ALTERATIONS TO AN EXISTING BUILDING AND THE ADDITION OF NEW BUILDINGS AT SOUTHERY MILL, NORFOLK

PRELIMINARY ECOLOGICAL APPRAISAL

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1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

Dowdall Architects are preparing a planning application on behalf of Brian Easey in relation to the development of existing buildings and the erection of new buildings at Southery Mill, Norfolk. It is anticipated that the local planning authority, the Borough Council of King's Lynn and West Norfolk will require an ecological assessment to accompany the planning application, in order to comply with government guidance. Philip Parker Associates Ltd have been asked to undertake this assessment.

1.2 This report presents the results of a Preliminary Ecological Appraisal (PEA) undertaken on the 13th July 2022 by project ecologist Rebecca Easter (Natural England Class 2 Bat Licence: 2021-10080-CL18-BAT).

1.3 THE SITE

The proposed development site is located to the east of the River Great Ouse, to the south of the village of Southery and to the east of Sedge Fen Road. The site was surrounded by arable farmland and a network of ditches. For the purpose of this report the buildings have been numbered 1 – 5 as shown on figure 5. Buildings 3-5 and the dwelling to the south of the site, are not to be impacted on by the proposed works.

1.4 DATA SEARCH

A 2km data search with the Norfolk Biodiversity Information Services (NBIS) and Cambridgeshire and Peterborough Environmental Records Center (CPERC) has recorded the following designated sites and protected species. Further information has been gathered from the MAGIC.defra.gov website:

- Breckland - SAC, SPA, SSSI – located 7.4km south-west of the site;
- Ouse Washes RAMSAR located 8km west of the site;
- Little Ouse River CWS and River Great Ouse CWS are located 1.6km south-east of the site;
- The closest bat record was for soprano pipistrelle located 525m south-west of the site;
- The closest badger record was 1.3km north-west of the site;
- The closest otter record was 900m north-west of the site;
- Barn owl, tawny owl, little owl and short-eared owl were all recorded 1.4km north-west of the site.

1.5 SURVEY RESULTS

A summary of the results of the survey are shown in the following table;

Table 1 Survey summary and development impact

Survey group	Results summary	Development impact	
		Unlikely impact	*Possible impact*
Protected sites	It is not anticipated that the proposed development will have any impact on any designated sites (the closest are the Little Ouse River CWS and River Great Ouse CWS, both located 1.6km south-east of the site).	✓	
Habitat	The majority of the site comprised of concrete and stone with piles of broken concrete and rubble. To the north/ north-east was an area of arable farmland along with piles of rubbish, bare soil, and stored machinery. Bags of stored goods were present to the south-east of the site.	✓	
Bats	No evidence of bats were noted, therefore buildings 1 and 2 were deemed to have negligible bat roosting potential. (Buildings 3 and 5 were also deemed to have negligible bat roosting potential whilst Building 4 was considered to have low bat roosting potential – none of these buildings are to be impacted on by the proposed works).		✓
Birds	No nesting birds were noted in Buildings 1 or 2 but nesting wood pigeon and house sparrow were noted in the other buildings on site (Buildings 3 and 4 – not impacted on by the proposed works). The conifers on site also had the potential to support nesting birds.	✓	
Water vole	No suitable habitat noted within the proposed development area, the closest suitable water body was present 13 metres south-west of the site.	✓	
Otter	No suitable habitat noted within the proposed development area, the closest suitable waterbody was present 13 metres south-west of the site.	✓	
Badger	No suitable habitat was present on site only potential for occasional foraging individual from the surrounding area.	✓	
Hedgehog	Limited suitable foraging habitat on site but surroundings are suitable.	✓	
Reptiles	Given the nature of the site (hard surfacing and arable farmland) meant that the majority of the site was considered unlikely to support reptiles albeit an occasional transient species such as grass snake would not be impossible. The large piles of broken concrete were present on site and areas along the ditches/vegetated soil mound to the north have limited potential to support reptiles and therefore a precautionary approach to their removal should be undertaken.	✓	
Amphibians	No ponds were recorded within the application site itself or within 250m of the site. A network of ditches was present around the site with the closest being 3 metres south-east of the site. A Habitat Suitability Index (HSI) of D1-D4 was undertaken, each of the four ditches came out as poor (See appendix A) and have a 0.03% chance of supporting great crested newts (GCN). Given the poor HSI results and the nature of the area surrounding the site (concrete and a road) no further surveys in relation to GCN are considered necessary.	✓	

1.6 REQUIREMENT FOR FURTHER SURVEYS

Given the relative lack of potential impacts, no further surveys are considered necessary.

1.7 MITIGATION AND ENHANCEMENTS

The following mitigation and enhancements are recommended:

- A toolbox talk to the contractors on site prior to works on the building commencing;
- Any additional lighting is to comply with section 7.8;
- Erection of bird boxes as per section 7.9;
- Erection of bat boxes as per section 7.7;
- Precautionary approach to clearing the site as per section 7.10.

2.0 INTRODUCTION

2.1 Dowdall Architects are preparing a planning application on behalf of Brian Easey in relation to the development of existing buildings and the erection of new buildings at Southery Mill, Norfolk. It is anticipated that the local planning authority, the Borough Council of King's Lynn and West Norfolk will require an ecological assessment to accompany the planning application, in order to comply with government guidance. Philip Parker Associates Ltd have been asked to undertake this assessment.

2.2 A Preliminary Ecological Appraisal (PEA) was undertaken on the 13th July 2022 by ecologist Rebecca Easter (Natural England Class 2 Bat Licence: 2021-10080-CL18-BAT). The survey commenced at 11:00 and took 1.25 hours to complete.

2.3 This report providing the findings has been prepared following guidance prepared by the Institute of Ecology and Environmental Management (CIEEM) and BS 42020:2013 Biodiversity : Code of practice for planning and development and takes the form of a Preliminary Ecological Appraisal (PEA).

2.4 The proposed development site is centred at Ordnance Survey Grid Reference TL 61893 92940 as shown on the following Ordnance Survey and aerial photograph extract.

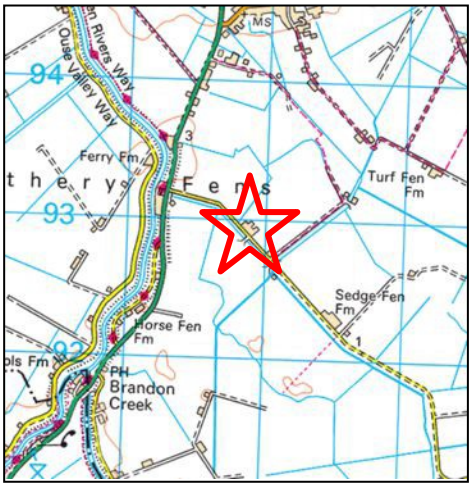

Figure 1 – OS Mapping location plan
Imagery C 2022 DigitalGlobe, Getmapping plc, Intorfera Ltd & Bluesky.

Figure 2 – Aerial photograph location plan
Imagery C 2022 DigitalGlobe, Getmapping plc, Intorfera Ltd & Bluesky.

2.5 CHARACTER AREA

The site falls within the Fens, National Character Area.

2.6 The Fens National Character Area (NCA) is a distinctive, historic and human-influenced wetland landscape lying to the west of the Wash estuary, which formerly constituted the largest wetland area in England. The area is notable for its large-scale, flat, open landscape with extensive vistas to level horizons. The level, open topography shapes the impression of huge skies which convey a strong sense of place, tranquillity and inspiration.

2.7 It is a large, low-lying, flat landscape with many drainage ditches, dykes and rivers that slowly drain towards the Wash, England's largest tidal estuary. The single obvious factor uniting the Fens is the low-lying, level terrain reflecting its geological past. With the exception of the Isle of Ely, which reaches above 20m, elevations rarely pass the 10m contour, and typically vary by little more than one or two metres over long distances. Much of the land is below sea level, relying on pumped drainage and the control of sluices at high and low tides to maintain its agricultural viability. The level horizons and the huge scale of the landscape create a strong sense of isolation and tranquillity, and a distinctive sense of place. There are, typically, large open panoramas and enormous skies, whose changing weather patterns have a strong influence on the observer. Four major rivers drain into the Wash: the Witham, Welland, Nene and Great Ouse. All rivers now have artificial canalised courses that run straight for long distances and are bounded by high banks to contain the watercourse from the lower adjacent fields.

3.0 DATA SEARCH

3.1 In order to assess whether there are any protected species records for the development site (grid reference TL 61893 92940) and the surrounding area (2km radius), a data search from the Norfolk Biodiversity Information Centre and Cambridgeshire and Peterborough Environmental Records Centre (CPERC) was undertaken on the 28th July 2022 as part of the PEA. A further assessment of Internationally Designated sites has been made using https://magic.defra.gov.uk.

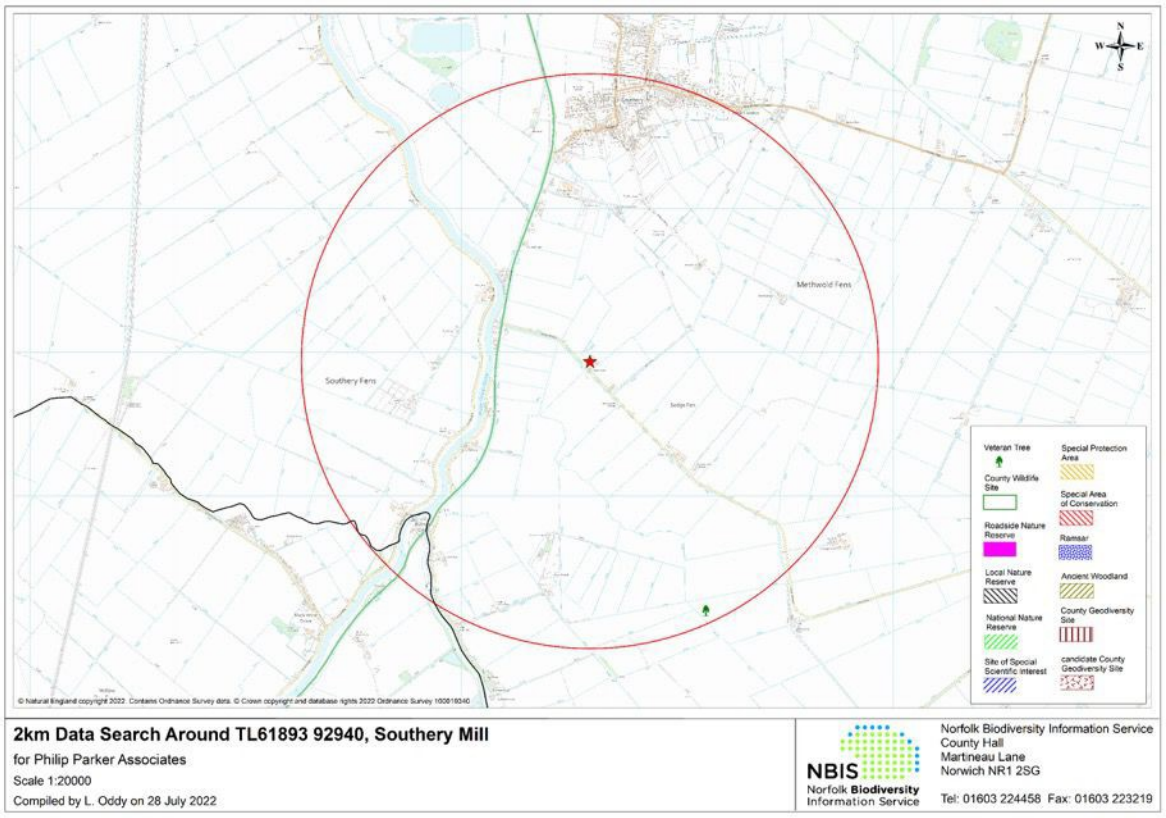

Figure 3 – NBIS results

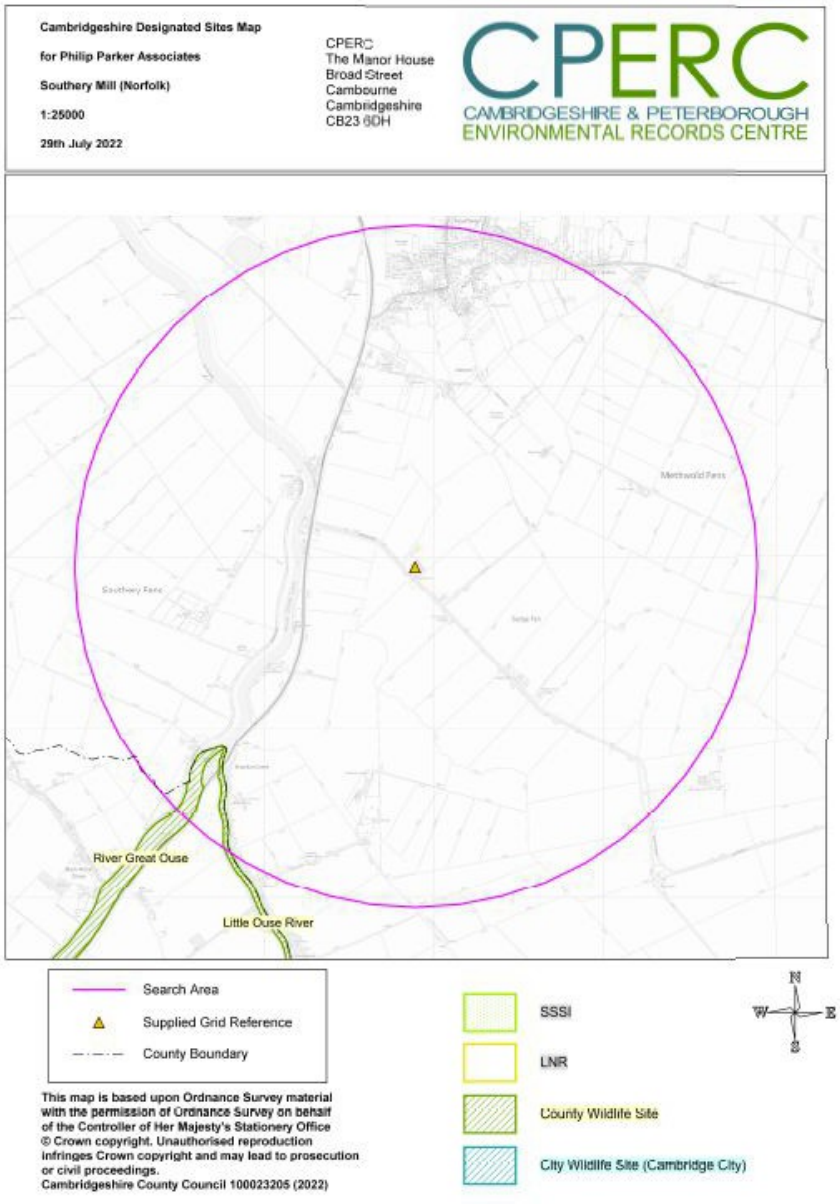

Figure 4 – CPERC results

3.2 PROTECTED SITES

A summary of the protected sites is given below.

3.3 Natura 2000 Sites

The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992) requires EU Member States to create a network of protected wildlife areas, known as Natura 2000, across the European Union. This network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), established to protect wild birds under the Birds Directive (Council

Directive 79/409/EEC of 2nd April 1979). These sites are part of a range of measures aimed at conserving important or threatened habitats and species.

3.4 Special Area of Conservation (SAC)

Special Areas of Conservation have been given special protection under the European Union's Habitats Directive. They provide increased protection to a variety of wild animals, plants and habitats and are a vital part of global efforts to conserve the world's biodiversity.

3.5 *No SAC's occurred within 2km of the site*. The closest site is Breckland located some 7.4km to the south-west.

3.6 Special Protection Area (SPA)

Special Protection Areas are strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species.

3.7 *No SPA's occurred within 2km of the site*. The closest site belongs to Breckland 7.4km south-west.

3.8 RAMSAR Sites

Ramsar sites are wetlands of international importance designated under the Ramsar Convention.

3.9 Sites proposed for selection are advised by the UK statutory nature conservation agencies, or the relevant administration in the case of Overseas Territories and Crown Dependencies, coordinated through JNCC. In selecting sites, the relevant authorities are guided by the Criteria set out in the Convention. The UK also has a national Ramsar Committee composed of experts who provide further advice.

3.10 In the UK, the first Ramsar sites were designated in 1976. Since then, many more have been designated. Compared to many countries, the UK has a relatively large number of Ramsar sites, but they tend to be smaller in size than many countries. The initial emphasis was on selecting sites of importance to water birds within the UK, and consequently many Ramsar sites are also Special Protection Areas (SPA) classified under the Birds Directive. However, greater attention is now being directed towards the selection of Ramsar sites in UK Overseas Territories and Crown Dependencies; the first of these was designated in 1990. Both within the UK and

overseas, non-bird features are increasingly taken into account, both in the selection of new sites and when reviewing existing sites.

3.11 *No RAMSAR sites occurred within 2km of the site*. The closest site belongs to the Ouse Washes located 8km west.

3.12 Sites of Special Scientific Interest (SSSI)

The SSSI/ASSI series has developed since 1949 as the national suite of sites providing statutory protection for the best examples of the UK's flora, fauna, or geological or physiographical features. These sites are also used to underpin other national and international nature conservation designations. Most SSSIs are privately-owned or managed; others are owned or managed by public bodies or non-government organisations. The SSSI/ASSI designation may extend into intertidal areas out to the jurisdictional limit of local authorities, generally Mean Low Water in England and Northern Ireland; Mean Low Water of Spring tides in Scotland. In Wales, the limit is Mean Low Water for SSSIs notified before 2002, and, for more recent notifications, the limit of Lowest Astronomical Tides, where the features of interest extend down to LAT. There is no provision for marine SSSIs/ASSIs beyond low water mark, although boundaries sometimes extend more widely within estuaries and other enclosed waters.

3.13 Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs have been re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and the Nature Conservation (Scotland) Act 2004.

3.14 No Sites of Special Scientific Interest (SSSI) occurred within 2km of the site. The closest site belongs to Breckland 7.4km south-west.

3.15 County Wildlife Sites

County Wildlife Sites are second tier ecological sites, identified as they fulfil a range of select criteria for their ecological interest on a county level. They do not receive statutory protection but are usually offered some protection under local plan policy.

3.16 Little Ouse River CWS – Located 1.6km south-east

A major river not grossly modified through canalisation or poor water quality.

3.17 River Great Ouse CWS – Located 1.6km south-east

A major river not grossly modified by canalisation or poor water quality; supports >0.5ha NVC S6 swamp; >0.5ha S4 swamp; >0.05ha MG13 grassland; a NS vascular plant (Nymphoides peltata); breeding populations of a NR dragonfly (Libellula fulva)

3.18 PROTECTED SPECIES

The following records for protected species were noted within the NBIS data search.

Mammals

- Pipistrelle species *Pipistrellus* – 1 record, 2015 – located 1.5km north
- Daubenton's *Myotis daubentoniid* – 2 records, latest 2019 – closest record 730m north-west
- Noctule *Nyctalus noctule* – 2 records, latest 2019 – closest record 730m north-west
- Common pipistrelle *Pipistrellus pipistrellus sensu lato* – 3 records, latest 2019 – closest record 525m south-west
- Soprano pipistrelle *Pipistrellus pygmaeus* – 3 records, latest 2019 – closest record 525m south-west
- Eurasian badger *Meles meles* – 3 records, latest 2014 – closest record 1.3km north-west
- Eurasian otter *Lutra lutra* – 9 records, latest 2017 – closest record 900m north-west

The majority of the bat records were collected using the Norfolk Bat Survey methodology

Birds

Barn owl *Tyto alba* – 16 records, latest 2011 – closest record 1.4km north-west

- Tawny Owl *Strix aluco* – 2 records, latest 2011 – closest record 1.4km north-west
- Little owl *Athene noctua* – 3 records, 2011 – closest record 1.4km north-west
- Short-eared owl *Asio flammeus* – 3 records, 2005 – closest record 1.4km north-west

3.19 *The following red and amber list birds were also noted within the 2km NBIS data search.*

Barnacle goose, brent goose, mute swan, bewick's swan, whooper swan, bean goose, tundra bean goose, pink-footed goose, white-fronted goose, greylag goose, shelduck, wigeon, gadwall, teal, mallard, shoveler, smew, grey partridge, quail, red-necked grebe, shag, marsh harrier, hen harrier, circus cyaneus subsp. cyaneus, montagu's harrier, kestrel, merlin, crane, oystercatcher, lapwing, stone-curlew, common sandpiper, snipe, whimbrel, woodcock, dunlin, ruff, black-tailed godwit, bar-tailed godwit, spotted redshank, redshank, greenshank, green sandpiper, wood sandpiper, british lesser black-backed gull, yellow-legged gull, black-headed gull, stock dove, turtle dove, cuckoo, swift, kingfisher, grasshopper warbler, willow warbler, skylark, house martin, meadow pipit, blue-headed wagtail, yellow wagtail, grey wagtail, nightingale, black redstart, whinchat, fieldfare, spotted flycatcher, house sparrow, tree sparrow, linnet, yellowhammer, reed bunting and corn bunting.

4.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT SITE

4.1 SITE DESCRIPTION

The proposed development site comprises of a collection of buildings and hard surfaces and is located to the east of the River Great Ouse, to the south of the village of Southery and to the east of Sedge Fen Road. The site was surrounded by arable farmland and a network of ditches. For the purpose of this report the buildings have been numbered 1 – 5 as shown on figure 5 below. Buildings 3-5 and the dwelling to the south of the site, are not to be impacted on by the proposed works.

Figure 5 – Building numbers

4.2 Building 1

Building 1 comprised of an RSJ frame with no roof. The walls were missing except for low brick walls to the south-east and north-west. A concrete floor was present.

Figure 6 – External view of Building 1 to the north-west

Figure 7 – Internal view of Building 1 looking south-west

4.3 Building 2

Building 2 comprised of an RSJ frame with a corrugated metal roof. The building was attached to the south-west of Building 5 and to the north-west of Building 3 (by a breezeblock wall with access over and around), the remaining elevations were open. A concrete floor was present.

Figure 8 – Internal view of Building 2 looking north-east

Figure 9 – Internal view of Building 2 looking north-west

4.4 Building 3

Building 3 comprised of an RSJ frame with a corrugated metal roof. The building was attached to Buildings 2 and 5 with access into northern half of Building 4. A concrete floor was present. Access was via a large door to the south-west.

Figure 10 – Internal view of Building 3 looking north-west

4.5 Building 4

Building 4 comprised of brick walls with corrugated asbestos over the south-west gable end (above eaves) and a corrugated asbestos roof. Below the roof was a corrugated metal roof in the north-east half of the building whilst a mix of hardboard ceilings and exposed asbestos was present in the south-western rooms.

Figure 11 – External view of the west elevation of Building 4

Figure 12 – External view of the south-east elevation of Building 4

Figure 13 – Internal view of north-east section of Building 4 looking south-east

Figure 14 – Internal view of south-west section of Building 4 looking south-east

Figure 15 – Internal view of south-west section of Building 4 looking south-east

4.6 Building 5

Building 5 comprised of an RSJ frame with corrugated metal walls and roof with a bricked door to the south-east. The building was being used to service lorries at the time of the survey. Access was via a large door to the north-west with a pedestrian door to the south-west.

Figure 16 – North-east elevation of Building 5

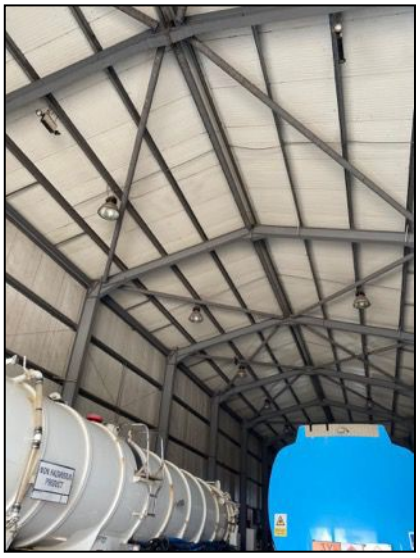

Figure 17 – Internal view Building 5 looking south-east

4.7 The majority of the site comprised of concrete and stone with piles of broken concreate and rubble. To the north/north-east was an area of arable farmland along with piles of rubbish, bare soil, and stored machinery. Bags of stored goods were present to the south-east of the site.

4.8 A row of mature conifers were present to the north-east of the building and south-east of the site. Grasses included false oat-grass *Arrhenatherum elatius and* brome spp *Bromus spp.* Herbs including nettle *Urtica dioica*, oxeye daisy *Leucanthemum vulgare*, bramble *Rubus fruticosus,*

rosebay willowherb *Chamaenerion angustifolium,* bristley oxtounge *Minthotheca echioides*, dandelion *Taraxacum officinale*, poppy *Papaver rhoeas*, chamomile *Matricaria chamomilla,* creeping thistle *Cirsium arvense,* fat-hen *Chenopodium album,* mallow spp *Malva spp,* groundsel *Senecio vulgaris,* doves foot cranesbill *Geranium mole,* broad leaved dock *Rumex obtusifolius* and white dead-nettle *Lamium album* were present around the north-west boundary and to the south-west and west of the arable field. Common reed *Phragmites australis* and mugwort *Artemisia vulgaris* were noted in ditch 2.

Figure 18 – Area of rubble to the south-west of Building 1

Figure 19 – Area of stone and concrete to the north-west of Building 1

Figure 20 – Area of rubble to the south-east of Building 1

Figure 21 – Conifer trees to the north-east of Building 5

Figure 22 – Area of stored goods and conifer trees to the south-east of Building 4

Figure 23 – Arable farmland to the north/ north-east of the site

5.0 FAUNA SURVEY

5.1 GENERAL

The potential scope of works, data search and habitats within the site have informed the basis of the preliminary ecological appraisal. Therefore, the following protected and priority species have been considered further within this report:

- Bats
- Water vole
- Otter
- Badger
- Hedgehog
- Breeding birds
- Reptiles
- Amphibians

5.2 BATS

Legislation

In Britain, all bat species and their roosts are legally protected, by both domestic and international legislation, namely:

- The Wildlife and Countryside Act (1981) (as amended);
- The Countryside and Rights of Way Act, 2000 and
- The Conservation of Habitats and Species (amendment) (EU Exit) Regulations 2019

5.3 This legislation makes it an offence amongst others to:

- Deliberately capture, injure or kill a bat;
- Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
- Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time);
- Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat;
- Intentionally or recklessly obstruct access to a bat roost.

5.4 A bat roost is regarded as “any structure or place which any wild animal….uses for shelter or protection” As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time.

5.5 Bats are also listed under the Natural Environment and Rural Communities Act (NERC, 2006). This is a list of habitats and species that are of principal importance for the conservation of biodiversity in England. The list (including 56 habitats and 943 species) has been drawn up in consultation with Natural England and draws upon the UK BAP List of Priority Species and Habitats. The S41 list should be used to guide decision-makers such as local and regional authorities when implementing their duty: to have regard to the conservation of biodiversity in the exercise of their normal duties.

5.6 Existing records

Pipistrelle species, daubenton's, noctule, common pipistrelle and soprano pipistrelle were noted within the 2km NBIS and CPERC data search. The closest record was for soprano pipistrelle located 525m south-west of the site.

5.7 Survey methodology

In summer, bats typically roost in trees and buildings. They feed along hedgerows, woodland edge, old pasture and over water. In winter, hibernation sites can include trees and buildings but more commonly underground structures such as caves and ice houses.

5.8 The Bat Mitigation Guidelines produced by English Nature (now Natural England) set out the timescales for survey work, as follows:

Table 2 Timescales for bat survey

SEASON	ROOST TYPE	INSPECTION	BAT DETECTOR AND EMERGENCE COUNTS
Spring (Mar – May)	Building	Suitable (Signs, perhaps bats)	Limited, weather dependent
	Trees	Suitable (Signs only)	Static detectors may be useful
	Underground	Suitable (signs only)	Static detectors may be useful
Summer (June – August)	Building	Suitable (signs and bats)	Suitable
	Trees	Difficult	Limited, use sunrise survey
	Underground	Suitable (signs only)	Rarely useful
Autumn (September – November)	Building	Suitable (signs and bats)	Limited, weather dependent
	Trees	Difficult	Rather limited, weather dependent; use sunrise survey
	Underground	Suitable (signs, perhaps bats)	Static detectors may be useful
Winter (December – February)	Building	Suitable (signs, perhaps bats)	Rarely useful
	Trees	Difficult (best for signs after leaves have gone)	Rarely useful
	Underground	Suitable (signs and bats)	Static detectors may be useful

5.9 Preliminary survey

The site was assessed for the presence of habitat that could support roosting and foraging/commuting bats.

5.10 Building survey methodology

Where present, buildings are inspected using a pair of 8 x 42 binoculars and a powerful Clulite lamp (fitted with a red filter where appropriate to avoid disturbing any bats that might be present). A Rigid CA-150 endoscope is used to inspect cavities where accessible.

5.11 Surveys concentrate on checking horizontal surfaces on which bat droppings and feeding remains could rest (including windowsills, beams, gutters, stored goods) as well as vertical surfaces such as walls. Potential access points to cavities and possible roost spaces (where present) are checked for urine staining and fur rubbings.

5.12 Building survey results

The results of the preliminary bat roost assessments are shown on the following tables. They are also present on Drawing D1.

Table 3 External / internal roosting potential and bat evidence on the buildings

Location	Roosting potential and evidence	Bat evidence
Building 1	**External** No bat roosting features were noted. An occasional shallow cavity was noted in the remaining brick walls. **Internal** No bat roosting features were noted.	No bat evidence noted.
Building 2	**External** No bat roosting features were noted. **Internal** No bat roosting features were noted.	No bat evidence noted.
Building 3	**External** No bat roosting features were noted. **Internal** Single cavity on the breezeblock wall to the north-west.	No bat evidence noted.
Building 4	**External** Vents in the corrugated asbestos roof. Gaps under asbestos sheeting on the south-west gable end. Gaps over the bricked-up window on the south-west elevation of the building. **Internal** Gaps between the corrugated metal and asbestos roof (access from the north-east section of the building). Gaps around the	No bat evidence noted.

Location	Roosting potential and evidence	Bat evidence
	bricked-up door in the north-east section of the building. Gaps between the wood and wall of the north-east elevation of the north-east room.	
Building 5	**External** No bat roosting features were noted. **Internal** No bat roosting features were noted.	No bat evidence noted.

Figure 24 – Gap over the bricked-up window on the south-west elevation of Building 4

Figure 25 – Gaps under the corrugated asbestos on the south-west gable end of Building 4

5.13 Bat foraging/commuting potential

The site supports some bat foraging suitability mainly through the presence of the conifer trees to the north and south-east. The site is connected to good bat habitat within the wider landscape i.e. ditches.

5.14 Suitability of habitat for bat activity

The potential of the site to support roosting and foraging bats has been assessed against Table 4.1 of the Bat Survey Guidelines 2016 (see Table 4 below).

Table 4 Suitability of trees, buildings and habitat for bat use

Suitability	Description of roosting habitats	Commuting and foraging habitat
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.

Suitability	Description of roosting habitats	Commuting and foraging habitat
Low	A structure or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, treelined watercourses and grazed parkland. Site is close to and connected to known roosts.
Confirmed roost	Bats discovered roosting within the building/tree or definitive evidence to suggest they do so.	

5.15 On the basis of the above, it is considered that the site supports the following bat suitability;

- **Building 4** – Low suitability;
- **Buildings 1,2,3,5** – Negligible suitability;
- **Foraging/ commuting habitat** – Low suitability (rows of conifer trees to the north-east and south-east along with ditches).

5.16 WATER VOLE

Legislation

Water vole *Arvicola amphibius* is protected through its inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This section of the Act protects water vole places of shelter from damage and disturbance as well as protecting the water vole itself. Legal protection makes it an offence to intentionally:

- Damage, destroy or obstruct access to any structure or place that water voles use for shelter or protection;
- Kill, injure or take water voles whilst they are using shelter.

5.17 Existing records

No records for water vole were noted within the 2km NBIS and CPERC data search.

5.18 Survey methodology

Although a detailed survey was not undertaken during the preliminary assessment, the area on and immediately adjacent to the site was assessed for suitable habitat such as banks for burrows, water edge berms, vegetation cover, suitable water depth for swimming and diving and food source. Any obvious signs of the presence of water vole signs such as latrines, piles of eaten vegetation (feeding stations), burrows and runs were also noted.

5.19 Survey results

Several ditches occur within close proximity of the site (D2-D4 were heavily overgrown). D1 did have the potential to support water vole. Despite this the nature of the development and distance and the fact these were on adjoining land/ the current use of the proposed development site, it is unlikely that the proposed works will have an impact on water voles and therefore these were not specifically inspected.

5.20 OTTER

Legislation

Otters are protected both under the Wildlife and Countryside Act 1981 and by the Conservation (Natural Habitats, &c.) Regulations 2017. Otters and their resting places are fully protected, and it is an offence to:

1) Disturb otters in their breeding or resting places;
2) Damage, destroy or obstruct their breeding or resting places.

5.21 Otter shelters are legally protected whether or not an otter is present.

5.22 Existing records

9 records for otter were noted within the NBIS and CPERC 2km data search. The closest record was for 900m north-west of the site.

5.23 Survey methodology

The area on and immediately adjacent to the site was searched for evidence of otter including laying up sites, commuting routes under cover, and potential feeding sites.

5.24 Survey results

Several ditches occur within close proximity of the site (D2-D4 were heavily overgrown). D1 did have the potential to support otter. Despite this the nature of the development and distance and the fact these were on adjoining land/ the current use of the proposed development site, it is unlikely that the proposed works will have an impact on otter and therefore these were not specifically inspected.

5.25 BADGER

Legislation

Badgers are protected under Appendix III of the Bern Convention and are protected in Britain under the Protection of Badgers Act 1992, and under Schedule 6 of the Wildlife and Countryside Act 1981.

5.26 A badger sett is defined in the legislation as “any occurrence which displays signs indicating current use by a badger” and includes seasonally used setts.

5.27 Badgers can be disturbed by work near the sett even if there is no direct interference or damage to the sett. A licence may be required for any working within 30m of a badger sett. The licensing authority is Natural England.

5.28 Existing records

Three records for badger were noted within the NBIS and CPERC 2km data search, the closest record was for 1.3km north-west of the site.

5.29 Survey methodology

The survey involved a detailed search of the site and immediate areas to identify evidence of badger residence, foraging or territorial activity in the vicinity of the site. Particular emphasis was placed on the location of badger setts. Paths and signs of territorial activity such as dung piles and latrines were searched for.

5.30 Survey results

No evidence of badger activity such as sett entrances, snuffle holes or latrines were noted within the proposed development area and tarmac surfacing, they are considered highly unlikely to occur. The wider landscape (farmland) however supported suitable habitat for this species.

5.31 HEDGEHOG

Legislation

Hedgehogs *Erinaceus europaeus* are partially protected under Schedule 6 of the Wildlife and Countryside Act (1981), making it illegal to trap or kill them without a licence. They are known to be in serious decline in the countryside at the moment.

5.32 Existing records

No records for hedgehogs were noted within the 2km NBIS and CPERC data search was noted.

5.33 Survey methodology

The survey involved a thorough search of the site and immediate areas to identify evidence of hedgehog activity through the presence of faeces or live individuals.

5.34 Survey results

No evidence of hedgehogs was noted during the survey. However, the surrounding habitat (pockets of trees, hedgerows and arable farmland) mean that the site has the potential to support foraging hedgehog. Hedgehogs are considered much less likely to occur on the hard surfacing of the site although not impossible.

5.35 BREEDING BIRDS

Legislation

The majority of breeding birds in Britain are protected under the Wildlife and Countryside Act 1981 (plus amendments) from disturbance whilst nesting (generally from late April to the end of August).

5.36 Some birds such as barn owls receive special protection under Schedule 1 of the Wildlife and Countryside Act 1981 (plus amendments). This makes it an offence (amongst others) to intentionally or recklessly disturb the bird whilst building a nest, or when such a bird is in, on or near a nest containing eggs or young, or intentionally or recklessly disturb dependent young.

5.37 An assessment was made of the site's suitability to support breeding bird species. Nesting birds will utilise a broad range of habitats, including built structures, trees, scrub, isolated shrubs, dense herbaceous vegetation (terrestrial and aquatic) and open grassland. All bird species and evidence of breeding activity (active or inactive) observed on site was recorded.

5.38 Existing records

A number of birds records were returned within the NBIS and CPERC data search. This included barn owl, little owl, tawny owl and short eared owl. A number of red and amber list species were also noted.

5.39 Survey results

No nesting birds were noted in Buildings 1 or 2. Nesting wood pigeons *Columba palumbus* and house sparrow *Passer domesticus* were noted in the adjoining buildings. Long tailed-tit *Aegithalos caudatus* were also noted during the survey.

5.40 REPTILES

Legislation

The commonly occurring reptiles in Norfolk (common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix helvetica* and adder *Vipera berus*) are all given limited legal protection under part of Section 9 (1) and all of Section 9 (5) of the Wildlife and Countryside Act 1981 (as amended). This means that it is an offence to intentionally kill, injure and offer for sale all of these reptiles.

5.41 Existing records

No records for reptiles were noted within the 2km NBIS and CPERC data search.

5.42 Survey methodology

An assessment was made of the site's suitability to support reptile populations. Key habitat features include: tussocky/patchy grassland; scrub edge; linear watercourses; ponds; compost heaps; brash piles and rubble/soil heaps. Linkage to suitable habitat within the surrounding landscape will increase the potential for reptiles to occur, although populations can occur within isolated/fragmented habitats even within urban areas.

5.43 Survey results

The hard surfacing around the site and the current use of the site for lorry servicing meant that the site was considered most unlikely to support reptiles albeit an occasional transient species such as grass snake would not be impossible. An arable field with an overgrown field margin (with areas of rubbish, bare soil and with machinery parked on) was present within the site boundary to the north-east this was also considered unlikely to support reptiles. Despite this the large piles of broken concrete were present on site and have the potential to support an occasional reptile as did areas along the ditches and on a vegetated soil mound to the north (although limited) and therefor a precautionary approach to their removal should be undertaken.

5.44 AMPHIBIANS

Legislation

Great crested newts *Triturus cristatus* and their habitat (aquatic and terrestrial) are afforded full protection by The Wildlife and Countryside Act 1981 (Section 9, Schedule 5; and as amended) and The Conservation (Natural Habitats & c.) Regulations 1994. It is an offence to:

1) Disturb, injure or kill recklessly a great crested newt;
2) Disturb or destroy recklessly great crested newt habitat (a breeding site or place of shelter).

5.45 Great crested newt is also listed in the National Biodiversity Action Plan.

5.46 Existing records

No records for amphibians were noted within the 2km NBIS and CPERC data search.

5.47 Survey methodology

Great crested newts utilise ponds for breeding and grassland areas for foraging. Newts are normally present in the breeding ponds between March and June and survey techniques to demonstrate presence or absence include torch survey, bottle trapping, netting and egg search. It is also possible to undertake a Habitat Suitability Index assessment (HSI), which assesses the potential of a pond to support great crested newts by looking at a range of environmental factors.

5.48 Recent development in eDNA technology means that it is possible to test pond water for the presence of great crested newt DNA between mid-April to the end of June. Environmental DNA (eDNA) is collected from the environment in which an organism lives rather than from the animal themselves. In aquatic environments, animals such as great crested newts shed cellular material into the water by reproduction, saliva, urine, faeces or skin cells. The DNA will be present in the water for several weeks and can be collected through a sample which is then analysed to detect if the target species of interest have been present in the water body.

5.49 Survey results

No ponds were recorded within the application site itself or within 250m of the site. A network of ditches was present around the site with the closet being 3m south-east of the site. A Habitat Suitability Index (HSI) of D1-D4 (see figure 20 below) was undertaken, each of the four ditches came out as poor (See appendix A) and have a 0.03% chance of supporting great crested newts (GCN). Given the poor HSI results and the nature of the area surrounding the site (concrete and a road) no further surveys in relation to GCN are considered necessary.

Figure 26 – View of D1

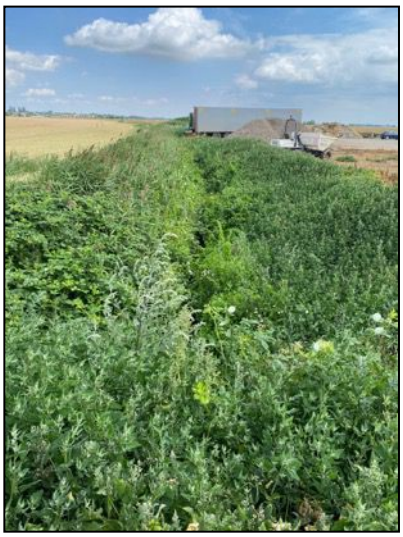

Figure 27 – View of D2

Figure 28 – View of D3

Figure 29 – View of D4

Figure 30 – Blue lines indicate ditches

6.0 EFFECTS OF THE PROPOSED DEVELOPMENT WORKS ON THE SPECIES PRESENT

6.1 PROPOSED DEVELOPMENT

The following development plan has been provided by Dowdall Architects.

- Proposed Site Plan – Levels Topographical – 229 – PL – 102 – D

6.2 The plan indicates that buildings 1 and 2 will be re-cladded and buildings 3,4 and 5 will not be impacted neither will the dwelling to the south of the site. A new canteen and office will be erected to the west of the site. The area to the north-west of the site will be developed for lorry parking along with half of the field to the north of the site. The conifer trees to the north-east and south-east are to remain.

6.3 IMPACTS ON PROTECTED SITES/SPECIES

An assessment of the impact on protected sites and species is shown below.

6.4 IMPACTS ON PROTECTED SPECIES

Table 5 Survey summary and development

Survey group	Results summary	Development impact	
		Unlikely impact	*Possible impact*
Protected sites	It is not anticipated that the proposed development will have any impact on any designated sites (the closest both the Little Ouse River CWS and River Great Ouse CWS, both located 1.6km south-east of the site).	✓	
Habitat	The majority of the site comprised of concrete and stone with piles of broken concreate and rubble. To the north/ north-east was an area of arable farmland along with piles of rubbish, bare soil, and stored machinery. Bags of stored goods were present to the south-east of the site.	✓	
Bats	No evidence of bats were noted, therefore buildings 1 and 2 were deemed to have negligible bat roosting potential. (Buildings 3 and 5 were also deemed to have negligible bat roosting potential whilst Building 4 was considered to have low bat roosting potential – none of these buildings are to be impacted on by the proposed works).		✓
Birds	No nesting birds were noted in Buildings 1 or 2 but nesting wood pigeon and house sparrow were noted in the other buildings on site (Buildings 3 and 4 – not impacted on by the proposed works). The conifers on site also had the potential to support nesting birds.	✓	
Water vole	No suitable habitat noted within the proposed development area, the closest suitable waterbody was present 13m south-west of the site.	✓	
Otter	No suitable habitat noted within the proposed development area, the closest suitable waterbody was present 13m south-west of the site.	✓	

Survey group	Results summary	Development impact	
Badger	No suitable habitat was present on site only potential for occasional foraging individual from the surrounding area.	✓	
Hedgehog	Limited suitable foraging habitat on site but surroundings are suitable.	✓	
Reptiles	Given the nature of the site (hard surfacing and arable farmland) meant that the majority of the site was considered unlikely to support reptiles albeit an occasional transient species such as grass snake would not be impossible. The large piles of broken concrete were present on site and areas along the ditches/vegetated soil mound to the north have limited potential to support reptiles and therefore a precautionary approach to their removal should be undertaken.	✓	
Amphibians	No ponds were recorded within the application site itself or within 250m of the site. A network of ditches was present around the site with the closet being 3m south-east of the site. A Habitat Suitability Index (HSI) of D1-D4 was undertaken, each of the four ditches came out as poor (See appendix A) and have a 0.03% chance of supporting great crested newts (GCN). Given the poor HSI results and the nature of the area surrounding the site (concreate and a road) no further surveys in relation to GCN are considered necessary.	✓	

6.5 REQUIREMENTS FOR FURTHER SURVEYS

Bats

Table 6 Recommended minimum number of survey visits for presence/absence surveys

Potential	Description
Negligible	No surveys required
Low suitability	One survey visit. One dusk emergence or dawn re-entry survey between May and August
Moderate suitability	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey between May and August
High suitability/ Proven bat roost	Three separate survey visits between May and September. At least one dusk emergence and a separate dawn re-entry survey. The third could be either dusk or dawn. At least 2 of the visits should be between May and August.

6.6 No further surveys in relation to bats are required.

6.7 Breeding birds, badger, reptiles, amphibians, water vole, otter, hedgehog

No further surveys are required in respect to these groups due to the lack of potential impact.

6.8 LICENSING

A derogation licence (most usually a European Protected Species Licence) may be required from Natural England where the proposed development would result in an otherwise un-lawful activity. This includes:

a. The killing or disturbance of a European Protected Species;

b. Damage, destruction or obstruction of any place used by a European Protected Species for shelter or protection.

6.9 Any licence application will take a minimum of 30 working days to process and can only be processed once any relevant permissions have been issued. The granting of the relevant permissions to allow the works to proceed is no guarantee that a licence will be granted.

6.10 Following changes to the Habitats Regulations in 2007, the threshold to which a person commits an offence of deliberately disturbing a European Protected species has changed, such that the disturbance is likely to affect;

(i) the ability of any significant group of animals of that species to survive, breed, rear or nurture their young, or

(ii) the local distribution or abundance of that species

6.11 Further changes took place in January 2009, but these generally relate to increased monitoring of licensed mitigation works.

6.12 In April 2015, a new Low Impact Class Licence (now renamed the Bat Mitigation Class Licence) was introduced which covers works that impact small numbers of common bat species. Such licences are normally granted within 10 working days. Philip Parker is a registered consultant to work under this licence.

6.13 Licences cannot be issued on a precautionary basis and normally require the benefit of supporting activity surveys to categorise the nature of the roost.

6.14 No derogation licence is required for the proposed works to be undertaken.

7.0 MITIGATION /ENHANCEMENT STRATEGY

7.1 The proposed strategy is to mitigate the impacts of any development on the various species as set out above. In addition, proposals are also put forward to enhance the biodiversity of the site via the development. The delivery of biodiversity enhancement of development sites is promoted by National Planning Policy Framework and Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006..

7.2 BATS

The following table is based on the guidance within Table 8 given in the Bat Mitigation Guidelines. Given the level of evidence noted during the PEA, the likely level of mitigation/enhancement will be updated once the surveys have been undertaken.

Table 7 Guidelines for proportionate mitigation

Roost status	Mitigation/compensation depending on the impact
Feeding perches of common/rarer species ↓ Individual bats of common species ↓ Small numbers of common species. Not a maternity site	Flexibility over provision of bat boxes, access to new buildings etc. No conditions about timing or monitoring
Feeding perches of Annex II species ↓ Small numbers of rarer species. Not a maternity Site	Provision of new roost facilities where possible. Need not be exactly like-for-like, but should be suitable, based on species' requirements. Minimal timing constraints or monitoring requirements

Roost status	Mitigation/compensation depending on the impact
Hibernation sites for small numbers of common/rarer species ↓ Maternity sites of common species	Timing constraints. More or less like-for-like replacement. Bats not to be left without a roost and must be given time to find the replacement. Monitoring for 2 years preferred.
Maternity sites of rarer species ↓ Significant hibernation sites for rarer/rarest species or all species assemblages	Timing constraints. Like-for-like replacement as a minimum. No destruction of former roost until replacement completed, and usage demonstrated. Monitoring for at least 2 years.
Sites meeting SSSI guidelines ↓ Maternity sites of rarest species	Oppose interference with existing roosts or seek improved roost provision. Timing constraints. No destruction of former roost until replacement completed and significant usage demonstrated. Monitoring for as long as possible.

7.3 Timing of the work

The Bat Mitigation Guidelines present the optimum seasons for works involving various types of bat roosts.

Table 8 Optimum seasons for undertaking work in different types of roost

Bat usage of the site	Optimum period for carrying out works (some variation between species)
Maternity	1st October – 1st May
Summer (not a proven maternity site)	1st September – 1st May
Hibernation	1st May – 1st October
Mating/swarming	1st November – 1st August

7.4 No constraints on timings of the works in relation to bats are required. It should be noted that the bird nesting season runs from March to August although this can run into September. Given the presence of nesting pigeons in the adjoining buildings, any works that could impact on these (disturbance to their nests) should be undertaken outside of the nesting period.

7.5 Bat ecologist

A licensed ecologist may be required to undertake the following;

- A toolbox talk to the contractors on site prior to works on the buildings commencing;

7.6 New Roosting Provision

Provision of new roosting opportunities for bats will form part of the enhancement strategy. As there are no suitable trees on the site, any new roosting provision will need to be attached to the buildings. A bat box that is suitable for buildings is shown below. These can be purchased from Greenwood's Ecohabitats. We recommend that a minimum of two bat boxes are erected on the developed buildings.

Figure 31 – Greenwood habitats bat boxes

7.7 Lighting

The area surrounding the building has some potential for foraging and commuting bats, therefore any additional lighting proposed for the building should comply with the following principles.

- Any external lighting should be limited to only that absolutely necessary for safety purposes;
- The brightness of the lighting should be as low as possible and kept at a low level and directed away from the boundary vegetation and any existing/new bat boxes/roosting areas;
- Narrow spectrum lighting with no UV light is preferred;
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats;
- Lighting on sensors should not be so sensitive that foraging bats set them off and should be on short timers (1 minute).

7.8 BREEDING BIRDS

Bird nests, when occupied or being built, receive legal protection under the Wildlife and Countryside Act 1981 (as amended). Any clearance of potential bird nesting habitat should be undertaken outside the bird nesting season, which is generally seen as extending from March to the end of August, although it may extend for longer depending on local conditions. If there is no alternative to carrying out work in these areas during this period, then suitable nesting locations should be carefully inspected by the ecologist for evidence of nests prior to works commencing. If occupied nests are present, then works must stop in the area and only recommence once the nest becomes unoccupied of its own accord.

7.9 Bird nesting habitat should be incorporated onto the building/ around the site as enhancement. This includes the addition of swift boxes (minimum of two) and house sparrow terraces (minimum of two).

Figure 32 – Example of a swift nest box

Figure 33 – Example of a house sparrow terrace

7.10 REPTILES/ AMPHIBIANS/SMALL MAMMALS

The potential for impacts on reptiles/protected amphibians and small mammals is considered to be limited due to the nature of the habitat present (concrete and arable farmland). However, a precautionary approach to the site development is still recommended in order to ensure that there are no impacts on these groups. This is detailed below:

a. All foundations trenches should be left covered at night. They should be checked in the morning before they are filled in. All trenches are to be provided with a small mammal ramp to allow any animals that get trapped to escape.

7.11 If any animals are discovered during the works, they will be moved to a safe location away from the development site (location to be agreed).

7.12 ADVISORY NOTE

This report presents a true reflection of habitats present and wildlife usage at the site at the time of the survey and remains valid for a period of 12 months from the date of this report. Even given the precautions set out above, it is always possible that protected species could be encountered at any time. In such a case, work should cease immediately and either Natural England or Philip Parker Associates Limited (Tel: 01553 630842) be contacted for further advice. Please note that any results from this survey and any subsequent surveys will be submitted to the local records centre.

8.0 REFERENCES

- **Altringham J D, 2003**, British Bats, Collins New Naturalist
- **Bat Conservation Trust, 2016**, BCT Bat Survey Guidelines Third edition
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- **BS 42020:2013**. Biodiversity. Code of practice for planning and development
- **English Nature, 1995 Badgers** - Guidelines for Developers
- **Froglife 1999, Reptile Survey -** An introduction to planning, conducting and interpreting surveys for snake and lizard conservation
- **Gent T and Gibson S 1998** Herpetofauna Workers Manual JNCC
- **Joint Nature Conservation Committee. 1993**. A Handbook for Phase 1 Habitat Survey : A Technique for Environmental Audit. Peterborough: Joint Nature Conservation Committee.
- **Mitchell Jones AJ, 2004**, Bat Mitigation guidelines, English Nature
- **Mitchell Jones AJ and McLeish A P**, The Bat Workers Manual, JNCC
- National Rivers Authority, 1993, Otters and River Habitat Management. Conservation Technical Handbook Number 3.
- **Natural Environment and Rural Communities Act 2006**, Ch 3, s. 40
- **Stace C. 2010** New Flora of the British Isles (Third Edition). Cambridge University Press
- Strachan and Moorhouse, 2006, Water Vole Conservation Handbook 2nd Ed. Environment Agency, English Nature, WildCRU. Oxford.

APPENDIX A HSI TABLES

	Criteria	D1
Distance to site boundary		13m south-west
S1	**Location**	1 (optimal)
S2	**Pond Area**	0.01 (7256msq)
S3	**Pond Drying**	0.90 (never)
S4	**Water Quality**	0.67 (moderate)
S5	**Shade**	1.00 (0%)
S6	**Fowl**	0.01 (major)
S7	**Fish**	0.01 (major)
S8	**Pond Count**	0.10 (0 ponds)
S9	**Terrestrial**	0.33 (poor)
S10	**Macrophytes**	0.90 (90%)
	Total	0.00000002
	Tenth Root	0.169
	HSI Ranking	Poor

	Criteria	D2
Distance to site boundary		8m north-west
S1	**Location**	1 (optimal)
S2	**Pond Area**	0.54 (3589msq)
S3	**Pond Drying**	0.50 (sometimes)
S4	**Water Quality**	0.33 (poor)
S5	**Shade**	0.20 (100%)
S6	**Fowl**	1.00 (absent)
S7	**Fish**	1.00 (absent)
S8	**Pond Count**	0.10 (0 ponds)
S9	**Terrestrial**	0.33 (poor)
S10	**Macrophytes**	0.31 (0%)

	Total	0.00018
	Tenth Root	0.42
	HSI Ranking	Poor

	Criteria	**D3**
Distance to site boundary		25m west
S1	**Location**	1 (optimal)
S2	**Pond Area**	0.82 (1813msq)
S3	**Pond Drying**	0.50 (sometimes)
S4	**Water Quality**	0.33 (poor)
S5	**Shade**	0.20 (100%)
S6	**Fowl**	1.00 (absent)
S7	**Fish**	1.00 (absent)
S8	**Pond Count**	0.10 (0 ponds)
S9	**Terrestrial**	0.33 (poor)
S10	**Macrophytes**	0.31 (0%)
	Total	0.00027
	Tenth Root	0.44
	HSI Ranking	Poor

	Criteria	D4
Distance to site boundary		3m south-east
S1	**Location**	1 (optimal)
S2	**Pond Area**	0.26 (5343msq)
S3	**Pond Drying**	0.50 (sometimes)
S4	**Water Quality**	0.33 (poor)
S5	**Shade**	0.20 (100%)
S6	**Fowl**	1.00 (absent)
S7	**Fish**	1.00 (absent)
S8	**Pond Count**	0.10 (0 ponds)
S9	**Terrestrial**	0.33 (poor)
S10	**Macrophytes**	0.31 (0%)
	Total	0.000087
	Tenth Root	0.39
	HSI Ranking	Poor

DRAWING D1 PRELIMINARY ECOLOGICAL APPRAISAL

DRAWING D2 PHASE 1 HABITAT SURVEY

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