually in dead tree stumps, but the species appears to be present throughout the year, with individuals utilising a range of roost sites in tree holes and under bark. - Bechstein's bat <i>Myotis bechsteinii</i> A maternity colony of Bechstein's bat is associated with this area of 91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles. Roosts are mainly in old woodpecker holes in the stems of live mature oak <i>Quercus petraea</i> trees.

UK DESIGNATED STATUTORY SITES

- 3.1.2. It should be noted that the sites of European or International importance listed in Table 1 above are also designated in the UK as Sites of Special Scientific Interest (SSSI), although they lie outside of the search radius applied for UK statutory sites (2km). There is one additional UK statutory designated site within a 2km radius of the Survey Area, The South Downs National Park. This is located approximately 1.3 km south of the Site (Table 2 and Figure 4).

Table 2 - Statutory designated sites of UK importance within a 2km radius of the Site

Site Name	Designation	Approximate Distance and orientation from Site	Description
The South Downs National Park	National Park	1.3km NW	A national park designated in 2010 for special qualities including, amongst others, a rich variety of wildlife and habitats including rare and internationally important species. The park is comprised of a mosaic of arable, heathland, grazed downland and ancient woodland habitat.

NON-STATUTORY SITES

- 3.1.3. The desk study identified four non-statutory nature conservation sites within 2km of the centre of the Site. The nearest being Fontwell Park Racecourse which is 0.5km north of the Site. A description of these sites is detailed in Table 3 below and shown in Figure 5.

Table 3 - Non-statutory designated sites within a 2km search radius of the Site

Site Name	Designation	Distance and orientation from Site (km)	Description
Fontwell Park Racecourse	Local Wildlife Site (LWS)	0.4km N	This area of interest in Fontwell Park Racecourse lies within and around the sides of the racetrack, where the grassland is minimally managed. The grassland is mostly unimproved and species rich, particularly in the areas where mowing is delayed until late in the season. The area within the track at the south end contains a number of notable species such as Adder's-tongue <i>Ophioglossum vulgatum</i> and Green-winged orchid <i>Orchis morio</i> .
Barnham Road at Eastergate	Notable Road Verge (NRV)	0.3km S	SxBRC designate NRV's based on whether the site:

Site Name	Designation	Distance and orientation from Site (km)	Description
			- supports locally rare, notable or protected species of flora or fauna - is a good example of uncommon, remnant or declining habitat - has a good overall species diversity - has wildlife value that is regarded as important by the local community - or contains wild flowers of high aesthetic value
Slindon Bottom	LWS	1.3km N	Slindon Bottom is predominantly mature woodland consisting of a mixture of pedunculated Oak <i>Quercus robur</i> , Ash <i>Fraxinus excelsior</i> , and Beech <i>Fagus sylvatica</i> . Some of the older trees support interesting 'old forest' epiphytic lichens. The ground flora is varied and moderately rich in some areas. There are occasional patches of Bluebell <i>Hyacinthoides non-scripta</i> , Butcher's Broom <i>Ruscus aculeatus</i> and Wood Spurge <i>Euphorbia amygdaloides</i> occur commonly. Other notable species include Spurge Laurel <i>Daphne laureola</i> , Sanicle <i>Sanicula europaea</i> , Primrose <i>Primula vulgaris</i> and Yellow Pimpernel <i>Lysimachia nemorum</i> . The woodland supports a diverse community of breeding birds.
Brittens Lane	NRV	1.3km NE	SxBRC designate NRV's based on whether the site: - supports locally rare, notable or protected species of flora or fauna - is a good example of uncommon, remnant or declining habitat - has a good overall species diversity - has wildlife value that is regarded as important by the local community - or contains wild flowers of high aesthetic value

OTHER HABITATS OF CONSERVATION IMPORTANCE

- 3.1.4. There are a total of 108 parcels of HPI within the 2km search area including coastal and floodplain grazing marsh (two parcels), deciduous woodland (79 parcels), lowland fen (one parcel), lowland meadows (two parcels), traditional orchard (12 parcels) and parcels of no main habitats but

additional habitat present⁸ (12 parcels). Portions of the traditional orchard HPI parcels are present within the north of the Site boundary, as shown on Figure 6.

- 3.1.5. Within a 2km search radius, there are 16 parcels of ancient woodland, the closest of which is 0.8km to the north of the Site. The locations of ancient woodland parcels are presented on Figure 6.
- 3.1.6. There are also approximately 10 waterbodies within the 500m search area which may have potential to support great crested newt. This includes mapped ditches that may hold standing water at times. Three of the waterbodies recorded as part of this search were identified within the Site, as shown on Figure 7.

3.2. HABITAT SURVEY

OVERVIEW

- 3.2.1. The Survey Area is large and varied over its extent. The northern areas contain a mixture of woody habitats including traditional orchard, woodland and scrub, with a small residential plot, whilst the centre and south feature predominantly semi-improved grassland and industrial buildings associated with a plant nursery.
- 3.2.2. The following account summarises the findings of the Phase 1 habitat survey. Fourteen Phase 1 habitat types were identified in the Survey Area. They are mapped on Figure 8 and a description of the dominant and notable species, as well as the composition and management of each habitat, is provided below. Photographs of key habitats are provided in Appendix C. The order of the habitat descriptions below reflects their ordering in the Phase 1 habitat survey manual and does not reflect habitat importance (J NCC, 2010).

BROADLEAVED SEMI-NATURAL WOODLAND ▶ A1.1.1

- 3.2.3. A single parcel of semi-natural broadleaved woodland was recorded within the northern section of the Survey Area, as shown by BW1 on Figure 8. This parcel comprises an unmanaged area of woodland with mature sycamore *Acer pseudoplatanus*, willow *Salix* sp. and occasional mature apple *Malus* sp. The understorey is sparse with littered deadwood throughout, and occasional common nettle *Urtica dioica*.

PLANTATION WOODLAND (INC. TRADITIONAL ORCHARD) ~ A1.1.2

- 3.2.4. In the north of the Survey Area there is an extensive area of orchard plantation woodland (PBW1) as shown on Figure 8. This parcel is a mature to semi-mature orchard with apple trees at a moderate density, with occasional mature pedunculate oaks. The apple trees reached approximately 3-4m high, were bushy and appeared to be under no current management. PBW1 is considered to meet the qualifying criteria for Traditional Orchard HPI.

⁸ This category comprises parcels where HPI have been recorded as present but not at sufficient densities to qualify as the main habitat within that parcel.

CONTINUOUS AND SCATTERED SCRUB ~ A2

- 3.2.5. Small areas of unmanaged continuous scrub were recorded within the Survey Area, as shown by DS1-4 on Figure 8, often occurring at boundaries of other habitat parcels. A small area of scattered scrub specimens were also recorded within the far north-west of the Survey Area. Species forming the scrub habitat included willow, bramble, butterfly bush *Buddleia davidii*, rose *Rosa* sp., elder and young elm *Ulmus minor*, cut through with scrambling species such as ivy, honeysuckle *Lonicera periclymenum*, white bryony *Bryonia dioica* and hedge bindweed occasionally.

SCATTERED TREES ~ A3

- 3.2.6. A range of individual trees are present within the Survey Area which are growing in isolation from woodland or parkland. Scattered species include lines of cypress *Cupressus* sp. along property boundaries in the north of the Survey Area. A significant row of tightly planted hornbeam *Carpinus betula* is present running through the orchard area on the boundary of BW1 (TN1 on Figure 8), which together with the associated scrub forms a good quality landscape feature.

SEMI-IMPROVED GRASSLAND ▶ B2.2

- 3.2.7. A selection of grassland fields under varying levels of management are present throughout the Survey Area, as shown on Figure 8. All of the grasslands were considered to be semi-improved in nature and are detailed in Table 4 below.

Table 4 - Semi-Improved Grassland Parcel Descriptions

Grassland Parcel No.	Description
SNG1	Two areas of recently mown grassland, approximately 5-10cm for the most part, though longer at the edges. Grass dominated with species such as false oat-grass <i>Arrhenatherum elatius</i> , fescues <i>Festuca</i> sp., bents <i>Agrostis</i> sp. and Yorkshire fog <i>Holcus lanatus</i> , with some herbs including common nettle, creeping thistle <i>Cirsium arvense</i> and sheep's sorrel <i>Rumex acetosella</i> .
SNG2	Large area of long grassland with little evidence of recent management. Dominated by false oat-grass, reaching over 1m high in places. Some areas were herb-dense including spear thistle <i>Cirsium vulgare</i> , broad-leaved dock <i>Rumex obtusifolius</i> , common nettle and ragwort <i>Jacobaea vulgaris</i> . A slight variation to the south where areas of bent-dominated softer, shorter grass are present, including timothy <i>Phleum pratense</i> and sweet vernal grass <i>Anthoxanthum odoratum</i> also.
SNG3	Recently mown grassland reaching approximately 10cm at the time of survey. Dominated by perennial rye grass <i>Lolium perenne</i> , with meadow foxtail <i>Alopecurus pratensis</i> and creeping bent <i>Agrostis capillaris</i> . White clover <i>Trifolium repens</i> is present within the sward, whilst other herbs confined to the margins include broad leaved dock, common nettle, spear thistle and yarrow <i>Achillea millefolium</i> .
SNG4	Recently mown grassland approximately 7cm at the time of survey, dominated by false oat-grass with few herbs in the sward save thistles. More herbs at the margins including common nettle, common ragwort, hawkbit <i>Leontodon</i> sp., and field bindweed <i>Convolvulus arvensis</i> .

TALL RUDERAL VEGETATION - C3.1

- 3.2.8. Tall ruderal vegetation is towards the south of the Survey Area, as shown by TR1 on Figure 8. This area is unmanaged save for occasional mowing or clearance. Species recorded included abundant common nettle, with mugwort *Artemisia vulgaris*, spear thistle, common ragwort, goat's-rue *Galega officinalis*, greater willowherb, rosebay willowherb *Chamerion angustifolium*, greater plantain, scented mayweed *Matricaria recutita*, musk-mallow *Malva moschata*, garlic mustard *Alliaria petiolata*, hogweed, nipplewort *Lapsana communis*, cleavers *Galium aparine*, white bryony, hedge parsley *Anthriscus sylvestris*, butterbur *Petasites hybridus*, ivy, burdock *Arctium lappa*, dark mullein and water mint *Mentha aquatica*.

STANDING WATER - G1

- 3.2.9. One waterbody was recorded within far south of the Survey Area, as labelled as SW1 on Figure 8. SW1 is a linear drainage pond situated between the plant nursery within the Survey Area and an arable field immediately adjacent to the Survey Area. SW1 was shallow at the time of survey, with dense aquatic vegetation cover present.

ARABLE LAND - J 1.1

- 3.2.10. A small area of cultivated horticultural land is present within the plant nursery to the south of the Survey Area, as shown as arable land on Figure 8. This land was in current use for growing ornamental flowers for wholesale.

AMENITY GRASSLAND - J 1.2

- 3.2.11. An area of amenity grassland comprising a residential garden area is present in the far north extent of the Survey Area, as shown by AM1 on Figure 8. AM1 is a regularly mown space with a short sward height at the time of survey (maximum sward height 10cm), dominated by perennial rye-grass and common daisy *Bellis perennis*.

HEDGEROWS - J 2.1.2

- 3.2.12. Three hedgerows were recorded within the Survey Area, including two hedgerows in the centre of the Survey Area and one in the south along the boundary of the plant nursery. The hedgerows are of similar character, species-poor with a lack of recent management resulting in bushy tops.
- 3.2.13. The results of the hedgerow surveys are summarised in Table 5, and labelled on Figure 8. It is generally the case that the most valuable hedgerows are those which are species-rich, however the presence of associated features (e.g. ditches and tracks) can increase the value of a hedgerow. As such Table 5 also includes a commentary on whether the hedgerow is likely to qualify as 'Important' under the Hedgerow Regulations (1997), although note this is provisional as a full hedgerow survey was not undertaken, nor is it known if the hedgerow supports protected or notable faunal species which would render it 'important'. All hedgerows classify as HPI.

Table 5 - Hedgerow Descriptions

Hedgerow No.	Description	Ph1 Type	Important?
PH1	Hedgerow evidently box-cut in the past, though not recently so now bushy. Approximately 2.5m high and 1m wide. Dominated by hawthorn and blackthorn with field maple and occasionally dogwood. Ground flora comprising grasses from the surrounding area (dominated by false oat grass), and the commoner tall ruderal herbs including common nettle, hedge bindweed and common ragwort.	Intact Sp. Poor	Unlikely
PH2	As PH1	Intact Sp. Poor	Unlikely
PH3	Hedgerow evidently box-cut in the past, though not recently so now bushy. Approximately 2m high and 1m wide. Dominated by hawthorn with occasional hazel.	Intact Sp. Poor	Unlikely

BUILDINGS ~ J 3.6

- 3.2.14. The accessible part of the Survey Area is largely devoid of buildings or structures. A single, recently constructed residential property is present in the far north of the Survey Area, and industrial warehouses and polytunnels are present in the plant nursery in the south of the Survey Area. The distribution of buildings is shown on Figure 8.

BARE GROUND (INC. HARDSTANDING) ~ J 4

- 3.2.15. Bare ground is sporadically present throughout the Survey Area in the form of tarmac roads, packed earth tracks and bare soil.
- 3.2.16. The majority of the bare ground had little to no colonising vegetation save very occasional species such as pineappleweed *Matricaria discoidea* or common orache *Atriplex patula*.

3.3. PROTECTED AND NOTABLE SPECIES ASSESSMENT

- 3.3.1. The potential for Survey Area to support legally protected species and notable species has been assessed using the results of the desk study and observations made during the site survey of habitats within and immediately surrounding the Survey Area. A summary of desk study information is included within Appendix B. Desk study records have only been considered below if they are recent (from the last 10 years) and/or if they relate to species that may be supported by habitats at the Survey Area. Habitats present within the Survey Area are suitable for the following species; further consideration is given below to the likelihood for these species to be present within the Survey Area.

- ☞ Bats.
- ☞ Badger.
- ☞ Hazel Dormouse.
- ☞ Otter and Water Vole.
- ☞ Other Mammals.
- ☞ Birds.

- ☞ Reptiles.
- ☞ Amphibians.
- ☞ Invertebrates.
- ☞ Flora.

3.3.2. The Survey Area does not provide suitable habitat for other protected or notable species and other species, beyond those listed above, will not be considered further in this PEA.

BATS

- 3.3.3. Roosts of eight species of bat within 5km of the Site were returned from the desk study, including for brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, serotine *Eptesicus serotinus*, Natterer's bat *Myotis nattereri*, barbastelle *Barbastella barbastellus*, as well as unidentified bat *Chiroptera* and pipistrelle *Pipistrellus* sp. The closest of these were common and soprano pipistrelle roosts at 0.9km from the Survey Area, whilst no roost records were returned from within the Survey Area itself.
- 3.3.4. There is considered to be a diverse species assemblage of bats within the wider area based on activity records within 2km of the Site, which includes the species listed as roosting with the addition of long-eared bat *Plecotus* sp., Myotis *Myotis* sp., Nathusius's pipistrelle *Pipistrellus nathusii*, Daubenton's bat *Myotis daubentonii*, Bechstein's bat *Myotis bechsteinii*, Leisler's bat *Nyctalus leisleri* and greater horseshoe bat *Rhinolophus ferrumequinum*. The closest activity records returned are for common pipistrelle, noctule and serotine all of which were recorded within 300m of the Site.
- 3.3.5. The trees over the whole Survey Area, including those in woodland, tree lines, orchard and hedgerow habitats, may offer opportunities for roosting bats. A full ground-level inspection was not undertaken but mature specimens likely to contain features such as cracks and cavities were noted during the survey.
- 3.3.6. In addition, the Survey Area contains a number of buildings such as houses, farm buildings and plant nursery buildings, which could support features suitable for roosting bats, although a specific ground-level inspection was not undertaken. Many of these buildings are located within land which was not accessible for survey, and which is unlikely to be affected by the Proposed Scheme (directly or indirectly), however several are. This includes a residential building in the north of the Site.
- 3.3.7. In terms of foraging, many habitats within the whole Survey Area are likely to support an elevated invertebrate assemblage for bats to feed upon. These include woody areas such as orchard and woodlands, as well as long grassland, scrub and tall ruderal areas.
- 3.3.8. A number of potential commuting features also pass through the Survey Area which may be important for bats travelling between roosting and feeding grounds. These include woodland edges (including the orchards), hedgerows and tree lines.

BADGER

- 3.3.9. No records of badger were returned from the desk study and no conclusive evidence of badger was recorded during the survey. Some mammal pathways were occasionally encountered but these may indicate the presence of other mammal species.
- 3.3.10. Badger are a resourceful species capable of utilising and making setts in a wide range of habitats, including the majority of those within the Survey Area, save the hardstanding. For this reason, their absence cannot be concluded based on information currently available.

HAZEL DORMOUSE

- 3.3.11. A large number of hazel dormouse records were returned from within 2km of the Site (38 in total), all of which relate to the same location on repeated occasions since 2008. The location is within woodland to the south of Slindon, approximately 1.2km north of the Survey Area.
- 3.3.12. The wooded habitats within the Survey Area including orchard, semi-natural woodland, hedgerows and continuous scrub in the north and centre however may offer opportunities for foraging, nest creation and hibernation.

OTTER AND WATER VOLE

- 3.3.13. No records of otter were returned from the desk study. There is only one area of standing water (SW1) in the south of the Survey Area, but this is considered to be too isolated and lacking in depth to be able to support otter.
- 3.3.14. Water vole records, by contrast, are present within the local area, with five records within 2km of the Site although none of these are present within the Site boundary.
- 3.3.15. The Survey Area does not contain suitable habitat for water vole, with SW1 in the south considered to be too shallow and isolated, and they are likely to be absent from that area.

OTHER MAMMALS

- 3.3.16. Records of two other mammal species were returned from the desk study, comprising polecat *Mustela putorius* and West European hedgehog *Erinaceus europaeus*, the latter being the closest recorded within 200m of the Survey Area.
- 3.3.17. The Survey Area contains a variety of habitats likely to support common mammal species, and the potential for some less common ones. Fox *Vulpes vulpes*, field vole *Microtus agrestis* and common shrew *Sorex araneus* are likely to use a range of habitats within the whole Survey Area including orchards, grassland, scrub and tall ruderal vegetation, whilst rabbits *Oryctolagus cuniculus* were recorded during the site survey.
- 3.3.18. The woody habitats in the Survey Area, such as the orchard, woodland and scrub, may offer opportunities for polecat as well as hedgehog, and hedgehog may also use a variety of habitats including the surrounding gardens which were not accessed. The open grassland is suitable for brown hare which prefer exposed habitats.

BIRDS

- 3.3.19. Records for 76 species of bird were returned from the desk study, as summarised at Table B2 in Appendix B. These included 18 species listed under Schedule 1 of the Wildlife and Countryside Act, of which some may utilise habitats present within the Survey Area such as red kite *Milvus milvus*, barn owl *Tyto alba*, kingfisher *Alcedo atthis* and firecrest *Regulus ignicapilla*. In addition, a range of red-listed and/or NERC Act Priority Species were also returned such as cuckoo *Cuculus canorus*, marsh tit *Poecile palustris*, lesser spotted woodpecker *Dendrocops minor*, bullfinch *Pyrrhula pyrrhula*, lapwing *Vanellus vanellus*, skylark *Alauda arvensis* and house sparrow *Passer domesticus*.
- 3.3.20. Several species were recorded within the Survey Area during the survey including greenfinch *Chloris chloris*, wood pigeon *Columba palumbus* and wren *Troglodytes troglodytes*.
- 3.3.21. The wooded habitats within the Survey Area offer nesting opportunities for a range of birds, including the orchard and hedgerows which could support species such as lesser spotted

woodpecker, yellowhammer *Emberiza citrinella*, tawny owl *Strix aluco*, and bullfinch, the latter of which is a Priority Species which favours fruit trees.

- 3.3.22. In addition, the open grassland habitats offer nesting opportunities for notable species which were returned in the desk study such as lapwing and skylark, being of a sufficient size and with a suitable open aspect. Barn owl records were returned from the desk study and may utilise the grassland and field margins present within the Survey Area for foraging, particularly along SNG2 which was unmanaged at the time of survey.
- 3.3.23. Several wetland bird species were returned from the desk study such as black winged stilt *Himantopus himantopus* (a migrant nester), little egret *Tachybaptus ruficollis* and little ringed plover *Charadrius dubius*, however the Survey Area does not contain habitat suitable for these birds to nest. They are more likely to be making use of floodplain grazing marsh present to the south east of the Survey Area, and within the wider landscape.
- 3.3.24. There is potential however for wintering species such as geese to utilise the grassland habitats during the winter months, which may include populations which also utilise designated sites such as Pagham Harbour Ramsar and SPA, and Chichester and Langstone Harbour Ramsar and SPA in the region (see Section 3.1).

REPTILES

- 3.3.25. Three reptile species were returned from the desk study, all within 100m of the Survey Area boundary; common lizard *Zootoca vivipara*, grass snake *Natrix natrix* and slow worm *Anguis fragilis*.
- 3.3.26. The grassland and tall ruderal habitats in the Survey Area are suitable for all reptiles foraging, whilst slow worm may also use the woodland and scrub, and grass snake may also use the waterbody in the south of the Survey Area (SW1 on Figure 8). The wooded habitats throughout the Survey Area, such as orchard, woodland, scrub and hedgerows, offer hibernation opportunities in the form of roots, rocks and fallen deadwood.

AMPHIBIANS

- 3.3.27. No amphibian records were returned from within the Survey Area, though four species were returned within 2km; common toad *Bufo bufo*, common frog *Rana temporaria*, great crested newt *Triturus cristatus* and smooth newt *Lissotriton vulgaris*. The nearest great crested newt record was from approximately 1km east of the Survey Area.
- 3.3.28. The commoner amphibians, common toad and smooth newt, may make use of the waterbody in the south of the Survey Area (SW1), as well as the surrounding terrestrial habitats.
- 3.3.29. SW1 may also be suitable for breeding great crested newt, which is European protected species, as well as a selection of waterbodies within 250m of the whole Survey Area (see Figure 7). In addition, many of the habitats throughout the Survey Area, including grassland, orchard, woodland, tall ruderal and scrub, offer terrestrial opportunities for foraging and movement by great crested newt. Hibernation opportunities are also present within woodlands and hedgerows where roots, rocks and other debris offer refuge.

INVERTEBRATES

- 3.3.30. Records of 35 invertebrate species were returned from the desk study, although none were from within the Survey Area, dominated by Lepidoptera, butterflies and moths. These included stag beetle *Lucanus cervus* a Priority Species and protected under the Wildlife and Countryside Act 1981

(as amended), as well as a range of moth Priority Species including cinnabar *Tyria jacobaeae*, lunar yellow underwing *Noctua orbona* and small emerald *Hemistola chrysoprasaria*. In addition, a record for pearl-bordered fritillary butterfly *Boloria euphrosyne* was returned from approximately 1.4km north-east of the Survey Area, which is also a Priority Species and protected under the Wildlife and Countryside Act 1981 (as amended).

- 3.3.31. A number of invertebrates were recorded during the site survey including cinnabar caterpillars, large white *Pieris brassicae*, comma *Polygonium c-album*, peacock *Aglais io*, meadow brown *Maniola jurtina*, red admiral *Vanessa Atalanta* and common blue *Polyommatus icarus*.
- 3.3.32. The tall ruderal and grassland habitats throughout the Survey Area offer opportunities for insects such as butterflies, moths and other pollinators, as well as spiders and grasshopper specialising in grassland. The woodland, orchard, scrub and scattered trees are also likely to support an elevated invertebrate assemblage. The orchard may also support specialist species such as stag beetle in standing and lying deadwood.
- 3.3.33. No white-clawed crayfish records were returned from the desk study and no suitable watercourses to support this species were recorded within the Survey Area.

NOTABLE FLORA

- 3.3.34. Records of 28 plant species were returned from the desk study, including some protected and notable species. These included bluebell *Hyacinthoides non-scripta*, protected under the Wildlife and Countryside Act 1981 (as amended), and a number of Priority Species such as spreading hedge-parsley *Torilis arvensis* and frog orchid *Coeloglossum viride*.
- 3.3.35. No notable botanical species were noted during the site survey, although an exhaustive search was not undertaken. Although it is unlikely that notable flora is present within the habitats on Site which are typically managed and/or disturbed regularly, the absence of such species cannot be confirmed.

NON-NATIVE INVASIVE SPECIES.

- 3.3.36. Records of eight non-native invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act were returned from the desk study, none of which were recorded within the Survey Area. Several species which can spread quickly and cause significant damage, particularly along watercourses, were recorded within 2km of the Site including giant hogweed *Heracleum mantegazzianum*, Himalayan balsam *Impatiens glandulifera* and Japanese knotweed *Fallopia japonica*.
- 3.3.37. Seven Schedule 9 listed invasive animal species were returned, mainly birds such as black swan *Cygnus atratus*, Canada goose *Branta canadensis* and golden pheasant *Chrysolophus pictus*, none of which were recorded within the Survey Area.
- 3.3.38. No records of American mink *Neovison vison* or signal crayfish *Pacifiastacus lenisculus* were returned, and it is considered that these species are likely absent from the Site given the absence of suitable aquatic habitat.

4. DISCUSSION AND RECOMMENDATIONS

4.1. OVERVIEW

- 4.1.1. This section considers the potential for effects on designated sites, legally protected species, notable species and notable habitats as a consequence of the Proposed Scheme. Where further surveys or detailed assessment of potential effects are required in order to design suitable mitigation, this is identified.

4.2. STATUTORY DESIGNATED SITES

- 4.2.1. Four international statutory nature conservation sites are present within 10km of the Site and three international statutory nature conservation sites with bat qualifying interest within 30km of the Site. Although several of these are likely to remain unaffected by the Proposed Scheme, several are designated for wintering bird species which may utilise habitats within the Survey Area, and thus may be affected.
- 4.2.2. The sites unlikely to be affected are Duncton to Bignor Escarpment SAC and the Solent and Dorset Coast SPA which lie 7.3km to the north-east and 5.5km to the south respectively and the three bat-related sites, Ebernoe Common SAC, The Mens SAC and Singleton and Cocking Tunnels SAC at 19.4km, 17.5km and 10.8km distance respectively are also considered unlikely to be affected due to the lack of potential significant effects pathways.
- 4.2.3. The Duncton to Bignor Escarpment site is designated for its Asperulo-Fagetum beech forest habitats, an Annex I habitat. Given the distance from the site these habitats are likely to remain unaffected by indirect impacts such as dust, noise or light. The Solent and Dorset Coast SPA is designated for its breeding populations of tern species, of which the Site is unlikely to support due to the lack of coastal habitats. This preliminary assessment should be confirmed during early stage screening to ensure that changes in air quality resulting from each phase of the Proposed Scheme do not affect these habitats and designated sites. Ebernoe Common SAC, The Mens SAC and Singleton and Cocking Tunnels SAC are also considered unlikely to be affected due to the lack of potential effects pathways for the relevant bat species.
- 4.2.4. The remaining sites; Pagham Harbour Ramsar and SPA, are designated for the wetland bird populations they support. The breeding populations of these birds rely on wetland habitats, none of which are within the Survey Area, and are therefore unlikely to be affected by the Proposed Scheme. Significant populations of a number of protected wintering or passage bird species do utilise those sites though, namely; little egret, bar-tailed godwit *Limosa lapponica*, ringed plover, grey plover *Pluvialis squatarola*, redshank *Tringa totanus*, dark-bellied brent goose, common shelduck *Tadorna tadorna*, and dunlin *Calidris alpina*.
- 4.2.5. Some of these species, for example the geese, may utilise the open grassland within the Survey Area, for example at high tide or during adverse weather conditions. As such, removal of this habitat may affect Pagham Harbour Ramsar and SPA, and Chichester and Langstone Harbour Ramsar and SPA indirectly.
- 4.2.6. The Habitats Regulations provide strict protection to sites of European and/or international importance. This includes requiring projects or plans to be screened for likely significant effects upon SPA, SAC and candidate SACs (cSACs). The NPPF also requires potential SPAs (pSPAs) and Ramsars to be subject to the same assessment. Therefore, due to the presence of Pagham Harbour
-

Ramsar and SPA, the Proposed Scheme must be screened by the competent authority (West Sussex County Council) to determine whether significant effects are likely to result. If the local authority is unable to conclude that significant effects are not likely, the Proposed Scheme must be subject to additional assessment in accordance with the Habitats Regulations.

- 4.2.7. In order to inform this assessment, it is recommended that wintering bird surveys are undertaken at the Survey Area, as detailed at Section 4.5.
- 4.2.8. In addition, one national statutory designated site is located 1.3km north-west of the Site; The South Downs National Park, which contains a mosaic of arable, heathland, woodland and downland habitats. This site is sufficiently distant to render most effects unlikely, however it is recommended that suitable pollution prevention measures are implemented during construction and operation as a precaution to protect this site, as detailed at Section 4.6.

4.3. NON-STATUTORY DESIGNATED SITES

- 4.3.1. Locally designated sites are protected under local and national planning policy. Four such sites are present within the search area. Of these, two are Notable Road Verges on Barnham Road and Brittens Lane (see Figure 5) which already tolerate high disturbance from their adjacent roads, and which are unlikely to be affected by the Proposed Scheme.
- 4.3.2. Fontwell Park Racecourse LWS and Slindon Bottom LWS are located 0.4km and 1.3km north of the Site respectively. Neither site is likely to be adversely affected by the scheme as Slindon Bottom is sufficiently distant from the Site, beyond existing housing, and Fontwell Racecourse's habitats are enclosed within the race track and its surrounding buildings and access tracks.

4.4. HABITATS

- 4.4.1. The Survey Area covers a breadth of habitats, some of which are common within the surrounding area and are of little ecological value such as bare ground and intensive arable land. Several of the habitats however are of ecological value, both intrinsically and for their potential to support protected and notable flora and fauna. This includes traditional orchard and hedgerows within the Survey Area.
- 4.4.2. In accordance with Section 41 of the NERC Act 2006. Under Section 40 of this legislation, every public body (including planning authorities) must, in exercising its functions, have regard so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. Additional habitats of value which may be lost include semi-improved grassland and standing water.
- 4.4.3. As well as loss of valuable habitat, the Proposed Scheme may cause effects such as runoff disruption, or increased lighting, dust or noise upon retained habitats.
- 4.4.4. Recommendations for how to avoid, protect and, if necessary, compensate for effects upon valuable habitats within the site are provided at Section 4.6.

4.5. PROTECTED AND NOTABLE SPECIES

- 4.5.1. The results of the desk study, Phase 1 habitat survey and protected species assessment highlighted the potential presence of several protected species or species of conservation concern within the Survey Area, or within its immediate surroundings. These comprise:

- Bats

- Badger

- ☞ Hazel dormouse
- ☞ Breeding birds
- ☞ Wintering birds
- ☞ Reptiles
- ☞ Amphibians
- ☞ Invertebrates

4.5.2. The legal protection afforded to these species is outlined below and, where appropriate, the requirement for further survey and/ or mitigation measures in each Phase of the Proposed Scheme is identified.

BATS

- 4.5.3. All species of bats recorded within the UK are protected from killing, injury and disturbance⁹ and their roosts protected from damage or destruction under the Habitats Regulations. Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of individuals occupying places of rest or shelter and obstruction of access to these. Activities that would otherwise constitute an offence under this legislation may be licensed by Natural England for certain purposes.
- 4.5.4. Certain species of bats, including the Bechstein's bat, greater and lesser horseshoe bats, noctule bat, brown long-eared bat and soprano pipistrelle bat are also listed as Species of Principal Importance (SPI) for the conservation of biodiversity in England in accordance with Section 41 of the NERC 2006. Section 40 obliges public bodies (including local planning authorities) to have regard for the conservation of biodiversity (including SPI) when discharging their duties (including determining planning applications).
- 4.5.5. In terms of roosting bats, a number of trees and barn/stable buildings may be removed in order to facilitate construction of both Phases of the Proposed Scheme. This could result in destruction of a roost if bats are utilising these features, whilst roosts may also be disturbed through routes such as lighting, noise and disturbance, if present. As such it is recommended that a Preliminary Bat Roost Assessment (PBRA) is undertaken, as detailed in Table 6. Based on the results of this, further survey such as climbed inspections or dusk emergence / dawn re-entry surveys may be required, in line with good practice guidance (Collins, 2016).
- 4.5.6. In addition, habitats within the Survey Area may support foraging bats such as the woodland, orchard, grassland and tall ruderal, whilst linear features such as tree lines and hedgerows may facilitate a range of bat species commuting around the local area. If these habitats cannot be retained, in order to assess the likely effect of the Proposed Scheme on foraging and commuting bats, further survey including walked transects and static detector monitoring of bat activity is recommended, as detailed in Table 6.

⁹ Disturbance is defined within the Habitats Regulations as that which is likely to impair a species ability to survive, breed or reproduce, hibernate or migrate or to significantly affect the local distribution or abundance of the species.

BADGER

- 4.5.7. The Protection of Badgers Act 1992 makes it illegal to wilfully kill, injure or take any badger, or attempt to do so. It also makes it an offence to intentionally or recklessly damage, destroy or obstruct access to any part of a badger sett. Activities that would otherwise constitute an offence under this legislation may be licensed by Natural England for certain purposes.
- 4.5.8. No evidence or records of badger were returned from the Survey Area, however this dynamic species could create setts in almost all of the habitats present, save perhaps the hard standing. For this reason a specific badger walkover survey to search for field signs is recommended for both Phases, as detailed at Table 6.

HAZEL DORMOUSE

- 4.5.9. Hazel dormice are protected from killing, injury and disturbance¹⁰ and their places of rest or shelter (occupied habitat) protected from damage or destruction under the Habitats Regulations. Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of individuals occupying places of rest or shelter and obstruction of access to these. Activities that would otherwise constitute an offence under this legislation may be licensed by Natural England for certain purposes.
- 4.5.10. Hazel dormice are also listed as SPI in accordance with Section 41 of the NERC Act 2006. Public bodies have an obligation under Section 40 to have regard for these species when carrying out their functions.
- 4.5.11. Removal of woody vegetation such as hedgerows, woodland (including orchard) and continuous scrub for the Proposed Scheme risks causing an offence under the legislation protecting this species, risking individuals, habitat loss and fragmentation, and as such further survey using nest tubes is recommended, as detailed at Table 6 so that likely effects upon this species may be assessed.

BIRDS

- 4.5.12. Under the amendments to the Habitat Regulations (16th August 2012) Reg 9A(2) and (3) state that local authorities must take such steps in the exercise of their functions as they consider appropriate to contribute to the preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds in the UK including by means of the upkeep, management and creation of such habitat. The legislation continues to state that economic and recreation requirements must be taken into consideration in considering which measures are appropriate.
- 4.5.13. Under the Wildlife and Countryside Act 1981 (as amended) all wild birds are protected from killing and injury, and their nests and eggs protected from taking, damage and destruction whilst in use. Additional protection is extended to species listed under Schedule 1 of the Act, meaning it is also an offence to disturb these species at or near the nest, or whilst they have dependent young.

¹⁰ Disturbance is defined within the Habitats Regulations as that which is likely to impair a species ability to survive, breed or reproduce, hibernate or migrate or to significantly affect the local distribution or abundance of the species.

- 4.5.14. A number of the habitats within the Survey Area have the potential to support breeding birds including the orchard, woodland, hedgerows and grassland. In addition, grassland areas within the Survey Area may have the potential to support foraging barn owl. As the Proposed Scheme will necessitate removal of some if not all of parts of these habitats, it is recommended that breeding bird surveys are undertaken to assess how breeding birds are utilising the Survey Area, including any potential ground-nesting species.
- 4.5.15. Finally, removal of grassland may impact wintering birds through loss of supporting habitat and foraging resource associated with local SPAs and Ramsar sites. As such, wintering bird surveys are recommended for these habitats, as detailed at Table 6.

REPTILES

- 4.5.16. Native widespread reptile species (common or viviparous lizard, adder, grass snake and slow worm) are partially protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This includes protection from killing and injury.
- 4.5.17. All reptile species are also listed as SPI in accordance with Section 41 of the NERC Act 2006. Public bodies have an obligation under Section 40 to have regard for these species when carrying out their functions.
- 4.5.18. Removal of habitats such as tall ruderal, grassland, woodland, orchard, scrub and hedgerows have the potential to kill, injure or disturb a number of reptile species such as slow worm, common lizard and grass snake. Some of these habitats may also support hibernating reptiles which, if disturbed during the construction stage, would result in an increased risk of killing and injury.
- 4.5.19. In order to assess the potential impact of the Proposed Scheme upon reptiles, it is recommended that a reptile survey is undertaken of suitable habitat, in line with relevant guidelines, as detailed in Table 6.

AMPHIBIANS

- 4.5.20. Great crested newts are protected from killing, injury and disturbance¹¹ and their places of rest or shelter (occupied habitat) protected from damage or destruction under the Habitats Regulations. Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of individuals occupying places of rest or shelter and obstruction of access to these. Activities that would otherwise constitute an offence under this legislation may be licensed by Natural England for certain purposes.
- 4.5.21. Great crested newts and common toad Bufo bufo are also listed as SPI in accordance with Section 41 of the NERC Act 2006. Public bodies have an obligation under Section 40 to have regard for these species when carrying out their functions.
- 4.5.22. The Survey Area contains a range of habitats suitable for great crested newt, and other amphibians, during their terrestrial phase for foraging, commuting and hibernating. In addition, the standing water

¹¹ Disturbance is defined within the Habitats Regulations as that which is likely to impair a species ability to survive, breed or reproduce, hibernate or migrate or to significantly affect the local distribution or abundance of the species.

in the south of the Survey Area may provide suitable breeding habitat and a number of connected waterbodies are present within 250m of the whole Survey Area (from which great crested newts could reach the site). As such, removal of natural habitats to facilitate the Proposed Scheme poses a risk to individual newts if they are present, as well as destroying places of rest or shelter. Although the Proposed Scheme is for a single carriageway road, the overall working width is likely to be of a width and nature so as to prevent newts crossing safely, and as such habitat fragmentation would also be likely to occur.

- 4.5.23. In order to assess the likely impacts of the Proposed Scheme upon great crested newt, a suite of further surveys is recommended, commencing with a Habitat Suitability Index (HSI) assessment of all connected waterbodies within 250m of the Survey Area. This would likely then be followed with presence-absence or population surveys as detailed in Table 6.

INVERTEBRATES

- 4.5.24. Stag beetle receive partial protection under Schedule 5 of the WCA. and are also a Priority species in England and Wales under Section 41 and Section 42 respectively of the NERC. They can therefore be considered a material consideration in a planning application, along with many other invertebrate species.
- 4.5.25. The Proposed Scheme may result in the removal of orchard and woodland habitat which may support stag beetle, and other habitats of use to invertebrate species. The Proposed Scheme may also fragment habitat areas. Mitigation measures to avoid and protect invertebrates, as well as habitat compensation recommendations, are made at Section 4.6. Further survey for invertebrates is recommended for the Survey Area which contains valuable, traditional orchard habitat.

FURTHER ASSESSMENT

- 4.5.26. Given the proximity to sites designated for their nature conservation value at the European and International scale, a Habitats Regulation Screening Assessment will be required. This should be informed by the results of the wintering bird surveys and preliminary air quality modelling.

FURTHER SURVEY REQUIREMENTS

- 4.5.27. Potential ecological constraints for which further surveys are required to ensure legal and planning policy compliance are listed in Table 8. All survey recommendations are in-line with the relevant published guidance.

Table 6 - Key Ecological Constraints and Further Survey Requirements

Ecological Receptor	Potential Constraints	Further Survey Requirements	Seasonal Constraints
Roosting Bats	Demolition/ felling of structures and trees may result in the damage/ destruction of a bat roost.	Further assessment of trees / buildings to determine presence, potential presence or likely absence of roosting bats. Features with potential to support roosting bats should be subject to an aerial inspection by a licensed bat ecologist. If the aerial surveys cannot confirm likely absence of roosting bats, dusk emergence and dawn re-entry surveys will be required.	External inspections can be undertaken at any time of year but, for trees, are most conclusive in the autumn and winter months where no leaf cover exists. Dusk emergence/ dawn re-entry surveys must be undertaken between May and September and are optimal between May and August.
Foraging and Commuting Bats	Destruction and fragmentation of suitable foraging habitats and commuting routes may result from the Proposed Scheme.	Bat activity surveys in the form of walked transects and static detector deployment.	Monthly surveys between April and October inclusive.
Badger	Risk to badger during the construction stage if the local badger social group constructs a new sett before works start.	Specific badger walkover.	Minimal seasonal constraints; survey during winter/spring months (between October and April) may be advisable to avoid limitations resulting from vegetation growth.

Ecological Receptor	Potential Constraints	Further Survey Requirements	Seasonal Constraints
Hazel Dormouse	Risk of direct habitat loss/ fragmentation and disturbance of individuals, through clearance of woody vegetation.	Deployment of nest tubes followed by monthly checks to determine the likely presence or absence of hazel dormouse.	March/April - October/November inclusive.
Breeding Birds	Risk of destruction of nests by removal of woody vegetation.	Breeding bird surveys involving walked transects in suitable habitat at dawn during the peak breeding season.	Surveys at suitable intervals during May - June inclusive (or April to record early nesting behaviour).
Wintering Birds	Risk of loss of supporting habitat for SPA/Ramsar sites designated for their internationally important wintering bird populations.	Walked transect wintering bird surveys of the grassland within the centre of the site.	At least three visits between October and March inclusive.
Reptiles	Risk to individuals from clearance of habitats within the Survey Area.	Survey comprising deployment of artificial refugia at a suitable density, followed by seven visits to check refugia.	April-September, with July and August being suboptimal, during appropriate weather conditions.
Great crested newt	Removal of suitable breeding ponds and terrestrial habitat, and risk to individuals.	Initial survey by undertaking HSI surveys of suitable, connected waterbodies within 250m of the Proposed Scheme. Where waterbodies are assessed to have potential to support great crested newt, it may be necessary to undertake further survey to	HSI: All year round; March-August (optimal) Presence absence: Mid-April to June (eDNA, 1 visit); mid- March- mid June (traditional field survey, four visits to determine presence/ absence).

Ecological Receptor	Potential Constraints	Further Survey Requirements	Seasonal Constraints
		determine the presence or likely absence of this species. This could involve testing water samples for environmental DNA (eDNA, in line with Defra, 2013) and/or traditional field survey approaches (as per English Nature, 2001), requiring multiple night-time visits. Where presence is confirmed by eDNA and the population may be affected by the Proposed Scheme, it is necessary to use traditional methods in order to assess population size.	Where presence confirmed, two additional visits required for population assessment. At least 50% visits mid-April to mid-May.
Invertebrates	Killing of rare and notable species through removal of orchard habitat. Permanent loss and fragmentation of habitat for these species.	A specialist invertebrate survey of the orchard habitat is recommended. This is likely to comprise an initial walkover followed by specific survey methodologies such as suction sampling, beating or pitfall trapping.	Survey timings vary, but generally should be undertaken in the summer months (May – September).

4.6. PRELIMINARY AVOIDANCE, MITIGATION AND COMPENSATION MEASURES

- 4.6.1. To enable compliance with relevant legislation and planning policy, as described above within Section 4, the following avoidance, mitigation and compensation measures should be designed in to the Proposed Scheme. These should be refined following completion of further survey recommended in Table 6 above.
- ☞ The detailed design should seek to retain valuable habitats where possible. That includes the traditional orchard and hedgerow HPI habitats. Where unavoidable impacts to these habitats occur, they should be replaced on at least a like for like basis, given their status as HPI.
 - ☞ Careful consideration of surface water drainage will be required to ensure that pollution from road drainage does not enter watercourses directly without sufficient attenuation and treatment to remove pollutants. This will protect local habitats and nature conservation sites.
 - ☞ The landscape design for the Proposed Scheme should seek to include habitats of known value to wildlife to include creation of species-rich grassland and planting of hedgerows and trees (including orchard), in order to compensate for any loss of HPI. New grassland should be seeded with a mix including species such as bents in order to benefit butterflies such as the small heath (locally present as shown by the desk study). Locally sourced species should ideally be used, and the use of fertilisers avoided. Natural regeneration should be promoted where appropriate and the importation of topsoil should be avoided as far as possible.
 - ☞ Any necessary lighting should be designed to be as directional as possible and light spill into adjacent habitats should be avoided. Particular care should be taken to avoid illumination of the mature trees, woodland, orchard and hedgerows. It may be appropriate to use baffles to avoid illuminating these habitats. Where lighting is required, lights that emit UV and blue-white short wavelengths should be avoided.
 - ☞ If hedgerows or tree lines are to be severed by the Proposed Scheme final design, hop-over planting is recommended whereby tall specimens are allowed to grow either side of the severance to assist with wildlife using the feature for commuting or navigation.
 - ☞ Seasonal timing of habitat clearance may be necessary to avoid impacts upon breeding birds, reptiles, amphibians or bats, depending on the results of further survey.
 - ☞ Furthermore, supervised clearance of habitats by a Suitably Qualified Ecologist (SQE) is likely to be required, also based on the results of further survey and the timing of works.
 - ☞ The landscape design for the Proposed Scheme (if any) should include the installation of log piles or hibernacula to benefit a range of species including beetles and amphibians. Piles can be created from arisings resulting from woody vegetation clearance on site.

ENVIRONMENTAL BEST PRACTICE

- 4.6.2. In addition, general environmental protection measures must be implemented during the construction stage of the Proposed Scheme. Such measures include guidance outlined in the Environment Agency's Pollution prevention for businesses (2019) and those outlined by the Construction Industry Research and Information Association guidance (CIRIA, 2015). The following minimum standards must be adhered to prevent ecological impacts beyond the Site boundary:
- ☞ Measures must be taken to prevent dust and other emissions from construction affecting land beyond the Site boundary.

- ☞ Chemicals and fuels must be stored in secure containers located away from watercourses or water bodies. Spill kits must be available.
- ☞ Excavations must be covered or securely fenced (with no potential access points beneath fencing) when the Site is closed (e.g. overnight) to prevent entrapment of animals.
- ☞ Retained trees must be protected in accordance with BS 5837.
- ☞ Noise and vibration must be controlled and kept to the minimum necessary.
- ☞ Lighting used for construction must be switched-off when not in use and positioned so as not to spill on to adjacent land or retained vegetation within the Survey Area.

4.7. ECOLOGICAL ENHANCEMENT OPPORTUNITIES

4.7.1. The National Planning Policy Framework (NPPF) (2018) states that at an overview level the planning system should contribute to and enhance the national and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures. At a local level, the West Sussex Transport Plan 2011-2026, the West Sussex Structure Plan 2001-2016 and the Adopted Arun Local Plan all include specific reference to the requirement for proposals to include enhancement measures. For example, Policy ENV DM5 of the Adopted Arun Local Plan states;

Development schemes shall, in the first instance, seek to achieve a net gain in biodiversity and protect existing habitats on site. They shall also however incorporate elements of biodiversity including green walls, roofs, bat and bird boxes as well as landscape features minimising adverse impacts on existing habitats (whether designated or not). Development schemes shall also be appropriately designed to facilitate the emergence of new habitats through the creation of links between habitat areas and open spaces. Together, these provide a network of green spaces which serve to reconnect isolated sites and facilitate species movement.

4.7.2. Ecological enhancements can also deliver other green infrastructure benefits such as storm water attenuation and reducing the urban heat island effect from the road.

4.7.3. To encourage compliance with planning policy the following measures are recommended for inclusion within the Proposed Development; where possible:

- ☞ Buffer zones should be designed around retained HPis to protect them from edge effects. These should be planted with vegetation such as hedgerow or scrub species.
- ☞ Retained habitats should also be enhanced where possible, for example by woodland management (selective felling, coppicing etc) and hedgerow management (seasonal trimming, Ash shape, infill planting etc).
- ☞ Naturalistic/wildlife planting should be included in the landscape scheme where possible, to extend the area of compensatory habitat required for any HPI loss.
- ☞ Bird and bat boxes, including barn owl boxes should be installed on retained trees or structures in suitable positions.
- ☞ Invertebrate hotels or habitat piles, including rotting wood, should be installed in landscaped areas to provide habitat for a range of species such as stag beetle. These can be created from brash or cleared vegetation from the construction stage.
- ☞ New ponds and SuDS such as naturalised attenuation ponds should be considered where possible.



- ❖ The management should avoid excessive salting of roads, and herbicide/pesticides should be used on verges or landscaped areas.
- ❖ Good horticultural practice should be utilised, including the use of peat-free composts, mulches and soil conditioners, native plants with local provenance and avoidance of the use of invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

4.7.4. In order to inform the landscape design, and achieve an overall improvement of wildlife value within the Site, a Biodiversity Net Gain assessment should be carried out. This method uses DEFRA metrics to quantify loss and proposed gain using baseline data such as this report, and detailed scheme proposals (WSP, 2018).

5. CONCLUSIONS

- 5.1.1. The Proposed Scheme being brought forward by WSCC is a new road to replace the existing A29 around Eastergate, Westergate and Barnham, West Sussex.
- 5.1.2. A desk study was carried out which identified several statutory designations which may be affected by the Proposed Scheme, several non-statutory sites which may be indirectly affected. Mitigation measures have been recommended to prevent effects upon designated sites, whilst further survey for wintering/migratory birds is also recommended to inform further assessment of potential impacts on Pagham Harbour Ramsar and SPA, and Chichester and Langstone Harbour Ramsar and SPA to be completed during HRA screening.
- 5.1.3. The Survey Area contains a range of habitats including some of elevated ecological value such as traditional orchard and hedgerows, which are considered to be HPI (the loss of which must be compensated for). The Survey Area has the potential to support a range of protected and notable species including bats, badger, hazel dormouse, birds (including wintering birds), reptiles, amphibians and invertebrates.
- 5.1.4. The Proposed Scheme is likely to necessitate loss of and potential adverse effects upon valuable habitats, and present risks to protected species. In order to comply with relevant legislation and planning policy therefore, further surveys would be required, including bats, badger, hazel dormouse, breeding birds, wintering birds, invertebrates, reptiles and great crested newt.
- 5.1.5. A number of preliminary ecological measures for avoidance, mitigation and compensation of adverse effects have been proposed, as well as feasible ecological enhancements, in line with national and local planning policy. Avoidance of valuable features through adjustment of the route of the Proposed Scheme should be prioritised. Recommendations should be refined following the completion of further survey.

6. REFERENCES

PROJECT REFERENCES

- ☞ WYG (2016), Eastergate, Extended Phase 1 Habitat Survey, March 2016.

GENERAL REFERENCES

- ☞ Arun District Council (2018). Adoption Arun Local Plan 2011-2031.
- ☞ British Standards Institution (2012). BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations. BSI, London.
- ☞ BSI (2013). Biodiversity code of practice for planning and development: BS42020. BSI, London.
- ☞ Bibby, C.J., Burgess, N.D., Hill D.A., and Mustoe, S.H. (2000). Bird Census Techniques. Second Edition. Elsevier Ltd.
- ☞ Chanin P. (2003). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough
- ☞ Chartered Institute of Ecology and Environmental Management (CIEEM) (2017a). Guidelines for Ecological Report Writing. CIEEM, Winchester.
- ☞ CIEEM (2017b). Guidelines for Preliminary Ecological Appraisal. CIEEM, Winchester.
- ☞ CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal. CIEEM, Winchester.
- ☞ CIRIA (2015). Environmental good practice on site (fourth edition) (C741) Charles, P., Edwards, P (eds). CIRIA, London.
- ☞ Collins J. (ed.) (2016). Bat Surveys for Professional Ecologists, Good Practice Guidelines (3rd Edition). The Bat Conservation Trust, London.
- ☞ Dean, M., Strachan, R., Gow, D. and Andrews R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds. Fiona Matthews and Paul Chanin. The Mammal Society, London.
- ☞ Department for Environment, Food and Rural Affairs (2011). A strategy for England's wildlife and ecosystem services. DEFRA, London.
- ☞ Drake, C.M., Lott, D.A., Alexander, K.N.A. and Webb, J. (2007). Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England Research Report NERR005. Natural England, Peterborough.
- ☞ Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. and Gregory, R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708–746. [Available online: britishbirds.co.uk/wp-content/uploads/2014/07/BoCC4.pdf]
- ☞ English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.
- ☞ English Nature (2006). The Dormouse Conservation Handbook. 2nd Edition. Natural England. Peterborough
- ☞ Environment Agency (2019). Pollution prevention for businesses. [Available online: <https://www.gov.uk/guidance/pollution-prevention-for-businesses>]
- ☞ Froglife (1999). Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice sheet 10. Froglife, Halesworth
- ☞ Gent, A. and Gibson, S. (2003). Herpetofauna Workers Manual. J NCC. Peterborough

- Gilbert, G., Gibbons, D.W. and Evans, J. (1998). Bird Monitoring Methods: A Manual of Techniques for Key UK Species. RSPB
- Harris, S, Cresswell, P. and Jefferies, D. (1991). (Report) Surveying Badgers. The Mammal Society, Bristol.
- HMSO (Her Majesty's Stationary Office) (1981). Wildlife and Countryside Act (as amended by the Countryside and Rights of Way Act 2000). HMSO, Norwich.
- HMSO (1992). The Badgers Act.
- HMSO (1996). The Wild Mammals (Protection) Act. HMSO, London.
- HMSO (1997). The Hedgerows Regulations, SI 1997/1160. HMSO, London.
- HMSO (2006). Natural Environment and Rural Communities Act. HMSO, Norwich.
- HMSO (2017). The Conservation of Habitats and Species Regulations 2017 (the Habitat Regulations)
- Institute of Lighting Professionals (ILP) (2018). Bats and artificial lighting in the UK. BCT, London.
- Joint Nature Conservation Committee (JNCC) (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit. JNCC, Peterborough.
- HMSO (2018). National Planning Policy Framework, HMSO, London
- JNCC Biodiversity Reporting and Information Group (2008). UK Biodiversity Action Plan
- JNCC and DEFRA (2012). UK Post 2010 Biodiversity Framework. Available online: <http://jncc.defra.gov.uk/page-6189>.
- Ministry for Housing, Communities and Local Government (MHCLG) (2019). The National Planning Policy Framework. MHCLG, London.
- Mitchell-Jones, A.J. (2004). Bat Mitigation Guidelines. English Nature.
- Office of the Deputy Prime Minister (ODPM) (2005). Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System.
- Roper, T.J. (2010). Badger. Harper Collins.
- West Sussex County Council (2011). West Sussex Transport Plan 2011-2026
- West Sussex County Council (2005). West Sussex Transport Plan 2001-2016
- WSP (2018). Biodiversity Net Gain A new role for infrastructure and development in improving Britain's wildlife, White Paper, WSP.



FIGURES

Figure 1- Site Location Plan

Figure 2 - European Statutory Designated Sites for Bats within 30km

Figure 3 - European Statutory Designated Sites within 10km

Figure 4 - UK Statutory Designated Sites within 2km

Figure 5 - Non-Statutory Designated Sites within 2km

Figure 6 - Ancient Woodland and Habitats of Principal Importance (HPI) within 2km

Figure 7 - Waterbodies within 500m

Figure 8 - Phase 1 Habitat Map



Contains Ordnance Survey data © Crown copyright and database right 2020

Key

Site

Survey Area

Client

West Sussex County Council

Project

A29 Realignment

Title

Site Location Plan

Drawing No: Figure 1

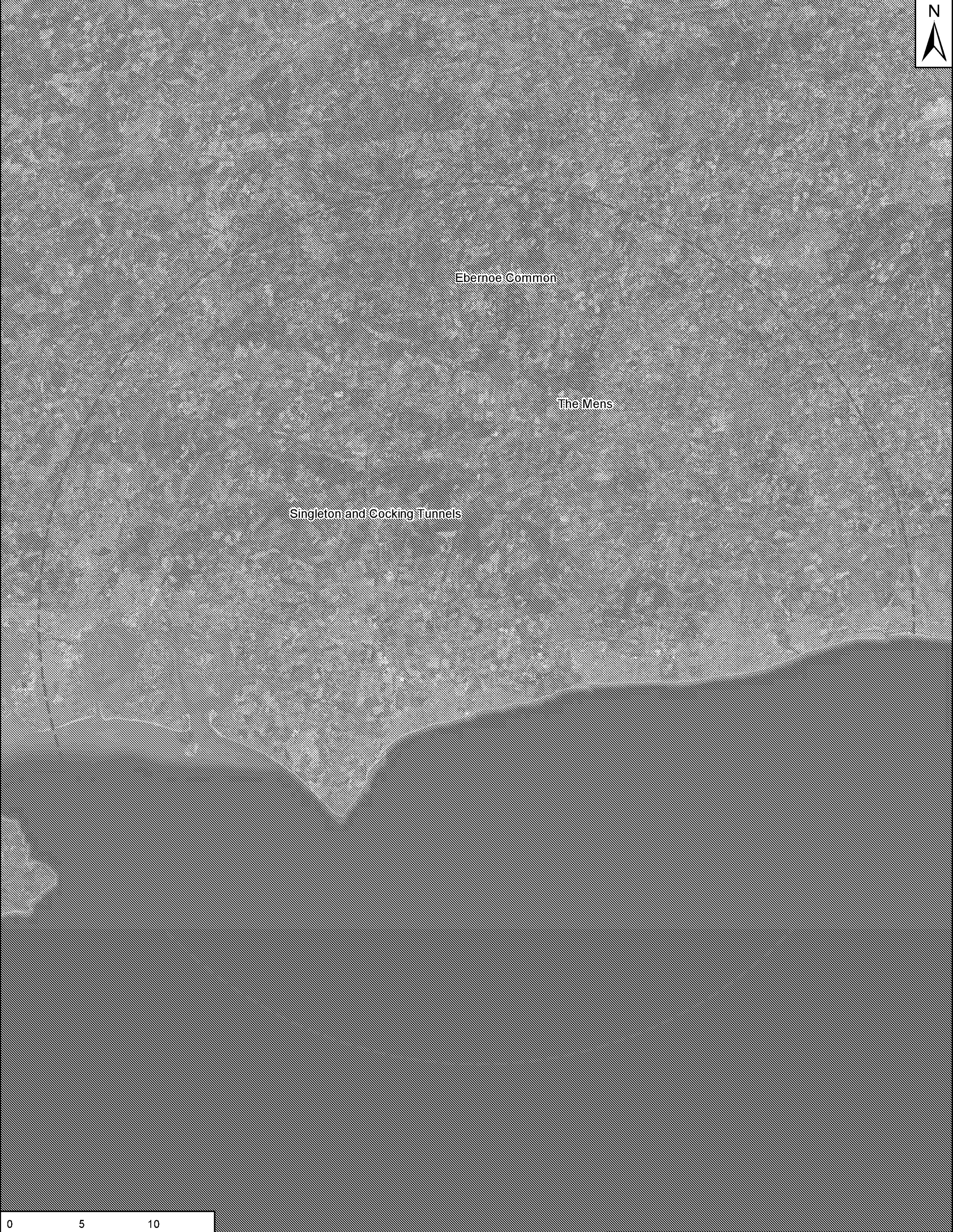
Date: September 2020

Scale: 10,000 @ A3

Drawn: RD

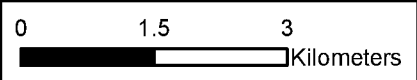
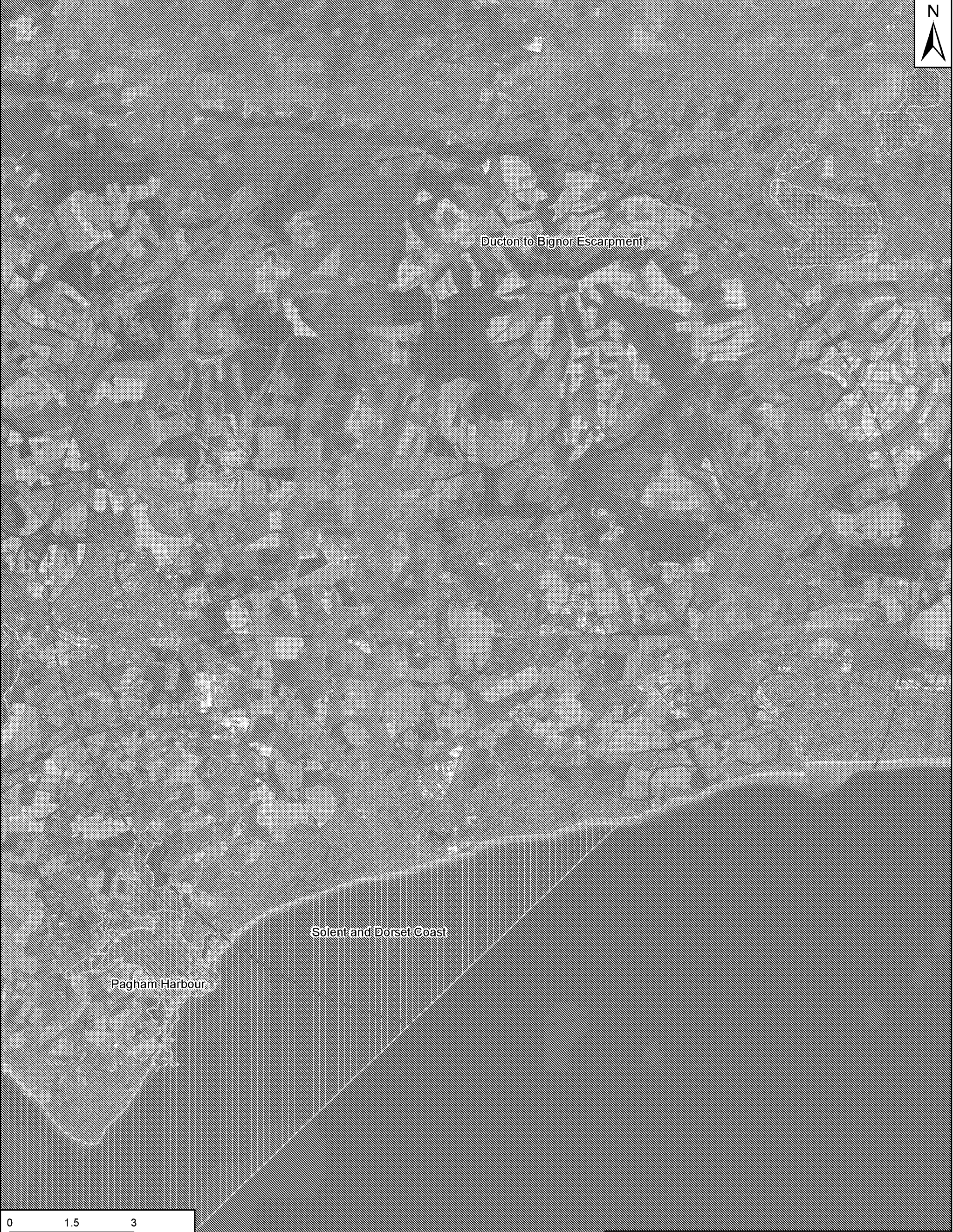
Checked: CH

Approved: VD



Contains Ordnance Survey data © Crown copyright and database right 2020

Key Survey Area 30km Search Area Special Area of Conservation (SAC) designated for Bats	Client		Project	
	West Sussex County Council		A29 Realignment	
	wsp		Title	
			European Statutory Designated Sites for Bats within 30km	
		Drawing No:	Figure 2	Drawn: RD
		Date:	September 2020	Checked: CH
		Scale:	245,000 @ A3	Approved: VD



Contains Ordnance Survey data © Crown copyright and database right 2020

Key  Survey Area  10km Search Area  Special Area of Conservation  Special Protection Area  Ramsar Site - Wetland of International Importance	Client West Sussex County Council		Project A29 Realignment	
			Title European Statutory Designated Sites within 10km	
	Drawing No: Figure 3 Date: September 2020 Scale: 85,000 @ A3		Drawn: RD Checked: CH Approved: VD	



Key Survey Area 2km Search Area National Park	Client	Project
	West Sussex County Council	A29 Realignment
		Title UK Statutory Designated Sites within 2km Drawing No: Figure 4 Date: September 2020 Scale: 20,000 @ A3 Drawn: RD Checked: CH Approved: VD



Contains Ordnance Survey data © Crown copyright and database right 2020

Key

- Survey Area
- 2km Search Area
- Notable Road Verge
- Local Wildlife Site

Client

West Sussex County Council

Project

A29 Realignment

Title

Non-Statutory Designated Sites within 2km

Drawing No: **Figure 5**

Date: **September 2020**

Scale: **20,000 @ A3**

Drawn: **RD**

Checked: **CH**

Approved: **VD**

ARUN DISTRICT COUNCIL 09/12/21/PL



Contains Ordnance Survey data © Crown copyright and database right 2020

Key
 Survey Area
 2km Search Area
 Ancient Woodland Inventory (Eng)
Habitats of Principal Importance
 Coastal and floodplain grazing marsh
 Deciduous woodland
 Good quality semi-improved grassland
 Lowland fens
 Lowland meadows
 Traditional orchard

No main habitat but additional habitats

Client
West Sussex County Council

Project
A29 Realignment

Title
Ancient Woodland and Habitats of Principal Importance (HPI) within 2km

Drawing No: **Figure 6**

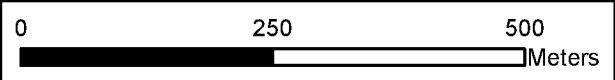
Date: **September 2020**

Scale: **20,000 @ A3**

Drawn: **RD**

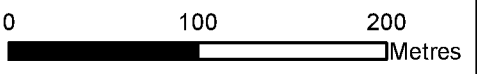
Checked: **CH**

Approved: **VD**



Contains Ordnance Survey data © Crown copyright and database right 2020

Key Waterbodies Survey Area 500m Search Area	Client		Project	
	West Sussex County Council		A29 Realignment	
			Title	
			Waterbodies within 500m	
			Drawing No:	Figure 7
			Date:	September 2020
			Scale:	7,500 @ A3
			Drawn:	RD
			Checked:	CH
			Approved:	VD



Contains Ordnance Survey data © Crown copyright and database right 2020

Key	
Survey Area	Cultivated/disturbed land - amenity grassland
Broadleaved woodland - semi-natural	Buildings
Broadleaved woodland - plantation	Bare ground
Scrub - dense/continuous	Hardstanding
Scrub - scattered	Broadleaved Parkland/scattered trees
Broadleaved Parkland/scattered trees	Coniferous Parkland/scattered trees
Neutral grassland - semi-improved	Intact hedge - species-poor
Other tall herb and fern - ruderal	Target Note
Standing water	
Cultivated/disturbed land - arable	

Client	West Sussex County Council

Project	A29 Realignment	
Title	Phase 1 Habitat Map	
Drawing No:	Figure 8	Drawn: RD
Date:	September 2020	Checked: CH
Scale:	4,000 @ A3	Approved: VD

Appendix A

RELEVANT LEGISLATION AND
PLANNING POLICY

115/1

ENGLAND AND WALES LEGISLATION AND POLICY CONTEXT

This report has been compiled with reference to relevant wildlife legislation, planning policy and the UK Biodiversity Framework. An overview and context of relevant legislation is provided, with the relevant protection each species groups or species receives summarised in Table 1.

The Wildlife and Countryside Act 1981, (as amended) (WCA)

Protected birds, animals and plants are listed under Schedules 1, 5, 8 and 9 respectively of the WCA, a description of these Schedules and their meaning is provided below.

Under the WCA (England and Wales) all birds, their nests and eggs (with exception of species listed under Schedule 2) are protected by the WCA. It is an offence to:

- ☞ Intentionally kill, injure, or take any wild bird,
- ☞ Take or destroy an egg of any wild bird.
- ☞ Damage or destroy the nest of any wild bird (whilst being built, or in use). Under the WCA the clearance of vegetation within the survey area boundary, or immediately adjacent to the survey area during the bird nesting season could result in an offence occurring by the disruption or destruction of nest sites. The bird breeding season can be taken to occur between March - August inclusive, although is subject to variations based on species, geographical and seasonal factors.

Schedule 1

Birds listed under Schedule 1 of the WCA¹² are afforded additional protection with regard to intentional or reckless disturbance whilst nest-building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.

Schedule 5

Species listed in Schedule 5 can either be fully protected or be partially protected under Section 9, which makes it unlawful to intentionally:

- ☞ Part 1: kill, injure or take;
- ☞ Part 2: possess or control (live or dead animal, part or derivative);
- ☞ Part 4 (a): damage or destruct any structure used for shelter or protection;
- ☞ Part 4 (b): disturb them in a place of shelter or protection;
- ☞ Part 4 (c): obstruct access to place of shelter or protection;
- ☞ Part 5 (a): sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative);
- ☞ Part 5 (b): advertise for buying or selling.

Schedule 8

The Act makes it an offence (subject to exceptions) to pick, uproot, trade in, or possess (for the purposes of trade) any wild plant listed in Schedule 8, and prohibits the unauthorised intentional uprooting of such plants.

Schedule 9

Invasive species listed under Schedule 9 are prohibited from release into the wild and the Act prohibits planting or `causing to grow_ in the wild of any plant species listed in Schedule 9. It should be noted that certain bird species listed on Schedule 1 of the WCA are also listed on Schedule 9 to prevent release of non-native and captive individuals, this includes barn owl, red kite, goshawk and corncrake.

Countryside Rights of Way Act 2000 (CRoW Act)

The CRoW Act has amended the WCA in England and Wales strengthening the protection afforded to Sites of Special Scientific Interest (SSSI) and the legal protection for threatened species. It adds the word `reckless` to the wording of the offences listed under Section 9(4) of the WCA. This alteration makes it an offence to recklessly commit an offence, where previously an offence had to be intentional to result in a breach of legislation.

¹² To view the current list of Schedule 1 listed birds visit: <http://www.legislation.gov.uk/ukpga/1981/69/schedule/1> [Accessed 01.03.2017].

Natural Environment and Rural Communities (NERC) Act 2006

Species and Habitats of Principal Importance in England and Wales are listed under Section 41 and Section 42 respectively of the NERC Act. The Section 41 and 42 lists detail species that are of principal importance for the conservation of biodiversity in England and Wales, and should be used to guide decision-makers such as local and regional authorities when implementing their duty to have regard for the conservation of biodiversity in the exercise of their normal functions – as required under Section 40 of the NERC Act 2006.

The Environment (Wales) Act 2016

The Environment (Wales) Act 2016 (<http://www.legislation.gov.uk/anaw/2016/3/contents/enacted>) puts in place the legislation needed to plan and manage Wales’s natural resources in a more proactive, sustainable and cohesive way. Section 7 replaces the duty in Section 42 of the NERC Act 2006 and it places a duty on the Welsh Ministers to publish, review and revise lists of living organisms and types of habitats which they consider are of key significance to sustain and improve biodiversity in Wales. The species and habitat lists are identical to those in Section 42 but it should be noted it is currently under review (23.03.2017).

The Protection of Badgers Act (1992)

It is an offence to wilfully take, kill, injure, possess or ill-treat a badger. Under the Act their setts are protected against intentional or reckless interference. Sett interference includes damaging or destroying a sett, obstructing access to any part of the sett, or disturbance of a badger whilst it is occupying a sett. The Act defines a badger sett as ‘any structure or place, which displays signs indicating the current use by a badger’ and Natural England (NE) takes this definition to include seasonally used setts that are not occupied but that show sign of recent use by badgers (Natural England, 2009¹³).

If impacts to badgers or their setts are unavoidable then authorised sett disturbance requires a licence.

The UK Post-2010 Biodiversity Framework (2011-2020) (J NCC and DEFRA, 2012)

This Framework lists the UK’s most threatened species and habitats and sets out targets and objectives for their management and recovery. The UK Biodiversity Action Plan (BAP) process is delivered nationally, regionally and locally and should be used as a guide for decision-makers to have regards for the targets set by the framework and the goals they aim to achieve. The UK BAP has now been replaced by the UK Post-2010 Biodiversity Framework, however, it contains useful information on how to characterise important species assemblages and habitats which is still relevant (UK Post-2010 Biodiversity Framework, 2012¹⁴).

The Conservation of Habitats and Species Regulations 2017

The Conservation of Habitats and Species Regulations 2017 consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. They also transpose elements of the EU Wild Birds Directive in England and Wales. The Regulations came into force on 30th November 2017, and extend to England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters). In Scotland, the Habitats Directive is transposed through a combination of the Habitats Regulations 2010 (in relation to reserved matters) and the Conservation (Natural Habitats andc.) Regulations 1994. The Conservation (Natural Habitats, andc) Regulations (Northern Ireland) 1995 (as amended) transpose the Habitats Directive in relation to Northern Ireland.

All species listed under Annex IV of the Habitats Directive require strict protection and are known as European Protected Species (EPS). Under Regulation 42 of the Habitats Regulations it is unlawful to:

- ☞ Deliberately kill, capture or disturb;
- ☞ Deliberately take or destroy the eggs of; and
- ☞ Damage or destroy the breeding site/resting place of any species protected under this legislation.

If the Ecologist determines that impacts to an EPS are unavoidable then the works may need to be carried out under a site specific mitigation licence from Natural England (NE) or Natural Resources Wales (NRW). Low Impact Class licences are also available in both England and Wales for bats and great crested newts. This enables Registered Low Impact Consultants to undertake certain low impact activities reducing the EPS application paperwork and process length.

¹³ Natural England, June 2009, Protection of Badgers Act 1992 (as amended), Guidance on ‘Current Use’ in the definition of a Badger Sett WMLG 17, Natural England, Peterborough.

¹⁴ J NCC and Defra (on behalf of the Four Countries’s Biodiversity Group), July 2012, UK Post-2010 Biodiversity Framework, Available from: http://jncc.defra.gov.uk/pdf/UK_Post2010_Bio-Fwork.pdf [Accessed 02.03.2017].

Certain EPS are also listed under Annex II of the Habitats Directive and are afforded protection by the establishment of core areas of habitat known as Special Areas of Conservation. This means these species are a relevant consideration in a Habitats Regulations Assessment (HRA).

The Birds Directive seeks to maintain populations of all wild bird species across their natural range (Article 2). All bird species listed under Annex I¹⁵ of the Birds Directive are rare or vulnerable and afforded protection by the classification of Special Protection Areas (SPAs), these are also designated under all regularly occurring migratory species, with regard to the protection of wetlands of international importance (Article 4). This means these bird species and communities are a relevant consideration in HRA.

¹⁵ To view birds listed under Annex I visit: http://ec.europa.eu/environment/nature/conservation/wildbirds/threatened/index_en.htm [Accessed: 06.04.2017]

Table A1: Key Species and National Wildlife Legislation, Policy and Biodiversity Framework Applicable in England and Wales

Species	Legislation, Planning Policy and UK Biodiversity Framework					The Conservation of /Habitats and Species Regulations 2017 (as amended) (Habitats Regulations) - Regulation 41	Natural Environment and Rural Communities (NERC) Act 2006 /The Environment(Wales) Act (2016)	The Protection of Badgers Act 1992	The UK Post-2010 Biodiversity Framework 2011-2020 (J NCC and DEFRA, 2012)
	Schedule1	Schedule 5	Schedule 8	Schedule 9	European Protected Species (Annex IV of the EC Habitats Directive),				
Badger								X	
Bats		X ¹⁶ (part)			X ¹⁷	X ¹⁸			X ¹⁹
Hazel Dormouse		X ⁵ (part)			X	X			X
Otter		X ⁵ (part)			X	X			X
Water vole		X ²⁰ (full)				X			X

¹⁶ These species are partially protected under section 9(4)(b), (4)(c) and (5).

¹⁷ Only Barbastelle (Barbastella barbastellus), Bechstein’s bat (Myotis bechsteinii), greater horseshoe bat (Rhinolophus ferrumequinum) and lesser horseshoe bat (Rhinolophus hipposideros) are listed on Annex II of the Habitats Directive.

¹⁸ Greater horseshoe bat, lesser horseshoe bat, Bechstein’s bat, noctule (Nyctalus noctula), soprano pipistrelle (Pipistrellus pygmaeus), brown long-eared bat (Plecotus auritus) and barbastelle are listed as Species of Principal Importance in England with the addition of common pipistrelle (Pipistrellus pipistrellus) in Wales listed under Section 7 of the Environment (Wales) Act (2016) <http://www.legislation.gov.uk/ukpga/2006/16/contents>.

¹⁹ Barbastelle bat, Bechstein’s bat, noctule, soprano pipistrelle, brown long-eared bat, greater horseshoe bat, lesser horseshoe bat are listed as UK BAP species of bat.

²⁰ Class Licences are available to Registered Consultants to intentionally disturb, damage or destroy water vole burrows or to displace water voles from their burrows in relation to a development proposal where the licensed action provides a conservation benefit for water voles. Certain displacement operations may be carried out under a Class licence by a registered person in England, however in Wales all displacement operations must be carried out under a site-specific licence.

Table A1: Key Species and National Wildlife Legislation, Policy and Biodiversity Framework Applicable in England and Wales

Species	Legislation, Planning Policy and UK Biodiversity Framework					The Conservation of /Habitats and Species Regulations 2017 (as amended) (Habitats Regulations) - Regulation 41	Natural Environment and Rural Communities (NERC) Act 2006 /The Environment(Wales) Act (2016)	The Protection of Badgers Act 1992	The UK Post-2010 Biodiversity Framework 2011-2020 (J NCC and DEFRA, 2012)
	Wildlife and Countryside Act 1981 (as amended), (WCA)								
	Schedule1	Schedule 5	Schedule 8	Schedule 9	European Protected Species (Annex IV of the EC Habitats Directive),				
Birds	x			x ²¹		x ²²		x ²³	
Reptiles		x ²⁴ (part)		x ⁹	x ²⁵	x ²⁶		x ²⁷	
Amphibians		x ²⁸ (part)		x ²⁹	x ^{30,31}	x ³²			

²¹ To view plants and animals listed on Schedule 9 Part 1 visit <http://www.legislation.gov.uk/ukpga/1981/69/schedule/9> [accessed 6 April 2017]

²² There are 49 species of birds listed as Species of Principal Importance in England in Section 41 of the NERC Act 2006 and 51 species in Wales under Section 7 of the Environment (Wales) Act (2016) <http://www.legislation.gov.uk/ukpga/2006/16/contents>.

²³ To view the current list of UKBAP birds visit: <http://jncc.defra.gov.uk/page-5163> [Accessed 01.03.2017].

²⁴ The four common reptile species, Adder (*Vipera berus*), Grass snake (*Natrix natrix*), Common lizard (*Zootoca vivipara*) and Slow worm (*Anguis fragilis*) are offered partial protection under section 9(5). The rarer UK reptile species (Smooth snake (*Coronella austriaca*) and Sand lizard (*Lacerta agilis*)) are partially protected under section 9(4)(b) and (c) and (5).

²⁵ Smooth snake (*Coronella austriaca*) and Sand lizard (*Lacerta agilis*) are the only reptiles to be designated as European Protected Species.

²⁶ All 6 reptile species are listed as Species of Principal Importance in England listed under Section 41 of the NERC Act 2006 and 5 species, excluding smooth snake, listed under Section 7 of the Environment (Wales) Act (2016) <http://www.legislation.gov.uk/ukpga/2006/16/contents>.

²⁷ To view the current list of UKBAP herptile species visit: <http://jncc.defra.gov.uk/page-5166> [Accessed 01.02.2017].

²⁸ The four common reptile species, Adder (*Vipera berus*), Grass snake (*Natrix natrix*), Common lizard (*Zootoca vivipara*) and Slow worm (*Anguis fragilis*) are offered partial protection under section 9(5). The rarer UK reptile species (Smooth snake (*Coronella austriaca*) and Sand lizard (*Lacerta agilis*)) are partially protected under section 9(4)(b) and (c) and (5).

²⁹ Common frog (*Rana temporaria*), Common toad (*Bufo bufo*), Smooth newt (*Lissotriton vulgaris*) and Palmate newt (*Lissotriton helveticus*) are offered partial protection under section 9(5). Great crested newt (*Triturus cristatus*) and Natterjack toad (*Epidalea calamita*) are offered partial protection under section 9(4)(b) and (c) and (5). Pool frog (*Pelophylax lessonae*) is offered partial protection under section 9(4)(b) and (c)(1) only and with respect to England only.

³⁰ Great crested newt, Natterjack toad and Pool frog are the only amphibians to be designated European Protected Species.

³¹ Great crested newt is the only amphibian listed on Annex II of the Habitats Directive.

³² Great crested newt, Natterjack toad and Common toad are listed as Species of Principal Importance in England in Section 41 of the NERC Act 2006 and under Section 7 of the Environment (Wales) Act (2016) <http://www.legislation.gov.uk/ukpga/2006/16/contents>.

Table A1: Key Species and National Wildlife Legislation, Policy and Biodiversity Framework Applicable in England and Wales

Species	Legislation, Planning Policy and UK Biodiversity Framework						The Protection of Badgers Act 1992	The UK Post-2010 Biodiversity Framework 2011-2020 (J NCC and DEFRA, 2012)
	Wildlife and Countryside Act 1981 (as amended), (WCA)							
	Schedule 1	Schedule 5	Schedule 8	Schedule 9	European Protected Species (Annex IV of the EC Habitats Directive),	The Conservation of /Habitats and Species Regulations 2017 (as amended) (Habitats Regulations) - Regulation 41	Natural Environment and Rural Communities (NERC) Act 2006 /The Environment(Wales) Act (2016)	
White-clawed Crayfish		x ³³ (partial)			x ³⁴	x		x
Invertebrates		x ³⁵ (full/part)		x	x ^{36,37}	x ³⁸		x ³⁹

³³ Under the Wildlife and Countryside Act it is illegal to take or sell white clawed crayfish under the WCA. A licence is required to survey (hand net or trap) for the species. To undertake work within WCC inhabited rivers a Class Licence maybe issued by the relevant authority to move WCC away from harm prior to works. Although WCC are not protected from killing or injury Natural England state in their Class licence that due to declining numbers all efforts should be made to conserve the species.

³⁴ White clawed crayfish are listed under Annex II and V of the Habitats Directive.

³⁵ To view the current list of invertebrates that are protected under this Act either in part or full visit: <http://www.legislation.gov.uk/ukpga/1981/69/schedule/5> [Accessed 01.03.2017].

³⁶ The Large blue butterfly (*Maculinea arion*), Fisher's estuarine moth (*Gortyna borelii lunata*) and Lesser whirlpool ram's-horn snail (*Anisus vorticulus*) are the only invertebrates to be designated European Protected Species.

³⁷ There are currently twelve invertebrates listed in Annex II of the Habitats Directive; White-clawed crayfish (*Austropotamobius pallipes*), Southern damselfly (*Coenagrion mercuriale*), Marsh fritillary butterfly (*Eurodryas aurinia*), Violet click beetle (*Limoniscus violaceus*), Stag beetle (*Lucanus cervus*), Freshwater pearl mussel (*Margaritifera margaritifera*), Narrow-mouthed whorl snail (*Vertigo angustior*), Round-mouthed whorl snail (*Vertigo genesii*), Geyer's whorl snail (*Vertigo geyeri*), Desmoulin's whorl snail (*Vertigo moulinsiana*), Lesser whirlpool ram's-horn snail (*Anisus vorticulus*) and Fisher's estuarine moth (*Gortyna borelii lunata*).

³⁸ There are currently 379 invertebrate species (not including marine species) listed as Species of Principal Importance in England http://www.google.co.uk/url?sa=t&rc=1&q=&esrc=s&source=web&cd=4&ved=0ahUKEwivvu7I9trSAhXiCsAKHX4TBGcOFggvMAM&url=http%3A%2F%2Fpublications.naturalengland.org.uk%2Ffile%2F6518755878240256&usq=AFOjCNEpiUWYuOghVcf5Dvi_3iK2Tj_ytIQ and 188 species in Wales http://www.eryn-npa.gov.uk/data/assets/pdf_file/0003/486156/SpeciesList.pdf listed under Section 41 of the NERC Act 2006 and listed under Section 7 of the of the Environment (Wales) Act 2016. [Accessed 01.03.2017]

³⁹ To view the current list of UKBAP invertebrates visit: <http://jncc.defra.gov.uk/page-5169> [Accessed 01.03.2017].

Table A1: Key Species and National Wildlife Legislation, Policy and Biodiversity Framework Applicable in England and Wales

Species	Legislation, Planning Policy and UK Biodiversity Framework					The Conservation of /Habitats and Species Regulations 2017 (as amended) (Habitats Regulations) - Regulation 41	Natural Environment and Rural Communities (NERC) Act 2006 /The Environment(Wales) Act (2016)	The Protection of Badgers Act 1992	The UK Post-2010 Biodiversity Framework 2011-2020 (J NCC and DEFRA, 2012)
	Wildlife and Countryside Act 1981 (as amended), (WCA)								
	Schedule1	Schedule 5	Schedule 8	Schedule 9	European Protected Species (Annex IV of the EC Habitats Directive),				
Fish		x ⁴⁰ (full/part)		x ⁹	x ^{41,42}	x ⁴³			x ⁴⁴
Plants			x ⁴⁵	x ⁹	x ^{46,47}	x ⁴⁸			x ⁴⁹

⁴⁰ To view the current list of fish either part or fully protected under the Act visit: <http://www.legislation.gov.uk/ukpga/1981/69/schedule/5>. [Accessed 01.03.2017].

⁴¹ Sturgeon (Acipenser sturio) is the only fish to be designated a European Protected Species.

⁴² There are eight fish species listed on Annex II of the Habitats Directive. To view the current list visit: <http://jncc.defra.gov.uk/page-1523> [Accessed 01.03.2017].

⁴³ There are 35 species of fish listed as Species of Principal Importance in England listed under Section 41 of the NERC Act 2006 and 10 species in Wales listed under Section 7 of the Environment (Wales) Act 2016.

⁴⁴ To view the current list of UKBAP fish visit: <http://jncc.defra.gov.uk/page-5164> [Accessed 01.03.2017].

⁴⁵ To view the current list of Schedule 8 listed plants visit: <http://www.legislation.gov.uk/ukpga/1981/69/schedule/8> [Accessed 01.03.2017].

⁴⁶ There are nine plant species designated as European Protected Species. To view the current list visit: <http://www.legislation.gov.uk/uksi/2010/490/schedule/5/made> [Accessed 01.03.2017].

⁴⁷ To view the current list of plant species on Annex II of the Habitats Directive visit: <http://jncc.defra.gov.uk/page-1523> [Accessed 01.03.2017].

⁴⁸ There are currently 152 vascular plants listed as Species of Principal Importance in England listed under Section 41 of the NERC Act 2006 and 77 species in Wales listed under Section 7 of the Environment (Wales) Act 2016.³¹ To view the current list of UKBAP plants visit: <http://jncc.defra.gov.uk/page-5171> and <http://jncc.defra.gov.uk/page-5168> [Accessed 01.03.2017].

⁴⁹ To view the current list of UKBAP plants visit: <http://jncc.defra.gov.uk/page-5171> and <http://jncc.defra.gov.uk/page-5168> [Accessed 01.03.2017].

Appendix B

SUMMARY OF ECOLOGICAL DESK
STUDY DATA

Table B1 - Protected and notable species (excluding birds) for which records have been identified within 2km. Bat species have been identified up to 5km

Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵⁰
Mammals - terrestrial (bat roosts)					
Bat species	Chiroptera sp.	25	2015	2.4	HabDir A2 NP, HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 CR/ENVU/NT/DD
Brown long-eared bat	Plecotus auritus	13	2019	1.7	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP
Common pipistrelle	Pipistrellus pipistrellus	16	2019	0.9	HabDir A4, HabReg Sch2, NERC, WCA Sch5, UKBAP
Long-eared species	Plecotus sp.	8	2019	1.4	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 EN
Natterer's bat	Myotis nattereri	6	2019	2.7	HabDir A4, HabReg Sch2, WCA Sch5,
Noctule bat	Nyctalus noctula	1	2019	2.8	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP
Pipstrelle species	Pipistrellus sp.	8	2019	0.7	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 NT
Serotine	Eptesicus serotinus	34	2019	2.7	HabDir A4, HabReg Sch2, WCA Sch5, RL-GB post2001 VU
Soprano Pipstrelle	Pipistrellus pygmaeus	22	2019	0.9	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP
Western barbastelle	Barbastella barbastellus	12	2015	1.7	HabDir A2 NP, HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 VU

⁵⁰ HabDir = Species listed under Annex 2 (A2) or Annex 4 of the European Habitats Directive 92/43/EEC, HabReg = Conservation of Habitats and Species Regulations (2017), WCA = Wildlife and Countryside Act (1981), NERC SPI = Schedule 41 Natural Environment and Rural Communities Act (2006), UKBAP = UK Biodiversity Action Plan species, RL-GB = Species on the Great Britain Red List, RL-Eng = Species on the English Red List. Notable = National Biodiversity Network (NBN) designation of uncommon invertebrate species not falling within IUCN categories, Nat Scarce/Rare = UK Red Data Book listing not based on IUCN guidelines (Nationally Rare and Scarce), Sussex Rare = Sussex rare species inventory.



Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵⁰
Whiskered/brandt's	Myotis mystacinus/brandtii	1	2013	2.8	HabDir A4, HabReg Sch2, WCA Sch5,
Mammals - terrestrial (bat activity)					
Alcathoe bat	Myotis alcathoe	31	2018	2.0	HabDir A4, HabReg Sch2, WCA Sch5, RL-GB post2001 DD
Bat species	Chiroptera sp.	3	2017	0.9	HabDir A2 NP, HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 CR/EN/VU/NT/DD
Bechstein's bat	Myotis bechsteinii	10	2018	2.8	HabDir A2 NP, HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP
Brandt's bat	Myotis brandtii	8	2019	2.0	HabDir A4, HabReg Sch2, WCA Sch5, RL-GB post2001 DD
Brown long-eared bat	Plecotus auritus	44	2019	0.9	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP
Common pipistrelle	Pipistrellus pipistrellus	113	2019	0.3	HabDir A4, HabReg Sch2, NERC, WCA Sch5, UKBAP
Daubenton's bat	Myotis daubentonii	17	2019	2.3	HabDir A4, HabReg Sch2, WCA Sch5,
Eptesicus Bat species	Eptesicus	4	2018	3.4	HabDir A4, HabReg Sch2, WCA Sch5, RL-GB post2001 VU
Greater horseshoe bat	Rhinolophus ferrumequinum	1	2019	2.4	HabDir A2 NP, HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP
Lesser noctule	Nyctalus leisleri	3	2018	3.4	HabDir A4, HabReg Sch2, WCA Sch5, RL-GB post2001 NT
Long-eared species	Plecotus sp.	29	2019	0.9	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 EN
Myotis Bat species	Myotis sp.	29	2019	0.9	HabDir A2 NP, HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 CR, RL-GB post2001 DD
Nathusius's pipistrelle	Pipistrellus nathusii	13	2019	1.0	HabDir A4, HabReg Sch2, WCA Sch5, RL-GB post2001 NT
Natterer's bat	Myotis nattereri	34	2019	2.3	HabDir A4, HabReg Sch2, WCA Sch5,
Noctule bat	Nyctalus noctula	36	2019	0.3	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP

Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵⁰
Nyctalus bat species	Nyctalus sp.	4	2018	3.4	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 NT
Pipistrelle sp.	Pipistrellus sp.	16	2019	0.3	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 NT
Serotine	Eptesicus serotinus	61	2019	0.3	HabDir A4, HabReg Sch2, WCA Sch5, RL-GB post2001 VU
Soprano pipistrelle	Pipistrellus pygmaeus	81	2019	0.9	HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP
Western barbastelle	Barbastella barbastellus	76	2019	0.5	HabDir A2 NP, HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 VU
Whiskered bat	Myotis mystacinus	18	2018	1.0	HabDir A4, HabReg Sch2, WCA Sch5, RL-GB post2001 DD
Whiskered/brandt's	Myotis mystacinus/brandtii	4	2019	2.4	HabDir A4, HabReg Sch2, WCA Sch5,
Mammals - terrestrial (excl. bats)					
European rabbit	Oryctolagus cuniculus	1	2014	0.1	RL-Global post2001 NT
European water vole	Arvicola amphibius	5	2016	1.0	WCA Sch5, NERC, UKBAP, RL-GB post2001 EN, Sussex Rare
Hazel dormouse	Muscardinus avellanarius	38	2018	1.2	HabDir A4HabReg Sch2, WCA Sch5, NERC, UKBAP, RL-GB post2001 VU
Polecat	Mustela putorius	1	2015	1.5	NERC, UKBAP
West European hedgehog	Erinaceus europaeus	17	2020	0.2	NERC, UKBAP, RL-GB post2001 VU
Reptiles					
Common lizard	Zootoca vivipara	40	2019	0.1	WCA Sch5, NERC, UKBAP
Grass snake	Natrix helvetica	11	2019	0.1	WCA Sch5, NERC, UKBAP
Slow-worm	Anguis fragilis	57	2019	0.1	WCA Sch5, NERC, UKBAP
Amphibians					



Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵⁰
Common frog	<i>Rana temporaria</i>	4	2017	0.1	WCA Sch5
Common toad	<i>Bufo bufo</i>	4	2019	1.1	WCA Sch5, NERC, UKBAP
Great crested newt	<i>Triturus cristatus</i>	8	2019	1.1	HabDir A2 NP, HabDir A4, HabReg Sch2, WCA Sch5, NERC, UKBAP
Smooth newt	<i>Lissotriton vulgaris</i>	3	2018	1.0	WCA Sch5
Invertebrates - ants, bees, sawflies & wasps					
An Ant, Bee, Sawfly or Wasp	<i>Dolichovespula media</i>	2	2017	In grid square ref within 2km from Survey Area	Notable A, Sussex Rare
Painted nomad bee	<i>Nomada fucata</i>	2	2017	2.0	Notable A, Sussex Rare
Red-girdled mining Bee	<i>Andrena labiata</i>	2	2017	In grid square ref within 2km from Survey Area	Notable A, Sussex Rare
Invertebrates - beetles					
A beetle	<i>Hedobia imperialis</i>	1	2014	In grid square ref within 2km from Survey Area	Notable B, Sussex Rare
Rose chafer	<i>Cetonia aurata</i>	1	2018	2.0	Sussex Rare
Stag beetle	<i>Lucanus cervus</i>	16	2019	0.2	HabDir A2 NPWCA Sch5, NERC, UKBAP, Nat Scarce, Notable B, Sussex Rare
Invertebrates - butterflies					
Pearl-bordered Fritillary	<i>Boloria euphrosyne</i>	1	2016	1.4	WCA Sch5, NERC, UKBAP, RL-GB post2001 EN, Sussex Rare
Purple emperor	<i>Apatura iris</i>	1	2018	2.0	WCA Sch5, RL-GB post2001 NT, Sussex Rare
Small heath	<i>Coenonympha pamphilus</i>	4	2018	1.6	NERC, UKBAP, RL-GB post2001 NT
White admiral	<i>Limenitis camilla</i>	2	2018	1.8	NERC, UKBAP, RL-GB post2001 VU
Invertebrates - dragonflies & damselflies					

Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵⁰
Common Club-tail	Gomphus vulgatissimus	1	2018	In grid square ref within 2km from Survey Area	RL-GB post2001 NT, Sussex Rare
Invertebrates - moths					
August thorn	Ennomos quercinaria	2	2019	0.3	NERC, UKBAP
Blood-vein	Timandra comae	1	2017	In grid square ref within 2km from Survey Area	NERC, UKBAP
Buff ermine	Spilosoma lutea	2	2017	1.3	NERC, UKBAP
Cinnabar	Tyria jacobaeae	1	2015	1.9	NERC, UKBAP
Clouded magpie	Abraxas sylvata	1	2017	In grid square ref within 2km from Survey Area	Sussex Rare
Dot moth	Melanchra persicariae	1	2017	In grid square ref within 2km from Survey Area	NERC, UKBAP
Dusky thorn	Ennomos fuscantaria	3	2018	0.3	NERC, UKBAP
Ghost moth	Hepialus humuli humuli	1	2017	In grid square ref within 2km from Survey Area	NERC, UKBAP
Grey dagger	Acronicta psi	1	2017	In grid square ref within 2km from Survey Area	NERC, UKBAP
Knot grass	Acronicta rumicis	1	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP
Maple pug	Eupithecia inturbata	2	2018	In grid square ref within 2km from Survey Area	Sussex Rare
Mocha	Cyclophora annularia	1	2018	In grid square ref within 2km from Survey Area	Sussex Rare
Pretty chalk carpet	Melanthia procellata	1	2017	In grid square ref within 2km from Survey Area	NERC, UKBAP
Red-tipped Clearwing	Synanthedon	1	2017	0.8	Sussex Rare

Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵⁰
	formicaeformis				
Rosy rustic	Hydraecia micacea	2	2019	1.0	NERC, UKBAP
Rustic	Hoplodrina blanda	4	2019	1.0	NERC, UKBAP
Satin lutescing	Tetheella fluctuosa	1	2017	In grid square ref within 2km from Survey Area	Sussex Rare
Small emerald	Hemistola chrysoprasaria	1	2017	In grid square ref within 2km from Survey Area	NERC, UKBAP
Small phoenix	Ecliptopera silaceata	3	2018	0.3	NERC, UKBAP
Sulphur pearl	Sitochroa palealis	1	2017	In grid square ref within 2km from Survey Area	Notable, Sussex Rare
White ermine	Spilosoma lubricipeda	1	2017	0.3	NERC, UKBAP
Invertebrates - true flies					
Bright four-spined Legionnaire	Chorisops nagatomii	1	2017	In grid square ref within 2km from Survey Area	Nat Scarce, Notable, Sussex Rare
Hornet mimic hoverfly	Volucella zonaria	1	2019	0.8	Sussex Rare
False chanterelle	Hygrophoropsis aurantiaca	1	2013	1.5	Sussex Rare
Higher plants - flowering plants					
Annual beard-grass	Polypogon monspeliensis	2	2011	1.3	Nat Scarce, Sussex Rare
Bell heather	Erica cinerea	1	2015	In grid square ref within 2km from Survey Area	RL-ENG post2001 NT
Bluebell	Hyacinthoides non-scripta	2	2015	In grid square ref within 2km from Survey Area	WCA Sch8

Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵⁰
Cat-mint	<i>Nepeta cataria</i>	1	2011	In grid square ref within 2km from Survey Area	RL-GB post2001 VU, RL-ENG post2001 VU
Chicory	<i>Cichorium intybus</i>	1	2011	1.7	RL-ENG post2001 VU
Corn mint	<i>Mentha arvensis</i>	2	2015	In grid square ref within 2km from Survey Area	RL-ENG post2001 NT
Crosswort	<i>Cruciata laevipes</i>	4	2015	1.7	RL-ENG post2001 NT
Eyebright	<i>Euphrasia nemorosa</i>	1	2015	In grid square ref within 2km from Survey Area	RL-ENG post2001 NT
Field scabious	<i>Knautia arvensis</i>	2	2014	1.9	RL-ENG post2001 NT
Frog orchid	<i>Coeloglossum viride</i>	1	2017	0.4	NERC, UKBAP, RL-GB post2001 VU, RL-ENG post2001 VU
Goldenrod	<i>Solidago virgaurea</i>	2	2015	1.0	RL-ENG post2001 NT
Heath speedwell	<i>Veronica officinalis</i>	1	2015	In grid square ref within 2km from Survey Area	RL-ENG post2001 NT
Heather	<i>Calluna vulgaris</i>	1	2015	In grid square ref within 2km from Survey Area	RL-ENG post2001 NT
Hound's-tongue	<i>Cynoglossum officinale</i>	1	2011	1.0	RL-GB post2001 NT, RL-ENG post2001 NT
Sanicle	<i>Sanicula europaea</i>	2	2015	1.0	RL-ENG post2001 NT
Stinking hellebore	<i>Helleborus foetidus</i>	1	2015	1.0	Nat Scarce, Sussex Rare
Strawberry clover	<i>Trifolium fragiferum</i>	1	2014	In grid square ref within 2km from Survey Area	RL-ENG post2001 VU
Sussex yellow-sorrel	<i>Oxalis dillenii</i>	1	2014	1.0	Sussex Rare
Tubular water-dropwort	<i>Oenanthe fistulosa</i>	1	2014	1.1	NERC, UKBAP, RL-GB post2001 VU, RL-ENG post2001 VU
Wild strawberry	<i>Fragaria vesca</i>	3	2015	0.1	RL-ENG post2001 NT



Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵⁰
Wood-sorrel	Oxalis acetosella	2	2015	In grid square ref within 2km from Survey Area	RL-ENG post2001 NT
Yellow-glandular Hawkweed	Hieracium sabaudum	1	2011	1.2	RL-ENG post2001 EN, RL-ENG post2001 NT
Lower plants - liverworts					
Great crestwort	Lophocolea bispinosa	1	2012	In grid square ref within 2km from Survey Area	Sussex Rare
Lower plants - mosses					
Lesser smoothcap	Atrichum angustatum	1	2010	In grid square ref within 2km from Survey Area	NERC, UKBAP, Sussex Rare
Marble Screw-moss	Syntrichia papillosa	1	2011	0.1	Sussex Rare
Fungi					
A fungus	Ascotremella faginea	1	2013	1.5	Sussex Rare
Lichens					
A lichen	Leptogium biatorinum	1	2012	In grid square ref within 2km from Survey Area	Nat Scarce, Sussex Rare
A lichen	Taeniolina scripta	1	2012	In grid square ref within 2km from Survey Area	Nat Rare

Table B2 - Protected and notable birds for which records have been identified within 2km

Species common name	Species Latin name	No. Of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵¹
Barn owl	<i>Tyto alba</i>	20	2019	In grid square ref within 2km from Survey Area	WCA Sch1, Notable Bird
Bewick's swan	<i>Cygnus columbianus</i>	3	2011	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, NERC, Bird Amber
Bewick's swan	<i>Cygnus columbianus</i> subsp. <i>bewickii</i>	2	2014	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, NERC, UKBAP, Bird Amber
Black-headed gull	<i>Chroicocephalus ridibundus</i>	2	2015	1.6	Bird Amber, Notable Bird
Black-tailed godwit	<i>Limosa limosa</i>	18	2018	In grid square ref within 2km from Survey Area	WCA Sch1, UKBAP, RL-Global post2001 NT, Bird Red
Black-winged Stilt	<i>Himantopus himantopus</i>	1	2014	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, Notable Bird
Bullfinch	<i>Pyrrhula pyrrhula</i>	4	2010	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Amber, Notable Bird
Cetti's warbler	<i>Cettia cetti</i>	25	2017	In grid square ref within 2km from Survey Area	WCA Sch1, Notable Bird

⁵¹ BirdsDir = Species listed under Annexe 1 (A1) of the Birds Directive 79/409/EEC, WCA = Wildlife and Countryside Act (1981), NERC = Schedule 41 Natural Environment and Rural Communities Act (2006), UKBAP = UK Biodiversity Action Plan species, Bird Amber/Red = Birds on either the Red list or Amber list of the Birds of Conservation Concern 4 (Eaton et al., 2015), Notable Bird = Sussex notable bird list.

Species common name	Species Latin name	No. Of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵¹
Common gull	Larus canus	20	2018	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
Common shelduck	Tadorna tadorna	1	2012	1.5	Bird Amber, Notable Bird
Corn bunting	Emberiza calandra	7	2014	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Cuckoo	Cuculus canorus	14	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Curlew	Numenius arquata	4	2015	In grid square ref within 2km from Survey Area	NERC, UKBAP, RL-Global post2001 NT, Bird Red, Notable Bird
Dunnock	Prunella modularis	19	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Amber, Notable Bird
Firecrest	Regulus ignicapilla	3	2015	In grid square ref within 2km from Survey Area	WCA Sch1, Notable Bird
Gadwall	Anas strepera	3	2013	1.9	Bird Amber, Notable Bird
Green woodpecker	Picus viridis	18	2018	In grid square ref within 2km from Survey Area	Notable Bird
Grey partridge	Perdix perdix	15	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Grey wagtail	Motacilla cinerea	5	2016	1.9	Bird Red, Notable Bird
Hawfinch	Coccothraustes coccothraustes	2	2018	In grid square ref	NERC, UKBAP, Bird Red, Notable Bird

Species common name	Species Latin name	No. Of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵¹
				within 2km from Survey Area	
Herring gull	Larus argentatus	6	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Hobby	Falco subbuteo	26	2018	In grid square ref within 2km from Survey Area	WCA Sch1, Notable Bird
House martin	Delichon urbicum	11	2015	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
House sparrow	Passer domesticus	17	2015	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Kestrel	Falco tinnunculus	17	2018	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
Kingfisher	Alcedo atthis	6	2016	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, Bird Amber, Notable Bird
Lapwing	Vanellus vanellus	19	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Lesser spotted woodpecker	Dendrocopos minor	1	2011	1.9	NERC, UKBAP, Bird Red, Notable Bird
Lesser spotted woodpecker	Dendrocopos minor subsp. Comminutus	1	2018	1.2	NERC, UKBAP, Bird Red, Notable Bird
Linnet	Linaria cannabina	9	2011	In grid square ref within 2km	NERC, UKBAP, Bird Red, Notable Bird

Species common name	Species Latin name	No. Of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵¹
				from Survey Area	
Little egret	Egretta garzetta	2	2013	In grid square ref within 2km from Survey Area	BirdsDir A1, Notable Bird
Little grebe	Tachybaptus ruficollis	7	2015	In grid square ref within 2km from Survey Area	Notable Bird
Little ringed plover	Charadrius dubius	4	2016	In grid square ref within 2km from Survey Area	WCA Sch1, Notable Bird
Mallard	Anas platyrhynchos	12	2017	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
Marsh tit	Poecile palustris	2	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Merlin	Falco columbarius	13	2017	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, Bird Red
Mistle thrush	Turdus viscivorus	6	2018	In grid square ref within 2km from Survey Area	Bird Red, Notable Bird
Mute swan	Cygnus olor	10	2016	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
Nightingale	Luscinia megarhynchos	4	2015	1.6	Bird Red, Notable Bird
Osprey	Pandion haliaetus	1	2018	1.4	BirdsDir A1, WCA Sch1, Bird Amber, Notable Bird

Species common name	Species Latin name	No. Of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵¹
Red kite	<i>Milvus milvus</i>	15	2018	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, RL-Global post2001 NT, Notable Bird
Redshank	<i>Tringa totanus</i>	7	2018	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
Redstart	<i>Phoenicurus phoenicurus</i>	6	2017	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
Reed bunting	<i>Emberiza schoeniclus</i>	14	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Amber, Notable Bird
Ring ouzel	<i>Turdus torquatus</i>	4	2015	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red
Ringed plover	<i>Charadrius hiaticula</i>	2	2018	In grid square ref within 2km from Survey Area	Bird Red, Notable Bird
Ruff	<i>Calidris pugnax</i>	10	2018	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, Bird Red
Short-eared Owl	<i>Asio flammeus</i>	5	2016	In grid square ref within 2km from Survey Area	BirdsDir A1, Bird Amber, Notable Bird
Skylark	<i>Alauda arvensis</i>	27	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Snipe	<i>Gallinago gallinago</i>	1	2014	In grid square ref within 2km	Bird Amber, Notable Bird

Species common name	Species Latin name	No. Of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵¹
				from Survey Area	
Song thrush	<i>Turdus philomelos</i>	19	2018	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Spoonbill	<i>Platalea leucorodia</i>	1	2014	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, Bird Amber
Spotted flycatcher	<i>Muscicapa striata</i>	1	2011	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Starling	<i>Sturnus vulgaris</i>	16	2015	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Stock dove	<i>Columba oenas</i>	17	2018	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
Swallow	<i>Hirundo rustica</i>	14	2017	In grid square ref within 2km from Survey Area	Notable Bird
Swift	<i>Apus apus</i>	7	2012	1.9	Bird Amber, Notable Bird
Tawny owl	<i>Strix aluco</i>	2	2014	1.5	Bird Amber, Notable Bird
Tufted duck	<i>Aythya fuligula</i>	3	2012	1.9	Notable Bird
Turtle dove	<i>Streptopelia turtur</i>	4	2012	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Wheatear	<i>Oenanthe oenanthe</i>	11	2016	In grid square ref within 2km from Survey Area	Notable Bird

Species common name	Species Latin name	No. Of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵¹
Whinchat	Saxicola rubetra	3	2012	In grid square ref within 2km from Survey Area	Bird Red, Notable Bird
White-fronted Goose	Anser albifrons	3	2014	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red
Whitethroat	Sylvia communis	13	2011	In grid square ref within 2km from Survey Area	Notable Bird
Whooper swan	Cygnus cygnus	51	2015	In grid square ref within 2km from Survey Area	BirdsDir A1, WCA Sch1, Bird Amber
Willow warbler	Phylloscopus trochilus	4	2017	In grid square ref within 2km from Survey Area	Bird Amber, Notable Bird
Woodcock	Scolopax rusticola	3	2015	In grid square ref within 2km from Survey Area	Bird Red, Notable Bird
Yellow wagtail	Motacilla flava	1	2014	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird
Yellowhammer	Emberiza citrinella	16	2014	In grid square ref within 2km from Survey Area	NERC, UKBAP, Bird Red, Notable Bird

Table B3 - Invasive species for which records have been identified within 2km

Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵²
Mammals - terrestrial					
Chinese muntjac	Muntiacus reevesi	1	2012	1.1	WCA Sch 9
Eastern grey squirrel	Sciurus carolinensis	1	2014	0.1	WCA Sch 9
Birds					
Barnacle goose	Branta leucopsis	1	2015	In grid square ref within 2km from Survey Area	WCA Sch 9
Black swan	Cygnus atratus	4	2015	1.9	WCA Sch 9
Canada goose	Branta canadensis	3	2018	0.5	WCA Sch 9
Egyptian goose	Alopochen aegyptiacus	1	2014	2.4	WCA Sch 9
Golden pheasant	Chrysolophus pictus	1	2015	1.9	WCA Sch 9
Invertebrates - beetles					
A beetle	Harmonia axyridis form succinea	1	2017	2.1	Sussex INNS
Harlequin ladybird	Harmonia axyridis	2	2017	0.8	Sussex INNS
Invertebrates - moths					
Horse-Chestnut Leaf-miner	Cameraria ohridella	4	2014	0.1	Sussex INNS
Higher plants - flowering plants					
Rhododendron	Rhododendron ponticum	1	2015	2.0	WCA Sch 9
False virginia creeper	Parthenocissus inserta	1	2015	In grid square ref within 2km from Survey Area	WCA Sch 9
Himalayan cotoneaster	Cotoneaster simonsii	1	2011	1.5	WCA Sch 9

⁵² WCA = Wildlife and Countryside Act (1981), Sussex INNS = Sussex Invasive Non-Native species list.

Species common name	Species Latin name	No. of records	Most recent record year	Distance from Survey Area (km)	Designation ⁵²
Hybrid bluebell	Hyacinthoides non-scripta x hispanica = H. x massartiana	2	2017	0.8	Sussex INNS
Himalayan balsam	Impatiens glandulifera	1	2011	2.0	WCA Sch 9
Japanese knotweed	Fallopia japonica	1	2011	In grid square ref within 2km from Survey Area	WCA Sch 9
Least duckweed	Lemna minuta	2	2013	1.7	Sussex INNS
Montbretia	Crocasmia pottsii x aurea = C. x crocosmiiflora	2	2011	2.0	WCA Sch 9
Nuttall's waterweed	Elodea nuttallii	1	2013	1.8	WCA Sch 9
Red valerian	Centranthus ruber	1	2015	In grid square ref within 2km from Survey Area	Sussex INNS
Variegated yellow archangel	Lamiastrum galeobdolon subsp. argentatum	3	2015	1.9	WCA Sch 9
Wall cotoneaster	Cotoneaster horizontalis	1	2011	In grid square ref within 2km from Survey Area	WCA Sch 9
Winter heliotrope	Petasites fragrans	3	2016	0	Sussex INNS

Appendix C

PHOTOGRAPHS

115/1

Table 7 - Photographs

	
1. Traditional orchard PBW1 in the north of the Survey Area.	2. Mature trees and common nettle understorey in semi-natural broadleaved woodland BW1 in the north of the Survey Area.
	
3. Line of hornbeam (TN1) bordering BW1 and PBW1 in the north of the Survey Area.	4. Semi-improved grassland SNG2 in the centre of the Survey Area.
	
5. Tall ruderal vegetation TR1 in the south of the Survey Area.	6. Species-poor intact hedgerow PH2 along a bare ground track in the centre of the Survey Area.



2 London Square
Cross Lanes
Guildford, Surrey
GU1 1UN

