

9. BIODIVERSITY

Introduction

- 9.1 This chapter of the ES assesses the likely significant effects of the Development on the environment in respect of biodiversity and ecology.

Policy Context

- 9.2 This section summarises the relevant legislation and planning policy in relation to ecology and biodiversity within the Arun District Council (ADC) administrative area, including national planning policy. This information is used to assess the compliance of the Development in relation to relevant legislation and planning policy and use this information to inform an appropriate mitigation strategy.

National Planning Policy Framework

- 9.3 The Ecological Impact Assessment will have reference to relevant policies within the National Planning Policy Frameworkⁱ. In particular:
- Paragraph 11;
 - Paragraph 170;
 - Paragraph 175; and
 - Paragraph 177.
- 9.4 It will also have reference to Circular 06/05. In particular:
- Paragraph 98; and
 - Paragraph 99
- 9.5 Further information on these policies are provided in Appendix 9.1.

Local Planning Policy

Arun District Council Local Plan 2018

- 9.6 Local planning policy within Arun is provided by policies within the Arun District Council Local Plan 2018ⁱⁱ, including:

- Policy ENV SP1 – Natural Environment;
- Policy ENV DM1 – Designated Sites of Biodiversity or Geological Importance;
- Policy ENV DM2 - Pagham Harbour;
- Policy ENV DM3 – Biodiversity Opportunity Areas;
- Policy ENV DM4 – Protection of Trees; and
- Policy ENV DM5 - Development and Biodiversity.

9.7 Further information on these policies are provided in Appendix 9.1.

Legislative Context

9.8 The following legislation is considered relevant in relation to the Development based on the ecological features present within the Site's Zone of Influence (see Paragraph 9.10).

- Wildlife and Countryside Act 1981;
- Conservation of Habitats and Species Regulations 2017, including;
- Protection of Badgers Act 1992; and
- Natural Environment and Rural Communities Act 2006.

9.9 Further information on this legislation and its relevance to this Development is provided in Appendix 9.1.

Assessment Methodology

Zone of Influence

9.10 To define the total extent of the study area for this assessment (Zone of Influence), the Development was reviewed to establish the spatial scale at which ecological features could be affected. The appropriate survey radii for the various elements of the appraisal (i.e. desktop study, field survey and species-specific surveys) have been defined in the relevant sections below. These distances are determined based on the professional judgement of the ecologist leading the assessment, taking into account the characteristics of the Site subject to assessment, its surroundings and the nature and scope of the Development. Determination of the Zone of Influence is an iterative process and was regularly reviewed and amended as the design of the Development evolved.

Scoping

9.11 Protected species considered within this assessment are those species/species groups considered likely to be encountered given the geographical location and context of the Site.

Where such a species is unlikely to be present on site, a justification for likely absence is provided. Species considered likely absent from the Site are not then considered further in the assessment process.

- 9.12 The scoping report for this assessment (refer to Appendix 2.1) identified that the site is suitable for a range of notable species but that there are no international or European designated sites of nature conservation within the site's Zone of Influence.
- 9.13 Within the Scoping Opinion (Appendix 2.2) provided by ADC, the Council's Ecological Advisor had identified that "*the Ford allocation site lies partly with the Arun Valley Impact Risk Zone (IRZ) and therefore the EIA should include an assessment of the potential loss of foraging habitat for Bewick's swans*", but notwithstanding this the scope of the EIA as identified within the scoping report was acceptable. The Arun Valley IRZ relates to the Arun Valley Special Protection Area (SPA), which is designated in part for supporting notable bird species Bewick's swan *Cygnus columbianus bewickii*. The IRZ represents a 10km buffer around the Arun Valley SPA, which represents the foraging range of Bewick's swanⁱⁱⁱ.
- 9.14 In response to the scoping opinion, the Zone of Influence was extended to include the Arun Valley SPA and wintering bird surveys undertaken to inform the assessment of potential impacts on the SPA and Bewick's swan.

Desktop Study

- 9.15 The desktop study included the following elements:
- Consultation of online mapping resources;
 - Consultation of the Multi-Agency Geographic Information for the Countryside (MAGIC) database;
 - Consultation with Sussex Biodiversity Record Centre (SxBRC);
 - Consultation of the ADC planning portal; and
 - Consultation of a previous 'Phase 1 Habitat Survey' reportiv which details the findings of extended Phase 1 Habitat Surveys undertaken at the Site on 9th and 16th July, 28th August 2015 and 26th August 2016.
- 9.16 Further details of the desktop study methodology, including consultation dates, search areas, limitations and information sought are provided in Appendix 9.1.

Species-Specific Surveys

9.17 Species-specific surveys were undertaken in relation to the following ecological features:

- Notable plants and habitats;
- Bats – roosting and foraging/commuting;
- Badger;
- Hazel dormouse;
- Breeding birds;
- Wintering birds;
- Reptiles; and
- Great crested newt.

9.18 Further details for each survey, including detailed methodologies, timings, conditions and limitations are provided in Appendix 9.1.

Evaluation

9.19 The evaluation criteria used in this chapter are based on ECOSA's professional judgement and publicly available publications, survey data and other sources. Details of current published relevant guidance used to inform the assessment are provided in Appendix 9.1. The evaluation is based on a sliding scale of importance outlined in Table 9.1.

Table 9.1 Scale of Importance for Ecological Features

Scale of Importance	Example
International	A site designated for its conservation importance at the international level e.g. A Ramsar site or a site which meets criteria ¹ for designation as a Ramsar site.
European	A site designated for its conservation importance at the European level e.g. A Special Protection Area (SPA) or Special Area of Conservation (SAC) or a site which meets criteria ¹ for these designations.
National	A site designated for its conservation importance at the national level e.g. A Site of Special Scientific Interest (SSSI), or a site which meets criteria ¹ for designation as a SSSI.
Regional	An ecological feature of importance at the regional level such as a population of notable or protected species which is not widespread throughout a region.
County	A site designated for its conservation importance at the county level e.g. a Local Nature Reserve (LNR) or a site which meets criteria ¹ for designation as an LNR.
Local	An ecological feature of importance at the local level, i.e. one which is uncommon, vulnerable or declining in the local area.

¹ For details of criteria see Paragraph 2.2 of Appendix 14.2

Site	An ecological feature which is common and widespread in the local area, but uncommon within the red line boundary area and may be of some value either intrinsically or to other interrelated ecological features e.g. a waterbody.
Negligible	An ecological feature which is not only common and widespread in the local area, but is also common and widespread within the red line boundary area and of no significant value either intrinsically or to other interrelated ecological features e.g. species-poor hedgerow.

- 9.20 There are a wide range of characteristics which contribute to the importance of ecological features, and these may justify an increase or reduction in the value of an ecological feature. Where deviations occur, these will be explained in the chapter.

Impact Assessment

- 9.21 Effects associated with construction will be assessed in accordance with guidance set out by CIEEM^v. The assessment will consider relevant aspects of ecological structure and function, including:

- Territory and resource requirements of relevant ecological features;
- Population and vegetation dynamics;
- Anthropogenic influences, including excavations and ground profiling, pollution, and disturbance;
- Historical context, including historic land use; and
- Ecosystem properties including connectivity/fragmentation, numbers in a population or meta-population and minimum viable populations.

- 9.22 Consideration will be given to the following potential ecological effects during the construction phase of the Development:

- Temporary or Permanent Land-take;
- Disturbance (visual, noise, vibration);
- Hydrology and pollution (dust generation, pollution of aquatic habitats);
- Lighting (construction); and
- Construction site hazards.

- 9.23 Consideration will be given to the following potential ecological effects during the operational phase of the Development:

- Permanent Land-take;
- Changes in air quality / pollution and hydrology;
- Permanent Lighting; and

- Anthropogenic influences (disturbance, trampling, littering, fire starting, pet predation and fouling) on retained on-site habitats and nearby designed sites.

9.24 Reference will be made to the following impact characteristics:

- Whether impacts are beneficial or adverse;
- The extent of impacts;
- The magnitude of impacts;
- Duration of impacts (e.g. short-term, long-term);
- Timing of impacts (adverse effects of some impacts are dependent on when the activity occurs);
- Frequency of impacts (adverse effects of some impacts are dependent on how regularly an activity occurs); and
- Reversibility of impacts (e.g. temporary or permanent).

Significance of Effects

- 9.25 In accordance with the current CIEEM guidance and terminology^v, a significant effect, in ecological terms, is defined as “*an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features'*”. Significant effects are therefore defined as ‘adverse’, if they undermine biodiversity conservation objectives, or ‘beneficial’, if they support these objectives.
- 9.26 Non-significant effects (referred to as ‘negligible’ in this ES) are those changes that do not cause an effect (adverse or beneficial) on the integrity of the habitat or species in question.
- 9.27 In order to provide an assessment of effects that is comparable with other chapters of this Environmental Statement (ES), an ‘Effect Significance Matrix’ is being used. The significance of an effect is determined by combining and assessment of the magnitude of impact and the sensitivity of a receptor. The defined magnitude of impacts has been set out in Table 9.2.

Table 9.2: Methodology for Assessment Magnitude of Impact

Magnitude of Impact	Criteria for assessing impact
Major	Total loss or major/substantial alteration to key elements/features of the baseline (pre-Development) conditions such that the post Development character/composition/attributes will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post Development character/composition/attributes of the baseline will be materially changed.
Minor	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition will be similar to the pre-Development circumstances/situation.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

9.28 The defined magnitude of impacts has been set out in Table 9.3.

Table 9.3: Methodology for Determining Impact Sensitivity

Sensitivity	Examples of receptor
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character, or is of international or national importance.
Moderate	The receptor/resource has moderate capacity to absorb change without significantly altering its present character, or is of high importance.
Low	The receptor/resource is tolerant of change without detriment to its character, is of low or local importance.

9.29 The Effect Significance Matrix is set out in Table 9.4.

Table 9.4: Effect Significance Matrix

Magnitude	Sensitivity		
	High	Moderate	Low
Major	Major Adverse/Beneficial	Major - Moderate Adverse/Beneficial	Moderate - Minor Adverse/Beneficial
Moderate	Major - Moderate Adverse/Beneficial	Moderate - Minor Adverse/Beneficial	Minor Adverse/Beneficial
Minor	Moderate - Minor Adverse/Beneficial	Minor Adverse/Beneficial	Minor Adverse/Beneficial - Negligible
Negligible	Negligible	Negligible	Negligible

Assessment of Cumulative Effects

9.30 Cumulative and in-combination effects will be assessed in accordance with guidance set out by CIEEM^v. For the purposes of this assessment, cumulative and in-combination effects are only assessed for ecological features where the Development will result in an adverse residual effect.

9.31 The developments considered in the cumulative assessments are detailed in Chapter 2 of this ES.

Baseline Conditions

- 9.32 Ecological features identified as present within the Site's Zone of Influence are summarised below. Details of all survey findings are provided in Appendix 9.3.

Designated Sites

- 9.33 Arun Valley SPA is the only statutory designated site of nature conservation within the Site's Zone of Influence. The SPA is designated for its wetland habitats, which support a population of Bewick's swan *Cygnus columbianus bewickii* and a significant wintering bird assemblage, regularly supporting 27,241 individual waterfowl (5 year peak mean for 1992/93 to 1996/97) including: shoveler *Anas clypeata*, teal *Anas crecca*, wigeon *Anas penelope*, and Bewick's swan. It lies approximately 10km north of the Site.
- 9.34 There are no non-statutory designated sites of nature conservation within the Site's Zone of Influence.

Habitats

- 9.35 The following habitats are present within the Site boundary:
- Arable land – approximately 72.06 hectares (ha);
 - Bare ground – approximately 0.40ha;
 - Broadleaved plantation woodland – approximately 0.29ha;
 - Broadleaved semi-natural woodland – approximately 0.68ha;
 - Hedgerows – approximately 4,873 square metres (sqm) of which approximately 186sqm is species-rich;
 - Grassland – approximately 4.06ha of which 3.16ha is improved and 0.88ha is poor semi-improved;
 - Scattered scrub – approximately 0.25ha;
 - Tall ruderal – approximately 0.22ha; and
 - Tree line – approximately 792 metres (m).

Notable and Protected Species

- 9.36 The following notable and protected species are present within the Site's Zone of Influence:

Bats

- 9.37 A single poplar within G52 (Appendix 9.3 – Map 1) has moderate suitability for roosting bats. Approximately 14 trees have low suitability for roosting bats due to a moderate level of ivy cladding. The cladding may in some cases obscure other potential roosting features, however, given the structure and maturity of the trees, they are considered unlikely to be suitable to support significant roosts. The remainder of the on site trees have negligible suitability for roosting bats.
- 9.38 Buildings on site have low suitability for roosting bats, but no roosts were present at the time of survey.
- 9.39 Ten species of bat (barbastelle, long-eared bat *Plecotus* species (which could be brown long-eared bat *Plecotus auritus* or grey long-eared bat *Plecotus austriacus*), common pipistrelle *Pipistrellus pipistrellus*, greater horseshoe, Leisler's bat *Nyctalus leisleri*, *Myotis* species, Nathusius' pipistrelle *Pipistrellus nathusii*, noctule *Nyctalus noctula*, serotine *Eptesicus serotinus* and soprano pipistrelle *Pipistrellus pygmaeus*) were recorded using hedgerows, tree lines and woodland edges across the Site.

Otter

- 9.40 Habitat on site is unsuitable for otter and therefore this species is not considered further in this assessment.

Badger

- 9.41 No badger setts or evidence of badger activity such as foraging signs or latrines were recorded on site. A small number of mammal paths, which could be attributed to badger, were recorded, suggesting that badger are not resident on site, but may make use of on-site habitats for foraging and commuting.

Hazel Dormouse

- 9.42 The hazel dormouse survey confirmed the likely absence of dormouse within the Site (Appendix 9.2). Therefore, this species is not considered further in this assessment.

Water Vole

- 9.43 Habitat on site is unsuitable for water vole and therefore this species is not considered further in this assessment.

European Hedgehog

- 9.44 Field margins and hedgerows provide suitable habitat for European hedgehog, however, no individuals were encountered as an incidental result of ecological surveys undertaken at the Site.

Brown Hare

- 9.45 Arable land on site is suitable for brown hare, however, no individuals were encountered as an incidental result of ecological surveys undertaken at the Site.

Birds

- 9.46 The Site supports a typical assemblage of farmland birds, with two red listed species (skylark *Alauda arvensis* and song thrush *Turdus philomelos*) and two amber listed species recorded breeding on site (dunnock *Prunella modularis* and stock dove *Columba oenas*). Although a number of notable wintering bird species make use of on-site habitats for foraging, no significantly large populations or notable assemblages were recorded.
- 9.47 The Site supports approximately 78ha of suitable breeding and foraging habitat for birds, including arable land, grassland, hedgerows, trees and woodland habitat.

Reptiles

- 9.48 A low population of common lizard was recorded within suitable habitat in the north of the Site. The Site supports approximately 4.4ha of habitat suitable for reptiles.

Amphibians

- 9.49 The Site supports approximately 4.4ha of terrestrial habitat suitable for amphibians and there are a number of ponds within 500m of the Site boundary. The SxBRC consultation revealed records of great crested newt and common toad within the local area, however, great crested newt have either been confirmed as or are highly likely to be absent from ponds within 500m of the Site.

Invertebrates

- 9.50 The majority of habitats on site have negligible suitability for notable species of invertebrate known to be present in the local area. Woodland, hedgerows and scattered trees which have suitability for a range of *Lepidoptera* Species of Principal Importance, including brown hairstreak *Thecla betulae* and stag beetle *Lucanus cervus*.

Evaluation

- 9.51 The importance of each ecological feature identified is provided in Table 9.5 below. Ecological features which were subject to survey but found to be absent from the Site have not been included within Table 9.5. Background information and justification of the evaluation of ecological features is provided in Appendix 9.

Table 9.5: Evaluation of Ecological Features within the Site's Zone of Influence

Group	Ecological Feature	Evaluation Rationale	Importance
Habitats	Arable	No notable habitats present. Rare species, corn parsley <i>Petroselinum segetum</i> , present but not a significant population. Habitat is poor quality and limited in extent.	Negligible
	Grassland	No notable habitats present. No rare species present. Habitat is poor quality and limited in extent.	Negligible
	Hedgerows	Hedgerow is a UK Priority Habitat, however, no rare species are present. Hedgerows are mainly species-poor and heavily managed and therefore of poor quality.	Local
	Ruderal vegetation	No notable habitats present. No rare species present. Habitat is poor quality and limited in extent.	Negligible
	Scrub	No notable habitats present. No rare species present. Habitat is poor quality and limited in extent.	Negligible
	Woodland, tree lines and scattered trees	Lowland Mixed Deciduous Woodland Priority Habitat and Woodland Sussex BAP Habitat present. No rare species present. Habitat is poor quality with limited ground flora and limited in extent.	Local
Species/ Species Group	Mammals - Bats	Site supports at least ten species of foraging bats including rare species barbastelle, greater horseshoe and Leisler's bat and significant numbers of common pipistrelle,. No roosts were recorded on site, but habitats provide roosting opportunities.	County
	Mammals - Badger	No setts have been identified on site. The Site provides suitable foraging habitat but it is unlikely to comprise a significant resource for the local population.	Site
	Mammals - European hedgehog	The Site provides suitable habitat for European hedgehog but it is unlikely to comprise a significant resource for the local population.	Site

Group	Ecological Feature	Evaluation Rationale	Importance
	Mammals Brown hare –	The Site provides suitable habitat for brown hare but it is unlikely to comprise a significant resource for the local population.	Site
	Mammals Harvest mouse –	The Site provides suitable habitat for harvest mouse but it is unlikely to comprise a significant resource for the local population.	Site
	Birds	The Site does not support significant numbers of notable bird species or significant assemblages. The Site supports suitable nesting and foraging habitat but it is unlikely to form a significant proportion of that available in the local area.	Site
	Reptiles	A low population of a common species is present. The Site supports suitable habitat but it is unlikely to form a significant proportion of that available in the local area.	Site
	Amphibians	Great crested newt are likely absent from the Site. The Site provides suitable habitat for common toad but it is unlikely to comprise a significant resource for the local population.	Site
	Invertebrates	Habitats on site suitable to support notable species are of limited extent and do not form a significant proportion of that in the local area. They are highly unlikely to perform a critical ecological function for any notable species or support important populations or assemblages.	Site
	Mammals Brown hare –	The Site provides suitable habitat for brown hare but it is unlikely to comprise a significant resource for the local population.	Site
	Mammals Harvest mouse –	The Site provides suitable habitat for harvest mouse but it is unlikely to comprise a significant resource for the local population.	Site

Future Baseline

- 9.52 It is anticipated that should the Development not proceed, the Site would continue to be managed as an active farm and therefore habitats would remain similar to their current baseline condition.

Likely Significant Effects

Construction Phase

Vegetation

- 9.53 The extent of habitat loss as a result of Development is summarised in Table 9.6. Habitats of value at the local level are hedgerows/treelines and broadleaved semi-natural woodland. The majority of habitats present on site (98%) will be lost in order to facilitate the development although approximately 77% of hedgerows/treelines will be retained.

Table 9.6: Summary of habitat loss

Habitat Type	Approximate Area Present (ha)	Approximate Area Lost	Percentage Habitat Loss
Arable	72.06	72.06	100%
Bare ground	0.4	0.4	100%
Broadleaved plantation	0.29	0.29	100%
Broadleaved woodland	0.68	0.68	100%
Buildings and hardstanding	6.96	5.95	85%
Earth bank	0.29	0.29	100%
Improved grassland	3.16	3.16	100%
Standing Water	0.01	0	0%
Poor semi-improved grassland	0.88	0.88	100%
Scattered scrub	0.25	0.25	100%
Semi-improved neutral grassland	0.02	0.02	100%
Tall ruderal	0.22	0.22	100%
Hedgerows/treelines	1.41	0.33	23%
Total	86.63	84.53	98%

- 9.54 The calculations for habitat loss have been based on the illustrative masterplan (Figure 3.4) and Arboricultural Assessment & Method Statement^{vi} provided in support of the outline planning application. The single species-rich hedgerow in the south of the Site will be retained and therefore the loss will only represent species poor hedgerow.
- 9.55 This represents a negligible impact on an ecological feature with low impact sensitivity, resulting in a negligible effect.
- 9.56 During the construction works, there is a risk of accidental damage to retained woodland and hedgerow vegetation through direct damage to trees or damage to roots through compaction of soil. There is also risk of indirect damage to retained habitats if pollution incidents, such as chemical spills or the creation of significant amounts of dust. These impacts are temporary and represent a minor impact on ecological features with low impact sensitivity, resulting in a minor adverse to negligible effect. Damage to other habitats is of negligible significance as these habitats are of negligible value.

Bats

- 9.57 Assessment of tree loss is based on the Illustrative Masterplan (Figure 3.4) and Arboricultural Assessment & Method Statement^{vi}. Part of G1^{vii}, which has negligible suitability for roosting bats, is required to be removed to facilitate development.
- 9.58 Accidental damage or destruction of trees could result in killing and injury of individual roosting bats, which also represents a minor impact on an ecological feature with moderate impact sensitivity, resulting in a minor adverse effect.
- 9.59 Construction will result in approximately 0.33ha of hedgerow and treeline habitat that provides linear features along which bats can forage and commute, and grassland habitat that provides a resource of invertebrate prey. This loss may also isolate linear habitat features resulting in a disruption of connectivity across the Site. This represents a permanent moderate impact on an ecological feature with moderate impact sensitivity, resulting in a moderate to minor adverse effect.
- 9.60 As it is assumed that all construction works will be undertaken during daylight hours, no disturbance as a result of lighting during construction is anticipated. Loud construction works undertaken in close proximity to trees with bat roosting suitability could result in disturbance to roosting bats and abandonment of a roost. As any bat roosts on site are likely to be used opportunistically, roost abandonment is likely to be a temporary minor impact on an ecological feature with moderate impact sensitivity, resulting in a minor adverse effect.

Badger

- 9.61 Construction will result in the loss of approximately 76ha of arable and grassland habitat suitable for foraging badger. This represents significant proportion of the habitat currently available on site. This habitat loss could also result in isolation of off-site areas of suitable habitat if badger are unable to pass through the Site. However, given that the site represents a small proportion of suitable habitat in the wider landscape due to the rural nature of the surrounding area, this represents a minor impact on a feature with low impact sensitivity, resulting in a minor adverse to negligible effect.
- 9.62 If excavations are left uncovered overnight badger could become trapped in excavations causing possible injury or death. The injury or killing of individual badger is likely to represent a minor impact on the local badger population, which is an ecological feature with low impact sensitivity, resulting in a minor adverse to negligible effect overall.
- 9.63 As no badger setts are present on site and no lighting is anticipated, effects associated with

disturbance are of negligible significance.

Brown Hare

- 9.64 Construction will result in the loss of approximately 72 ha of arable habitat suitable for brown hare. This represents 100% of the habitat currently available. This habitat loss could also result in isolation of off-site areas of suitable habitat if brown hare are unable to pass through the Site. Although all on-site habitat will be lost, this represents a small proportion of suitable habitat in the wider landscape, given the rural nature of the surrounding area. Therefore, this represents a minor impact on a feature with low impact sensitivity, resulting in a minor adverse to negligible effect.
- 9.65 If excavations are left uncovered overnight brown hare could become trapped in excavations causing possible injury or death. The injury or killing of individual brown hare is likely to represent a minor adverse impact on the local population, which is an ecological feature with low impact sensitivity, resulting in a minor adverse to negligible effect overall.
- 9.66 As no lighting is anticipated, effects associated with disturbance are of negligible significance.

European Hedgehog

- 9.67 Construction will result in the loss of approximately 0.33ha of hedgerow habitats suitable for European hedgehog. This loss will also result in a disruption of connectivity across the Site. this represents a permanent moderate impact on an ecological feature with low impact sensitivity, resulting in a minor adverse effect.
- 9.68 If excavations are left uncovered overnight, European hedgehog could become trapped in excavations causing possible injury or death. The injury or killing of individual European hedgehog is likely to represent a minor adverse impact on the local population, which is an ecological feature with low impact sensitivity, resulting in a minor adverse to negligible effect overall.
- 9.69 As no lighting is anticipated, impacts associated with disturbance are of negligible significance.

Harvest Mouse

- 9.70 Construction will result in the loss of approximately 72ha of arable land and approximately 0.33ha of hedgerow habitat suitable for harvest mouse. Although all on site habitat will be

lost, this represents a small proportion of suitable in the wider landscape, given the rural nature of the surrounding area. Therefore, this represents a minor adverse impact on a feature with low impact sensitivity, resulting in a minor adverse to negligible effect.

- 9.71 Destruction of habitat suitable for harvest mouse has the potential to result in the killing and injury of individuals. This represents a permanent minor impact on an ecological feature with low impact sensitivity, resulting in a minor adverse - negligible effect.

Birds

- 9.72 Construction will result in the loss of approximately 72 ha of arable farmland suitable for nesting skylark and used as a foraging resource by other bird species. There will also be a minor net loss of hedgerow and tree/woodland habitat that provides nesting opportunities for other bird species including song thrush, dunnock and stock dove.
- 9.73 The Site is of importance at the site level for this species group due to the significant extent of suitable habitat in the wider area. As only a limited proportion of habitat available to the local population will be lost, the magnitude of this impact is minor and therefore this represents a permanent minor impact on an ecological feature with low impact sensitivity, resulting in a minor to negligible adverse effect.
- 9.74 Destruction of habitat suitable for nesting birds could result in destruction of nests and killing of individual birds. Loud construction works undertaken in close proximity to active nests within these habitats could result in disturbance to nesting birds and abandonment of eggs or young. This represents a permanent moderate impact on an ecological feature with low impact sensitivity, resulting in a minor adverse effect.
- 9.75 As it is assumed that all construction works will be undertaken during daylight hours, no disturbance as a result of lighting during construction is anticipated.

Reptiles

- 9.76 Construction will result in the loss of a limited extent of grassland and arable field margin habitat suitable for common species of reptile. This loss signifies a permanent moderate impact on an ecological feature with low impact sensitivity, resulting in a minor adverse effect.
- 9.77 Destruction of habitat suitable for reptiles has potential to result in the killing and injury of individuals. This represents a permanent major impact on an ecological feature with low impact sensitivity, resulting in a moderate to minor adverse effect.

Amphibians

- 9.78 Construction of the Development will result in the loss of a limited extent of grassland and field margin habitat suitable for common species of amphibian. This loss signifies a permanent moderate impact on an ecological feature with low impact sensitivity, resulting in a minor adverse effect.
- 9.79 Destruction of habitat suitable for common amphibians has potential to result in the killing and injury of individuals. This represents a permanent major impact on an ecological feature with low impact sensitivity, resulting in a moderate to minor adverse effect.

Invertebrates

- 9.80 Construction of the Development will result in the loss of approximately 0.33ha of hedgerow habitat suitable for supporting invertebrates. This represents a permanent minor impacts on an ecological feature with low impact sensitivity, resulting in a minor adverse effect.

Operational Phase

Designated Sites

- 9.81 The Development will not result in direct effects on the Arun Valley SPA.
- 9.82 Whilst the site itself does not support habitat functionally linked to the Arun Valley SPA, adjacent habitats have suitability to support Bewick's swan, a qualifying feature of this designated site. There is potential for the Development to result in an increase in disturbance impacts on this species as a result of new residents using publicly accessible footpaths through this habitat. However, suitable habitat adjacent to the Development is limited in extent and at the very edge of Bewick's swan foraging range from the SPA (10 kilometres) ^{viii}. This represents a permanent minor impact on an ecological feature with major sensitivity, resulting in a moderate to minor adverse effect.

Vegetation

- 9.83 Locally important retained habitats including hedgerows and broadleaved woodland could be damaged or destroyed through inappropriate management or degradation as a result of an increase in residents, through trampling, littering and pet fouling. This represents a moderate impact on ecological features with moderate impact sensitivity, resulting in a moderate to

minor adverse effect.

Bats

- 9.84 Introduction of a new external lighting scheme could result in significant light spill on retained habitats suitable for roosting, foraging and commuting bats. Light spill can deter more light averse bat species such as long-eared bats *Plecotus* species, *Myotis* species, barbastelle *Barbastella barbastellus*, and greater horseshoe *Rhinolophus ferrumequinum*, from using the available habitat, potentially resulting in foraging habitat loss, isolation of habitats and abandonment of roosts. This represents a permanent major impact on an ecological feature with low impact sensitivity, resulting in a major to moderate adverse effect.
- 9.85 Damage or destruction of trees and hedgerows, or removal of suitable roosting features, through insensitive management has the potential to result in a net loss in remaining roosting, foraging and commuting habitat, and could result in the killing and injury of individual bats. This represents a permanent moderate impact on an ecological feature with moderate impact sensitivity, resulting in a moderate to minor adverse effect.
- 9.86 Killing and injury of individual bats could result from an increase in predation by domestic pets. However, cats are only known to kill or injure a small number of bats with a study finding that bats formed 1.6% of mammals predated by domestic cats and 0.19% of all animals predated by domestic cats^{ix}. The loss to the local population is considered likely to represent a very minor change from baseline conditions and therefore this represents a negligible effect.

Badger

- 9.87 The introduction of a new external lighting scheme as part of the Development could result in significant light spill on retained habitats suitable for foraging and commuting badger. This could deter badger from using this habitat and result in isolation of habitat in the wider area and a loss of available foraging habitat. This represents a permanent major impact on an ecological feature with low impact sensitivity, resulting in a moderate to minor adverse effect.

Brown Hare

- 9.88 As no habitat suitable for brown hare will be present on site following completion of the Development, no operational effects are anticipated.

European Hedgehog

- 9.89 The introduction of a new external lighting scheme could result in significant light spill on retained habitats suitable for European hedgehog and could deter individuals from using this habitat and result in isolation of habitat in the wider area and a loss of available foraging habitat. This represents a permanent major impact on an ecological feature with low impact sensitivity, resulting in a moderate to minor adverse effect.
- 9.90 Killing and injury of individual hedgehogs could result from an increase in predation by domestic pets. However, anecdotal evidence suggests that cats avoid predating hedgehogs and a study found that out of 14,370 animals killed by cats, none were hedgehog^{ix}. Dogs may occasionally attack hedgehog, however, adults are usually sufficiently protected by their spines, with only young vulnerable to death from such attacks. The loss to the local population is considered likely to represent a very minor change from baseline conditions and therefore this represents a negligible effect.

Harvest Mouse

- 9.91 Killing and injury of individual harvest mouse could result from an increase in predation by domestic pets. A recent study found that harvest mouse formed 1.8% of mammals and 1.2% of animals predated by domestic cats. The study also recorded 12.3% of animals predated as unidentified mouse species so predation rates could be considerably higher^{ix}. This could represent a permanent major impact on an ecological feature with low impact sensitivity, resulting in a moderate to minor adverse effect.

Birds

- 9.92 The introduction of a new external lighting scheme could result in significant light spill on retained habitats suitable for nesting birds, which may deter birds from making use of on-site habitat. This represents a permanent major impact on an ecological feature with low impact sensitivity, resulting in a moderate to minor adverse effect.
- 9.93 Killing and injury of individual birds could result from an increase in predation by domestic pets. This represents a permanent major impact on an ecological feature with low impact sensitivity, resulting in a moderate to minor adverse effect.

Reptiles

- 9.94 Insensitive management of retained habitats, such as scrub removal or intensive management of grassland, could result in the loss of retained reptile habitat and killing and injury of individual reptiles. Killing and injury of reptiles could also occur as a result of an increase in pet predation. This represents a permanent moderate impact on an ecological feature with low impact sensitivity, resulting in a minor adverse effect.
- 9.95 Killing and injury of individual reptiles could result from an increase in predation by domestic pets. However, cats are only known to kill or injure a small number of reptiles with a study finding that reptiles formed 1% of all animals preyed on by domestic cats^{ix}. The loss to the local population is considered likely to represent a very minor change from baseline conditions and therefore this represents a negligible effect.

Amphibians

- 9.96 Insensitive management of retained habitats, such as scrub removal or intensive management of grassland, could result in the loss of retained amphibian habitat and killing and injury of individual amphibians. Killing and injury of amphibians could also occur as a result of an increase in pet predation. This represents a permanent moderate impact on an ecological feature with low impact sensitivity, resulting in a minor adverse effect.
- 9.97 Killing and injury of individual amphibians could result from an increase in predation by domestic pets. However, cats are only known to kill or injure a small number of amphibians with a study finding that amphibians formed 4.1% of all animals preyed on by domestic cats^{ix}. The loss to the local population is considered likely to represent a very minor change from baseline conditions and therefore this represents a negligible effect.

Invertebrates

- 9.98 Artificial light spill on retained suitable habitat has potential to result in disturbance to invertebrates by disrupting the natural light/dark patterns, thus affecting invertebrate feeding, breeding and movement. This represents a permanent minor impact on an ecological feature with low impact sensitivity, resulting in a minor adverse to negligible effect.

Mitigation, Compensation and Enhancement Measures

Construction Phase

Vegetation

- 9.99 Proposed landscaping includes 20.3ha of buffer planting and semi-natural green spaces.
- 9.100 Hedgerow planting will be including with the buffer planting area and around the proposed allotments. This will compensate for the loss of hedgerow habitat on site and represents significant net gain.
- 9.101 In order to protect retained tree lines and hedgerows from damage during construction, the root protection zones of these habitats will be protected using Heras-type fencing. In addition, a pollution prevention plan will be designed to ensure that habitats are not damaged as a result of pollution events.
- 9.102 As an enhancement measure, new hedgerows will comprise a range of native species and retained hedgerows will be diversified. Approximately 20.3ha of natural and semi-natural green space will be created as part of the Development and will include native species-rich grassland, scrub, scattered trees and orchard habitats which will be of greater ecological value than the habitats currently present on site. Waterbodies will also be created as part of the SUDs drainage strategy and will be planted with a diverse range of native wetland species. The landscaping proposals will be developed in consultation with an ecologist to ensure that the final detailed landscaping proposals deliver a net gain in habitat diversity.

Bats

- 9.103 In order to mitigate for a net loss in potential roosting features, 20 bat boxes, comprising a mix of designs to suit a range of bat species, will be installed in retained trees to provide compensatory roosting habitat. In addition, 20 integrated roost units (such as Schwegler 2FR roost units or similar) will be installed in the external walls of buildings that are situated adjacent to suitable bat foraging and commuting habitat, where they will not be subject to significant light spill.
- 9.104 To avoid killing and injury of roosting bats, trees with low suitability for roosting bats that are proposed to be removed will be subject to sectional felling under the supervision of a suitably qualified ecologist.

- 9.105 Soft landscaping of the Development will include tree and hedgerow planting that will provide continuous green corridors around and across the Site. Native species grassland planting, the creation of orchard habitat and waterbodies planted with native marginal and emergent species will provide a resource of invertebrate prey.
- 9.106 The protection of retained trees with Heras-fencing will prevent loud works being undertaken in close proximity to potential tree roosts.

Badger

- 9.107 Soft landscaping of the Development will include hedgerow and margin planting that will provide continuous green corridors around and across the Site. Native species grassland planting, the creation of orchard habitat and waterbodies planted with native marginal and emergent species will provide a resource of invertebrate prey.
- 9.108 To prevent badger becoming trapped in deep excavations during construction, such excavations will be covered overnight, or a timber ramp installed to allow trapped animals to escape of their own accord.

Brown Hare

- 9.109 To prevent brown hare becoming trapped in deep excavations during construction, such excavations will be covered overnight, or a timber ramp installed to allow trapped animals to escape of their own accord.

European Hedgehog

- 9.110 Soft landscaping within the Development will include hedgerow and margin planting that will provide continuous green corridors around and across the Site. Gaps of a minimum 13 centimetres x 13 centimetres will be left under any closed board timber fencing used to separate residential gardens, allowing European hedgehog to pass through garden habitat.
- 9.111 Native species grassland planting, hedgerow creation/strengthening and the creation of orchard habitat will mitigate for the loss of foraging habitat on site.
- 9.112 To prevent European hedgehog becoming trapped in deep excavations during construction works, such excavations will be covered overnight, or a timber ramp installed to allow trapped animals to escape of their own accord.

Harvest Mouse

- 9.113 In order to avoid killing and injury of harvest mouse during construction, the Site will be kept clear after harvesting of the most recent arable crop. This will encourage harvest mouse to remain within areas of retained hedgerow and will deter them from recolonising the construction area.

Birds

- 9.114 In order to prevent disturbance, killing or injury of nesting birds, areas of suitable habitat, such as arable land and field margins, hedgerows and tree lines, will be removed outside of the breeding season (March to August inclusive), or if not possible, under the supervision of an ecologist. If active nests are encountered, the area will be left undisturbed with a suitable buffer (determined by the attending ecologist) until young have fledged.
- 9.115 New native species tree, hedgerow and scrub planting will mitigate for the loss nesting opportunities within these habitats. Creation of areas of diverse grassland, berry-bearing species within hedgerow and scrub planting and wildlife friendly attenuation basins will provide an enhanced plant and invertebrate foraging resource for birds.

Reptiles

- 9.116 In order to avoid the killing and injury of reptiles, suitable habitat will be subject to a translocation exercise and/or subject to persuasive strim and destructive search under the supervision of a suitably qualified ecologist. Reptiles encountered will be translocated to the newly created agricultural grassland habitat, which will be established prior to the commencement of the translocation works.
- 9.117 Creation of areas of diverse grassland and scrub on site will mitigate for the loss of suitable reptile foraging habitat on site. Grassland within the orchard and allotment areas, and along the margins of the Site will be left to develop a longer sward to provide suitable habitat for reptiles.

Amphibians

- 9.118 In order to avoid the killing and injury of amphibians, suitable habitat will be subject to a translocation exercise and/or subject to persuasive strim and destructive search under the supervision of a suitably qualified ecologist. Amphibians encountered will be translocated to

the newly created agricultural grassland habitat, which will be established prior to the commencement of the translocation works.

- 9.119 Creation of areas of diverse grassland and scrub on site will mitigate for the loss of suitable reptile foraging habitat on site. Grassland within the orchard and allotment areas, and along the margins of the Site will be left to develop a longer sward to provide suitable habitat for amphibians.

Invertebrates

- 9.120 Approximately 20.3ha of natural and semi-natural green space will be created as part of the Development and will include native species-rich grassland, scrub, scattered trees and orchard habitats which will be of greater value to invertebrates than the habitats currently present on site.

Operational Phase

Designated Sites

- 9.121 To avoid disturbance impacts on Bewick's swan using habitats adjacent to the site, stockproof fencing/low lying hedgerows will be established along the edges of the public footpaths to the north and east of the site to prevent access to the fields by humans and dogs and to screen their movement, without inhibiting the view for walkers. This will avoid disturbance impacts that may result in the loss of habitat functionally connected to the Arun Valley SPA.
- 9.122 The hedgerows bordering Footpath 3 are likely to make the small area of field to the south unsuitable for Bewick's swan as it will be enclosed by hedgerows. However, this represents approximately two hectares of suitable habitat. The area to the north of the footpath represents approximately eight hectares of suitable habitat, and this area will be made more suitable for Bewick's swan as any existing disturbance as a result of the footpath will be screened by the hedgerow and informal access by walkers and their dogs will be prevented.

Vegetation

- 9.123 A detailed management plan, which will be secured by planning condition, will be designed to ensure that the quality and diversity of retained and created habitats of importance is maintained. This will include sensitive methods and timings of works associated with grassland, hedgerow, tree/woodland and wetland management, to allow new plants to establish, maintain suitable habitat structure, remove invasive species and also ensure that

notable and protected species which may be using such habitats will not be adversely affected (for example, managing hedgerows only in winter to maintain a bushy structure and avoid disturbance, killing or injury of nesting birds).

- 9.124 Areas of dense, thorny scrub will be planted in selected locations in order to deter informal access to certain areas by local residents, to reduce the impact of trampling on sensitive habitats.

Bats

- 9.125 A sensitive external lighting scheme will be designed as part of the Development to ensure that light spill on habitats used by roosting, foraging and commuting bats is avoided. The scheme will have reference to measures outlined in current guidance on lighting mitigation^x.
- 9.126 A detailed management plan will be designed to ensure that bat roosting features associated with on site trees are retained wherever possible and that removal of such features is undertaken at an appropriate time of year.

Badger

- 9.127 A sensitive external lighting scheme will be designed as part of the Development to ensure that light spill on habitats used by foraging and commuting badger is avoided. The scheme will have reference to measures outlined in current guidance on lighting mitigation^x.

Brown Hare

- 9.128 A sensitive external lighting scheme will be designed as part of the Development to ensure that light spill on habitats used by foraging and commuting brown hare is avoided. The scheme will have reference to measures outlined in current guidance on lighting mitigation^x.

European Hedgehog

- 9.129 A sensitive external lighting scheme will be designed as part of the Development to ensure that light spill on habitats used by foraging and commuting European hedgehog is avoided. The scheme will have reference to measures outlined in current guidance on lighting mitigation^x.

Harvest Mouse

- 9.130 Leaflets will be provided to homeowners to encourage the use of collar mounted devices such as bells or CatBib™ which have been shown to reduce the success of cat predation^{xi, xii}.

Birds

- 9.131 Leaflets will be provided to homeowners to encourage the use of collar mounted devices such as bells or CatBib™ which have been shown to reduce the success of cat predation^{xi, xii}.

Reptiles

- 9.132 A detailed management plan will be designed to ensure that killing and injury of reptiles and habitat loss through mismanagement is avoided. This will include sensitive working methods and timing of works.
- 9.133 Leaflets will be provided to homeowners to encourage the use of collar mounted devices such as bells or CatBib™ which have been shown to reduce the success of cat predation^{xi, xii}.
- 9.134 Compensatory habitat will be created within the orchard and allotment area in the north-east of the Site and within the buffer planting and green open space in the south of the Site. Green corridors around and across the Site will be managed to provide suitable habitat for reptiles. This will maintain connectivity across the Site and with suitable habitats in the wider area, such as grassland fields and the network of arable field margins within the surrounding landscape.
- 9.135 New drainage basins (Paragraph 9.138) will provide an invertebrate and amphibian prey resource for reptiles.

Amphibians

- 9.136 Leaflets will be provided to homeowners to encourage the use of collar mounted devices such as bells or CatBib™ which have been shown to reduce the success of cat predation^{xi, xii}.
- 9.137 Compensatory habitat will be created within the orchard and allotment area in the north-east of the site and within the buffer planting and green open space in the south of the site. Green corridors around and across the site will be managed to provide suitable terrestrial habitat for amphibians. This will maintain connectivity across the site and with suitable habitats in the wider area, such as nearby waterbodies, grassland fields and the network of arable field

margins within the surrounding landscape.

- 9.138 New attenuation basins will be sensitively designed, with gently sloping sides and planted with native wetland vegetation to provide additional suitable habitat for this species group. The basins will also provide suitable aquatic habitat at certain times of year when there is higher rainfall.

Invertebrates

- 9.139 A sensitive external lighting scheme will be designed as part of the Development to ensure that light spill on habitats used by invertebrates is avoided. The scheme will have reference to measures outlined in current guidance on lighting mitigation^x.

Residual Effects

Vegetation

- 9.140 Proposed landscaping will result in a net gain in high quality habitat on site through creation of species-rich hedgerows, tree lines, orchard, grassland and wetland habitat. This represents a permanent minor impact on an ecological feature with moderate impact sensitivity, resulting in a minor beneficial residual effect.

Bats

- 9.141 New tree and hedgerow planting will result in a net gain in foraging and commuting habitat and new grassland planting and creation of drainage basins (Paragraph 9.138) will result in a net gain in habitat supporting invertebrate prey resource. This represents a permanent minor impact on an ecological feature with moderate impact sensitivity, resulting in a minor beneficial residual effect.

Badger

- 9.142 Killing and injury of badger will be avoided and compensatory habitat for badger will be provided. This will mitigate/compensate for adverse effects on badger, resulting in a negligible residual effect.

Brown Hare

- 9.143 The loss of agricultural land suitable for supporting brown hare cannot be compensated.

However, the Site is of importance at the Site level for this species due to the significant extent of arable land in the wider area. As only a limited proportion of available habitat will be lost, the magnitude of this impact is minor and therefore the residual effect is minor adverse to negligible.

European Hedgehog

- 9.144 Killing and injury of European hedgehog will be avoided and compensatory habitat for this species will be provided. This will mitigate/compensate for adverse effects on European hedgehog, resulting in a negligible residual effect.

Harvest Mouse

- 9.145 The loss of agricultural land suitable for supporting harvest mouse cannot be compensated. However, the Site is of importance at the Site level for this species due to the significant extent of arable land in the wider area. As only a limited proportion of available habitat will be lost, the magnitude of this impact is minor and therefore the residual effect is minor adverse to negligible.

Birds

- 9.146 New tree and hedgerow planting will result in a net gain in habitat for birds that nest in these features. This represents a permanent minor impact on an ecological feature with low impact sensitivity, resulting in a minor beneficial to negligible residual effect.
- 9.147 The loss of agricultural land used by ground nesting birds including skylark cannot be compensated. However, the Site is of importance at the Site level for this species due to the significant extent of arable land in the wider area. As only a limited proportion of available habitat will be lost, the magnitude of this impact is minor and therefore the residual effect is minor adverse to negligible.

Reptiles

- 9.148 Proposed soft landscaping will result in a net gain in reptile habitat at the Site. The represents a permanent minor impact on an ecological feature with low impact sensitivity, resulting in a minor beneficial to negligible residual effect.

Amphibians

- 9.149 Proposed soft landscaping and the appropriate design of attenuation basins will result in a significant net gain in amphibian habitat at the Site. This represents a permanent moderate impact on an ecological feature with low impact sensitivity, resulting in a minor beneficial residual effect.

Operational Phase

- 9.150 Adverse disturbance impacts on wintering birds in habitats adjacent to the Site will be avoided through screening measures. A Shadow Habitat Regulations Assessment (HRA) has been undertaken for the Development (Appendix 9.7) and concludes there will be no significant effects after mitigation.
- 9.151 Adverse effects on all other ecological features at the site would result from insensitive management, new external lighting, pet fouling and pet predation. These effects will be mitigated through the implementation of a sensitive management strategy, a sensitive lighting scheme, soft landscaping that will deter human and pet access to more sensitive areas of the site, and pet predation control measures. All enhancements will be implemented during the construction phase of the Development. Therefore, all residual effects associated with the operation phase are of negligible significance.

Cumulative Effects

- 9.152 As the Development will result in adverse residual effects on brown hare, harvest mouse and skylark only cumulative effects on these species have been assessed, as no adverse cumulative effects are anticipated for any other species/species groups. The residual effects, and therefore potential for cumulative effects, on these species in relation to each scheme within the scope of the cumulative assessment are discussed below.
- 9.153 Cumulative adverse effects on skylark were identified in combination with two cumulative schemes within the local area, Land off Burndell Road, Yapton and Arun DC Secondary School Site. These sites both support intensively managed arable habitat which is suitable for skylark, brown hare and harvest mouse. However, both sites are of low quality, with breeding skylark unconfirmed at the Burndell Road, Yapton site and only a single breeding territory present within the Arun DC Secondary School Site.
- 9.154 A further site, Land to the south of Ford Lane East of North End Road, Yapton, also has potential suitability for brown hare and harvest mouse, although these species are not

discussed within the related ecological impact assessments. These habitats also comprise intensively managed arable crops which provide low quality habitat for these species.

- 9.155 Only three of 16 schemes within the scope of the cumulative assessment are likely to result in in-combination effects, totalling approximately 25ha of suitable habitat. Given the availability of arable land in the local area, this is considered to be a minor adverse effect on ecological features of low impact sensitivity, and is therefore concluded to be a minor to negligible cumulative effect overall.

[Land to the south of Ford Lane East of North End Road, Yapton - Ref. Y/80/16/OUT](#)

- 9.156 Residual effects have not been formally assessed as part of the planning application for this scheme. The site comprises an arable field with unmanaged grassland and ruderal margins and a line of mature oak trees. The extended Phase 1 habitat survey report^{xiii} states that the arable field may be suitable for ground nesting birds and skylark were heard in an adjacent field, however, the site is considered to be too disturbed and close to private properties and therefore unlikely to support ground nesting birds. No mention is made of harvest mouse or brown hare, although arable land on site may be suitable.
- 9.157 As such a cumulative effect cannot be ruled out for these species as a result of the Development in combination with this scheme.

[Land off Burndell Road, Yapton - Ref. Y/19/16/OUT](#)

- 9.158 Residual effects have not been formally assessed as part of the planning application for this scheme. The site comprises arable land but was bare at the time that the site inspection was undertaken^{xiv}. Ground nesting birds, brown hare and harvest mouse are not discussed, however, arable habitats may be suitable for these species/species groups.
- 9.159 As such a cumulative effect cannot be ruled out for these species as a result of the Development in combination with this scheme.

[Land at Bilsham Road, Yapton - Ref. Y/91/17/OUT](#)

- 9.160 Residual effects have not been formally assessed as part of the planning application for this scheme. However, Ecological Design Strategy^{xv} states:

"5.2 The development would provide robust habitat networks which will ensure continual species use and provide biodiversity gains within

the scheme.

5.3 It is considered that the development and revised masterplan would result in a net gain in biodiversity if the recommendations within this report are supported."

- 9.161 Therefore if the recommendations within this report are implemented, it can be assumed that no adverse residual effects will result.
- 9.162 As such, no cumulative effects are anticipated as a result of the Development in combination with this scheme.

Land east of Drove Lane, Yapton - Ref. Y/92/17/OUT

- 9.163 Residual effects have not been formally assessed as part of the planning application for this scheme. However, the Preliminary Ecological Appraisal^{xvi} report states:

"The land on site (>99%) is dominated by arable land and the existing arable field margins would do little to offset its detriment to ecology. For the reasons provided in the preceding paragraphs, the site is considered to represent 'low' ecological value. As such, it is considered that there would be little impediment, by the way of ecology, to the progression of the development proposals."

- 9.164 The report goes on to state that there are, however, potential issues relating to reptiles, breeding birds and bat flight paths. The only potential breeding bird habitat discussed are hedgerows, scrub and scattered trees. It is therefore assumed that the arable land on site is unsuitable for ground nesting birds.
- 9.165 As such, no cumulative effects are anticipated as a result of the Development in combination with this scheme.

Bonhams Field Main Road Yapton - Ref. Y/1/17/OUT

- 9.166 The Ecological Assessment^{xvii} undertaken for this scheme that there will be no significant residual effects after mitigation measures have been implemented.
- 9.167 Therefore no cumulative effects are anticipated as a result of the Development in combination with this scheme.

Land at Stakers Farm North End Road Yapton - Ref. Y/44/17/OUT

- 9.168 Residual effects have not been formally assessed as part of the planning application for this

scheme. However, as planning permission has been granted for this scheme with a condition (Condition 5) that recommendations and mitigation measures within the associated Preliminary Ecological Appraisal report^{xviii} and Ecological and Landscape Masterplan Strategy^{xix} should be adhered to, it can be assumed that no adverse residual effects will result.

- 9.169 Therefore no cumulative effects are anticipated as a result of the Development in combination with this scheme.

[Clays Farm North End Road Yapton - Ref. Y/62/18/OUT](#)

- 9.170 Residual effects have not been formally assessed as part of the planning application for this scheme at this stage, although the application is still being assessed. The Preliminary Ecological Appraisal report^{xx} identifies the site as being suitable for reptiles and amphibians as well as birds that nest in trees and buildings. No mention is made of suitability for ground nesting birds such as skylark and the habitats described are not considered suitable for this species. The report states *"No suitable habitat for any other species was recorded on site."* and therefore it is concluded that the site is not suitable for brown hare or harvest mouse.

- 9.171 Therefore no cumulative effects are anticipated as a result of the Development in combination with this scheme.

[Land North of Yapton C of E Primary School North End Road, Yapton - Ref. Y/88/18/OUT](#)

- 9.172 Residual effects have not been formally assessed as part of the planning application for this scheme at this stage, although the application is still being assessed. The Preliminary Ecological Appraisal report^{xxi} identifies the site as being suitable for foraging and commuting bats, great crested newt, reptiles and nesting birds. The potential presence of skylark, harvest mouse and brown hare was not discussed, however, the site comprises a horse grazed paddock which is unlikely to be suitable to support these species.

- 9.173 Therefore no cumulative effects are anticipated as a result of the Development combination with this scheme.

[Land at Street Buildings North End Road Yapton BN18 0DT - Ref. Y/49/17/OUT](#)

- 9.174 Residual effects have not been formally assessed as part of the planning application for this scheme. The potential presence of skylark, harvest mouse and brown hare is not discussed in the extended Phase 1 habitat survey report^{xxii}, however, the site comprises three horse grazed paddocks and a stable block which are unlikely to be suitable to support these species.

- 9.175 Therefore no cumulative effects are anticipated as a result of the Development in combination with this scheme.

[Land to the South of Ford Lane, Ford - Ref: F/4/18/PL](#)

- 9.176 Residual effects have not been formally assessed as part of the planning application for this scheme. However, the biodiversity checklist submitted with the application does not identify any potential ecological constraints associated with the proposals.

- 9.177 Therefore no cumulative effects are anticipated as a result of the Development in combination with this scheme.

[Land at Wicks Farm, Ford Lane, Ford - Ref: F/18/17/WS](#)

- 9.178 An Ecological Impact Assessment was not required as part of this planning application, therefore it is assumed that the nature of the proposals, installation of a digestate lagoon, are unlikely to result in residual adverse effects on ecological features.

- 9.179 Therefore no cumulative effects are anticipated as a result of the Development in combination with this scheme.

[Land south of Burndell Road, Yapton - Ref: F/7/15/OUT](#)

- 9.180 Residual effects have not been formally assessed as part of the planning application for this scheme. The Extended Phase 1 and Animal Walkover Survey report^{xxiii} identifies the site as being suitable for bats, reptiles, amphibians and Western European hedgehog as well as birds that nest in trees and buildings. The report states " *The grassland is unlikely to support ground nesting birds for a number of reasons such as the nature and structure of the grass and the presence of cats and dog walkers. Birds recorded at the site during the survey were limited to common species such as Blackbird (*Turdus merula*), Robin (*Erithacus rubecula*) and Great Tit (*Parus major*).*". Brown hare and harvest mouse are not specifically discussed, however, given the nature of the habitats on site, it is considered likely that the site is unsuitable.

- 9.181 Therefore no cumulative effects are anticipated as a result of the Development in combination with this scheme.

Arun DC Secondary School Site

- 9.182 The Ecological Impact Assessment is not yet publicly available for these proposals as a formal planning application has not been submitted. However, the current proposed location lies direction adjacent to the Site within Field 13 (refer to Figure 2.1), where a single skylark breeding territory was identified during the breeding bird surveys undertaken for the Site. This habitat has also been identified as suitable for brown hare and harvest mouse. It is not yet known whether the proposals will adequately mitigate for potential impacts on these species/species groups and therefore unknown whether adverse residual effects will result.
- 9.183 As such a cumulative effect cannot be ruled out for these species as a result of the Development in combination with this scheme.

The Ford Market Application

- 9.184 An Ecological Impact Assessment was completed by ECOSA in 2019^{xxiv}. The assessment concluded that there would be no significant residual effects, assuming that the proposed mitigation and compensation measures are implemented, and therefore it is considered unlikely that the proposals will contribute to cumulative adverse effects in association with other proposals in the local area, including the development of the wider Ford Airfield site.
- 9.185 As such a cumulative effect cannot be ruled out for these species as a result of the Development in combination with this scheme.

Land At Northwood Farm, Burndell Road, Yapton - Ref. CM/6/18/PL

- 9.186 Residual effects have not been formally assessed as part of the planning application for this scheme. However, the biodiversity checklist submitted with the application does not identify any potential ecological constraints associated with the proposals. Therefore no cumulative effects are anticipated as a result of the Development in combination with this scheme.

Waste Treatment Facility, Circular Technology Park, Ford - Ref. WSCC/027/18

- 9.187 The Ecology Chapter of the Environmental Impact Assessment^{xxv} which supports this application concludes that if recommended avoidance measures are incorporated into the proposed works programme, no significant residual impacts to protected species and habitats are anticipated. Therefore no cumulative effects are anticipated as a result of the Development.

Summary

- 9.188 A Preliminary Ecological Appraisal was undertaken to determine whether the Site supports any notable habitats, and whether habitats have suitability to support notable or protected species. Subsequently, more detailed surveys were undertaken for specific species/species groups to determine their presence/absence on site and, if present, the status of the populations. All surveys were undertaken in accordance with industry guidelines.
- 9.189 The Site is dominated by arable land, grassland, ruderal vegetation and scrub of negligible intrinsic value, with hedgerows, woodland, tree lines and scattered trees of local value present on the Site boundaries. These habitats provide suitable habitat for bats, badger, European hedgehog, brown hare, harvest mouse, breeding and wintering birds, reptiles and amphibians but is of site value for all of these species/species groups with the exception of bats. The Site is valued at county level for bats due to its use by rare species including barbastelle, greater horseshoe and Leisler's bat as well as significant numbers of common pipistrelle.
- 9.190 The construction of the Development will result in a significant loss of habitats of negligible intrinsic value, but the majority of habitats of local value will be retained. Construction works have the potential to result in habitat damage, isolation or loss, and disturbance or harm to animals. These adverse impacts will be mitigated/compensated through protection of retained habitats, pollution prevention measures, removal of animals from the construction zone (where appropriate), sensitive working methods, timing of works to when affected animals will not be present, and habitat creation including green corridors.
- 9.191 The occupation of the Development by new residents has the potential to result in habitat degradation through human activities, including insensitive management of habitats, and killing and injury of animals through pet predation. These adverse impacts will be mitigated through the implementation of a sensitive management strategy to ensure the high quality of newly created and enhanced habitats is maintained and to avoid harm to animals which they may support. New residents will be encouraged to use bells or CatBibs™ on their cats to reduce predation success, and will be discouraged from entering areas of greatest ecological sensitivity on site.
- 9.192 The proposed mitigation measures will ensure there are no adverse effects on the majority of ecological features associated with the Site, with the exception of those that make use of arable habitats. However, given that these habitats are common and widespread in the local area, this remaining adverse effect is considered to be of minor to negligible significance. The measures will also ensure that activities on site comply with relevant wildlife legislation.

9.193 The Development will result in a significant net gain in high quality habitats at the site and provide increased opportunities for the majority of wildlife at the Site. As such, despite a minor to negligible adverse effect on a small number of species, the Development represents a net gain for biodiversity overall. It is therefore considered that the Site will accord with all relevant national and local planning policy.

9.194 Table 9.7 contains a summary of the likely significant effects of the Development.

Table 9.7: Table of Significance – Biodiversity

Potential Effect	Nature of Effect (Permanent/Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
				I	UK	E	R	C	B	L	
Construction											
Habitat - Loss of woodland and hedgerow habitats	Permanent	Minor Adverse	New native species tree and hedgerow planting and creation of areas of diverse grassland.							*	Minor Beneficial
Habitat- Accidental damage of hedgerow/treeline habitats	Temporary	Minor Adverse - Negligible	Protection of retained hedgerows and trees using Heras-type fencing, and pollution control measures.							*	Negligible
Bats – Loss of roosting habitat	Permanent	Negligible	Installation of bat boxes and bat roost units.					*			Minor beneficial
Bats – Killing and injury	Permanent	Minor Adverse	Sectional felling of suitable trees under the supervision of an ecologist.					*			Negligible
Bats – Loss of foraging and commuting habitat	Permanent	Moderate - Minor Adverse	New native species tree and hedgerow planting, creating foraging and commuting corridors across the Site.					*			Minor Beneficial
Bats – Disturbance of bat roosts	Temporary	Minor Adverse	Suitable buffer to be maintained around retained trees with suitability for roosting bats.					*			Negligible
Badger – Isolation and loss of foraging habitat	Permanent	Moderate – Minor Adverse	Creation of areas of diverse grassland and scrub suitable for badger foraging. Creation of green corridors across the Site.							*	Negligible
Badger – Killing or injury through trapping in excavations	Temporary/Permanent	Minor Adverse - Negligible	Deep excavations to be covered overnight or a timber ramp inserted to allow trapped animals to escape.							*	Negligible
Brown hare – Isolation and loss of foraging habitat	Permanent	Minor Adverse - Negligible	N/A							*	Minor adverse
Brown hare – Killing or injury through trapping in excavations	Temporary/Permanent	Minor Adverse - Negligible	Deep excavations to be covered overnight or a timber ramp inserted to allow trapped animals to escape.							*	Negligible

Potential Effect	Nature of Effect (Permanent/Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
				I	UK	E	R	C	B	L	
European hedgehog – Isolation and loss of foraging habitat	Permanent	Minor Adverse - Negligible	New native species hedgerow planting and creation of areas of diverse grassland. Creation of green corridors. Gaps under garden fences to allow animals to pass through garden habitat.							*	Negligible
European hedgehog – Killing or injury through trapping in excavations	Temporary/Permanent	Minor Adverse - Negligible	Deep excavations to be covered overnight or a timber ramp inserted to allow trapped animals to escape.							*	Negligible
Harvest mouse – Isolation and loss of habitat	Permanent	Minor Adverse – Negligible	N/A							*	Minor adverse
Harvest mouse – Killing and injury	Permanent	Minor Adverse - Negligible	Site to be kept clear of vegetation following final crop harvest to deter harvest mouse from colonising the construction area.							*	Negligible
Birds – Loss of nesting habitat	Permanent	Minor Adverse - Negligible	New native species tree, hedgerow and scrub planting and creation of areas of diverse grassland.							*	Minor Beneficial - negligible
Birds – Killing of individuals	Permanent	Minor Adverse	Destruction of habitat suitable for nesting birds undertaken outside the bird nesting season, or active nests left with a suitable buffer until nesting ends.							*	Negligible
Birds – Disturbance of active nests	Permanent	Minor Adverse								*	Negligible
Reptiles – Loss of habitat	Permanent	Minor Adverse	Creation of areas of diverse grassland and scrub. Creation of green corridors. Creation of wildlife friendly attenuation basins.							*	Negligible
Reptiles – Killing and injury of individuals	Permanent	Moderate – Minor Adverse	Translocation exercise, clearance of suitable habitat under supervision of a suitably qualified ecologist.							*	Negligible
Amphibians – Loss of habitat	Permanent	Minor Adverse	Creation of areas of diverse grassland and scrub. Creation of green corridors. Creation of wildlife friendly attenuation basins.							*	Minor Beneficial

Potential Effect	Nature of Effect (Permanent/Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
				I	UK	E	R	C	B	L	
Amphibians – Killing and injury of individuals	Permanent	Moderate – Minor Adverse	Translocation exercise, clearance of suitable habitat under supervision of a suitably qualified ecologist.							*	Negligible
Invertebrates – Loss of habitat	Permanent	Minor Adverse	New native species tree and hedgerow planting and creation of areas of diverse grassland.							*	Negligible
Completed Development											
Designated Sites – Disturbance of adjacent Bewick's swan habitat functionally linked to the Arun Valley SPA through increased human activity	Permanent	Moderate – Minor Adverse	Implementation of screening measures			*					Negligible
Habitats – Damage and degradation through insensitive management, trampling, pet fouling etc.	Temporary	Moderate – Minor Adverse	Sensitive management measures detailed and secured. Planting of thorny scrub around significant areas of natural habitat to deter informal entry.							*	Negligible
Bats – Disturbance through new external lighting	Permanent	Major – Moderate Adverse	Sensitive lighting strategy designed and secured.					*			Negligible
Bats – Loss of roosting habitat through insensitive management	Permanent	Moderate – Minor Adverse	Sensitive management measures detailed and secured.					*			Negligible
Bats – Killing and injury through pet predation	Permanent	Negligible	N/A					*			Negligible
Badger – Disturbance through new external lighting	Permanent	Moderate – Minor Adverse	Sensitive lighting strategy designed and secured.							*	Negligible
Brown hare – Disturbance through new external lighting	Permanent	Moderate – Minor Adverse								*	Negligible
European hedgehog - Disturbance through new external lighting	Permanent	Moderate – Minor Adverse								*	Negligible
European hedgehog – Killing and injury through pet predation	Permanent	Negligible	N/A							*	Negligible

Potential Effect	Nature of Effect (Permanent/Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
				I	UK	E	R	C	B	L	
Harvest mouse – Killing and injury through pet predation	Permanent	Moderate – Minor Adverse	Encourage use of bells and CatBibs™, protection of 'wildlife areas' from pet access, creation of new habitat to increase carrying capacity for harvest mouse.							*	Negligible
Birds - Disturbance through new external lighting	Permanent	Moderate – Minor Adverse	Sensitive lighting strategy designed and secured.							*	Negligible
Birds – Killing and injury through pet predation	Permanent	Minor Adverse - Negligible	Encourage use of bells and CatBibs™, protection of 'wildlife areas' from pet access.							*	Negligible
Reptiles – Loss of habitat through insensitive management	Permanent	Minor Adverse	Sensitive management measures detailed and secured.							*	Negligible
Reptiles - Killing and injury through insensitive management and pet predation	Permanent	Negligible	Encourage use of bells and CatBibs™, protection of 'wildlife areas' from pet access, creation of new habitat to increase carrying capacity for reptiles.							*	Negligible
Amphibians – Loss of habitat through insensitive management	Permanent	Minor Adverse	Sensitive management measures detailed and secured.							*	Negligible
Amphibians - Killing and injury through insensitive management and pet predation	Permanent	Negligible	Encourage use of bells and CatBibs™, protection of 'wildlife areas' from pet access, creation of new habitat to increase carrying capacity for amphibians.							*	Negligible
Invertebrates – Disturbance through new external lighting	Permanent	Minor Adverse – Negligible	Sensitive lighting strategy designed and secured.							*	Negligible

*** Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; D = District; L = Local

REFERENCES

- ⁱ MHCLG (February 2019) *National Planning Policy Framework*
- ⁱⁱ Arun District Council (July 2018) *Adoption Arun Local Plan 2011-2031*
- ⁱⁱⁱ Stroud, D.A., Bainbridge, I.P., Maddock, A., Anthony, S., Baker, H., Buxton, N., Chambers, D., Enlander, I., Hearn, R.D., Jennings, K.R., Mavor, R., Whitehead, S. & Wilson, J.D. - on behalf of the UK SPA & Ramsar Scientific Working Group (eds.) (2016) *The status of UK SPAs in the 2000s: the Third Network Review*.
- ^{iv} Artemis (2016) *Phase 1 Habitat Survey - Land at Ford, West Sussex - Redrow Homes Limited and Wates Developments*.
- ^v CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*. 2nd ed. Winchester: Chartered Institute of Ecology and Environmental Management.
- ^{vi} Barrel Tree Consultancy (2019) *Arboricultural Assessment & Method Statement - Ford Airfield, Yapton Road, Ford, Yapton*. Barrel Tree Consultancy, Fordingbridge
- ^{vii} Barrel Tree Consultancy (2019) *Tree protection plan Ref: 18189-BT8a, b and c*
- ^{viii} Stroud, D.A., Bainbridge, I.P., Maddock, A., Anthony, S., Baker, H., Buxton, N., Chambers, D., Enlander, I., Hearn, R.D., Jennings, K.R., Mavor, R., Whitehead, S. & Wilson, J.D. - on behalf of the UK SPA & Ramsar Scientific Working Group (eds.) (2016) *The status of UK SPAs in the 2000s: the Third Network Review*.
- ^{ix} Woods, M., McDonald, R. A. & Harris, S. (2003). *Predation of wildlife by domestic cats Felis catus in Great Britain*.
- ^x BCT and ILP (2018) *Guidance Note 08/18 Bats and artificial lighting in the UK*. BCT and ILP.
- ^{xi} Nelson, S.H., Evans, A.D. & Bradbury, R.B. (2005) *The efficacy of collar-mounted devices in reducing the rate of predation of wildlife by domestic cats*. Applied Animal Behaviour Science, 94, 273–285.
- ^{xii} Calver, M., Thomas, S., Bradley, S., and McCutcheon, H. (2007) *Reducing the rate of predation on wildlife by pet cats: The efficacy and practicability of collar-mounted pounce protectors*. Biological Conservation, Vol 137, Issue 3, July 2007, pp 341-348
- ^{xiii} Corylus Ecology (2013) *Land at Yapton, West Sussex – Extended Phase 1 Habitat Survey*
- ^{xiv} The Ecology Partnership (2015) *Preliminary Ecological Appraisal – Burndell Road, Yapton*
- ^{xv} The Ecology Partnership (2018) *Ecological Design Strategy – Land at Bilsham Road, Yapton*
- ^{xvi} Lizard Landscape Design (2016) *Land Adjacent to Drove Lane, Yapton, West Sussex*
- ^{xvii} Aluco Ecology Ltd (2016) *Land at Bonhams, Yapton – Ecological Assessment*
- ^{xviii} PJC Consultancy (2017) *Preliminary Ecological Appraisal – Stakers Farm, North End Road, Yapton, West Sussex BN18 0HZ*
- ^{xix} Lizard Landscape Design (2017) *Land at Stakers Farm, North End Road, Yapton, West Sussex – Ecological and Landscape Masterplan Strategy. Drawing No. LLD1136/01 Rev. 01*
- ^{xx} Lizard Landscape Design (2018) *Clays Farm, Yapton, West Sussex – Preliminary Ecological Appraisal Report – Day Time Bat Roost*
- ^{xxi} PJC Consultancy (2018) *Land at North End Road, Yapton, West Sussex BN18 0DU*
- ^{xxii} Corylus Ecology (2017) *Street Buildings, North End Road, Yapton – Extended Phase 1 Habitat Survey*
- ^{xxiii} AEW Ltd (2014) *Extended Phase 1 and Animal Walkover Survey – Land at Burndell Road, Yapton, West Sussex*
- ^{xxiv} ECOSA (2019) *Ford Airfield Market, Ford – Ecological Impact Assessment*
- ^{xxv} Grundon (2018) *Proposed New Access Road to Ford Circular Technology Park – Planning Application and Environmental Impact Assessment*