



Preliminary Ecological Assessment

Land at Lower Farm

Yapton Lane, Walberton, Arundel

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LIABILITIES:

Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living animals and plants are capable of migration/establishing and whilst such species may not have been located during the survey duration, their presence may be found on a site at a later date.

This report provides a snap shot of the species that were present at the time of the survey only and does not consider seasonal variation. Furthermore, where access is limited or the site supports habitats which are densely vegetated only dominant species maybe recorded.

The recommendations contained within this document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to or during works.

1.0 Introduction

Background

- 1.1 The Ecology Partnership was commissioned by John Hall Consulting to undertake a preliminary ecological assessment (PEA) of land at Lower Farm, Walberton, West Sussex.
- 1.2 The key objectives of a PEA (CIEEM, 2017) are to:
- Identify the likely ecological constraints associated with a project;
 - Identify any mitigation measures likely to be required, following the 'Mitigation Hierarchy' (CIEEM, 2016; BSI 2013, Clause 5.2);
 - Identify any additional surveys that may be required to inform an Ecological Impact Assessment (EcIA); and
 - Identify the opportunities offered by a project to deliver ecological enhancement.
- 1.3 This report comprises the:
- Legislative and planning context (Section 1);
 - Assessment methodologies (Section 2);
 - Results (Section 3);
 - Implications for development (Section 4);
 - An impact assessment (Section 5); and
 - Conclusions (Section 6).

Site Context and Status

- 1.4 The site is situated on Yapton Lane; the connecting road between Walberton and Yapton, south-west of Arundel, West Sussex (SU 98030 04923) and covers c. 7.2ha. The surrounding area is made up of arable fields to the north and south, with low density dwellings and agricultural buildings. The site itself is dominated by an arable field, with some areas of rough grassland and existing access track.
- 1.5 The site, its immediate surroundings and approximate red line boundary are shown in the Figure 1 below.



Figure 1: Approximate red line boundary of the site and immediate surroundings. Taken from Google Earth Pro, October 2020

Description of the Proposed Development

- 1.6 Current plans involve the construction of a large glasshouse on the existing arable field to the north of the site, a reservoir within the existing field to the south of the site and associated access.

Planning Policies

- 1.7 The proposals were assessed against policy guidance provided by the National Planning Policy Framework (NPPF, 2019) as well as relevant planning policies from the Arun District Council. The 2011-2031 Local Plan was adopted in July 2018 the following

policies have been identified as being relevant to development of the site and conservation of protected species:

- *Policy GI SP1: Green Infrastructure and development*
- *Policy ENV SP1: Natural Environment*
- *Policy ENV DM1: Designated Sites of biodiversity or geological importance*
- *Policy ENV DM3: Biodiversity Opportunity Areas*
- *Policy ENV DM4: Protection of trees*
- *Policy ENV DM5: Development and biodiversity*

1.8 This report addresses the site in relation to nature conservation and wildlife and indeed to the local planning requirements as well as national planning and nature conservation legislation.

1.9 The site was surveyed to assess its ecological value and to ensure compliance with national and local plan policies. The report has been produced with reference to current guidelines for preliminary ecological appraisal (CIEEM, 2017) and in accordance with BS 42020:2013 Biodiversity – Code of Practice for Planning and Development.

2.0 Methodology

Desktop Study

2.1 A desktop study search was completed using an internet-based mapping service (www.magic.gov.uk) for statutory designated sites and an internet-based aerial mapping service (www.maps.google.co.uk) was used to understand the habitats present in and around the survey area and habitat linkages and features (such as ponds, woodlands etc.) within the wider landscape. Biological records (up to 2km) were acquired from Sussex Biodiversity Record Centre (SxBRC).

Preliminary Ecological Appraisal

2.2 An extended preliminary ecological appraisal was undertaken originally on 13th July 2020 by Chris Jennings BSc (Hons) MSc MCIEEM, with regards to the footprint of the

previous design. An update extended preliminary ecological appraisal was undertaken on 9th October 2020 by the same surveyor to survey additional areas and review previously surveyed land with regards to the latest proposal. The surveyor identified the habitats present, following the standard 'Phase 1 habitat survey' auditing method developed by the Joint Nature Conservancy Council (JNCC). The site was surveyed on foot and the existing habitats and land uses were recorded on an appropriately scaled map (JNCC 2010). In addition, the dominant plant species in each habitat were recorded. The potential for the site to support protected species was also assessed.

- 2.3 Plant species abundance was recorded using the DAFOR scale. Species abundance was assigned to one of the following categories; Dominant, Abundant, Frequent, Occasional or Rare.

Protected Species Assessments

- 2.4 Any evidence of protected species was recorded. Standard methods of search and measures of presence, or likely presence based on habitat suitability were used for bats in trees and buildings (Collins 2016), breeding birds¹, dormouse (Bright *et al.* 2006), great crested newt (ARG 2010), reptiles (Froglife 2015), badgers (Creswell *et al.* 1990) and water vole (Strachan *et al.* 2011).

Limitations

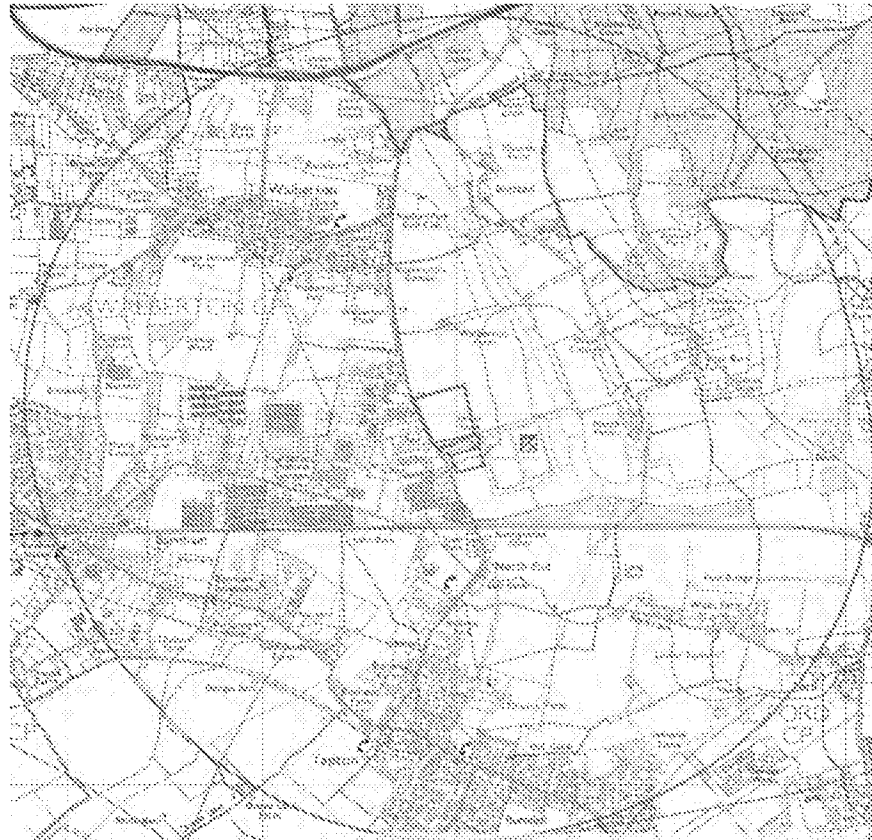
- 2.5 It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no single investigation could ensure the complete characterisation and prediction of the natural environment. The site was visited over the period of one site visit, as such seasonal variations cannot be observed and potentially only a selection of all species that potentially occur within the site have been recorded. Therefore, the survey provides a general assessment of potential nature conservation value of the site and does not include a definitive plant species list.

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- 2.6 The protected species assessment provides a preliminary view of the likelihood of protected species occurring on site, based on the suitability of the habitat and any direct evidence on site. It should not be taken as providing a full and definitive survey of any protected species group. The assessment is only valid for the time when the survey was carried out. Additional surveys may be recommended if, on the basis of this assessment it is considered reasonably likely that protected species may be present.

3.0 Results

Desktop Study

- 3.1 The site itself if not designated for its nature conservation value, however it is within a SSSI Impact Risk Zone, although it is not clear which statutory site the zone relates to. Of the listed development descriptions to be considered, it is thought that the proposed development would come under 'large non-residential development outside existing settlements/urban areas where footprint exceeds 1ha.'
- 3.2 The site is not situated within 2km of any designated sites although it does fall 1km south west of South Downs National Park. The nearest designated sites are Arundel Park SSSI approximately 4.1km to the north east and Climping Beach SSSI and West Beach LNR located approximately 4.9km to the south east.



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Figure 3: No designated sites within 2km of the red line boundary; Although the site does lie within a SSSI impact zone (light lilac line) and The South Downs National Park lies approximately 1.2km north of site (green line)

3.3 There are a number of Priority Habitats within 2km of the red line boundary, with the majority located to the north of the red line boundary (Figure 3):

- Coastal and floodplain grazing marsh (closest c. 300m east);
- Traditional orchard (closest c. 915m north-east);
- Deciduous woodland (closest c. 645m north-west);
- Wood-pasture and parkland (closest c. 250m north);
- Ancient semi-natural woodland (closest is Lake Copse c. 1.0km north-east);
- Ancient replanted woodland (closest is Tottington Common c. 1.7km north-east).

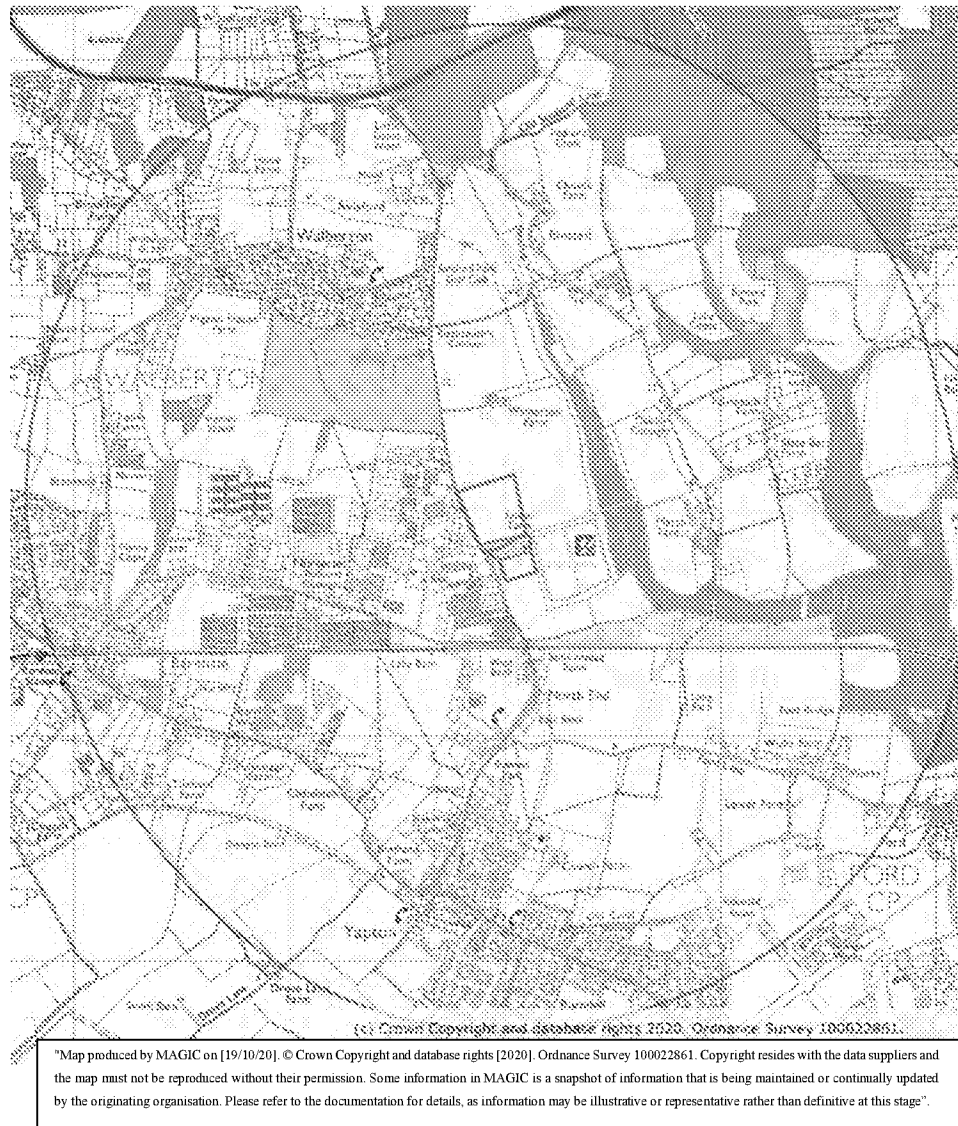


Figure 4: Priority habitats within 2km of the red line boundary; coastal and floodplain grazing marsh (blue), traditional orchard (bright green), deciduous woodland (dull green), ancient semi-natural woodland (vertical hatchings), ancient replanted woodland (horizontal hatchings), wood-pasture and parkland (pale green with symbols).

- 3.4 Mapping and the site visit revealed 7 ponds located within 250m of the site. These are numbered 1-7 in Figure 5 below, as well as additional ponds (Pond 1, 2, & 8) which were located outside the 250m radius.

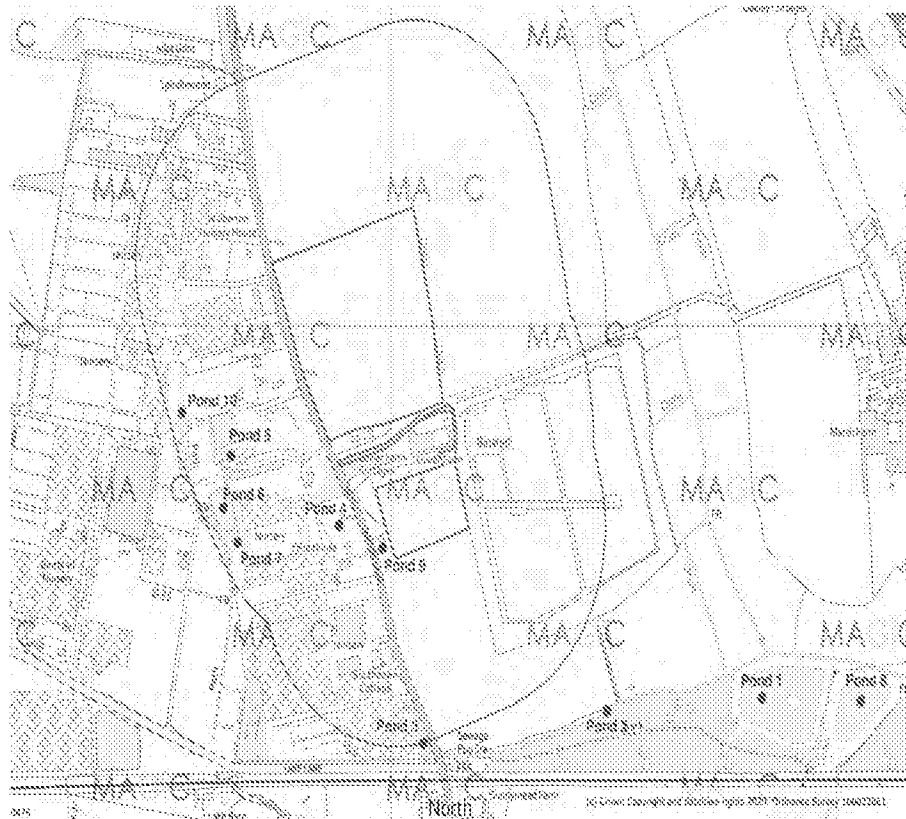


Figure 5: Ponds within, and outside of, a 250m radius (yellow area) of the red line boundary, labelled Pond 1-10 for ease of reference

- 3.5 There were no European Protected Species licences granted, great crested newt licence returns, or eDNA survey records within 2km of the red line boundary, according to MAGIC mapping.
- 3.6 A 2km data search was requested from the Sussex Biodiversity Record Centre (SxBRC). The records closest to site, recorded within the last 10 years and relevant to the habitats on site have been included in Table 1.

Table 1: Notable species records within 2km of the site in the last 10 years

Species	Status	Closest Record to Site	Most recent record
West European Hedgehog <i>Erinaceus europaeus</i>	NERC Act (2006) Section 41	c. 540m SW (02/2017)	c. 1km NW (10/04/2020)
European Water Vole <i>Arvicola amphibius</i>	Wildlife and Countryside Act (1981 as amended) Schedule 5; NERC Act (2006) Section 41	c. 405m East (02/07/2015)	c. 715m west (24/05/2016)
Hazel Dormouse <i>Muscardinus avellanarius</i>	Wildlife and Countryside Act (1981 as amended) Schedule 5; Conservation of Habitats and Species Regulations (2017) Schedule 2; Habitats and Species Directive (1992) Annex 4; NERC Act (2006) Section 41	c. 960km NE (26/09/2018)	c. 960km NE (06/10/2019)
Polecat <i>Mustela putorius</i>	Conservation of Habitats and Species Regulations (2017) Schedule 4; Wildlife and Countryside Act 1981 (as amended) Schedule 6	c. 1.45km E (21/12/2018)	c. 1.45km E (21/12/2018)
Stag Beetle <i>Lucanus cervus</i>	Wildlife and Countryside Act (1981 as amended) Schedule 5; Habitats Directive Annex 2; NERC Act (2006) Section 41	c. 900m NW (02/07/2013)	c. 980m NW 28/11/2019
Great Crested Newt <i>Triturus cristatus</i>	Conservation of Habitats and Species Regulations (2010) Schedule 2; Wildlife and Countryside Act (1981 as amended) Schedule 5; Habitats Directive Annex 2 & 4	c. 1.65km west (14/05/2012)	Within 2km (01/06/2017)
European Eel <i>Anguilla anguilla</i>	NERC Act (2006) Section 41	c.425m E (14/07/2018)	c.425m E (14/07/2018)
Slow Worm <i>Anguis fragilis</i>	Wildlife and Countryside Act (1981 as amended) Schedule 5; NERC Act (2006) Section 41	c.1.39km west (2015)	c. 1.9km SW (24/09/2019)
Common Lizard <i>Zootoca vivipara</i>	Wildlife and Countryside Act (1981 as amended) Schedule 5; NERC Act (2006) Section 41	c. 850m NE (15/05/2017)	c. 1.95km SW (24/09/2019)
Grass Snake <i>Natrix natrix</i>	Wildlife and Countryside Act 1981 (as amended); NERC Act (2006) Section 41	c. 710m SE (12/06/2014)	c. 1.3km NW (Summer 2019)
Adder <i>Vipera berus</i>	Wildlife and Countryside Act (1981 as amended) Schedule 5; NERC Act (2006) Section 41	c. 930m NE (23/07/2015)	c. 1.3km NE (25/07/2017)
Western Barbastelle	Conservation of Habitats and Species Regulations (2010) Schedule 2; Habitat	Within 2km	Within 2km (19/08/2019)

(<i>Barbastella barbastellus</i>)	and Species Directive (1992) Annex 4; Wildlife and Countryside Act (1981 as amended) Schedule 5		
Serotine <i>Eptesicus serotinus</i>	As above	Within 2km	Within 2km (25/07/2019)
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	As above	Within 2km	Within 2km (27/07/2019)
Nathusius's Pipistrelle <i>Pipistrellus nathusii</i>	As above	Within 2km	Within 2km (30/09/2019)
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	As above	Within 2km	Within 2km (19/08/2019)
Brown Long-eared Bat <i>Plecotus auritus</i>	As above	Within 2km	Within 2km (27/07/2019)
Leisler's bat <i>Nyctalus leisleri</i>	As above	Within 2km	Within 2km (19/08/2018)
Noctule <i>Nyctalus noctula</i>	As above	Within 2km	Within 2km (19/09/2019)
Alcathoe Bat <i>Myotis alcathoe</i>	As above	Within 2km	Within 2km (30/07/2017)
Bechstein's Bat <i>Myotis bechsteinii</i>	As above	Within 2km	Within 2km (22/05/2017)
Brandt's Bat <i>Myotis brandtii</i>	As above	Within 2km	Within 2km (27/07/2019)
Natterer's Bat <i>Myotis nattereri</i>	As above	Within 2km	Within 2km (19/08/2018)
Daubenton's Bat <i>Myotis daubentonii</i>	As above	Within 2km	Within 2km (27/07/2019)
Whiskered Bat <i>Myotis mystacinus</i>	As above	Within 2km	Within 2km (19/08/2018)
Greater Horseshoe <i>Rhinolophus ferrumequinum</i>	As above	c. 975m north (30/09/2019)	c. 975m north (30/09/2019)
Red Kite <i>Milvus milvus</i>	Birds Directive Annex 1; Wildlife and Countryside Act (1981 as amended) Schedule 1; Convention on Migratory Species Appendix 2	Within 2km	Within 2km (06/06/2018)
Kestrel <i>Falco tinnunculus</i>	Wildlife and Countryside Act (1981 as amended); Bern Convention Appendix 2; Convention on Migratory Species Appendix 2	Within 2km	Within 2km (15/07/2018)
Merlin <i>Falco columbarius</i>	Wildlife and Countryside Act (1981 as amended); Birds Directive Annex 1; Red List BoCC	Within 2km	Within 2km (19/10/2018)

Hobby <i>Falco subbuteo</i>	Wildlife and Countryside Act (1981 as amended)	Within 2km	Within 2km (02/08/2017)
Lapwing <i>Vanellus vanellus</i>	Birds Directive Annex 2.2; Convention on Migratory Species Appendix 2; NERC Act (2006) Section 41	Within 2km	Within 2km (06/06/2018)
Snipe <i>Gallinago gallinago</i>	Birds Directive Annex 2.1; Convention on Migratory Species Appendix 2	Within 2km	Within 2km (15/04/2018)
Curlew <i>Numenius arquata</i>	Birds Directive Annex 2.2; Convention on Migratory Species Appendix 2; NERC Act (2006) Section 41	Within 2km	Within 2km (04/07/2016)
Cuckoo <i>Cuculus canorus</i>	NERC Act (2006); BoCC Red List	Within 2km	Within 2km (20/05/2018)
Turtle Dove <i>Streptopelia turtur</i>	Birds Directive Annex 2.2; NERC Act (2006) Section 41	Within 2km	Within 2km (17/06/2016)
Barn Owl <i>Tyto alba</i>	Wildlife and Countryside Act (1981 as amended) Schedule 1	Within 2km	Within 2km (03/08/2018)
Kingfisher <i>Alcedo atthis</i>	Birds Directive Annex 1; Wildlife and Countryside Act (1981 as amended) Schedule 1	Within 2km	Within 2km (29/08/2016)
Cetti's Warbler <i>Cettia cetti</i>	Wildlife and Countryside Act (1981 as amended) Schedule 1	Within 2km	Within 2km (06/06/2018)
Skylark <i>Alauda arvensis</i>	NERC Act (2006) Section 41; Birds Directive Annex 2.2	Within 2km	Within 2km (15/05/2019)
Nightingale <i>Luscinia megarhynchos</i>	Red List BoCC	Within 2km	Within 2km (29/04/2017)
Linnet <i>Linaria cannabina</i>	NERC Act (2006) Section 41; Red List BoCC	Within 2km	Within 2km (29/04/2017)
Yellowhammer <i>Emberiza citronella</i>	NERC Act (2006) Section 41; Red List BoCC	Within 2km	Within 2km (29/04/2017)
Firecrest <i>Regulus ignicapillus</i>	Wildlife and Countryside Act (1981 as amended) Schedule 1	Within 2km	Within 2km (03/08/2018)
Common Crossbill <i>Loxia curvirostra</i>	Wildlife and Countryside Act (1981 as amended) Schedule 1	Within 2km	Within 2km (03/02/2012)
Reed Bunting <i>Emberiza schoeniclus</i>	Wildlife and Countryside Act (1981 as amended); Amber List BoCC; UK BAP	Within 2km	Within 2km (03/03/2018)
Corn Bunting <i>Emberiza calandra</i>	NERC Act (2006); BoCC Red List	Within 2km	Within 2km (01/06/2014)

Phase 1 Habitat Survey

- 3.7 The site was to the north and south was predominantly an arable field with associated hedgerows and semi-improved grassland boundaries, as seen in Figure 1 above. A detailed Phase 1 Habitat Map is attached in Appendix 1, and a full species list is provided in Appendix 2.

Arable

- 3.8 The site was dominated by arable land. The field to the north was under crop. The field to the south had been ploughed and reseeded between the original site visit in July to the site visit and the October site visit. The fields were heavily managed and offered little in the way of biodiversity value.

Semi-improved / tall ruderal mosaic habitat

- 3.9 Around much of the site boundary which was largely marked by field boundaries with associated hedgerows a mix of largely unmanaged grassland was present. This was a mix of grassland and tall ruderal plant species.

Semi-improved Grassland

- 3.10 An area of semi-improved grassland was present at the eastern side of the site at the north east corner of the southern field. This area was largely at a short sward and appears to provide access to the neighbouring fields.

Hedgerows

- 3.11 Native hedgerows were present around the site boundaries, with intact mature hedgerow present in particular on the western boundary as well as most of the southern boundary of the northern field. A newly planted hedge was present on much of the eastern boundary of the southern field.
- 3.12 Hedgerow regulation assessments were undertaken at three points around the site.

Ditch

- 3.13 Dry ditches ran along the southern and eastern boundaries of the northern field. These features are more drainage features more than waterbodies and are only likely to hold water during periods of extended rainfall.

*Target Notes ²**Target Note 1: Badger Latrine*

- 3.14 A badger latrine was noted in the arable field close to the western boundary of the northern field

Target Note 2: Japanese Knotweed

- 3.15 A small stand of Japanese Knotweed was found towards the western side of the southern boundary of the northern field close to the adjacent residential gardens.

Hedgerow Assessment

- 3.16 Hedgerows 1 and 2 have been assessed against the Hedgerow Regulations (1997) criteria in Table 1 below.

Table 1: Hedgerow Regulations assessment of the qualifying on-site hedgerows

Hedge number	Number of lengths sampled	Mean number of woody species	Adjacent to public right of way	≥ 1 standard tree/50m	Rare trees	Bank	Ditch	≥ 3 woodland field layer species	Gaps <10%	Connectivity score	Parallel hedge	IMPORTANT
1	1	5	x	✓	x	x	✓	x	✓	3	x	NO
2	2	4	✓	x	x	x	✓	✓	x	1	✓	NO

² The location of the Target Notes can be seen within the habitat map in Appendix 1.

- 3.17 The two hedges were considered not to be important under the regulations as they did not contain the diversity of wooded species in a 30m length to qualify as such. Much of the hedgerow along the eastern boundary of the site was newly planted and as such was not assessed due to its immaturity.

Protected Species

Bats

Tree Survey

- 3.18 With no buildings on site gauging potential bat roost potential was restricted to trees. One large oak tree was present on the southern boundary of the northern field however no bat roosted features were noted at the time of the survey.

Foraging and commuting habitats

- 3.19 The managed poor semi-improved grassland and arable land which dominated the site were considered to provide poor opportunities for foraging and commuting bats. However, the boundary hedgerows, as linear features, could act as commuting corridors for bats present within the wider landscape. Therefore, the site overall is deemed to be sub-optimal for foraging and commuting bats.

Badgers

- 3.20 No setts were located during the survey. It is understood that badgers are present within the local landscape and a badger sett is present across the adjacent fields to the east, a significant distance from the proposed development. It is therefore considered likely that badgers use the site for commuting and foraging purposes. A latrine was located to the western boundary of the northern field. This would indicate that the site forms at least part of a badger groups territory.

Reptiles

- 3.21 Any potential for reptiles is restricted to the site boundaries the unmanaged field margins, with grassland and tall ruderal vegetation which provide suitable habitat for common reptile species such as slow worm, common lizard and grass snake. The arable land contained sparse vegetation at ground height and did not offer the structure typical of habitat used by reptile species, due to a lack of cover from predators and a lack of basking opportunities due to the long length of the vegetation present.

Hazel Dormice

- 3.22 Potential habitat for dormice is limited to habitat on the site boundaries in the form of hedgerows. There is some potential for the presence of dormice around the western and southern boundaries of the northern field in particular. The eastern boundary of the southern field was largely made up of newly planted hedgerow which severely limited the likelihood of the presence of dormice in this area of the site.

Water Vole

- 3.23 It is understood that water voles are present within the local area. No evidence of the presence of the species was noted during the survey. With the dry nature of the waterbodies present it was considered unlikely that the species is present. A stream is present to the south of the southern field (also labelled as pond 2 within the GCN survey work) which was considered to support some suitable habitat for the species.

Great Crested Newts (GCN)

- 3.24 The habitats on site were considered to be sub-optimal for GCN at best with the vast majority of habitat considered unsuitable. The highly managed nature of the site, with arable land and heavily disturbed grassland made much of the site sub-optimal for great crested newts, with any suitable habitat limited to the site boundaries within the hedgerow and strips of unmanaged grassland.

- 3.25 Seven ponds and waterbodies were present within the local area. Access to survey ponds 1, 2 & 3 along the southern stretch of the site were granted. Although labelled pond 2, this waterbody was in fact a slow flowing stream. Pond 1, although access was granted to survey could not be reached due to thick vegetation and a blocked pathway after some tree maintenance, pond 8, which lies adjacent to pond 1 was surveyed instead. Pond 3 was present the other side of Yapton Lane to the south western of site. The ponds were surveyed using eDNA water collection techniques. Collected water samples were then sent off to a laboratory to test to see whether great crested newts were present within the water column. All samples were collected by a Chris Jennings BSc (Hons) MSc MCIEEM, Natural England Great Crested Newt class licence holder on 29th June 2020.
- 3.26 Since the eDNA survey the red line boundary has altered. Ponds 4, 5, 6, 7 & 10 were located on the opposite side of Yapton Lane which is considered likely to form a significant barrier to dispersal. At least three of these water bodies are thought to be reservoir features for the associated greenhouses and are unlikely to be suitable for the species. Pond 9 was noted during the July site visit, it is understood that this pond has been recently constructed by the occupants of the nearby house.
- 3.27 All samples were analysed by SureScreen Scientifics and were submitted for eDNA analysis to the protocol stated in DEFRA WC1067 (latest amendments). Full results and methods can be found in Appendix 5.

Other Species

- 3.28 Birds are likely to use the hedgerows and tree lines for foraging and breeding. Ground nesting birds may also use the arable field for nesting, refuge and foraging.
- 3.29 With proposals predominantly within the existing arable land which is heavily managed and of limited ecological value, it is not considered that species such as stag beetle, polecat and hedgehog will be negatively impacted by the scheme. European eel are present within the local ditch network. With works to the stream to the south minimal by installing a small headwall and outflow drainage pipe it is not considered

that this species would be impacted by the scheme. These species are not considered further within this report.

4.0 Discussion

- 4.1 The following paragraphs consider the effects of the development on designated sites, priority habitats and protected and priority species. Where the desk study and Phase 1 survey provide sufficient evidence for an assessment of effects on any of these groups to be taken through planning, these are detailed below, the need for additional surveys and when and how these should be completed are summarised, if required.

Effects on designated sites and priority habitats

- 4.2 The site does not fall within 2km of any statutory designated sites, so development is not considered to be constrained by any such sites. Although there are no direct or indirect impacts on designated sites predicted as part of the development as the site has been highlighted as being within a SSSI impact zone, further consideration and consultation with Natural England is likely to be required.
- 4.3 Only the southern section of the field located within the impact zone, and the northern section of the site outside the impact zone. Any non-residential developments outside existing urban areas exceeding 1ha, would also be considered a potential impact. As the southern section of the site is located within the impact zone, the development within the impact area is therefore considered over this 1ha requirement at approximately 1.7ha – 2ha (see figure 6 below). As such impacts from the development will need to be considered through further consultation.



Figure 6: Red line boundary of the site, showing the northern portion lying outside the impact risk zones (purple line) and the southern portion of the site located partially within this zone. The area (in blue) is considered at approximately 1.7ha.

- 4.4 There are parcels of Priority Habitat within 2km of the red line boundary: Traditional Orchard Priority Habitat, Deciduous Woodland Priority Habitat and Coastal and Floodplain Grazing Marsh Priority Habitat. It is not predicted that there will be any negative direct or indirect impacts on these habitats as well as ancient woodland due to the distance of these habitats from the red line boundary. Boundary hedgerows with added enhancements to retain and improve existing green links with the wider landscape should be designed into the scheme to ensure that connectivity remains across the local landscape. This would also satisfy *Policy ENV DM4: Protection of trees* laid out in the Arun District Council 2011-2031 Local Plan.

Effect on on-site habitats

- 4.5 The habitats present on site are largely common and widespread throughout the local area and the UK and are considered to be of site value only. The dominant habitat on site was recorded as arable land and as such had limited scope for wildlife species due to its heavily managed nature.
- 4.6 The habitats on the site boundaries including hedgerow as well as the rough ruderal grassland habitats, are of greatest interest and are considered to be of local value. They are considered to have ecological potential for several protected species, namely bats, reptiles and nesting birds.
- 4.7 It is understood that an outfall from the proposed reservoir will flow south to the stream located at the southern boundary outside the scope of the red line boundary. The ditch and stream network on the site boundaries, in particular the stream to the south are also considered to be important habitat. These habitats should be retained where possible and adequately buffered and enhanced to ensure habitat linkages across the local system are maintained on site. As part of Policy G1 SP1 Green Infrastructure should be considered at an early stage of design.
- 4.8 It is recommended that ecological enhancements are put in place on site, in particular around the new reservoir to the south of the site and new native planting should be incorporated into the final scheme. New hedgerows should be planted on site in particular along the eastern boundary of the northern field. This will ensure that the requirements of *Policy G1 SP1 Green Infrastructure and Development* and *Policy ENV DM3: Biodiversity Opportunity Areas* are met.
- 4.9 The development should aim to achieve an overall biodiversity gain and enhancement recommendations are laid out in section 4. The site was assessed for its potential to support a range of protected species and these are discussed individually below. Recommendations for further survey work, mitigation and suitable ecological enhancements are in line with the points laid out in Policy ENV DM5: Development and biodiversity.

Protected Species***Badgers***

- 4.10 It is not considered that badgers are residing on site, no potential badger setts were recorded during the site survey. A badger latrine was recorded close to the western boundary of the northern field, which would indicate that the site is likely to form part of a badger clan territory. It is understood from anecdotal evidence that badgers are present in an active sett to the east of the site across the although this has not been fully established. It is not considered that any badger sett will be damaged or disturbed by the development.
- 4.11 As no setts or other signs of badgers were found, the site is not considered to be constrained by badgers. The local landscape provides good opportunities for commuting and foraging badgers.
- 4.12 It is recommended that any excavations and trenches associated with construction are either covered at night or supplemented with a means of escape for any badgers that may fall into the excavation whilst foraging. Any open pipes or conduits laid should be blocked off each night to prevent badgers from entering them. If possible, construction work should only take place between dawn and dusk with no late evening work to reduce possible disturbance.
- 4.13 With the installation of a reservoir on site it is recommended that during excavation and also operational stage a means of escape for wildlife including large mammals such as badgers, foxes and deer is installed, particularly if a liner is used. If a liner is used then exclusion fencing should be installed around the reservoir to minimise the potential for wildlife becoming trapped within the waterbody. Lined banks can form surfaces that wildlife cannot climb to escape.
- 4.14 It is always recommended that badger update surveys are undertaken across the site prior to any development works or if there is a lapse in time between the survey and development as badgers may move onto the site in the intervening period.

Bats

- 4.10 No trees with bat roosting potential were identified during the initial survey. With regards to the impact on foraging and commuting bats, the construction of a green house and associated reservoir are considered likely to have minimal impact on foraging and commuting bats as the vast majority of suitable habitat is to be retained allowing connectivity for bats across the landscape. Additional planting as part of the application could improve connectivity for bats across the local landscape. It is however considered that if artificial light is to be used to grow plants during the night resulting in significant light spill onto adjacent habitats in use by bats such as hedgerows and woodland blocks, then further activity survey and additional mitigation through planting and or shielding light spill maybe required.
- 4.11 Any proposed lighting scheme as part of the development will have to consider bats in the surrounding area as well as site. All bat species are nocturnal, resting in dark conditions in the day and emerging at night to feed. Many species of bats are known to sample the light levels before emerging from their roost; only emerging for their night's hunting when the light intensity outside reaches a critical level after sunset. Artificial lighting can restrict and alter this natural behaviour, and if a roost site is illuminated it can restrict and shorten the time bats spend foraging at night or completely discourage bats from using an area at all. This needs to be considered, with a sympathetic lighting scheme for the development. Recommendations include:
- No potential bat roost should be illuminated by artificial lighting, lighting should be positioned to point away from any roosting site, leaving the entrance and exit points in darkness, this should consider the bat potential trees identified;
 - Lighting should only be installed if there is a significant need;
 - Light levels should be kept low where possible;
 - Lighting should be avoided near treelines or hedgerows, with light angled away from these areas, bats use linear features such as treelines to commute across the landscape to forage; and
 - Lights should have focussed luminance on their target area, preventing light spill and pollution into other areas of the site and local area.

- Additional shielding such as use of blinds should be used to restrict light spill from any artificial night time light used within the greenhouse.
- 4.12 The hedgerows which have been identified on site, and fields within the adjacent land should be retained and enhanced to maintain linkages between the two sites for foraging and commuting bats.
- 4.13 To enhance the local bat population and provide roosting opportunities, it is recommended that boxes should be hung on mature trees or buildings around the site. Recommended boxes should be constructed of woodcrete or a similar material to ensure the long life of bat boxes installed onsite.
- 4.14 Further enhancements for bats in the local area can be achieved through the use of native tree planting and landscaping within the development (see general enhancements below).

Reptiles

- 4.15 The majority of the site is dominated by managed arable land with any habitat suitability confined to the field margins. It appears that very little if any reptile habitat will be impacted by the final scheme. There will be no additional negative impact during operational phase on reptile species, such as increased predation from domestic pets that would be associated with a residential development.
- 4.16 It is recommended that habitat manipulation techniques are used to encourage reptiles away from development areas and any small sections of habitat that are to be lost or impacted as part of works. This will be achieved by use of a two phased cut. Prior to development the footprint of development and any additional works areas will need to be cut in a sensitive manner using a two-phase cut undertaken under ecological watching brief. Vegetation removal works will follow the following specification:
- Vegetation removal works are to be carried out using hand tools only or a raised fixed flail on the rear of a non-tracked vehicle;

- Works will proceed in a linear progression, beginning in the north of the site and working towards the south east, to encourage reptiles to disperse into retained habitat
- Any trees and shrubs are to be checked thoroughly for the presence of birds' nests, observing the tree from within the canopy where possible.
- Vegetation will be strimmed down using the following method in suitable weather conditions (avoiding rain/wet conditions) under ecological supervision:
 - 1 Day 1: Strim to 200mm
 - 2 Day 2: No works to vegetation to allow any reptiles present to vacate the site
 - 3 Day 3: Strim to ground level
 - 4 Day 4: No works to vegetation to allow any remaining reptiles present to vacate the site
 - 5 Day 5: End of sensitive clearance process

4.17 Once cut it is recommended that habitat is maintained at a short sward.

4.18 It is considered that if this process is undertaken then reptile species will not be harmed as part of works and any population present on site will persist post development. The scheme has scope to increase the habitat available for reptiles including the creation of banks around the reservoir and green house access road. Banked habitats are used by reptiles for maximising basking, especially if south facing.

Hazel Dormice

4.19 It is considered possible that hazel dormice are present within the local area. With suitable habitat present on the site boundaries although suitable core habitat is limited to the small section of woodland adjacent to site running along the railway line to the south of site. It is not considered that the proposals will have a significant direct impact on potential habitat present.

- 4.20 No hedges or vegetation considered suitable for dormice will be impacted by proposals. The development will largely be confined to the arable fields and as such will have very little impact on any potential dormouse population. There will be no indirect impacts such as an increase in disturbance by new residents or predation through increase in domestic pets which would be associated with a residential development.
- 4.21 With scope for additional planting to enhance the site for wildlife it is recommended that additional opportunities for dormice as well as other wildlife is planted within the retained greenspace areas to the south of the site, with an area small area of woodland planted that provides a mix of food sources for dormice.
- 4.22 It is recommended that the following species are planted to establish new hedgerow and scrub habitats on site:
- Hazel
 - Rowan
 - Silver Birch
 - Ash
 - Hawthorn
 - Oak
 - Wayfaring Tree; and
 - Sycamore
- 4.23 It is considered that artificial light may impact nocturnal activity of dormice potentially present. As such additional planting should be undertaken along the site boundaries to strengthen and thicken up the boundary hedgerows, to lessen the impact of artificial light on the species and other wildlife.

Water Vole

- 4.24 The ditches on the site boundaries were dry at the time of survey and are therefore not considered likely to hold water. The eastern boundary ditch of the northern field was overgrown with ruderal species, whilst the ditch on the southern boundary of the

northern boundary was heavily shaded and sparse with vegetation. Neither of these features are considered likely to support water voles.

- 4.25 It is understood however that the stream on the southern boundary of the southern field will have a drainage point built into its northern bank. This will allow for any over flow from the reservoir to drain into the ditch. It is understood that this will not be a regular activity as the water within the reservoir will be regularly used within the greenhouse limiting the water level and significantly reducing the likelihood that water will be discharged into the stream. However during construction of the headwall it is recommended that the works area is inspected by a suitably qualified ecologist prior to establish whether water voles are present. Although within the local area no evidence was noted when this water body was inspected during the July site visit, although not all areas could be viewed due to dense vegetation restricting access.
- 4.26 If suitable water vole habitat is to be directly impacted through development then it is recommended that a water vole survey is undertaken to establish whether the species are present and to inform any specific mitigation and any required licence.

Great Crested Newt (GCN)

- 4.27 Ponds 2, 3 and 8 were tested for the presence of great crested newts using approved eDNA techniques. All three ponds tested negative for great crested newts. Access to Pond 1 was given, however, due to dense vegetation present on site, access was not possible. Pond 8 was surveyed instead which lies very close to pond 1 and would support a metapopulation of any newt population located within pond 1. In addition, pond 1 was of a very large size and it is thought is stocked with fish which would reduce the likelihood of great crested newts being present. Pond 3 was considered to be a good quality great crested newt breeding pond, surrounded by suitable habitat with an absent fish population. Pond 3 tested negative for great crested newts.
- 4.28 Although there were several other ponds situated within the local area these were situated on private land and were not accessed at the time of survey. The survey was carried out across waterbodies both south east and south west of the site indicating the

likely absence of great crested newts within the local landscape. Of the ponds not surveyed Pond 9 was located on the western boundary of the site within the residential garden of the adjacent house and was understood to have been newly constructed as part of garden renovation works and with no direct connectivity to any potential newt breeding ponds is considered unlikely to support a population. Pond 4, 5, 6, and 7 were located on the opposite side of Yapton Lane to the west and were associated with residential properties and dispersed around agricultural greenhouse sites. It is considered that Yapton Lane would be a barrier to dispersal for great crested newts.

- 4.29 The development will occur within the heavily managed and cultivated arable fields which provide very little in the way of suitable habitat for great crested newts. No further survey work is recommended, however if a great crested newt is recorded during works, works must stop, and a suitably qualified ecologist consulted on how to proceed.

Other Species

- 4.30 Breeding birds are likely to use the hedgerows on site as nesting habitat. The long sward within the semi-improved grassland and arable field provides suitable conditions for ground nesting birds. The UK breeding season for most bird species takes place between March and September. Although the recommendation is for the hedgerows and trees to be maintained, it is recommended that if any works affecting the hedgerows and associated scrub on site, as well as the grassland habitat and arable habitat are to be carried out, these are completed outside of this period or immediately after a nesting bird check by a suitably qualified ecologist. If an active nest is identified, works in the vicinity of the nest must cease until the birds have fledged the nest.
- 4.31 With much of the nesting bird habitat on site to be retained and the opportunity to enhance retained areas of greenspace to provide better quality habitat for ground nesting birds, the requirement of a breeding bird survey is not considered necessary.

General Ecological Enhancements

- 4.32 A number of enhancements can be made to the final development to help reduce potential ecological impacts. It is important to utilise native species of local provenance in landscaping schemes to enhance the ecological value of a development. These enhancements will also help the development to fall in line with *Policy ENV DM5: Development and biodiversity* in the Arun District Council local plan.
- 4.33 The hedgerows should be maintained and incorporated into the design of the potential development as these provide valuable habitat for species such as birds, invertebrates and some mammals including bats.
- 4.34 It is recommended that additional native species are planted within the hedgerow, in particular in any sparse areas and gaps as is present on the eastern boundaries. Species of benefit to the site would be hazel, beech, sweet chestnut, wild cherry, field rose, hornbeam, field maple and dogwood. These native species will enhance the existing hedgerows and add food sources at various times of year for local wildlife. In order to boost berry crops within existing hedgerows and ensure thick nesting cover is available, it is recommended that where permissions allow, hedgerows be trimmed on a two- or three-year rotation, rather than annually. Flailing of hedgerows should be avoided, as this practice can damage woody material. For heavy hedges, a circular saw is preferable.
- 4.35 The hedgerows have a relatively good understorey and edge species composition of vascular plants and this should be maintained. To this end, a buffer of around 1 metre either side of the hedgerow is recommended to be maintained and bramble control should be exercised between September and March.
- 4.36 Provision for reptiles should be made in the form of a marshy grassland area or wildflower meadow within the development. This meadow should be located near the boundaries so that it is not isolated from the wider landscape, the area around the reservoir in particular to the south of the proposed reservoir should be used for this purpose. An amenity grassland area will not be able to fulfil this function, as an area for reptiles must be managed to be of long sward, particularly in the summer months,

which means no mowing during May – September. Log and rubble piles should be added to provide hibernacula for species such as common amphibian species and reptile species. It is recommended that the Emorsgate EM8 – Meadow Mixture For Wetlands is used to seed the southern grassland areas of site including the reservoir embankment.

- 4.37 In addition, the grassland areas should be supplemented with a small section of woodland planting within the south eastern corner of the site to provide additional cover and the mosaic of habitats required for reptiles and also provide additional habitat for mammal species.
- 4.38 If tree and shrub removal is to be carried out, this should be done outside the nesting bird season or immediately after a nesting bird check by a suitably qualified ecologist. If an active nest is identified, works in the vicinity of the nest must cease until the birds have fledged the nest.
- 4.39 Bird boxes may be hung on retained mature trees to increase the number of breeding opportunities throughout the site. This should be made of woodcrete or similar to ensure they are long lasting and a variety of boxes should be used to attract a varied bird assemblage.
- 4.40 Creation of swales and/or SUDs as part of the development can further enhance the site and ensure the development falls in line with the local plan *Policy W DM3: Sustainable Urban Drainage Systems*. These waterbodies should be linked to the wider landscape through the protection and enhancement of tree lines and associated grassland strips. Wetlands and ponds, swales or ditches can be planted to enhance invertebrate species on the site and provide breeding opportunities for amphibian and reptile species. These should be planted with species of ecological value:
- Water mint - (*Mentha aquatica*);
 - Common reed - (*Phragmites australis*);
 - Soft rush - (*Juncus effuses*);
 - Water plantain - (*Alisma plantago-aquatica*);
 - Meadowsweet - (*Filipendula ulmaria*);
 - Yellow flag iris - (*Iris pseudacorus*).

-
- 4.41 The above can also be considered if possible with regards to the new reservoir. If the reservoir does not require a liner it can be enhanced for wildlife. If the reservoir does need a liner to hold water then the water features should be fenced off to prevent wildlife from becoming trapped within the waterbody and a means of escape for wildlife such as textured walkway must be installed.
- 4.42 The incorporation of the recommended enhancements to the design of the site will greatly enhance the site for local wildlife. Log piles can be incorporated into the design to encourage invertebrates, as well as hedgehogs and amphibian and reptile species.
- 4.43 It is considered that the use of wildflower edges, the creation and enhancement of hedgerows, the use of wildlife friendly planting within SUDs schemes (ponds and swales) and the creation of a marshy grassland and tree planting, that the biodiversity value of the site will be enhanced post development. Currently a large proportion of the site is of limited ecological value due its arable status, which is considered to be a monoculture of limited ecological interest.

5.0 Impact assessment

- 5.1 This section of the report forms an EcIA (Ecological Impact Assessment) and is designed to quantify and evaluate the potential impacts of the development on habitats and species present on site, or within the local area.

Methodology

- 5.2 The approach to this assessment accords with guidance presented within the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM 2018).
- 5.3 The zone of influence of the development is defined as:
- The project red line, for effects on habitats and species;
 - Adjacent habitat, considered by species, for mobile species with territories or foraging ranges that may overlap the site.
- 5.4 The types of features considered in the assessment of effects, to meet legislative and policy requirements, are:

- Designated sites (European, national and local);
- Protected species;
- Habitats and species of principal importance (Section 41 list);
- Hedgerows, where not of principal importance; and
- Habitats, where not of principal importance, that may function as wildlife corridors or stepping stones.

5.5 Impact assessment is required for each feature determined as important and not for other features. CIEEM (2018) advises that each impact assessment should consider if possible the different stages of a development (construction, operation and decommissioning) and that it should be characterised by the following:

- Positive or negative - whether the impact leads to an adverse, beneficial or neutral effect;
- Extent – the spatial area over which the impact occurs;
- Magnitude – change in for example the amount of habitat or the size of population;
- Duration – both in relation to the life cycle of the ecological feature and of the life of the project;
- Frequency and timing – for example the number of disturbance incidents to birds and their timing in relation to the breeding cycle; and
- Reversibility – if and at what timescale recovery is possible.

5.6 In essence, an EcIA assesses the activities associated with a proposed scheme that are likely to generate changes, within identified zone of influences, on identified ecological features and receptors. The proposals are subsequently reviewed, and iteration undertaken to include enhancements and mitigation to reduce negative impacts.

Assessment

Baseline Ecological Conditions

5.7 The site does not lie within 2km of any statutory or non-statutory designated sites of national, European or local importance. No perceived negative impacts on designated sites have been predicted although the site does fall within a Defra SSSI impact zone. As

such Natural England should be consulted with regards to the development. None of the priority habitats present locally are found within the site boundary and are only related to the proposed development site through a partial hedgerow connectivity.

5.8 There were a number of hedgerows, woodland edge habitat and a stream and marginal vegetation on site which could act as wildlife corridors, to varying extent. The remaining habitats on-site comprised a mosaic of arable land, poor semi-improved grassland and tall ruderal habitats and hardstanding, which are common and widespread and of no interest above site level.

5.9 In terms of protected species, the site was considered to have **potential** to support the following:

- Foraging and commuting bats – hedgerows;
- Nesting birds – arable land and hedgerows;
- Dormice;
- Water Voles
- Reptile species;
- Commuting and foraging badgers;

Impact Assessment and Mitigation

Table 3: Assessment of effects from the proposal after mitigation and compensation

Feature	Scale of Importance	Mitigation/Compensation Required	Residual Effect
Dormice	Local	Dormice maybe present within the hedgerows around site which are largely to be retained and enhanced. No Hedgerows are to be removed as part of proposals. A sensitive lighting scheme should be devised to prevent any negative impact of artificial light on dormice. Enhancement planting would enhance the site for dormice. New hedgerows are to be planted around the perimeters of the site, including the	Minor Positive

		northern and eastern boundaries adjacent to the glasshouse and around the reservoir.	
Water Vole	Regional	Although not considered to be present in the dry ditches around the development area, water vole maybe present where the reservoir outfall will be installed on the stream to the south of the site. A water vole survey should be conditioned and undertaken prior to the construction works. Only a small area of habitat will be impacted. Natural England licence put in place if necessary. The hydrology of the stream is not understood to be impacted significant with minimal discharge from the scheme.	Not significant
Roosting bats	Local	Trees and hedgerows within the boundaries of the site should be protected from artificial light from the development New hedgerows are to be planted around the perimeters of the site, including the northern and eastern boundaries adjacent to the glasshouse and around the reservoir.	Not significant
Commuting and foraging bats	Local	Sensitive lighting scheme and the retention of the trees and hedgerows on site that may act as potential foraging and commuting routes. If significant impact from night time light is predicted additional survey work and mitigation maybe required. Enhancement of hedgerows and site boundaries. This will improve the functionality of the existing hedge as a wildlife corridor for a multitude of species including bats.	Unknown / Not Significant
Reptiles	Local	Habitat manipulation and sensitive clearance techniques to any reptiles encourage reptiles present to retained habitat. Enhancement of retained ground to provide increased reptile habitat on site post development	Not significant
Nesting Birds	Local	Mitigating direct harm to nests by removal of any hedgerow, trees or arable habitat outside of	Not Significant

		nesting bird season or after a check by a suitably qualified ecologist. Sensitive lighting scheme Compensation in the form of the installation of bird boxes.	
Commuting and foraging badgers	Local	Safety measures enforced on site during works to mitigate any possibility of accidental harm to badgers through interaction with open excavations and underground services.	Not Significant

Cumulative impacts

- 5.10 It is considered that any planning application within the local area should have ecological mitigation and enhancement designed into the scheme to satisfy planning policy. With the proposed development containing scope to ecologically enhance the site post development, it is considered that the site will not have negative cumulative impacts with other sites.

6.0 Conclusions

- 6.1 The site was dominated by arable land and associated existing site access. These habitats were considered to offer very limited ecological value as they are heavily managed. Overall the habitats are of limited interest, with the boundary and buffer habitats of greatest interest for biodiversity on site and in the local area.
- 6.2 The surrounding hedgerows, scrub and woodland edges, as well as stream, ditches and associated marginal vegetation and marsh grassland provide ecological value to the local wildlife community. As such, it has been recommended to maintain and enhance these features as part of any development scheme. The grassy buffer around much of the arable land provides some value at site level to local wildlife, with particular emphasis on the reptile populations.
- 6.3 The hedgerow habitats are considered to be optimum for breeding birds. These habitats also provide landscape connectivity, which would allow bats, birds, amphibians, reptiles and mammals to move across the landscape and provide good opportunities for

foraging. The boundary features should also be shielded by the potential impacts of artificial light. The hedgerows have the potential to support commuting and foraging bats, nesting birds and dormice that all maybe impacted by artificial light, altering the way they impact with the natural environment.

- 6.4 A sensitive clearance and habitat manipulation approach has been recommended within this report with regards to reptiles if any small areas of habitat are to be temporarily impacted during works. This should be undertaken when reptile species are active and must tie in with any mitigation for nesting birds.
- 6.5 Water voles maybe present within the stream located off site to the south. A small drainage outflow will be installed on the bank of the stream. As such prior to works a water vole survey should be undertaken to establish whether the species are present or will be impacted. Suitable mitigation should be devised if found to be present. Discharge into the stream from the reservoir will be minimal.
- 6.6 No badger setts were present within the survey area, although it is understood a main sett exists within the local landscape to the east of the site, although this will not be impacted by works. A badger latrine was found towards the western boundary of the northern field indicating the site forms part of a territory. It is not considered that the species will be significantly impacted by proposals although with the species within the local area recommendations such as working practices during construction and providing a means of escape for wildlife from the proposed reservoir have been made.
- 6.7 Further survey work for great crested newt were undertaken on ponds 2, 3 and 8 (pond 2 was actually a stream on the southern boundary) within the local area. All three tested negative for great crested newts. Other ponds which were not accessed lie the opposite side of the Yapton Lane which is considered a barrier to dispersal for the species. Pond 9 was present within a residential garden close to the western boundary of the southern field. It is understood that this had been recently constructed and with no direct connectivity to other potential great crested newt breeding ponds it is considered highly unlikely that this water body would have been colonised. The development will be concentrated with already highly disturbed and managed arable land which provides

- poor quality habitat for great crested newts. It is therefore considered unlikely that great crested newts are present within the local area and no further recommendations are made.
- 6.8 Nesting bird habitat has been identified on site recommendations with regards to protecting active nests must be adhered to.
- 6.9 Potential ecological enhancements that can be implemented into development plans have been recommended within the report. Recommendations include use of native species within landscaping schemes, including wildflower planting, use of wildlife friendly planting in SUDs schemes and woodland and hedgerow planting and the installation of bat and bird boxes on site. These enhancements would provide an increase in biodiversity interest to the site post development, and allow the site to conform to the relevant local planning policies described.

7.0 References

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Internet resources:

Google Maps: www.google.co.uk/maps

Magic Interactive Map: www.magic.gov.uk

Arun District Council: www.arun.gov.uk

Appendix 1: Habitat Map

Appendix 1: Habitat Map

Key

Defunct hedgerow

Intact hedgerow

Dry ditch

Red line boundary

Arable

Hardstanding

Semi-improved grassland

Semi-improved grassland/
tall ruderal

Target Notes

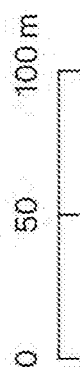
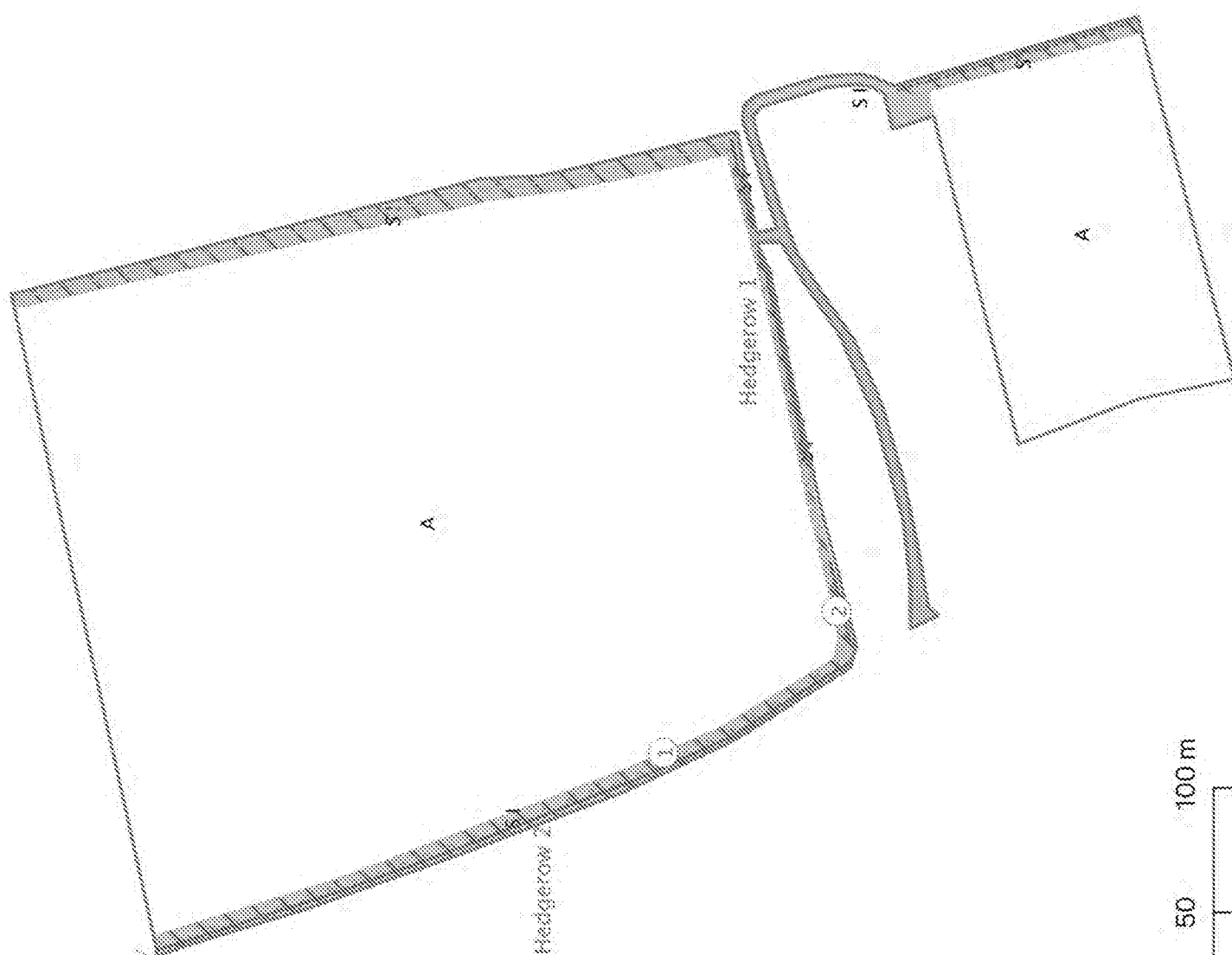
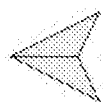
① Badger latrine

② Japanese knotweed

Client: John Hall Consulting
Site: Lower Farm, Yapton Lane, Walberton.
Date of Survey: 09.10.2020
Surveyors: C. Jennings

the
ecology
partnership

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Appendix 2: Species list for the site

Common name	Latin name	DAFOR score
Semi-improved Grassland		
Creeping bent	<i>Agrostis stolonifera</i>	D
Perennial rye grass	<i>Lolium perenne</i>	F
False oat grass	<i>Arrhenatherum elatius</i>	O
Scentless mayweed	<i>Tripleurospermum inodorum</i>	R
Greater plantain	<i>Plantago major</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Cocksfoot	<i>Dactylis glomerata</i>	R
Semi-improved grassland / Tall ruderal		
False oat grass	<i>Arrhenatherum elatius</i>	A
Creeping bent	<i>Agrostis stolonifera</i>	A
Soft brome	<i>Bromus hordeaceus ssp hordeaceus</i>	F
Creeping thistle	<i>Cirsium arvense</i>	F
Common nettle	<i>Urtica dioica</i>	O
Creeping bent	<i>Agrostis stolonifera</i>	O
Hogweed	<i>Heracleum sphondylium</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Cow Parsley	<i>Anthriscus sylvestris</i>	O
Curled dock	<i>Rumex crispus</i>	O
Common sorrel	<i>Rumex acetosa</i>	O
Creeping buttercup	<i>Ranunculus repens</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Broadleaved dock	<i>Rumex obtusifolius</i>	O
Cleavers	<i>Galium aparine</i>	O
Cocksfoot	<i>Dactylis glomerata</i>	
Yarrow	<i>Achillea millefolium</i>	R
Common toadflax	<i>Linaria vulgaris</i>	R
Red fescue	<i>Festuca rubra</i>	R
Bramble	<i>Rubus fruticosus</i>	R
White dead nettle	<i>Lamium album</i>	R
Common mallow	<i>Malva sylvestris</i>	R
Hedgerow		
Blackthorn	<i>Prunus spinosa</i>	D (Locally)
Elm	<i>Ulmus agg</i>	A
Ash	<i>Fraxinus excelsior</i>	O
Elder	<i>Sambucus nigra</i>	O
Hawthorn	<i>Crataegus monogyna</i>	O
Hazel	<i>Corylus avellana</i>	R

Appendix 3: Photographs

Photograph 1: Northern field looking north	
Photograph 2: Southern boundary of the northern field	
Photograph 3: Japanese knotweed identified towards the south west corner of the northern field	

Photograph 4: Western boundary of the northern field	 A black and white photograph showing a dense thicket of trees and shrubs on the left side, with tall grasses in the foreground. This represents the western boundary of the northern field.
Photograph 5: Dry ditch running the eastern boundary of the northern field	 A black and white photograph showing a wide, flat field with a dry ditch running through it. The ditch is a shallow, straight line in the middle of the field. In the background, there is a line of trees and a small hill on the right. This represents the eastern boundary of the northern field.

Photograph 6: Newly planted hedge which marks the eastern site boundary with the adjacent solar farm	
Photograph 7: The freshly planted southern field which had been ploughed and replanted since the previous site visit	
Photograph 8: Existing access	

Photograph 9: Pond 3, which tested negative for GCN	
Photograph 10: Pond 8, which tested negative for GCN	

Appendix 4: Biological Records

Ecological Data Search SxBRC/20/327 - Summary Report

An ecological data search was carried out for land at Binstead Farm, Walberton on behalf of Alice Bailey (The Ecology Partnership) on 17/08/2020.

The following datasets were consulted for this report:

	Requested	Radius/buffer size
Designated sites, habitats & ownership maps	Yes	2km
Protected, designated and invasive species	Yes	2km

Summary of results

Sites and habitats

Statutory sites	1 National Park
Non-statutory sites	1 LWS
Section 41 habitats	6 habitats
Ancient and/or ghyll woodland	Present

Protected and designated species

International designations	55 species	846 records
National designations	143 species	4,782 records
Other designations	316 species	8,109 records
Total	336 species	8,719 records
Invasive non-native	35 species	314 records

The report is compiled using data held by Sussex Biodiversity Record Centre (SxBRC) at the time of the request. SxBRC does not hold comprehensive species data for all areas. Even where data are held, a lack of records for a species in a defined geographical area does not necessarily mean that the species does not occur there – the area may simply not have been surveyed.

**This summary page may be published.
The full report and maps may not be published or otherwise shared.**

The data search report is valid until 17/08/2021 for the site named above.

Appendix 5: Great Crested Newt eDNA results

Folio No: E8479
Report No: 1
Purchase Order: BINS101
Client: THE ECOLOGY
PARTNERSHIP
Contact: Chris Jennings

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 10/07/2020
Date Reported: 24/07/2020
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
2334	Pond 8, Binstead Farm South	SU 98853 04493	Pass	Pass	Pass	Negative	0
2347	Pond 2, Binstead Farm South	SU 98294 04445	Pass	Pass	Pass	Negative	0
2357	Pond 3, Binstead Farm South	SU 98056 04434	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: [REDACTED]

Reported by: Chris Troth

Approved by: Jennifer Higginbottom



Forensic Scientists and Consultant Engineers
SureScreen Scientifics Ltd, Morley Retreat, Church Lane, Morley, Derbyshire, DE7 6DE

METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

- SIC:** **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.
- DC:** **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.
- IC:** **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.
- Result:** **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.



Forensic Scientists and Consultant Engineers

SureScreen

The Ecology Partnership Ltd

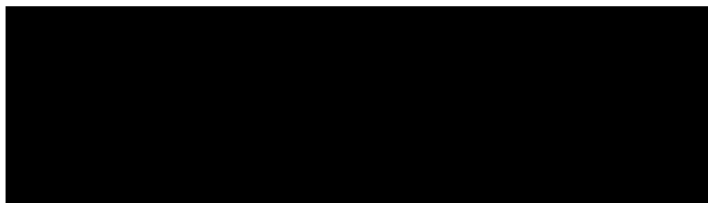
Thorncroft Manor

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Leatherhead

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Approved by: Alexia Tamblyn MA (Oxon) MSc CEnv MCIEEM FRGS, Managing Director

03/11/2020