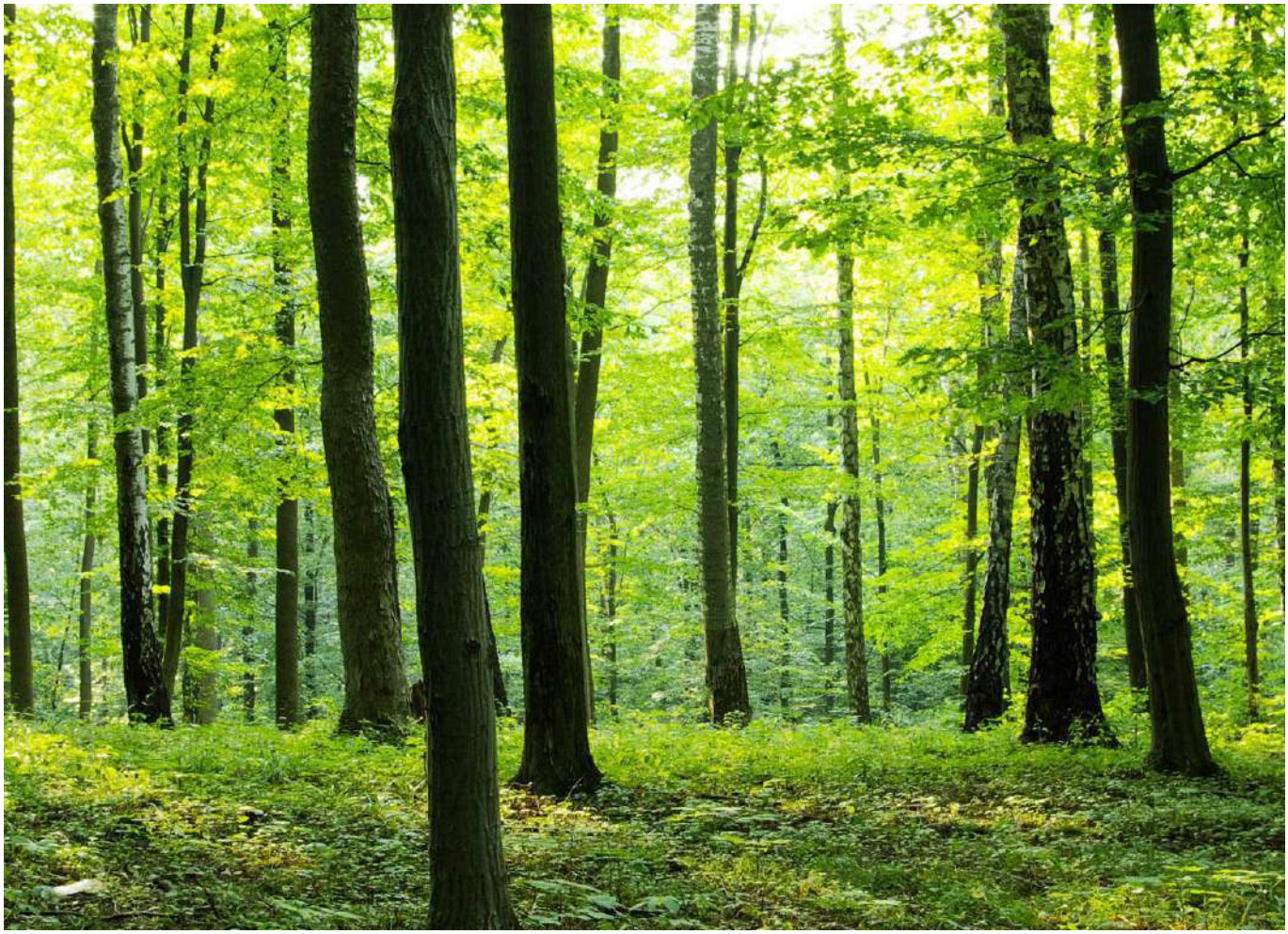
Appendix E – ix-Ecological Assessment – including HRA Screening, Preliminary Ecology Appraisal and Survey Reports



GE Aviation

Hamble-le-Rice Campus

Preliminary Ecological Appraisal

856776

MARCH 2017

RSK GENERAL NOTES

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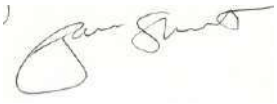
Signature:		Signature :	
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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report provides the results of a Preliminary Ecological Appraisal comprising a Phase 1 Habitat Survey and Habitat Suitability Index survey for Great Crested Newts carried out at the GE Aviation the site at Hamble-le-Rice near Southampton, Hampshire (Ordnance Survey Grid References SU46890717).
2. The following habitats are present on the site; semi-natural and plantation broadleaved and mixed woodland, scattered broadleaved and coniferous trees, dense scrub, introduced scrub, hedges and amenity grassland.
3. The site and its disposable land plan are within the SSSI impact zone for the Lee-on-the Solent to Itchen Estuary SSSI.
4. An area of ancient semi-natural woodland borders part of the disposable land area. Additionally some of the broadleaved woodland on the site has been listed as deciduous woodland under the Priority Habitat Inventory for England. Any proposed development should be planned to avoid affects on these areas if possible.
5. No evidence of Badgers was found on the site.
6. Buildings and mature trees could provide habitat for roosting bats, and the site provides foraging habitat between two national parks. Further bat surveys are outlined.
7. Habitat suitable for nesting birds is present. Further surveys for breeding birds are required to ascertain which species are using the site for breeding.
8. The site is also suitable for wintering birds and is adjacent to the Solent and Southampton Water Ramsar & SPA designated sites. Further surveys for wintering birds are required to ascertain which species are using the site during the winter.
9. As Common Dormice have a wide distribution in the county and the site borders a country park containing Ancient Woodland further surveys for Dormice will be required.
10. One pond within 500 m of the site could contain a population of Great Crested Newts and there is suitable terrestrial foraging habitat for Great Crested Newts on the site. Further surveys will be needed between mid-March and mid-June.
11. Habitat that is suitable for common reptile species was recorded therefore further surveys will be required to ascertain whether reptiles are present.
12. Stag beetles have been recorded on the site and there is potential for White-letter Hairstreak butterflies. A further survey for White-letter Hairstreak butterflies will be conducted and Stag Beetles should be considered as part of the mitigation plan.

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1 INTRODUCTION

1.1 Purpose of this Report

This report presents the results of a Preliminary Ecological Appraisal (PEA) survey carried out at the GE Aviation campus in Hamble-le-Rice, Southampton to assess its ecological value and potential for protected animal species and important vegetation. Further surveys that may be required to inform a planning application are discussed.

The work relates to a 'disposable land' plan in which GE Aviation has identified parts of the campus that could be sold.

1.2 Ecological Context

The site – which is near the coast - is a *c.*20 ha industrial campus comprising areas of hard-standing and industrial buildings alongside a sports ground and some broadleaved woodland. There is a large amount of ornamental planting throughout. To the north of the site is the Royal Victoria Country Park. To the west and south is Southampton Water, and to the east there are residential areas which form part of the village of Hamble-le-Rice. There are 28 designated sites within 5 km of the campus, some of which are directly adjacent to the site. Given the proximity to the coast there are significant areas of ecological interest for birds in particular.

1.3 Structure of the Report

The remainder of this report is structured as follows:

- *Section 2* describes the survey and assessment methods;
- *Section 3* presents the survey results;
- *Section 4* gives an evaluation of the results;
- *Section 5* lists the references;
- *Section 6* present the figures;
- *Appendix A* provides botanical and animal 'target notes' from the survey;
- *Appendix B* provides a botanical species list from the survey;
- *Appendix C* lists the notable species from the data search; and
- *Appendix D* explains the abbreviations used for protected species legislation.

2 METHODS

2.1 Background Data Search

A search was made in February 2017 for reference materials relating to the ecology of the Hamble site, and a list of sources is given in *Table 1*.

Table 1. Data sources

Information Obtained	Available From
Protected and Noteworthy species-records	Hampshire Biodiversity Information Centre
Designated site locations and citations	Natural England website
Designated site locations and citations	Hampshire Biodiversity Information Centre
Designated site information	Hampshire County Council website
Designations and legal protection of noteworthy species	Joint Nature Conservation Committee (JNCC) website
Details of species and habitats listed on the Hampshire LBAP	Local BAP website http://www.hampshirebiodiversity.org.uk/hampshire%20BAP.html

A search was made for information on statutory designated sites (often internationally and nationally important sites for ecology) within 5 km of the site boundary and non-statutory designated sites (often important in a local context) within 2 km. A search was also made for records of noteworthy species within 2 km of the site boundary, extending to 5 km for bat records. Species included in the search parameters were:

- European protected species (listed on *Schedules 2* and *5* of *The Conservation of Habitats and Species* (Amendment) *Regulations 2012*);
- nationally protected species under *Schedules 1, 5* and *8* of *The Wildlife & Countryside Act 1981* and *The Protection of Badgers Act 1992*;
- species listed as Critically Endangered, Endangered or Vulnerable on the *IUCN 2001 Red List*
- all species listed on the RSPB *Birds of Conservation Concern 4* as Red or Amber;
- Nationally Rare or Nationally Scarce species;
- Notable invertebrates; and
- species of Principal Importance under *The Natural Environment and Rural Communities (NERC) Act (2006)* or are Priority Species under the Local Biodiversity Action Plan.

2.2 Field Surveys

The field survey was undertaken on 7 February 2017 by RSK Principal Ecologist Jan Skuriat with assistance from Lindsay Stronge, a Graduate Ecologist.

Jan has over 15 years experience of ecological consultancy and is a member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He is experienced in undertaking preliminary ecological appraisals and holds a Natural England licence for bats (2015-11605-CLS-CLS level 2 and 3). Lindsay is a graduate member of CIEEM.

2.3 Botanical Survey

2.3.1 Phase 1 Habitat Survey

The botanical survey centred on the Phase 1 Habitat Survey approach (Joint Nature Conservation Committee 2010). This involves the following elements.

- Habitat mapping using a set of standard colour codes to indicate habitat types on a Phase 1 Habitat Map (these are shown in *Figure 2*); and
- Description of features of ecological or nature conservation interest in notes relating to numbered locations on the Phase 1 Habitat Map, called target notes (provided in *Appendix A*).

Basic Phase 1 Habitat Survey methods are described in detail in Joint Nature Conservation Committee (2010). Limits to the achievable reliability of the method are discussed in Cherrill & McClean (1999).

Plant nomenclature in this report follows Stace (2010) for vascular plants. Plant names in text are given with scientific names first, followed by the English name in brackets.

Botanical surveys conducted in February will not record as many species as a summer survey, but the general character of the habitats can usually be assessed. Specific questions may need further survey at a suitable time of year, *e.g.* determining if vernal woodland herbs are present in hedges (which may affect their status as Important), or the proportions of species present that may indicate calcareous grassland.

2.3.2 Invasive Plant Species

Phase 1 Habitat survey does not involve exhaustive surveying for any individual plant species. But if invasive plant species, *e.g. Fallopia japonica* (Japanese Knotweed), *Heracleum mantegazzianum* (Giant Hogweed) or *Impatiens glandulifera* (Indian Balsam), were seen during the normal course of the survey they were noted and reported.

2.4 Surveys for Protected Animals

2.4.1 Introduction

All sites were assessed for their suitability for those protected animals that are likely to occur in the area. Taking into account the proposed works, the geographical location and the habitats at the sites, assessment was carried out for:

- Badgers;
- bats;
- breeding and wintering birds (including Barn Owl);
- Common Dormouse
- GCN; and
- common reptiles.

2.4.2 Badgers

An initial assessment was carried out to identify areas that might be used by Badger for commuting, foraging and sett-building within 30 m of all areas potentially affected by works (where access was possible). The area was systematically searched for signs of Badgers including setts, foraging signs, paths (runs) and latrines where possible.

2.4.3 Bats

2.4.3.1 Roosting

There are large numbers of buildings and mature trees on the site and the assessment of these features for their suitability as bat roosts will be reported separately.

2.4.3.2 Foraging/Commuting

Habitats were assessed for their suitability for foraging or commuting bats and categorised in accordance with *Table 2.* Areas of particular interest vary between species, but generally include sheltered areas and those habitats with good numbers of insects, such as woodland, scrub, hedges, watercourses, ponds, lakes and more species-rich or rough grassland. For commuting, well-connected hedgerows, woodland edge, watercourses and other linear features are generally considered to be of high value.

Table 2. Categorisation of foraging and commuting habitats (adapted from Collins, 2016)

Category	Description
Negligible	Negligible habitat features on the site likely to be used by commuting or foraging bats.
Low	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 lone tree (not in a parkland situation) or a patch of scrub.
Moderate	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.

Category	Description
High	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be regularly used 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, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.4.4 Birds

2.4.4.1 Breeding Birds

The suitability of habitat for breeding birds was assessed. Incidental sightings of birds and old nests were recorded if seen, but observations from an initial non-specific survey are of limited value.

2.4.4.2 Barn Owl

Trees and buildings were assessed for their suitability for nesting Barn Owls. Barn Owls require a nesting platform (preferably at height) that is relatively secluded and will use hollow trees, and modern or traditional farm buildings, as well as specially designed boxes. Evidence of occupancy by Barn Owls includes distinctive numbers of droppings and regurgitated pellets. Sometimes remains of eggs, feathers, uneaten prey and even dead chicks can be found.

2.4.4.3 Wintering Birds

The site was assessed for its suitability for use by wintering bird species. Features that make a site suitable for wintering species include expanses of water, wide open fields, lack of cover for predator species and proximity to other sites designated for their interest to birds.

2.4.5 Common Dormouse

Habitats on the site were assessed for their suitability for Common Dormice. Dormice generally use areas of dense woody vegetation cover, and are more likely to be found where there is a wide diversity of woody species contributing to three-dimensional habitat complexity, a number of food sources, plants suitable for nest-building material, and good connectivity to other areas of suitable habitat.

2.4.6 Great Crested Newts

2.4.6.1 Terrestrial Habitats

The terrestrial habitats were assessed for their suitability for Great Crested Newts (GCN) (*Triturus cristatus*). Suitable habitat generally includes rough grassland and woodland where they can forage and hibernate; it requires good links to breeding ponds

and cover from predators in the areas where they forage and hibernate during their terrestrial period.

2.4.6.2 Habitat Suitability Index (HSI) Survey

An HSI survey to assess the suitability of two water bodies for GCN was carried out on 7 February 2017.

Water bodies were assessed to determine whether they were suitable for GCN using a Habitat Suitability Index (HSI) developed by Oldham *et al.* (2000), which is a derived from systems developed by the US Fish and Wildlife Service It is a numerical index, between 0 and 1, where 0 indicates unsuitable habitat and 1 represents optimal habitat. The HSI for the GCN uses ten factors (suitability indices (SI) 1 to 10), which are thought to affect GCN as follows:

- geographic location (SI 1);
- surface area (SI 2);
- hydrology (drying) (SI 3);
- water quality (SI 4);
- shade (SI 5);
- presence of water fowl (SI 6);
- presence of fish (SI 7);
- number of adjacent water features (SI 8);
- terrestrial habitat (SI 9); and
- macrophyte cover (SI 10).

Each factor is scored using field and desk-based survey. These ten scores are then converted to SI scores using a scale from 0.01 to 1 from graphs given in Oldham *et al.* (2000) and a HSI result is calculated using the following formula:

$$HSI = (SI1 \times SI2 \times SI3 \times SI4 \times SI5 \times SI6 \times SI7 \times SI8 \times SI9 \times SI10)^{1/10}$$

Further research by Brady (unpublished) has developed a system for using HSI scores to define pond suitability for GCN according to the following categories:

- HSI <0.5 = poor
- HSI 0.5 – 0.59 = below average
- HSI 0.6 – 0.69 = average
- HSI 0.7 – 0.79 = good
- HSI > 0.8 = excellent

There is a positive correlation between HSI scores and presence and abundance of GCN in ponds. Generally, ponds with high HSI scores are likely for larger populations. However, the relationship is not sufficiently precise to conclude that any pond with a

high HSI will support newts in high populations, or that any pond with a low score will support low numbers of newts or no newts at all.

2.4.7 Common Reptiles

The site was assessed for reptiles, with particular attention to features that provide basking areas (*e.g.* south-facing slopes), hibernation the sites (*e.g.* banks, walls, piles of rotting vegetation) and opportunities for foraging (*e.g.* rough grassland and scrub).

The site was assessed for its suitability for the four commoner reptile species. Specific habitat requirements differ between species. Common Lizards (*Zootoca vivipara*) use a variety of habitats from woodland glades to walls and pastures, although one of their favoured habitats is rough grassland. Slow-worms (*Anguis fragilis*) use similar habitats to Common Lizards, and are often found in rank grassland, gardens and derelict land. Grass Snakes (*Natrix natrix*) have broadly similar requirements to Common Lizards with a greater reliance on ponds and wetlands, where they prey on Common Frogs (*Rana temporaria*). Adders (*Vipera berus*) use a range of fairly open habitats with some cover, but are most often found in dry heath (Beebee & Griffiths 2000).

2.4.8 Other Species

Consideration was given to the site's suitability for Species of Principle Importance (SPoI) as listed on Local and National BAPs, and particularly those species for which there are records in the immediate vicinity.

3 RESULTS

3.1.1 Biodiversity Action Plans

The latest Hampshire Local Biodiversity Action Plan (LBAP) lists 14 Habitat Action Plans (HAPs) and 28 Species or Species Group Action Plans (SAPs). The local HAPs and SAPs that are relevant to the proposed development are;

Habitats:

- Ancient Semi-natural Woodlands
- Coast
- Hedgerows

Species:

- Butterflies and Moths
- Great Crested Newt
- Pipistrelle Bat
- Serotine Bat
- Shorebirds
- Stag Beetle
- Woodland Lichens

3.1.2 Designated Sites

Statutory Sites

There are 28 statutory designated sites within 5 km of the site boundary, comprising 2 Ramsar Sites, 2 Special Protection Areas (SPAs), 2 Special Areas of Conservation (SACs), 7 Sites of Special Scientific Interest (SSSIs), 1 National Nature Reserve (NNR), 10 Local Nature Reserves (LNRs), 1 National Park (NP) and 3 Country Parks (CPs). A lot of the sites cover the same areas. These sites are listed in *Table 3* in order of proximity to the site; short descriptions are given for the sites.

Table 3: Statutory sites within 5 km of the site boundary.

Site Name	Designation	Approximate Distance (m)
Royal Victoria	CP	5
The Royal Victoria CP covers 50 ha to the north-west of the site boundary. Habitats in the CP include ancient woodland, broad-leaved woodland, standing water, grassland, a sensory garden and buildings. The CP runs along the shoreline, adjacent to the Lee-on-the Solent to Itchen Estuary SSSI / Solent and Southampton Water Ramsar & SPA. The site is important for birds.		
Lee-on-the Solent to Itchen Estuary	SSSI	15
Lee-on-the Solent to Itchen Estuary SSSI extends along the eastern shore of		

Site Name	Designation	Approximate Distance (m)
Southampton Water from Lee-on-the-Solent to the mid-Itchen estuary. The site comprises extensive intertidal mud flats with a fringe of vegetated shingle, saltmarsh, reedbed, swamp, marshy grasslands and ancient woodland. There are extensive beds of the eelgrasses *Zostera angustifolia* and *Z. noltii*, and green algae species are widespread in the intertidal zone. The ancient woodland is dominated by *Alnus glutinosa* (Alder), *Fraxinus excelsior* (Ash) and *Quercus robur* (Pedunculate Oak). The marshy grassland is unimproved and semi-improved grasslands of old grazing marshes; *Agrostis* sp. (Bent) and *Festuca* sp. (Fescue) are frequent with *Alopecurus pratensis* (Meadow Foxtail) and *Hordeum secalinum* (Meadow Barley). The saltmarsh is dominated by Halimione portulacoides (Sea Purslane) with *Aster tripolium* (Sea Aster), *Limonium vulgare* (Sea-lavender), *Puccinellia maritima* (Common Saltmarsh-grass) and *Spartina* sp. (Cord-grass). There are areas of vegetated shingle which is a nationally restricted habitat. The SSSI supports an outstanding assemblage of nationally scarce coastal plants; species of note include *Bupleurum tenuissimum* (Slender hare's-ear), *Crambe maritima* (Sea-kale), *Puccinellia fasciculata* (Borrer's Saltmarsh-grass) and *P. rupestris* (Stiff Saltmarsh-grass). The site is also of geological importance. The sediments support high densities of benthic invertebrates that help support a diverse assemblage of wildfowl and waders. The SSSI also supports a diverse assemblage of breeding birds. The site is also designated as Solent & Southampton Water Ramsar and SPA and the bird interest of the site is described below. The SSSI lies to the south of the site boundary, running along the shoreline.		
Solent and Southampton Water	Ramsar & SPA	15
Solent and Southampton Water Ramsar & SPA comprises saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs. The diversity of habitats supports internationally important numbers of wintering waterfowl as well as important breeding gull and tern populations. Species with populations of note include Black-headed Gull, Black-necked Grebe, Black-tailed Godwit, Common Greenshank, Common Tern, Curlew, Dark-bellied Brent Goose, Dunlin, Great Cormorant, Great-crested Grebe, Greenshank, Grey Plover, Little Egret, Little Grebe, Little Tern, Mediterranean Gull, Pintail, Redshank, Roseate Tern, Ringed Plover, Sandwich Tern, Shelduck, Shoveler, Slavonian Grebe, Spotted Redshank, Teal, Water Rail and Wigeon. The site also supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on the site.		
Solent Maritime	SAC	1,080
The Solent Maritime SAC is designated for the following Annex 1 habitats: - Estuaries – the Solent and its inlets are unique in Britain for having four tides a day. There are diverse and complex estuarine habitats which include mudflats, sandflats, Zostera sp. (Eelgrass) beds, a sandy reef and sand and shingle spits. - Spartina swards – the site supports rare cord-grass species such as Spartina alterniflora (Smooth Cord-grass), S. maritima (Small Cord-grass) and Spartina ×townsendii (Townsend's Cord-grass). - Atlantic salt meadows (Glauco-Puccinellietalia maritimae) – the site has a large number of separate areas of saltmarsh. The saltmarsh is ungrazed and supports communities dominated by Armeria maritima (Thrift), Atriplex portulacoides (Sea-		

Site Name	Designation	Approximate Distance (m)
purslane) and Limonium vulgare (Sea Lavender). The site has transitions to freshwater reedswamp and alluvial woodland as well as coastal grassland. - Coastal lagoons The site supports rare fauna including rare sponges, Harbour Seal and Desmoulin's Whorl Snail.		
Mercury Marshes	LNR	1,100
Mercury Marshes LNR is on the western bank of the River Hamble and is predominantly reedbed with patches of *Salix* sp. (Willow) carr, saltmarsh and intertidal mud. The LNR is important for invertebrates and birds. Species include Golden Plover, Reed Bunting and Water Rail. The LNR is within the Solent and Southampton Water Ramsar & SPA, Solent Maritime SAC and Lee-on-the Solent to Itchen Estuary SSSI.		
Hook with Warsash	LNR	1,340
Hook with Warsash LNR comprises reedbed, coastal grazing marsh, scrub, saltmarsh, inter-tidal mud, stable shingle ridge and woodland. The site is important for a range of fauna; species of note include Black Tailed Godwit, Dark-bellied Brent Goose, Lapwing, Golden-ringed Dragonfly, Grizzled Skipper, White-letter Hairstreak, Long-eared bats, Adder and Grass Snake. The majority of theLNR is within the Solent and Southampton Water Ramsar & SPA, Solent Maritime SAC and Lee-on-the Solent to Itchen Estuary SSSI.		
Lincegrove and Hackett's Marshes	SSSI	1,365
Lincegrove and Hackett's Marshes SSSI covers an area of mature saltmarsh on the west bank of the River Hamble estuary. The saltmarsh is dominated by *Halimione portulacoides* (Sea Purslane) and *Spartina anglica* (Common Cord-grass). The saltmarsh grades into a *Elymus pycnanthus* (Sea Couch) or *Phragmites australis* (Common Reed) zone. The SSSI is within the Solent and Southampton Water Ramsar & SPA and Solent Maritime SAC.		
Hythe to Calshot Marshes	SSSI	1,475
Hythe to Calshot Marshes SSSI comprises an extensive area of saltmarsh and mudflats. There are a range of saltmarsh communities; the dominant species tend to be *Halimione portulacoides* (Sea Purslane), *Puccinellia maritima* (Common Saltmarsh-grass), and *Spartina anglica* (Common Cord-grass). The SSSI has a wide range of *Spartina* species and hybrids whose genetic material is of great scientific importance. There are margins of shell and shingle banks which support an interesting strandline flora. The outer fringe of the saltmarsh has reed beds and fringing *Quercus* sp. (Oak), *Salix* sp. (Willow) and *Ulex europaeus* (Gorse). The site has high densities of benthic invertebrates inhabiting the mudflats and is important for birds. The SSSI supports important numbers of Black-tailed Godwit, Dark-bellied Brent Goose Dunlin, Grey Plover, Redshank, Ringed Plover, Teal and Wigeon. The SSSI is within the Solent and Southampton Water Ramsar & SPA and Solent Maritime SAC.		
Holly Hill Woodland Park	LNR & CP	1,740
Holly Hill Woodland Park LNR & CP has two distinct areas; Winnards Copse and Cawtes Copse. Winnards Copse is a more formal woodland that includes non-native species and lakes. Cawtes Copse is broad-leaved semi-natural woodland and includes some areas of ancient woodland.		

Site Name	Designation	Approximate Distance (m)
Hackett's Marsh	LNR	1,880
Hackett's Marsh LNR comprises species-rich meadows and saltmarsh. The reserve is important for insects and wildfowl and waders. The saltmarsh area of the site is within the Solent and Southampton Water Ramsar & SPA, Solent Maritime SAC and Lincegrove and Hackett's Marshes SSSI.		
Westwood Woodland Park	LNR	1,975
Westwood Woodland Park LNR comprises ancient woodland and grassland.		
Warsash Common	LNR	2,895
Warsash Common LNR is a mix of rough grassland and heathland with areas of broad-leaved woodland, open meadows, wet woodland and seasonal ponds.		
New Forest	NP	3,070
The New Forest NP covers over 56,000 hectares that is designated for its landscape interest. The majority of the NP is also designated as a SSSI, Ramsar, SPA & SAC as described below.		
The New Forest	SSSI	3,560
The New Forest SSSI covers a large area of unsown vegetation. Habitats include lowland heath, mires, fen, acid grassland, neutral grassland and ancient pasture woodland including riparian and bog woodland. There is also a network of small streams and ponds. The wide range of habitats support an assemblage of nationally rare and scarce plants. Species of note include *Chamaemelum nobile* (Chamomile), *Eriophorum gracile* (Slender Cottongrass), *Gentiana pneumonanthe* (Marsh Gentian), *Gladiolus illyricus* (Wild Gladiolus), *Hammarbya paludosa* (Bog Orchid), *Ludwigia palustris* (Hampshire-purslane), *Mentha pulegium* (Pennyroyal), *Pulicaria vulgaris* (Small Fleabane) and *Rhynchospora fusca* (Brown Beak-sedge). The SSSI also has a rich bryophyte and lichen flora and is rich in fungi; species of note include the lichens *Cladonia incrassate* and the rare dung fungus *Poronia punctata.* The SSSI is important for a wide variety of fauna. The site supports internationally important bird populations and much of the SSSI is also designated as an SPA and Ramsar site. Species of note include Dartford Warbler, Hen Harrier, Nightjar, Redstart, Ringed Plover and Woodlark. The SSSI has a nationally important assemblage of rare and scarce invertebrates. Over half of the 2,500 species of British butterflies and moths have been recorded in the SSSI and a third of the British beetle species. The wetland habitats are exceptionally diverse in dragonflies. Species of note include Silver-washed Fritillary, Southern Damselfly, Stag Beetle and White Admiral. Several of the streams in the SSSI support Otter and the woodland provides roosting sites for several species of bats including Bechstein's Bat. Great Crested Newt can be found in the less acidic ponds and all of Britain's native reptiles have been recorded, including Sand Lizard and Smooth Snake.		
Millers Pond	LNR	3,735
Millers Pond LNR comprises semi-natural woodland, acid grassland and a pond.		
Upper Hamble Estuary and Woods	SSSI	3,905
Upper Hamble Estuary and Woods SSSI comprises the uppermost section of the estuary of the River Hamble and its flanking zones of saltmarsh, reed swamp and ancient semi-natural woodland. The SSSI has 12 types of ancient broad-leaved woodland giving rise		

Site Name	Designation	Approximate Distance (m)
to a diverse flora. Uncommon woodland types include stands of *Tilia cordata* (Small-leaved Lime), wet *Fraxinus excelsior* (Ash) / *Ulmus glabra* (Wych Elm) woodland and an estuarine form of *Alnus glutinosa* (Alder) woods. The woodland grades into neutral grassland, swamp and estuarine saltmarsh. The SSSI supports a rich invertebrate fauna including Purple Emperor, the rare leaf beetle *Orsodacne lineola* and the rare marshland beetle *Mecinus collaris*. The site is also important for warblers and water birds.		
Manor Farm	LNR & CP	4,005
Manor Farm LNR & CP is a historic farm and visitor centre with areas of woodland, grassland and standing water. The site has a diverse flora and fauna.		
Netley Common	LNR	4.090
Netley Common LNR comprises open heathland with areas of grassland, scrub and a mixed woodland fringe.		
Calshot Marshes	LNR	4.305
Calshot Marshes LNR is an area of saltmarsh that is important for birds. The site supports important populations of wintering Black-tailed Godwit, Dark-bellied Brent Goose, Dunlin, Grey Plover, Redshank, Ringed Plover, Teal and Wigeon. The LNR is within the Solent and Southampton Water Ramsar & SPA, Solent Maritime SAC and Hythe to Calshot Marshes SSSI.		
The New Forest	Ramsar, SPA & SAC	4,520
The New Forest is designated as an SAC for the following habitats and species: - Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) - Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and / or of the Isoëto-Nanojuncetea - Northern Atlantic wet heaths with Erica tetralix - European dry heaths - Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) - Depressions on peat substrates of the Rhynchosporion - Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrub layer (Quercion robori-petraeae or Ilici-Fagenion) - Asperulo-Fagetum beech forests - Old acidophilous oak woods with Quercus robur on sandy plains - Bog woodland - Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) - Southern Damselfly - Stag Beetle Animal species mentioned in the SPA and Ramsar citations include Brook Lamprey, Bullhead, Dartford Warbler, Great Crested Newt, Hen Harrier, Hobby, Honey Buzzard, Nightjar, Stag Beetle, Woodlark and Wood Warbler. The site is also designated as a SSSI; as described above.		

Site Name	Designation	Approximate Distance (m)
Dibden Bay	SSSI	4,750
Dibden Bay SSSI was formed between the 1930s and 1973 by the deposition of marine dredgings over a complex of coastal habitats. The reclaimed land was allowed to colonise naturally with plants, and now supports wet and dry grassland together with saltmarsh vegetation, saltpans, swamp, reedbed, scrub and open water. The SSSI has a nationally important assemblage of invertebrates including 21 nationally rare and 67 nationally scarce species. The site is also important for wintering and breeding birds.		
North Solent	SSSI & NNR	4,860
The North Solent extends along approximately 13 km of the north shoreline of the West Solent. The site has a range of habitats including coastal mudflats and salt marshes, shingle beaches and spits, fresh and brackish marshland and pools, maritime grassland, species rich neutral and acidic grassland, valley mire, heathland and a range of ancient semi-natural woodlands. The habitats have a rich flora which includes rare species such as *Eleocharis parvula* (Dwarf Spike-rush). The site is important for invertebrates; species of note include Duke of Burgundy, Pearl-bordered Fritillary, Silver-washed Fritillary, White Adminral and the shrimp *Gammarus insensibilis*. The site is of international importance for its populations of overwintering and migratory wildfowl and wading birds and is of national importance for its populations of breeding gulls, terns and waders. Smooth Snakes have also been recorded in the SSSI.		

SSSI Impact Risk Zones

The site intersects SSSI Impact Risk Zones for the Lee-on-the Solent to Itchen Estuary SSSI. Due to the proximity of the site Natural England should be consulted for all planning applications, except house-holder applications.

Non-statutory Sites

There are 22 non-statutory designated sites within 2 km of the site boundary, all of which are Sites of Importance for Nature Conservation (SINCs). These sites are listed in *Table 4* in order of proximity to the site; the criteria based on which the SINC was selected has been noted.

Table 4: Non-statutory sites within 2 km of the Site Boundary

Site Name	Designation	Approximate Distance (m)
West Wood (Royal Victoria Country Park)	SINC	0
- Ancient semi-natural woodlands. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods.		
Netley to Hamble Shore	SINC	Borders
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats,		

Site Name	Designation	Approximate Distance (m)
sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.		
Petters Copse	SINC	395
Ancient semi-natural woodlands.		
Netley Lodge	SINC	745
- Ancient semi-natural woodlands. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods. - Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.		
Hamble Common West	SINC	830
- Areas of heathland vegetation; including matrices of dwarf shrub, acid grassland, valley mires and scrub. - Areas of heathland which are afforested or have succeeded to woodland that are contiguous with, or form an integral part of an open area of heathland.		
Spear Pond Gully	SINC	965
- Other woodland where there is a significant element of ancient semi-natural woodland surviving.		
Mercury Marsh South	SINC	1,020
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.		
St. Mary's Road Wood	SINC	1,055
- Pasture woodland and wooded commons, not included in any of the above, which are of considerable biological and historical interest.		
Hamble Common North	SINC	1,155
- Agriculturally unimproved grasslands.		
Badnum Copse	SINC	1,155
- Ancient semi-natural woodlands. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods. - Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.		
Priors Hill Copse / Hound Grove	SINC	1,265
- Ancient semi-natural woodlands.		
Mercury Marina Saltmarsh	SINC	1,280
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands. - Sites which support one or more notable species.		
Mallards Moor	SINC	1,495
- Ancient semi-natural woodlands. - Other semi-natural woodland that comprise important community types of restricted		

Site Name	Designation	Approximate Distance (m)
distribution in the county, such as yew woods and alder swamp woods.		
Hook-With-Warsash LNR (Wendleholme)	SINC	1,605
- Grasslands which have become impoverished through inappropriate management but which retain sufficient elements of relic unimproved grassland to enable recovery.		
Winnard's & Cawte's Copses	SINC	1,670
- Ancient semi-natural woodlands. - Other woodland where there is a significant element of ancient semi-natural woodland surviving.		
Downkiln Copse	SINC	1,735
- Ancient semi-natural woodlands. - Other woodland where there is a significant element of ancient semi-natural woodland surviving.		
Fawley Polders	SINC	1,790
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands. - Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions. - Sites which support one or more notable species.		
Priors Hill Brickworks	SINC	1,810
- Other woodland where there is a significant element of ancient semi-natural woodland surviving. - Grasslands which have become impoverished through inappropriate management but which retain sufficient elements of relic unimproved grassland to enable recovery. - Areas of heathland which are afforested or have succeeded to woodland that retain significant remnants of heathland vegetation which would enable their recovery.		
Brook Wood, Fareham	SINC	1,865
- Other woodland where there is a significant element of ancient semi-natural woodland surviving. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods.		
River Hamble Mudflats & Saltmarsh – 1	SINC	1,865
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.		
Piland's Wood (Lower)	SINC	1,870
- Ancient semi-natural woodlands.		
West Wood Grange Field	SINC	1,975
- Grasslands which have become impoverished through inappropriate management but which retain sufficient elements of relic unimproved grassland to enable recovery.		

Site Name	Designation	Approximate Distance (m)
- Sites of nature conservation interest which occur in areas otherwise deficient in such interest, and / or are known to be of particularly high value to local communities e.g. community wildlife sites.		

Other Notable Sites

There are seven areas of ancient woodland within 2 km of the site boundary. One of these woodland; West Wood is within the site boundary, running along the north-western edge.

3.1.3 Protected and Noteworthy Species

At least 216 noteworthy species are recorded from places within 2 km of the site boundary, extending to 5 km for bat records. Of these, 1 is an amphibian, 108 are birds, 71 are invertebrates, 18 are plants, at least 14 are mammals and 4 are reptiles. Species that are protected by law under *Schedules 2 and 5 of The Conservation of Habitats and Species (Amendment) Regulations 2012*, *The Wildlife and Countryside Act 1981* or *The Protection of Badgers Act 1992* and have been recorded in the search area are listed in the table below; a full species list is given in *Appendix C*.

Table 5: Protected species records within 2km of the site boundary, extending to 5 km for bat records.

Latin Name	Common Name	Designation	Most Recent	No of records	Within 100m	Within 2km	Within 5km
Amphibians							
Bufo bufo	Common Toad	WCA5	2003	1		**P**	☒
Birds							
Alcedo atthis	Kingfisher	WCA1.1	2015	337		☒	
Anas querquedula	Garganey	WCA1.1	2010	1		☒	
Aythya marila	Scaup	WCA1.1	2009	1		**P**	☒
Botaurus stellaris	Bittern	WCA1.1	2015	1		☒	
Calidris pugnax	Ruff	WCA1.1	2015	7		☒	
Cettia cetti	Cetti's Warbler	WCA1.1	2015	157	☒		
Charadrius dubius	Little Ringed Plover	WCA1.1	2015	14	**P**	☒	
Chlidonias niger	Black Tern	WCA1.1	2010	3		☒	
Circus aeruginosus	Marsh Harrier	WCA1.1	2015	6		**P**	☒
Clangula hyemalis	Long-tailed Duck	WCA1.1	2013	5		**P**	☒
Falco columbarius	Merlin	WCA1.1	2006	1		**P**	☒
Falco subbuteo	Hobby	WCA1.1	2012	7		**P**	☒
Fringilla	Brambling	WCA1.1	2013	5		☒	

Latin Name	Common Name	Designation	Most Recent	No of records	Within 100m	Within 2km	Within 5km
montifringilla							
Gavia arctica	Black-throated Diver	WCA1.1	2013	2		☒	
Gavia immer	Great Northern Diver	WCA1.1	2014	48	**P**	☒	
Gavia stellata	Red-throated Diver	WCA1.1	2013	15		☒	
Hydrocoloeus minutus	Little Gull	WCA1.1	2014	6	**P**	☒	
Ixobrychus minutus	Little Bittern	WCA1.1	2009	1		**P**	☒
Jynx torquilla	Wryneck	WCA1.1	2015	2		☒	
Larus melanocephalus	Mediterranean Gull	WCA1.1	2015	109	**P**	☒	
Limosa limosa	Black-tailed Godwit	WCA1.1	2015	364		☒	
Loxia curvirostra	Common Crossbill	WCA1.1	2011	3		**P**	☒
Lullula arborea	Woodlark	WCA1.1	2009	2	**P**	☒	
Luscinia svecica	Bluethroat	WCA1.1	2002	1		**P**	☒
Melanitta nigra	Common Scoter	WCA1.1	2015	28		☒	
Milvus milvus	Red Kite	WCA1.1	2015	11	**P**	☒	
Numenius phaeopus	Whimbrel	WCA1.1	2015	177		☒	
Oceanodroma leucorhoa	Leach's Petrel	WCA1.1	2012	2		**P**	☒
Pandion haliaetus	Osprey	WCA1.1	2015	11		☒	
Panurus biarmicus	Bearded Tit	WCA1.1	2015	46		**P**	☒
Phoenicurus ochruros	Black Redstart	WCA1.1	2015	25	**P**	☒	
Platalea leucorodia	Spoonbill	WCA1.1	2015	4		**P**	☒
Plectrophenax nivalis	Snow Bunting	WCA1.1	2011	2		☒	
Podiceps auritus	Slavonian Grebe	WCA1.1	2013	16		☒	
Podiceps nigricollis	Black-necked Grebe	WCA1.1	2013	3		☒	
Porzana porzana	Spotted Crake	WCA1.1	2003	2		**P**	☒
Recurvirostra avosetta	Avocet	WCA1.1	2014	14		☒	
Regulus ignicapilla	Firecrest	WCA1.1	2015	118	☒		
Sternula albifrons	Little Tern	WCA1.1	2001	1		☒	
Sylvia undata	Dartford Warbler	WCA1.1	2015	72	**P**	☒	
Tringa glareola	Wood Sandpiper	WCA1.1	2015	3		**P**	☒

Latin Name	Common Name	Designation	Most Recent	No of records	Within 100m	Within 2km	Within 5km
Tringa nebularia	Greenshank	WCA1.1	2015	719	**P**	☒	
Tringa ochropus	Green Sandpiper	WCA1.1	2015	18	**P**	☒	
Turdus iliacus	Redwing	WCA1.1	2015	8	**P**	☒	
Turdus pilaris	Fieldfare	WCA1.1	2011	8		**P**	☒
Tyto alba	Barn Owl	WCA1.1	2015	15	**P**	☒	
Upupa epops	Hoopoe	WCA1.1	2007	1		**P**	☒
Invertebrates							
Lucanus cervus	Stag Beetle	WCA5	2013	17	☒		
Plebejus argus	Silver-studded Blue	WCA5	2013	3		☒	
Satyrium w-album	White-letter Hairstreak	WCA5	2009	2		☒	
Mammals							
Arvicola amphibius	European Water Vole	WCA5	2002	1		☒	
Chiroptera	Bat species	EPS(Sch2)	2016	45	☒		
Eptesicus serotinus	Serotine	EPS(Sch2), WCA5	2016	37	☒		
Lutra lutra	European Otter	EPS(Sch2), WCA5	2006	1		**P**	☒
Meles meles	Eurasian Badger	BA	2008	2		☒	
Myotis daubentonii	Daubenton's Bat	EPS(Sch2), WCA5	2015	8		☒	
Myotis mystacinus	Whiskered Bat	EPS(Sch2), WCA5	2011	2			☒
Myotis mystacinus / brandtii	Whiskered / Brandt's Bat	EPS(Sch2), WCA5	2005	3			☒
Myotis nattereri	Natterer's Bat	EPS(Sch2), WCA5	2015	33		☒	
Myotis sp.	a Myotis bat	EPS(Sch2), WCA5	2013	11			☒
Nyctalus noctula	Noctule Bat	EPS(Sch2), WCA5	2015	42	☒		
Pipistrellus pipistrellus	Common Pipistrelle	EPS(Sch2), WCA5	2016	90	☒		
Pipistrellus pygmaeus	Soprano Pipistrelle	EPS(Sch2), WCA5	2016	63	☒		
Pipistrellus sp.	a Pipistrelle bat	EPS(Sch2), WCA5	2015	149	☒		
Plecotus auritus	Brown Long-eared Bat	EPS(Sch2), WCA5	2015	35		☒	
Plecotus sp.	a Long-eared bat	EPS(Sch2), WCA5	2016	10		☒	
Reptiles							
Anguis fragilis	Slow-worm	WCA5	2015	58	☒		
Natrix natrix	Grass Snake	WCA5	2007	2		☒	
Vipera berus	Adder	WCA5	2005	1	☒		

Latin Name	Common Name	Designation	Most Recent	No of records	Within 100m	Within 2km	Within 5km
Zootoca vivipara	Common Lizard	WCA5	2015	24	☒		

Note - **P** relates to records with 4 figure or tetrad grid references that could potentially be anywhere within a 1 km or 2 km square.

3.2 Habitats

The following habitats are present on the site:

- broad-leaved semi-natural woodland
- broad-leaved plantation woodland
- mixed plantation woodland
- scattered broad-leaved trees
- scattered coniferous trees
- dense scrub
- introduced scrub
- species-poor intact hedge
- amenity grassland

Detailed descriptions can be found below and shown on *Figure 1. Target Note*s are given in *Appendix A*.

3.2.1 Broad-leaved semi-natural woodland

There is a large strip of broadleaved woodland along the southern site boundary (*Target Note* 8). This area is characterised by three species; *Betula pendula* (Silver Birch), *Fagus sylvatica* (Beech) and *Quercus cerris* (Turkey Oak). The understorey is sparse but contains some shrub species such as *Rubus fruticosus* agg. (Bramble) and *Ilex aquifolium* (Holly). The largest area of woodland on the site is found at *Target Note 36* where the canopy comprises *Quercus robur* (Pedunculate Oak) with smaller quantities of *Fagus sylvatica* (Beech) *Thuja plicata* (Western Red-cedar) and *Taxus baccata* (Yew). *Buxus sempervirens* (Box) *Rhododendron ponticum* (Rhododendron) and *Ulex europaeus* (Gorse) are present in the understorey.

3.2.2 Broad-leaved plantation woodland

There are a large number of ornamental species planted on the site and there is even a small tree nursery in part of the woodland at *Target Note 34*. The area surrounding the tree nursery contains an open area of *Betula pendula* (Silver Birch) plantation.

3.2.3 Mixed plantation woodland

In the area at *Target Note* 3 the mix of ornamental conifers with deciduous native species is of a sufficient ratio to merit the description of mixed plantation. Here, *Quercus robur* (Pedunculate Oak) and *Sambucus nigra* (Elder) grow alongside *Cedrus atlantica* (Atlas Cedar), *Pinus sylvestris* (Scots Pine) and *Taxus baccata* (Yew). The shrub layer includes *Ilex* (Holly) and *Hedera* (Ivy) cultivars.

3.2.4 Scattered broad-leaved trees

There are dozens of scattered broad-leaved trees on the site, with the largest area at *Target Note 18* where mature *Aesculus hippocastanum* (Horse-chestnut), *Arbutus unedo* (Strawberry-tree), *Laurus nobilis* (Bay) and *Quercus cerris* (Turkey Oak) form a line around two sides of the sports pitches.

3.2.5 Scattered coniferous trees

There are a few lines of planted conifers forming windbreaks on the site at *Target Notes 15, 16, 19, 21* and *32*. The majority of these lines are ×*Cuprocyparis leylandii* (Leyland Cypress) but they also include *Thuja plicata* (Western Red-cedar).

3.2.6 Dense scrub

There is one area of dense scrub at *Target Note 26* where *Salix* spp. (Willow) coppiced regrowth is present alongside *Betula pendula* (Silver Birch), *Fraxinus excelsior* (Ash), *Quercus cerris* (Turkey Oak) and *Quercus ilex* (Evergreen Oak). A fine-leaved *Rubus fruticosus* agg. (Bramble) and some *Cytisus scoparius* (Broom) were also found.

3.2.7 Introduced scrub

Ornamental planting of introduced scrub can be found around some of the buildings on the site and at *Target Note 28* in particular where *Berberis* agg. (Barberry), three *Cotoneaster* sp. *(*a Cotoneaster), *Forsythia x intermedia* (a Forsythia), *Hebe* sp. (a Hebe), *Pyracantha coccinea.* (Firethorn) and *Viburnum davidii* (a Viburnum) can all be found.

3.2.8 Species-poor intact hedge

All hedges on the site have been planted and are relatively recent. Most contain *Ligustrum vulgare* (Wild Privet) and *Cotoneaster* (Cotoneaster) species.

3.2.9 Amenity grassland

The grassland on the site is closely mown amenity turf dominated by *Lolium perenne* (Perennial Rye-grass). Other species are present at very low abundance but include infrequent *Achillea millefolium* (Yarrow) and *Bellis perennis* (Daisy).

3.3 Assessment for Protected Species

3.3.1 Badgers

No evidence of Badgers was recorded during the survey.

3.3.2 Bats

3.3.2.1 Foraging/Commuting

There are large numbers of mature trees on the site and areas of amenity grassland. The site is connected to the Royal Victoria Country Park which contains ancient woodland and is the most significantly wooded area in the Southampton conurbation.

A number of bat species have been recorded within 100 m of the site including Noctule, Serotine and Pipistrelle species. Long-eared species have been recorded with 2 km.

3.3.3 Birds

3.3.3.1 Breeding

Trees and scrub on the site are suitable for nesting birds as is grassland. A number of species protected under Schedule 1 of the *Wildlife and Countryside Act 1981* have been recorded with 100 m of the site. There are numerous records of Black Redstart, Cetti's Warbler, Dartford Warbler and Firecrest. All of these species could use habitats on the site for breeding.

3.3.3.2 Overwintering

Parts of the site, such as the playing fields, are open in aspect with long views and are suitable for use by overwintering birds. The site borders the Solent and Southampton Water Ramsar & SPA which is designated for its wintering bird community including species such as the Brent Goose. The habitat immediately to the south of the site is limited to shingle beach but at low tide there are small areas of exposed mudflat suitable for foraging waders.

3.3.4 Common Dormouse

The Royal Victoria Country Park borders the site and contains ancient woodland and high quality habitat. The wooded and scrub areas of the site which are ecologically connected to the Royal Victoria Country Park have some potential for Dormouse habitat.

3.3.5 Great Crested Newts

There is one pond within 500 m which could possible contain a population of Great Crested Newts. The site contains a range of terrestrial habitat that is suitable for the species, particularly scrub and tussocky grassland.

There are no records of Great Crested Newts within 2 km of the site, but this species is significantly under recorded and a lack of records does not necessarily mean Great Crested Newts are absent.

The Habitat Suitability Index score of the pond surveyed indicated that it is suitable for Great Crested Newts (0.67 Average). The location of the pond is shown in *Figure 4*.

3.3.6 Common Reptiles

There are habitats on the site that are suitable for reptiles including tussocky grassland, and scrub and woodland edges. Additionally there are several log piles which could form hibernacula (see *Animal Notes*). No reptiles were seen during the survey but records of reptiles are unlikely to be obtained by walk-through surveys, especially in the winter months.

There are records of Adder within 100 m and records of both Common Lizard and Slow Worm on the site.

3.3.7 Other Species

Two species were recorded in the area that are listed on either *the Wildlife and Countryside* Act or as Species of Principle Importance under *The Natural Environment and Rural Communities (NERC) Act (2006)*. These are Stag Beetles (which have been recorded on the site) and the White-letter Hairstreak butterfly within 2 km. The White-letter Hairstreak butterfly requires elm trees to complete its life cycle and elm trees are present on the campus.

4 EVALUATION AND CONCLUSIONS

4.1 Designated sites

4.1.1 Statutory sites

The area of disposable land on the western part of the site is approximately 100 m from the Lee-on-the Solent to Itchen Estuary SSSI at its nearest point. The site and its disposable land plan therefore fall within the SSSI impact zone and any proposed development which results in a net gain of residential units will require the Local Planning Authority to consult with Natural England about likely risks to the SSSI. When more precise details about the proposed development of the disposable land areas on the campus are known Natural England can be consulted for pre-application advice on how impacts might be avoided or mitigated.

The disposable land area on the western part of the site is on the boundary of woodland belonging to the Royal Victoria Country Park which includes Local Biodiversity Action Plan habitats such as ancient semi-natural woodland.

4.1.2 Non-statutory sites

An area of ancient semi-natural woodland within the Royal Victoria Country Park, West Wood, has an additional designation as a Site of Importance for Nature Conservation (SINC). West Wood borders the campus site and appears to overlap with part of the disposable land plan. Considerations around this habitat type are discussed further below.

The Netley to Hamble Shore also has SINC status and is within 15 m of the red line boundary of the site. The second area of disposable land is currently only accessible by a tar macadam track running alongside the SINC. The effects of a proposed development and its construction upon the SINC should be considered. In particular an access plan for the second area of disposable land should take into account potential impacts of construction traffic upon the SINC and woodland habitat surrounding this road.

All other non-statutory sites are at more than 395 m distance from the site and are unlikely to need assessment for either direct or indirect impacts.

4.2 Habitats and Species

4.2.1 Habitats

Most of the habitats on the site are heavily managed or derive from ornamental planting which reduces their importance for nature conservation.

The areas of broadleaved semi-natural woodland on the site are however important and West Wood, adjacent to the disposable land boundary, has ancient woodland status. Any development proposals should include, as a minimum, a 15 m undeveloped buffer zone between the proposed development and the ancient woodland boundary. This is a distance considered appropriate by Natural England. Buffer zones can avoid or reduce

many potentially harmful effects of development including damage to tree roots, disturbance, noise, pet predation, light spill and the need for tree management (Natural England, 2012).

Furthermore, part of the broadleaved woodland on the site (*Target Note* 36) that is within the disposable land boundary has been mapped as Deciduous Woodland under the Priority Habitat Inventory for England (*Figure 3*). This is a material consideration for planners when deciding upon the outcome of a planning application. Any proposed development should implement the mitigation hierarchy and in the first instance avoid impacts upon these areas. If that is not possible then a plan to reduce impacts should be implemented and only as a last resort should habitat compensation be considered.

Due to the ancient status of the woodland adjacent to the disposable land site and the fact that woodland lichens are listed on the local Habitat Action Plan a lichen survey of the woodland bordering site and any woodland on the site to be affected by a development should be completed.

It would also be preferable to plan any proposed development to retain the lines of mature trees at *Target Note* 18 as these form part of the ecological connectivity on the site and are likely to be of value to protected animal species such as bats.

There is a disused ornamental lawn at *Target Note 2* behind one of the older buildings. The lawn appears to be long established and has a different character to the amenity grassland present across the rest of the site. Some of the species detected such as *Potentilla sterilis* (Barren Strawberry) and *Ranunculus bulbosus* (Bulbous Buttercup suggest that it may contain a greater species diversity if surveyed in the optimum season however this area of habitat is very small, *c.* 0.3 ha and therefore we judge it to be of limited conservation value.

4.2.2 Species

No rare or protected plant species were recorded, though the species recorded do not represent a complete list of species likely to be present, as botanical surveys in February could have missed uncommon species.

4.2.3 Invasive species

Several *Cotoneaster* (Cotoneaster) plants were found during the survey (see *Target Notes* 21 and 28). *Cotoneaster* is a complex genus including a large number of deciduous to semi-evergreen or evergreen shrubs found across lowland Britain. It was introduced for horticultural purposes, a practice which continues to this day, although some species are now listed on Schedule 9 of the *Wildlife and Countryside Act*. The identification of *Cotoneaster* species is technically difficult and for development sites a precautionary approach can be adopted whereby any *Cotoneaster* species is identified and removed. We also suggest that this species should not be included in any planting plan subsequently developed for the disposable land area or the rest of campus. In terms of control measures, both mechanical and chemical management techniques can work but removal works best if the plants are completely dug up and either burnt on the site or burnt or chipped (Pilkington 2011).

4.3 Protected Animal Species

4.3.1 Badgers

No Badger setts or evidence of foraging badger were found during the survey. Further detailed surveys are not necessary. Badger survey data is only valid for one year (*i.e.* until February 2018) as Badgers can readily dig new setts.

4.3.2 Bats

4.3.2.1 Foraging/Commuting

The habitat on the site was considered to have high suitability for foraging and commuting bats due to the quantity of woodland present and its connection to the Royal Victoria Country park. At a landscape level the site forms one of very few wooded areas between the New Forest National Park and the South Downs National Park. It is within commuting distance of the larger bat species from the New Forest National Park and the wooded areas around site could form a natural stop off point for bats commuting across the Southampton Water.

Bats use nearly all UK habitats for foraging at some point during the year and determining the level of use would be important for an Environmental Statement. A series of up to two activity transects visits per month between April and October would provide the information to assess annual usage of the site by bats. Static detector monitoring should also be employed.

4.3.3 Birds

4.3.3.1 Breeding

The site provides a range of habitats that are likely to be used by breeding birds including some Schedule 1 protected species. A series of three surveys between March and June would allow the population of all species using the site to be assessed. Separate surveys will be required for Black Redstart birds as the methodology differs from the standard breeding bird survey.

Vegetation clearance works must be conducted outside the breeding bird season (March to August inclusive). If this is not possible then a watching brief by an ecologist would ensure that no breeding birds are present. If nests were found to be present during this time work would have to stop until the nestlings had fledged. All active birds' nests, regardless of species, are protected by law. A nest is deemed to be active even if it is in the process of being built and does not yet contain eggs or young.

4.3.3.2 Over wintering

The site provides some habitat that may be used by overwintering birds such as the playing fields. Given the presence of a Ramsar/SPA adjacent to the site and the suite of protected migratory bird species present further wintering bird surveys (one per month of each of the winter months) will be required.

4.3.4 Common Dormouse

Dormice have a wide distribution in the Hampshire area and although there are no records within the surrounding area the species is under-recorded. A lack of records is not necessarily evidence of its absence. Further surveys involving nest tubes should be conducted between April and September to confirm the presence or likely absence of this species.

4.3.5 GCN

There are terrestrial habitats suitable for Great Crested Newt present on the site but only one pond within 500 m. As a first step this pond should be surveyed using the environmental DNA test which can confirm presence or absence of the newts in the water. If positive then a series of six further visits between mid- March and June would be required to assess the population size. If Great Crested Newts prove to be present close to the site and it is likely that they use the site during their terrestrial phase then there would be legal implications for any development of the site. There is a licensing procedure administered by Natural England in place but at this time it is under review. It may be that a European Protected Species Licence would be necessary to develop the site. European Protected Species Licences are only issued subject to an agreed method statement that may include a commitment to mitigating impacts on newts by moving them out of harm's way (know as translocation). Alternatively District Licensing may be available. Under this scheme the developer affecting newt habitat pays into a fund to create newt habitats.

4.3.6 Common Reptiles

Habitat that is highly suitable for common reptiles was recorded at Animal Notes 1 and 6 but there are also smaller areas of suitable habitat around the site boundary. A detailed survey of the most suitable areas would determine if reptiles are present and allow the impact of the proposals to be assessed. To ensure that no reptiles are killed or injured by the proposed works then it may be necessary to translocate (move) reptiles to suitable habitat that is to be retained. If very few individual reptiles are found then it may be possible to follow a precautionary approach to habitat removal under a watching brief by an ecologist. If a translocation of reptiles is necessary the developer would have to prove that a significant proportion of the population had been re-located to suitable habitat before the development could go ahead.

4.3.7 Other Species

The impact of the scheme on a range of other species (such as Stag Beetles and White Hairstreak butterflies) will need to be assessed in the Environmental Statement. A mitigation plan for managing dead wood on the site should be drawn up for Stag Beetles. A further survey visit will be undertaken in the White-letter Hairstreak flight season (mid June – August) and focus on surveying Elm trees to identify if any colonies are present on the site.

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6 FIGURES

Figure 1: Phase 1 Habitat Survey map

Figure 2: Designated sites and location plan

Figure 3: Ancient and priority habitat woodland

Figure 4: Location of pond

Rev	Date	Description	Drn	Chk	App
00	21.02.17	856776	RG	SP	LS

GE Aviation Hamble

RSK

Figure 1

Phase 1 Habitat Survey Map

0 75
metres
Scale = 1:2,500 @ A3

N W E S

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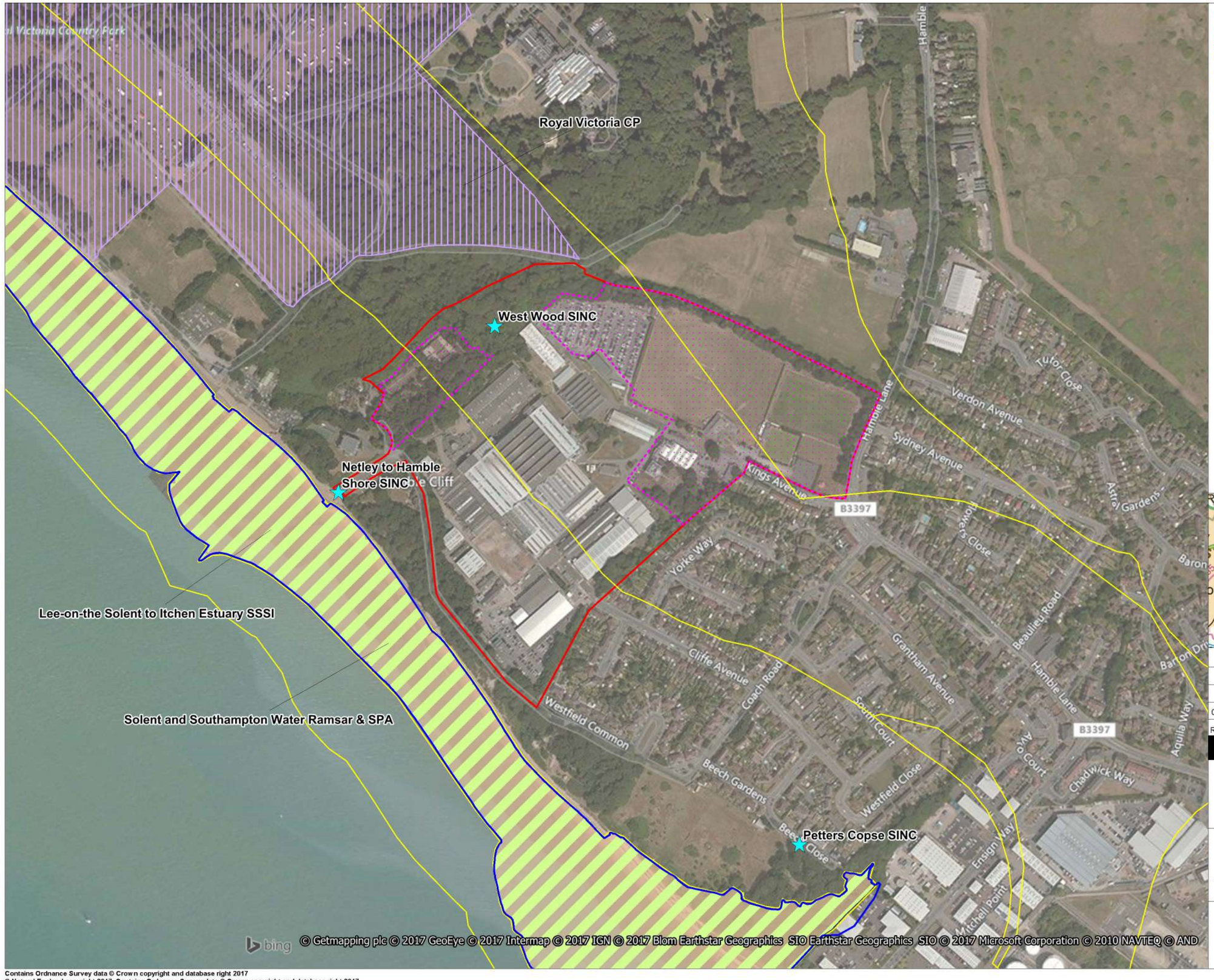
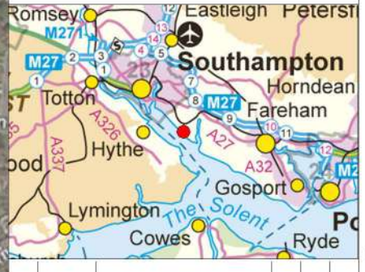


Site boundary
Disposable land
Ramsar Site
Special Protection Area (SPA)
Site of Special Scientific Interest (SSSI)
Country Park (CP)
SSSI Impact Risk Zones
Site of Importance for Nature Conservation (SINC)



Rev	Date	Description	Drn	Chk	App
00	27.02.17	856776	RG	SP	LS

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Figure 2

Designated Sites and Location Plan
Confidential

0 150
metres
Scale = 1:5,000 @ A3

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SINC locations adapted from information provided by Hampshire Biodiversity Information Centre

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Figure 3

Ancient and Priority Habitat Woodland

0 150
metres
Scale = 1:5,000 @ A3

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Figure 4

Location of Pond

0 195
metres
Scale = 1:6,500 @ A3

N W E S

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APPENDIX A – TARGET AND ANIMAL NOTES

Target Note 1: A closely mown area of amenity grassland including species such as *Lolium perenne* (Perennial Rye-grass). A few anomalous specimens were also noted at the edges of this area including *Erodium* spp. (Storksbill spp), *Leucanthemum vulgare* (Oxeye Daisy) and *Plantago coronopus* (Buck's-horn Plantain).

Target Note 2: A disused ornamental garden with long established amenity grassland lawns. The grass appears to be infrequently mown and includes fine-leaved species such as *Agrostis capillaris* (Common Bent) and *Festuca rubra* (Red Fescue). Other species present are *Anthoxanthum odoratum* (Sweet Vernal-grass), *Dactylis glomerata* (Cock's-foot), *Holcus lanatus* (Yorkshire-fog) and *Lolium perenne* (Perennial Rye-grass). Herbs amongst the sward include *Potentilla sterilis* (Barren Strawberry) and *Ranunculus bulbosus* (Bulbous Buttercup). *Laurus nobilis* (Bay), *Prunus spp.* (Cherry), *Ulmus procera* (English Elm) and *Rhododendron ponticum* (Rhododendron) trees have been planted at the edge of the gardens. Disturbed areas that were likely former flower beds now contain tall ruderal species such as *Epilobium ciliatum* (American Willowherb) and *Epilobium hirsutum* (Great Willowherb).

Two varieties of waxcaps were noted in the grass at the time of survey including *Gliophorus spp*. (Parrot waxcaps).

Target Note 3: Mixed plantation woodland comprising *Quercus robur* (Pedunculate Oak) *Sambucus nigra* (Elder) and *Taxus baccata* (Yew). There are areas of *Ilex aquifolium* (Holly) *Rubus fruticosus* agg. (Bramble) scrub with stands of *Carex pendula* (Pendulous Sedge), *Epilobium hirsutum* (Great Willowherb) and *Juncus effusus* (Soft-rush) in wetter areas. The ground flora contains shade tolerant herbs such as *Pentaglottis sempervirens* (Green Alkanet) and *Urtica dioica* (Common Nettle).

Target Note 4: A line of ornamental mixed trees and scrub near the site boundary including *Cedrus atlantica* (Atlas Cedar), X *Cuprocyparis leylandii* (Leyland Cypress), *Pinus sylvestris* (Scots Pine), *Quercus ilex* (Evergreen Oak) and *Salix cinerea* (Grey Willow). The scrub comprises *Ilex* cultivars (Holly cultivars) and *Rubus fruticosus* agg. (Bramble) with some large stands of *Buddleja davidii* (Butterfly-bush). The ground flora included *Galium aparine* (Cleavers) and *Narcissus* sp. (Daffodil).

Target Note 5: Freely mown amenity turf with reseeded areas. Common species in this area include *Achillea millefolium* (Yarrow), *Bellis perennis* (Daisy), *Cerastium fontanum* (Common Mouse-ear), *Lolium perenne* (Perennial Rye-grass), *Plantago lanceolata* (Ribwort Plantain) and *Trifolium repens* (White Clover).

Target Note 6: A disused concrete pathway with a mesh fence and a sparse line of *Fraxinus excelsior* (Ash) and *Salix spp*. (Willow) trees running alongside it. Species such as *Conyza spp*. (Fleabane spp.), *Lapsana communis* (Nipplewort) *Oenothera biennis* (Common Evening-primrose) are encroaching upon the hardstanding. A fox was seen here during the survey.

Target Note 7: An area of woodland which extends beyond the site boundary. *Acer pseudoplatanus* (Sycamore), *Ilex aquifolium* (Holly) and *Ulmus procera* (English Elm) are the main tree species. *Ulex europaeus* (Gorse) is present in the scrub layer and *Ruscus aculeatus* (Butcher's-broom) was noted growing at the foot of a tree. The ground flora in this area was largely formed of *Hedera hibernica* (Hibernica Ivy) with smaller amounts of *Lapsana communis*

(Nipplewort), *Oenothera biennis* (Common Evening-primrose) and *Urtica dioica* (Common Nettle).

Target Note 8: Semi-natural broadleaved woodland containing *Betula pendula* (Silver Birch), *Fagus sylvatica* (Beech) and *Quercus cerris* (Turkey Oak). The sparse understorey contained *Acer pseudoplatanus* (Sycamore) and *Ulmus spp*. (Elm) saplings alongside *Ilex aquifolium* (Holly) and *Rubus fruticosus* agg. (Bramble). *Brachypodium sylvaticum* (False Brome) and *Iris foetidissima* (Stinking Iris) were noted in the ground layer. Access to this area was limited by the fence line.

Target Note 9: An area of amenity turf with three planted *Betula utilis* var. *jacquemontii* (Himalayan birch). The sward contained *Festuca rubra* (Red Fescue) *Holcus lanatus* (Yorkshire-fog) *Senecio jacobaea* (Common Ragwort) *Trifolium repens* (White Clover) and *Veronica chamaedrys* (Germander Speedwell). There was evidence of deer grazing in this area and droppings were also found.

Target Note 10: An area of *Betula pendula* (Silver Birch) plantation with some *Arbutus unedo* (Strawberry-tree) and *Prunus lusitanica* (Portugal Laurel). This area is open with sunny glades containing log piles and some tussocky grassland which provides suitable habitat for reptiles. Rabbit activity and ant hills were noted at the time of survey.

Target Note 11: An outgrown *Ligustrum vulgare* (Wild Privet) hedge *c.* 3.5 m high with some *Betula pendula* (Silver Birch) trees.

Target Note 12: A row of mixed tree stumps interspersed with some ruderal herbs *Cirsium vulgare* (Spear Thistle), *Linaria vulgaris* (Common Toadflax) and *Sonchus oleraceus* (Smooth Sow-thistle).

Target Note 13: Amenity grassland currently in use as a bowling green. The edges are planted with *Brachyglottis x jubar* (a ragwort) *Lonicera nitida* (Wilson's Honeysuckle) *Nandina domestica* (Sacred Bamboo).

Target Note 14: Amenity grassland currently in use as football pitches. Species in the sward included *Achillea millefolium* (Yarrow), *Bellis perennis* (Daisy), *Lolium perenne* (Perennial Rye-grass) *Hypochaeris radicata* (Cat's-ear).

Target Note 15: A line of *X. Cuprocyparis leylandii* (Leyland Cypress) trees forming a hedge.

Target Note 16: A line of *Thuja plicata* (Western Red-cedar) c. 12 m high.

Target Note 17: A *Ligustrum vulgare* (Wild Privet) hedge c. 4 m high.

Target Note 18: A line of mature trees around two sides of the football pitch containing *Aesculus hippocastanum* (Horse-chestnut) *Arbutus unedo* (Strawberry-tree) *Laurus nobilis* (Bay) and *Quercus cerris* (Turkey Oak) amongst other species. Many of these trees had features which appear to be suitable for roosting bats. Species such as *Allium vineale* (Wild Onion), *Cyclamen hederifolium* (Sowbread) and *Ruscus aculeatus* (Butcher's-broom) were found growing at the base of these trees.

Target Note 19: A line of *X Cuprocyparis leylandii* (Leyland Cypress) trees c. 12 m high.

Target Note 20: A line of cut *X Cuprocyparis leylandii* (Leyland Cypress) trees c. 4 m high.

Target Note 21: A *Hedera helix* (Ivy) and *Ligustrum vulgare* (Wild Privet) hedge c. 17 m long. There are some individual *Cotoneaster* sp. (a Cotoneaster) at the base. The amenity grassland

beside the hedge contains *Festuca rubra* (Red Fescue), *Lapsana communis* (Nipplewort) and *Luzula campestris* (Field Wood-rush).

Target Note 22: A species poor planted hedge containing *Ilex aquifolium* (Holly) *Ligustrum vulgare* (Wild Privet), *Rubus fruticosus* agg. (Bramble) *Taxus baccata* (Yew).

Target Note 23: A stand of *Buddleia globosa* (Orange-ball-tree) c. 5 m high and 20 m long.

Target Note 24: Broad-leaved semi-natural woodland containing *Quercus cerris* (Turkey Oak) *Quercus robur* (Pedunculate Oak) and a single *Pinus sylvestris* (Scots Pine). The understorey comprises *Rubus fruticosus* agg. (Bramble) and *Buddleja davidii* (Butterfly-bush) with a leaf litter ground layer.

Target Note 25: A *Berberis* agg. (Barberry) hedge approximately 1.5 m high with some *Brachyglottis x jubar* (a ragwort), *Fraxinus excelsior* (Ash) and *Ilex aquifolium* (Holly).

Target Note 26: An area of *Salix spp.* (Willow) coppiced regrowth with *Acer pseudoplatanus* (Sycamore), *Betula pendula* (Silver Birch), *Fraxinus excelsior* (Ash), *Quercus cerris* (Turkey Oak) and *Quercus ilex* (Evergreen Oak). A fine-leaved *Rubus fruticosus* agg. (Bramble) and some *Cytisus scoparius* (Broom) were also found. *Epilobium ciliatum* (American Willowherb) *Heracleum sphondylium* (Hogweed) and *Hypericum perforatum* (Perforate St John's-wort) were present in the field layer.

Target Note 27: A single *Quercus robur* (Pedunculate Oak) at the end of the path.

Target Note 28: A planted shrubbery containing *Berberis* agg. (Barberry), three *Cotoneaster* sp. *(*a Cotoneaster), *Forsythia x intermedia* (a Forsythia), *Hebe* sp. (a Hebe), *Pyracantha coccinea.* (Firethorn) and *Viburnum davidii* (a Viburnum).

Target Note 29: A single three-stemmed *Betula utilis* var. *jacquemontii* (Himalayan Birch).

Target Note 30: A mature *Cedrus atlantica* (Atlas Cedar).

Target Note 31: A *Pteridium aquilinum* (Bracken) patch containing *Buddleja davidii* (Butterfly-bush) *Laurus nobilis* (Bay) *Ulex europaeus* (Gorse) and a single mature *Pinus pinea* (Stone Pine).

Target Note 32: A row of *X Cuprocyparis leylandii* (Leyland Cypress) c. 16 m in height.

Target Note 33: A slipway comprising an area of hard standing with what appeared to be amenity turf and scrub at the margins. There was no access at time of survey

Target Note 34: A tree nursery in a clearing containing *Rhododendron ponticum* (Rhododendron) and *Arbutus unedo* (Strawberry-tree) specimens.

Target Note 35: A former ornamental garden with areas allocated for vegetable growing. The grassy areas have naturalised to some degree and the sward comprises *Centaurea debeauxii* (Chalk knapweed) *Dactylis glomerata* (Cock's-foot) and *Festuca rubra* (Red Fescue). Fruit trees are present and ornamental shrubs such as *Hypericum androsaemum* (Tutsan) and *Nandina domestica* (Sacred Bamboo). There are some buildings including two former greenhouses.

Target Note 36: A large area of plantation broadleaved woodland. The canopy comprises *Quercus robur* (Pedunculate Oak) with smaller quantities of *Fagus sylvatica* (Beech) *Thuja plicata* (Western Red-cedar) and *Taxus baccata* (Yew). *Buxus sempervirens* (Box) *Rhododendron ponticum* (Rhododendron) and *Ulex europaeus* (Gorse) are present in the understorey. At the field layer there are large quantities of leaf litter, some sedges *Carex pendula*

(Pendulous Sedge) and *Carex divulsa* (Grey Sedge) and herbs such as *Digitalis purpurea* (Foxglove), *Scrophularia nodosa* (Common Figwort) and *Urtica dioica* (Common Nettle).

Target Note 37: A mature *Quercus robur* (Pedunculate Oak) in the car park.

Target Note 38: A mature *Taxus baccata* (Yew) in the car park.

Animal Note 1: An area containing a linear stack of log piles embedded in scrub providing suitable refuge and hibernation habitat for amphibians and reptiles.

Animal Note 2: A mammal hole (possibly fox) under a tree stump.

Animal Note 3: An area of grass clippings suitable for breeding grass snakes.

Animal Note 4: Another area of grass clippings suitable for breeding grass snakes.

Animal Note 5: Four roe deer were seen in the garden at the time of survey. Heavy tracks along the inside of the new fence line indicate that they may have been inadvertently trapped on the site when the fence was erected.

Animal Note 6: An open glade containing tussocky grassland and habitat suitable for common reptile species.

APPENDIX B – SPECIES LIST

Plant name
Woody Species
Acer pseudoplatanus (Sycamore)
Aesculus hippocastanum (Horse-chestnut)
Arbutus unedo (Strawberry-tree)
Berberis agg. (Barberry)
Betula pendula (Silver Birch)
Betula utilis var. *jacquemontii* (Himalayan Birch)
Buddleja davidii (Butterfly-bush)
Buddleja globosa (Orange-ball-tree)
Buxus sempervirens (Box)
Castanea sativa (Sweet Chestnut)
Cedrus atlantica (Atlas Cedar)
Chamaecyparis lawsoniana (Lawson's Cypress)
Cotoneaster sp. (a Cotoneaster)
Corylus avellana (Hazel)
Crataegus mongyna (Hawthorn)
X *Cuprocyparis leylandii* (Leyland Cypress)
Cytisus scoparius (Broom)
Fagus sylvatica (Beech)
Fallopia baldschuanica (Russian-vine)
Forsythia x intermedia (a Forsythia)
Fraxinus excelsior (Ash)
Laurus nobilis (Bay)
Lonicera periclymenum (Honeysuckle)
Hebe sp. (a Hebe)
Hedera helix (Ivy)
Hedera hibernica (Atlantic Ivy)
Hypericum androsaemum (Tutsan)
Ilex aquifolium (Holly)
Ilex cultivars
Laurus nobilis (Bay)
Ligustrum vulgare (Wild Privet)
Lonicera periclymenum (Honeysuckle)
Malus sylvestris (Crab Apple)
Malus sp. (an Apple)
Nandina domestica (Sacred Bamboo)
Pinus sylvestris (Scots Pine)

Pinus pinea (Stone Pine)
Primula vulgaris (Primrose)
Prunus sp. *(*a Cherry)
Prunus laurocerasus (Cherry Laurel)
Prunus lusitanica (Portugal Laurel)
Pyracantha coccinea (a Firethorn)
Quercus cerris (Turkey Oak)
Quercus ilex (Evergreen Oak)
Quercus robur (Pedunculate Oak)
Rhododendron ponticum (Rhododendron)
Rosa spp. (a Rose)
Rubus fruticosus agg. (Bramble)
Ruscus aculeatus (Butcher's-broom)
Salix cinerea (Grey Willow)
Sambucus nigra (Elder)
Taxus baccata (Yew)
Thuja plicata (Western Red-cedar)
Tilia sp. (a Lime)
Ulex europaeus (Gorse)
Ulmus procera (English Elm)
Viburnum davidii (a Viburnum)
Yucca sp. (a Spanish-dagger)
Herbaceous species
Achillea millefolium (Yarrow)
Agrostis capillaris (Common Bent)
Agrostis stolonifera (Creeping Bent)
Alliaria petiolata (Garlic Mustard)
Allium vineale (Wild Onion)
Anthoxanthum odoratum (Sweet Vernal-grass)
Arrhenatherum elatius (False Oat-grass)
Arum maculatum (Lords-and-Ladies)
Ballota nigra (Black Horehound)
Bellis perennis (Daisy)
Brachyglottis x jubar (a ragwort)
Brachypodium sylvaticum (False Brome)
Capsella bursa-pastoris (Shepherd's-purse)
Carex divulsa (Grey Sedge)
Carex pendula (Pendulous Sedge)
Centaurea debeauxii (Chalk knapweed)
Cerastium fontanum (Common Mouse-ear)
Cirsium vulgare (Spear Thistle)
Conyza sp. (a Fleabane)

Crepis biennis (Rough Hawk's-beard)
Crocus sp. (a Crocus)
Cyclamen hederifolium (Sowbread)
Dactylis glomerata (Cock's-foot)
Digitalis purpurea (Foxglove)
Dipsacus fullonum (Teasel)
Epilobium ciliatum (American Willowherb)
Epilobium hirsutum (Great Willowherb)
Erodium sp. (a Stork's-bill)
Festuca rubra (Red Fescue)
Galium aparine (Cleavers)
Geranium lucidum (Shining Crane's-bill)
Geranium molle (Dove's-foot Crane's-bill)
Geranium robertianum (Herb-Robert)
Geum urbanum (Wood Avens)
Heracleum sphondylium (Hogweed)
Holcus lanatus (Yorkshire-fog)
Hydrangea sp. *(*a Hydrangea)
Hypochaeris radicata (Cat's-ear)
Hypericum perforatum (Perforate St John's-wort)
Iris foetidissima (Stinking Iris)
Juncus effusus (Soft-rush)
Lamium purpureum (Red Dead-nettle)
Lapsana communis (Nipplewort)
Leucanthemum vulgare (Oxeye Daisy)
Linaria vulgaris (Common Toadflax)
Lolium perenne (Perennial Rye-grass)
Luzula campestris (Field Wood-rush)
Medicago lupulina (Black Medick)
Mentha sp. (a mint)
Narcissus sp. (Daffodil)
Oenothera biennis (Common Evening-primrose)
Pentaglottis sempervirens (Green Alkanet)
Plantago coronopus (Buck's-horn Plantain)
Plantago lanceolata (Ribwort Plantain)
Potentilla reptans (Creeping Cinquefoil)
Potentilla sterilis (Barren Strawberry)
Prunella vulgaris (Selfheal)
Pseudofumaria lutea (Yellow Corydalis)
Pteridium aquilinum (Bracken)
Ranunculus bulbosus (Bulbous Buttercup)
Ranunculus repens (Creeping Buttercup)
Rumex sp. (Dock sp.)

Sambucus nigra (Elder)
Scrophularia nodosa (Common Figwort)
Senecio jacobaea (Common Ragwort)
Sonchus oleraceus (Smooth Sow-thistle)
Trifolium repens (White Clover)
Urtica dioica (Common Nettle)
Veronica chamaedrys (Germander Speedwell)
Veronica serpyllifolia (Thyme-leaved Speedwell)
Fungi
Gliophorus spp. (Parrot waxcaps)

APPENDIX C – NOTEWORTHY SPECIES RECORDS

Table 6 displays noteworthy species records that are located within 2 km of the site boundary, extending to 5 km for bat records. These species records were obtained from the Hampshire Biodiversity Information Centre. The Latin and common names for species are given as well as their level of designation. A glossary defining abbreviations used in the table is given in *Table 7, Appendix D*. If a species is not included in the table below it does not necessarily mean the species is absent from the search area, but rather that data-holding organizations do not have records of it in these locations.

Table 6: Noteworthy Species Records within 2 km of the Site Boundary, extending to 5 km for bat records

Latin Name	Common Name	Designation
Amphibians		
Bufo bufo	Common Toad	WCA5, S41
Birds		
Acanthis cabaret	Lesser Redpoll	S41, Red
Acrocephalus scirpaceus	Reed Warbler	LBAP
Alauda arvensis	Skylark	S41, Red, LBAP
Alcedo atthis	Kingfisher	WCA1.1, Amber
Anas clypeata	Shoveler	Amber
Anas querquedula	Garganey	WCA1.1, Amber
Anas strepera	Gadwall	Amber, LBAP
Anser albifrons	White-fronted Goose	S41, Red, LBAP
Anthus spinoletta	Water Pipit	Amber
Anthus trivialis	Tree Pipit	S41, Red
Arenaria interpres	Turnstone	Amber, LBAP
Asio flammeus	Short-eared Owl	Amber
Aythya ferina	Pochard	Red, LBAP
Aythya marila	Scaup	WCA1.1, S41, Red
Botaurus stellaris	Bittern	WCA1.1, S41, Amber, LBAP
Branta bernicla	Brent Goose	Amber, LBAP
Branta leucopsis	Barnacle Goose	Amber
Calidris alba	Sanderling	Amber, LBAP
Calidris alpina	Dunlin	Amber, LBAP
Calidris canutus	Knot	Amber, LBAP
Calidris pugnax	Ruff	WCA1.1, Red

Latin Name	Common Name	Designation
Caprimulgus europaeus	Nightjar	S41, Amber, LBAP
Cettia cetti	Cetti's Warbler	WCA1.1, LBAP
Charadrius dubius	Little Ringed Plover	WCA1.1
Charadrius hiaticula	Ringed Plover	Red
Chlidonias niger	Black Tern	WCA1.1, Amber
Chroicocephalus ridibundus	Black-headed Gull	Amber
Circus aeruginosus	Marsh Harrier	WCA1.1, Amber
Clangula hyemalis	Long-tailed Duck	WCA1.1, Red
Cuculus canorus	Cuckoo	S41, Red
Dendrocopos minor	Lesser Spotted Woodpecker	S41, Red, LBAP
Egretta garzetta	Little Egret	Amber, LBAP
Emberiza schoeniclus	Reed Bunting	S41, Amber, LBAP
Falco columbarius	Merlin	WCA1.1, Red, LBAP
Falco subbuteo	Hobby	WCA1.1, LBAP
Ficedula hypoleuca	Pied Flycatcher	Red
Fringilla montifringilla	Brambling	WCA1.1
Gallinago gallinago	Snipe	Amber, LBAP
Gavia arctica	Black-throated Diver	WCA1.1, Amber
Gavia immer	Great Northern Diver	WCA1.1, Amber
Gavia stellata	Red-throated Diver	WCA1.1, Amber
Haematopus ostralegus	Oystercatcher	Amber
Hydrocoloeus minutus	Little Gull	WCA1.1, Amber
Ixobrychus minutus	Little Bittern	WCA1.1
Jynx torquilla	Wryneck	WCA1.1
Larus argentatus	Herring Gull	S41, Red
Larus fuscus	Lesser Black-backed Gull	Amber
Larus marinus	Great Black-backed Gull	Amber
Larus melanocephalus	Mediterranean Gull	WCA1.1, Amber, LBAP
Limosa lapponica	Bar-tailed Godwit	Amber, LBAP
Limosa limosa	Black-tailed Godwit	WCA1.1, Red, LBAP
Linaria cannabina	Linnet	S41, Red, LBAP
Locustella naevia	Grasshopper Warbler	S41, Red, LBAP
Loxia curvirostra	Common Crossbill	WCA1.1
Lullula arborea	Woodlark	WCA1.1, S41, Amber, LBAP
Luscinia megarhynchos	Nightingale	Red, LBAP
Luscinia svecica	Bluethroat	WCA1.1
Melanitta nigra	Common Scoter	WCA1.1, S41, Red, LBAP
Mergellus albellus	Smew	Amber
Mergus merganser	Goosander	LBAP
Mergus serrator	Red-breasted Merganser	LBAP
Milvus milvus	Red Kite	WCA1.1, Amber, LBAP
Motacilla cinerea	Grey Wagtail	Red

Latin Name	Common Name	Designation
Motacilla flava	Yellow Wagtail	S41, Red, LBAP
Muscicapa striata	Spotted Flycatcher	S41, Red, LBAP
Numenius arquata	Curlew	S41, Red
Numenius phaeopus	Whimbrel	WCA1.1, Red
Oceanodroma leucorhoa	Leach's Petrel	WCA1.1, Amber
Oenanthe oenanthe	Wheatear	Amber
Pandion haliaetus	Osprey	WCA1.1, Amber
Panurus biarmicus	Bearded Tit	WCA1.1, Amber, LBAP
Passer domesticus	House Sparrow	S41, Red
Phalacrocorax aristotelis	Shag	Red
Phoenicurus ochruros	Black Redstart	WCA1.1, Red
Phoenicurus phoenicurus	Redstart	Amber
Platalea leucorodia	Spoonbill	WCA1.1, Amber
Plectrophenax nivalis	Snow Bunting	WCA1.1, Amber
Pluvialis apricaria	Golden Plover	Amber, LBAP
Pluvialis squatarola	Grey Plover	Amber, LBAP
Podiceps auritus	Slavonian Grebe	WCA1.1, Red, LBAP
Podiceps nigricollis	Black-necked Grebe	WCA1.1, Amber, LBAP
Poecile palustris	Marsh Tit	S41, Red
Porzana porzana	Spotted Crake	WCA1.1, Amber
Pyrrhula pyrrhula	Bullfinch	S41, Amber, LBAP
Recurvirostra avosetta	Avocet	WCA1.1, Amber
Regulus ignicapilla	Firecrest	WCA1.1, Amber, LBAP
Riparia riparia	Sand Martin	Amber
Rissa tridactyla	Kittiwake	Red
Saxicola rubetra	Whinchat	Red, LBAP
Scolopax rusticola	Woodcock	Red
Sterna hirundo	Common Tern	Amber
Sterna paradisaea	Arctic Tern	Amber
Sterna sandvicensis	Sandwich Tern	Amber
Sternula albifrons	Little Tern	WCA1.1, Amber, LBAP
Sturnus vulgaris	Starling	S41, Red
Sylvia undata	Dartford Warbler	WCA1.1, Amber, LBAP
Tadorna tadorna	Shelduck	Amber
Tringa glareola	Wood Sandpiper	WCA1.1, Amber
Tringa nebularia	Greenshank	WCA1.1, Amber
Tringa ochropus	Green Sandpiper	WCA1.1, Amber
Tringa totanus	Redshank	Amber, LBAP
Turdus iliacus	Redwing	WCA1.1, Red
Turdus philomelos	Song Thrush	S41, Red, LBAP
Turdus pilaris	Fieldfare	WCA1.1, Red
Turdus viscivorus	Mistle Thrush	Red
Tyto alba	Barn Owl	WCA1.1, Amber
Upupa epops	Hoopoe	WCA1.1
Vanellus vanellus	Lapwing	S41, Red, LBAP

Latin Name	Common Name	Designation
Invertebrates		
Abdera biflexuosa	*Abdera biflexuosa*	Notable:A
Acronicta psi	Grey Dagger	S41
Acronicta rumicis	Knot Grass	S41
Agrilus (Anambus) angustulus	*Agrilus (Anambus) angustulus*	NS
Agrochola helvola	Flounced Chestnut	S41
Agrochola lychnidis	Beaded Chestnut	S41
Amphipoea oculea	Ear Moth	S41
Andrena (Hoplandrena) trimmerana	Trimmer's Mining Bee	Notable:B
Andrena (Poecilandrena) labiata	Girdled Mining Bee	Notable:A
Argynnis paphia	Silver-washed Fritillary	LBAP
Ashfordia granulata	Silky Snail	LBAP
Brachyopa bicolor	*Brachyopa bicolor*	LBAP
Cantharis fusca	*Cantharis fusca*	NS
Celaena leucostigma	Crescent	S41
Cerapheles terminatus	*Cerapheles terminatus*	NR
Chlorissa viridata	Small Grass Emerald	LBAP
Coenonympha pamphilus	Small Heath	S41
Cordulia aenea	Downy Emerald	LBAP
Cryptocephalus aureolus	*Cryptocephalus aureolus*	Notable:B
Dicheirotrichus obsoletus	*Dicheirotrichus obsoletus*	Notable:B
Dichrooscytus gustavi	*Dichrooscytus gustavi*	Notable:B
Dolichovespula (Dolichovespula) media	*Dolichovespula (Dolichovespula) media*	Notable:A
Donacia thalassina	*Donacia thalassina*	Notable:B
Ecliptopera silaceata	Small Phoenix	S41
Eilema sororcula	Orange Footman	LBAP
Epistrophe diaphana	*Epistrophe diaphana*	Notable
Eurygaster maura	*Eurygaster maura*	Notable:B
Helops caeruleus	*Helops caeruleus*	Notable:B
Hipparchia semele	Grayling	S41, GB RDB(VU)
Hippodamia (Adonia) variegata	Adonis' Ladybird	Notable:B
Hoplodrina blanda	Rustic	S41
Hypena rostralis	Buttoned Snout	LBAP
Ischnura pumilio	Scarce Blue-tailed Damselfly	LBAP
Lasioglossum (Evylaeus) pauxillum	*Lasioglossum (Evylaeus) pauxillum*	Notable:A
Lasiommata megera	Wall	S41
Limenitis camilla	White Admiral	S41, GB RDB(VU)
Litoligia literosa	Rosy Minor	S41
Longitarsus dorsalis	*Longitarsus dorsalis*	Notable:B

Latin Name	Common Name	Designation
Longitarsus parvulus	Flax Flea Beetle	Notable:A
Lucanus cervus	Stag Beetle	WCA5, S41, Notable:B, LBAP
Malacosoma neustria	Lackey	S41
Mantura rustica	*Mantura rustica*	Notable:B
Melanchra persicariae	Dot Moth	S41
Melanthia procellata	Pretty Chalk Carpet	S41
Melieria picta	*Melieria picta*	Notable
Mutilla europaea	Large Velvet Ant	Notable:B
Mythimna favicolor	Mathew's Wainscot	LBAP
Neliocarus faber	*Neliocarus faber*	Notable:B
Nomada fucata	*Nomada fucata*	Notable:A
Notaris scirpi	*Notaris scirpi*	Notable:B
Omalus puncticollis	*Omalus puncticollis*	Notable:A
Opomyza punctata	*Opomyza punctata*	Notable
Orsodacne humeralis	*Orsodacne humeralis*	Notable:B
Orthetrum coerulescens	Keeled Skimmer	LBAP
Orthotylus (Melanotrichus) moncreaffi	*Orthotylus (Melanotrichus) moncreaffi*	LBAP
Plebejus argus	Silver-studded Blue	WCA5, S41, GB RDB(VU), LBAP
Polydrusus (Neoeustolus) pulchellus	Sea-Wormwood Weevil	Notable:B
Psallus (Psallus) albicinctus	*Psallus (Psallus) albicinctus*	Notable:B
Pyrgus malvae	Grizzled Skipper	S41, GB RDB(VU)
Satyrium w-album	White-letter Hairstreak	WCA5, S41, GB RDB(EN), LBAP
Sitochroa palealis	Sulphur Pearl	Notable
Sphecodes crassus	*Sphecodes crassus*	Notable:B
Sphinginus lobatus	*Sphinginus lobatus*	LBAP
Spilosoma lubricipeda	White Ermine	S41
Synaphe punctalis	Long-legged Tabby	Notable:B
Tetratoma desmarestii	*Tetratoma desmarestii*	Notable:A
Tyria jacobaeae	Cinnabar	S41
Volucella inanis	*Volucella inanis*	Notable
Volucella inflata	*Volucella inflata*	Notable
Volucella zonaria	*Volucella zonaria*	Notable
Watsonalla binaria	Oak Hook-tip	S41
Mammals		
Arvicola amphibius	European Water Vole	WCA5, S41, LBAP
Chiroptera	Bat species	EPS(Sch2)
Eptesicus serotinus	Serotine	EPS(Sch2), WCA5, LBAP
Erinaceus europaeus	West European Hedgehog	S41
Lutra lutra	European Otter	EPS(Sch2), WCA5,

Latin Name	Common Name	Designation
		S41, LBAP
Meles meles	Eurasian Badger	BA
Myotis daubentonii	Daubenton's Bat	EPS(Sch2), WCA5
Myotis mystacinus	Whiskered Bat	EPS(Sch2), WCA5
Myotis mystacinus / brandtii	Whiskered / Brandt's Bat	EPS(Sch2), WCA5
Myotis nattereri	Natterer's Bat	EPS(Sch2), WCA5
Myotis sp.	a Myotis bat	EPS(Sch2), WCA5
Nyctalus noctula	Noctule Bat	EPS(Sch2), WCA5, S41
Phoca vitulina	Common Seal	S41
Pipistrellus pipistrellus	Common Pipistrelle	EPS(Sch2), WCA5, LBAP
Pipistrellus pygmaeus	Soprano Pipistrelle	EPS(Sch2), WCA5, S41, LBAP
Pipistrellus sp.	a Pipistrelle bat	EPS(Sch2), WCA5, LBAP
Plecotus auritus	Brown Long-eared Bat	EPS(Sch2), WCA5, S41
Plecotus sp.	a Long-eared bat	EPS(Sch2), WCA5, S41
Plants		
Anacamptis morio	Green-winged Orchid	ENG BSBI RDB(VU), LBAP
Bupleurum tenuissimum	Slender Hare's-ear	S41, GB RDB(VU), ENG BSBI RDB(VU), NS, LBAP
Centaurea cyanus	Cornflower	S41, LBAP
Cuscuta epithymum	Dodder	GB RDB(VU), ENG BSBI RDB(VU)
Gymnostomum viridulum	Luisier's Tufa-moss	NS
Misopates orontium	Weasel's-snout	GB RDB(VU), ENG BSBI RDB(VU)
Poa bulbosa	Bulbous Meadow-grass	NS, LBAP
Polypogon monspeliensis	Annual Beard-grass	NS, LBAP
Puccinellia rupestris	Stiff Saltmarsh-grass	NS, LBAP
Ranunculus flammula	Lesser Spearwort	ENG BSBI RDB(VU)
Salicornia fragilis	Yellow Glasswort	NS
Salicornia pusilla	One-flowered Glasswort	NS, LBAP
Sarcocornia perennis	Perennial Glasswort	NS
Spergula arvensis	Corn Spurrey	GB RDB(VU), ENG BSBI RDB(VU)
Tilia platyphyllos	Large-leaved Lime	NS
Trifolium fragiferum	Strawberry Clover	ENG BSBI RDB(VU)
Trifolium suffocatum	Suffocated Clover	NS, LBAP
Viola canina	Heath Dog-violet	ENG BSBI RDB(VU)
Reptiles		

Latin Name	Common Name	Designation
Anguis fragilis	Slow-worm	WCA5, S41
Natrix natrix	Grass Snake	WCA5, S41
Vipera berus	Adder	WCA5, S41
Zootoca vivipara	Common Lizard	WCA5, S41

APPENDIX D – ABBREVIATIONS

Table 7 displays abbreviations of protected species legislation.

Table 7: Glossary of abbreviations used in this report

Code	Full Title	Explanation
Amber	Amber list	Amber listed species have a population status in the UK of medium conservation concern.
BA	The Protection of Badgers Act 1992	Legislation making it an offence to kill, injure or take a Badger, or to damage or interfere with a sett unless a licence is obtained from a statutory authority.
BAP	Biodiversity Action Plan	A plan that identifies threats to significantly important species and habitats, and sets out targets and actions to enhance or maintain biodiversity.
DA	The Deer Act 1991	All wild deer with the exception of Muntjac (*Muntiacus reevesi*) and Chinese Water deer (*Hydropotes inermis*) are protected by a closed season.
ENG BSBI RDB	A Vascular Plant Red List for England	A list published in 2014 by the Botanical Society of Britain and Ireland of the red list status of plants in England. Measured against standardised IUCN criteria.
ENG BSBI RDB(CR)	Critically Endangered	A BSBI Red List designation for species at an extremely high risk of extinction.
ENG BSBI RDB(EN)	Endangered	A BSBI Red List designation for species at a very high risk of extinction.
ENG BSBI RDB(VU)	Vulnerable	A BSBI Red List designation for species at high risk of extinction.
EPS (Sch 2)	European Protected Species (Schedule 2)	European protected animal species (listed on *Schedules 2* of *The Conservation of Habitats and Species* (Amendment) *Regulations 2012*)
EPS (Sch 5)	European Protected Species (Schedule 5)	European protected plant species (listed on *Schedules 5* of *The Conservation of Habitats and Species* (Amendment) *Regulations 2012*)
GB RDB	Red Data Book Species	Species identified in one of the UK Red Data 2001.
GB RDB(CR)	Critically Endangered	An IUCN Red List designation for species at an extremely high risk of extinction.
GB RDB(EN)	Endangered	An IUCN Red List designation for species at a

Code	Full Title	Explanation
		very high risk of extinction.
GB RDB(VU)	Vulnerable	An IUCN Red List designation for species at high risk of extinction.
HAP	Habitat Action Plan	A plan that identifies threats to a priority habitat and sets out targets and actions to enhance or maintain that habitat.
IUCN	International Union for Conservation of Nature and Natural Resources (also known as The World Conservation Union)	A worldwide partnership and conservation network to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.
LBAP	Local Biodiversity Action Plan	A plan that identifies threats to locally important species and habitats, and sets out targets and actions in Species Action Plans and Habitat Action Plans to enhance or maintain biodiversity at the county or regional level.
LHAP	Local Habitat Action Plan	A plan that identifies threats to a locally important priority habitat and sets out targets and actions to enhance or maintain that habitat.
LSAP	Local Species Action Plan	A plan that identifies threats to locally important species, and sets out targets and actions to prevent losing that species from the local area.
Notable	Scarce and threatened invertebrates	Invertebrate species which are estimated to occur within the range of 16 to 100 10km squares but subdivision into Notable A and Notable B categories is not possible as there is insufficient information available).
Notable:A	Scarce and threatened invertebrates	Taxa which do not fall within Red Data Book categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties.
Notable: B	Scarce and threatened invertebrates	Taxa which do not fall within Red Data Book categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties.
NN	Nationally Notable	Designation for invertebrate taxa that are thought to be notably important in the UK.
NR	Nationally Rare	Species in 15 or fewer hectads in Great Britain.
NS	National Scarce	Species in 16-100 hectads in Great Britain.
Red	Red List	Red listed species have a population status in the UK with high conservation concern.
SAP	Species Action Plan	A plan that identifies threats to significantly

Code	Full Title	Explanation
		important species, and sets out targets and actions to prevent losing that species to extinction.
S41	Species of Principal Importance	Species of Principal Importance in England under *The Natural Environment and Rural Communities (NERC) Act (2006)*
UKBAP	UK Biodiversity Action Plan	A plan that identifies threats to locally important species and habitats, and sets out targets and actions in Species Action Plans and Habitat Action Plans to enhance or maintain biodiversity in the UK.
WCA	*The Wildlife and Countryside Act 1981* (as amended)	Containing 4 Parts and 17 Schedules, the Act covers protection of wildlife (birds, and some animals and plants), the countryside, National Parks, and the designation of protected areas, and public rights of way. All wild plants in Britain are protected from intentional uprooting by an unauthorized person, but land owners, land occupiers, persons authorized by either of these or persons authorized in writing by the Local Authority for the area are exempt. Protection for some species may be limited to certain Sections of the Act (*e.g.* S13(2).
WCA1	Schedule 1 of *The Wildlife and Countryside Act 1981* (as amended)	This Schedule lists birds protected by special penalties at all times, but virtually all wild birds have some protection in law. Acts which are prohibited for all wild birds (except derogated 'pest' species) include intentional killing, injuring or taking; taking, damaging or destroying nests in use or being built; taking or destroying eggs; possessing or having control of (with certain exceptions but including live for dead birds, parts or derivative); setting or permitting certain traps, weapons, decoys or poisons. Selling, offering or exposing for sale, possessing or transporting for sale any live wild bird, egg or part of an egg or advertising any of these for sale, or dead wild bird including parts or derivatives are also prohibited. Many birds must be formally registered and ringed if kept in captivity. Schedule I WCA birds are additionally protected from intentional or reckless disturbance while building a nest, or when such a bird is in, on or near a nest containing eggs or young, or intentional or reckless disturbance of dependent young.
WCA5	Schedule 5 of *The Wildlife and Countryside Act*	Schedule 5 animals are protected from intentional killing, injuring or taking; possessing (including parts or derivatives); intentional or

Code	Full Title	Explanation
	1981 (as amended)	reckless damage, destruction or obstruction of any structure or place used for shelter or protection; selling, offering or exposing for sale, possessing or transporting for the purpose of sale (alive or dead, including parts or derivatives). Protection of some species is limited to certain Sections of the Act (*e.g.* S9(1), S9(4a), S9(4b), S9(5)).
WCA8	Schedule 8 of *The Wildlife and Countryside Act 1981* (as amended)	Plants and fungi protected from intentional picking, uprooting, destroying, trading (including parts or derivatives), *etc*.

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Matthew Brewer
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06 February 2018

Ref: 856776 – GE Aviation, Hamble – HRA Screening – Rev 0

Dear Mr Brewer,

This letter outlines the results of a Stage 1 screening Habitat Regulations Assessment (HRA) in relation to the proposed residential development of *c.*150 units at the GE Aviation site in Hamble-le-Rice. The site is within 300 m of the Solent and Southampton Water RAMSAR and Special Protection Area (SPA) and Lee-on-the Solent to Itchen Estuary Site of Special Scientific Interest (SSSI).

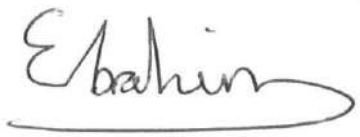
The works include construction of *c.*150 units with accompanying access roads, parking and landscaping, this document specifically considers potential effects of the proposed works on the designated features of the protected sites.

This assessment comprises the initial stages of the HRA process, i.e. a screening assessment and subsequent No Significant Effects Report. The results of the assessment are provided within the screening table (*Appendix 1*) and subsequent No Significant Effect Report (*Appendix 2*). The assessment is based on the Preliminary Ecological Appraisal (RSK 2017), wintering bird surveys (RSK 2018) and consultation with Eastleigh Borough Council and the Hampshire & Isle of Wight Wildlife Trust.

As can be seen from the assessment, due to the absence of key species on site and the contributions that will be provided to the Solent Recreation Mitigation Strategy, no significant effects on the designated features are anticipated.

If you have any questions please do not hesitate to contact me on 01442 416680 or email eibrahim@rsk.co.uk.

Yours sincerely,



Errol Ibrahim
Ecological Consultant

Technical Review by:

Tom Smith
Associate Director
On behalf of RSK Environment

Appendix 1 – Screening Matrix

Project Name	GE Aviation, Hamble
Natura 2000 Site under Consideration	Solent and Southampton Water Ramsar & SPA (Lee-on-the Solent to Itchen Estuary SSSI)

Date	**Author**
February 2018	Errol Ibrahim
Brief description of the project or plan	Construction of a new residential area of *c.* 150 units. With associated car parking and landscaping.
Brief description of the Natura 2000 site	The site is of international importance for over-wintering dark-bellied brent geese and of national importance for three species of wildfowl (great-crested grebe, teal and wigeon) and five species of wader (black-tailed godwit, dunlin, grey plover, ringed plover, redshank). The SSSI supports an outstanding assemblage of nationally scarce coastal plants. In addition, the cliffs at Brownwich and the foreshore at Lee-on-The Solent are of national geological importance. [1]
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 site.	The scheme will involve the construction of *c. 150* residential units with accompanying access roads, parking and landscaping (*Figure 1*). All of the works being undertaken are outside of the designated sites.
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:	
size and scale;	The area of the GE aviation development is *c.*8 ha. None of the proposed works are situated within a designated site. The nearest Natura 2000 designated sites are Lee-on-the Solent to Itchen Estuary SSSI (290 m) and Solent and Southampton Water RAMSAR SPA (290 m).

[1] https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1005846.pdf

land-take	There will be a permanent loss of *c.* 2.4 ha of amenity grassland and planted coniferous trees. However this is not within any of the designated site. The football pitch and bowls area will be retained as will the tree lines which provide an ecological corridor to surrounding woodlands and suitable nesting habitats for birds.
distance from the Natura 2000 site or key features of the site	Approximately 340 m to Lee-on-the Solent to Itchen Estuary SSSI and Solent and Southampton Water RAMSAR SPA.
resource requirements (water abstraction etc.)	None
emissions (disposal to land, water or air)	Minor emissions from construction machinery.
excavation requirements	It is anticipated there will be multiple excavations relating to the construction of the residential development, all of which will be outside of the RAMSAR SPA boundary.
transportation requirements	Access to the site for construction traffic will be from the existing road network.
duration of construction, operation, decommissioning, etc	Works will are anticipated to take 12 months to complete. All works are outside of the RAMSAR SPA boundary.
other	-
Describe any likely changes to the site arising as a result of:	
reduction of habitat area:	There will be no loss of habitats within the designated sites. Amenity grassland and planted coniferous trees will be lost on site but these habitats have little conservation value.

disturbance to key species	There is the potential for disturbance impacts during construction should activities be scheduled during winter and birds utilise the site. However, surveys undertaken between October 2017 and December 2017 found no key species (brent goose and waders) using the site and therefore the site is not providing a support function to key species listed within the citation. These survey results were also reviewed by Hampshire & Isle of Wight Wildlife Trust and followed their survey effort requirements. Disturbance impacts are therefore considered not significant.
habitat or species fragmentation	None
reduction in species density	There is some potential for disturbance during the construction works that could affect species density; however as detailed above, no key species were recorded using the site during recent surveys.
changes in key indicators of conservation value (water quality etc.)	None
climate change	None
Describe any likely impacts on the Natura 2000 site as a whole in terms of:	
interference with the key relationships that define the structure of the site	-
interference with key relationships that define the function of the site	-
Provide indicators of significance as a result of the identification of effects set out above in terms of:	
loss	No loss of habitat within the Natura 2000 site.
fragmentation	No impacts anticipated
disruption	Temporary

disturbance	Net increase in residential development as a result of the housing development would lead to a likely significant effect from disturbance; however, this significant effect will be controlled by the Solent Recreational Mitigation Strategy (SRMS). The strategy is backed by Natural England and provides sufficient mitigation to offset any disturbance from new developments within the Eastleigh borough. A financial levy is provided for each new dwelling within 5.6km of the SPA which funds the mitigation project. This development will therefore be subject to the levy.
change to key elements of the site (e.g. water quality etc.).	No impacts anticipated.
Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	Impacts are known and not considered significant due to the Natural England back SRMS.

Appendix 2 – No Significant Effects Report

Project Name	GE Aviation, Hamble
Natura 2000 Site under Consideration	Solent and Southampton Water Ramsar & SPA (Lee-on-the Solent to Itchen Estuary SSSI)

Date	**Author**
January 2018	Errol Ibrahim
Name and location of European Site	Solent and Southampton Water Ramsar & SPA
Description of the project	Construction of a new residential area of *c.* 150 units. With associated car parking and landscaping.
Is the project directly connected with or necessary to the management of the site (provide details)?	No
Are there other projects or plans that together with the project being assessed could affect the site (provide details)?	No, any recreational pressure/disturbance would be offset by the Solent Recreational Mitigation Partnership Interim Strategy. The strategy aims to prevent any disturbance as a result of additional recreational pressures arising from the *c.* 64,000 new dwellings planned around the Solent SPAs.[2]
The Assessment of Significance of Effects	
Describe how the project (alone or in combination) is likely to affect the European Site	Increased recreational pressure as a result of the development, which will likely cause an increase in disturbance.
Explain why these effects are not considered significant.	A financial levy is provided for each new dwelling within 5.6km of the SPA which funds the Solent Recreational Mitigation Strategy (SRMS).
List of agencies consulted: provide contact name and telephone or e-mail address.	Eastleigh Borough Council. Deborah Salmon, Ecologist (Deborah.Salmon@eastleigh.gov.uk) Hampshire & Isle of Wight Wildlife Trust. Trevor Codlin, Senior Specialist for Planning & Development (Trevor.Codlin@hiwwt.org.uk)

[2] http://www.birdaware.org/CHttpHandler.ashx?id=29372&p=0

Response to Consultation	Early consultation with the Council Ecologist suggested that the development would not cause any significant effects subject to the financial levy. It was requested that requested that the wildlife trust should be contacted to discuss an appropriate wintering bird survey strategy to confirm this During meetings setting out the results of surveys HIWWT was consulted on the survey strategy and an agreement made that results would also be reviewed by HIWWT. Following the surveys, HIWWT were satisfied that our survey effort demonstrated that the site was not currently used by waders and brent geese. In their opinion there would be no significant effects as a result of the development, particularly given that any recreation issues would be dealt with by contributions to the SRMS.

Data Collected to carry out the Assessment

Who carried out the assessment?	*Sources of data*	*Level of assessment completed*	*Where can the full results of the assessment be accessed and reviewed?*
Errol Ibrahim	Record – LRC; Natural England Website; Solent Waders and Brent Goose Strategy Website; Solent Recreation Mitigation Strategy.	Screening	Preliminary Ecological Appraisal Report. Wintering Bird Survey Report.

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16 July 2018

Our reference: 857362 – GE Aviation – Ecological Surveys Summary Letter

Mr Matthew Brewer

Planner - RPS Planning & Development

140 London Wall

London

EC2Y 5DN

United Kingdom

Dear Matthew,

GE AVIATION – ECOLOGICAL SURVEYS SUMMARY

This letter provides a summary of all ecological surveys carried out in relation to the proposed residential development on the GE Aviation Campus (*Appendix 1*). Due to changes in scheme design, recommendations in previous reports are no longer applicable. Therefore, all recommendations have been reviewed and those within this report supersede those in previous ecological reports provided by RSK. This letter should be read as an aide memoire to the detailed ecological survey reports submitted in connection with a detailed planning application for the site.

Existing Ecological Survey Reports

A number of ecological surveys were carried between February 2017 and January 2018. A summary is provided in *Table 1*.

Table 1. Ecological surveys carried out to date at GE Aviation Campus.

Survey	Survey Date	Report Reference
Preliminary Ecological Appraisal	February 2014	RSK (2017) 856776 – GE Aviation – PEA Report
Reptile surveys	April – June 2017	RSK (2017) 856776 – GE Aviation – Reptile Survey Report
Breeding bird surveys	April – June 2017	RSK (2017) 856776 – GE Aviation – Breeding Bird Survey Report
Wintering bird surveys	October – December 2017	RSK (2017) 856776 – GE Aviation – Wintering Bird Survey Report
Dormouse surveys	April – October 2017	RSK (2017) 856776 – GE Aviation – Dormouse Survey Report

Survey	Survey Date	Report Reference
Preliminary bat roost assessment of buildings and trees	April 2017 – January 2018	RSK (2017) 856776 – GE Aviation – Preliminary Roost Assessment Report RSK (2017) 856776 – GE Aviation – Breeding Bird Survey Report
Bat activity surveys	April – October 2017	RSK (2017) 856776 – GE Aviation – Bat Activity Survey Report
Bat emergence / dawn surveys	August – September 2017	RSK (2017) 87362 –GE Aviation – Bat Survey Report
Habitat Regulations Assessment	February 2018	RSK (February 2018) 856776 – GE Aviation – HRA Screening Letter Report

Ecological Surveys - Summary

Extended Phase 1 Habitat Surveys

The development site comprises 11 buildings, fragments of broad-leaved woodland, mixed plantation woodland, mature trees, introduced scrub, species-poor hedges and amenity grassland.

There are 26 statutory designated sites and 21 non-statutory designated sites within 5 km. There are records of birds including Barn Owl (*Tyto alba*) and Greenshank (*Tringa nebularia*), protected invertebrates including White-letter Hairstreak (*Satyrium w-album*) and Stage Beetle (*Lucanus cervus*), Water Vole (*Arvicola terrestris*), Badger (*Meles meles*), Slow-worm (*Anguis fragillis*) and various bat species from within 2 km of the site.

The development site abuts ancient woodland and the West Wood SINC, in order to protect these areas from the urbanising and recreational impacts a 20 m buffer from the development has been adopted and a woodland management plan should be provided.

Great Crested Newts

Habitats on site were deemed to be suitable for Great Crested Newt and a single pond was identified using aerial imagery. The location of the pond was visited and it was discovered that the pond no longer held water and, as a result, was unsuitable for Great Crested Newts. No further survey work or mitigation is required with regard to this species.

Reptiles

A medium population of Slow Worm (*Anguis fragilis*) was found during surveys in 2017. Slow Worms were concentrated around the northern and southern boundaries of the site in areas of scattered broad-leaved trees and mixed plantation woodland. The majority of the site is amenity grassland and hard standing which is not suitable habitat for common reptiles. Development proposals retain all suitable habitat for reptiles; as a result a translocation will not be required. A method statement will be produced by a suitably qualified ecologist outlining the precautionary measures to be followed during the works. Habitat features (such as log piles) will be included in the scheme to provide reptiles with additional refuges.

Breeding Birds

Breeding bird surveys were undertaken in April, May and June, thirty species of bird were recorded – of these 24 species were either confirmed breeding (five), probable breeding (eight) or possible breeding (11). Vegetation clearance will be undertaken outside of the nesting bird season (where possible) or checked by an ecologist prior to removal.

Wintering Birds

Surveys recorded 40 species of birds, including Schedule 1, UKBAP and BoCC species and species included in the Solent and Southampton Water SPAs and Ramsar sites. None of these species were found within the site boundary, suggesting that the site is not used by wintering birds, possibly due to the heavy levels of disturbance. Due to the size of the development, a financial levy will be provided to the Solent Recreational Mitigation Strategy, this strategy is supported by Natural England and aims to provide sufficient mitigation to offset any disturbance from new developments with the Eastleigh borough,

Dormice

Surveys during 2017 found that Hazel Dormice (*Muscardinus avellanarius*) were absent from the site and no further actions were required.

Badgers

No Badger setts or evidence of foraging Badger were found during the Preliminary Ecological Appraisal undertaken in February 2017. Further detailed surveys are not necessary.

Bats – buildings

Table 2 provides a summary of the surveys and results.

Table 2. Results of preliminary roost assessment for bats

Building reference	Date	Surveyors	Bat Roost Potential
Sydney Lodge	27/04/2017	John Daw (Class 2 licence: 2015-10716-CLS-CLS) with assistance from Olivia Guidon.	**Confirmed Roost**
Sports Pavillion	27/04/2017	John Daw (Class 2 licence: 2015-10716-CLS-CLS) with assistance from Olivia Guidon.	**Moderate Potential**
Security Kiosk	27/04/2017	John Daw (Class 2 licence: 2015-10716-CLS-CLS) with assistance from Olivia Guidon.	**Negligible Potential**
Building 3	27/04/2017	John Daw (Class 2 licence: 2015-10716-CLS-CLS) with assistance from Olivia Guidon.	**Moderate Potential**

Building reference	Date	Surveyors	Bat Roost Potential
Old Canteen	27/04/2017	John Daw (Class 2 licence: 2015-10716-CLS-CLS) with assistance from Olivia Guidon.	**Low Potential**
Offices	27/04/2017	John Daw (Class 2 licence: 2015-10716-CLS-CLS) with assistance from Olivia Guidon.	**Negligible Potential**
Design Office	27/04/2017	John Daw (Class 2 licence: 2015-10716-CLS-CLS) with assistance from Olivia Guidon.	**Negligible Potential**
Building 7a	27/04/2017	John Daw (Class 2 licence: 2015-10716-CLS-CLS) with assistance from Olivia Guidon.	**Negligible Potential**
Building 9	28/09/2017	Jessica Breeze (Class 2 licence: 2015-17895-CLS-CLS) with assistance from Cecilia Montauban	**Negligible Potential**
Building 31	28/09/2017	Jessica Breeze (Class 2 licence: 2015-17895-CLS-CLS) with assistance from Cecilia Montauban	**Negligible Potential**
Building 4	23/01/2018	Errol Ibrahim (Class 2 licence: 2017-32783-CLS-CLS) with assistance from Cecilia Montauban	**Negligible Potential**

Bats – trees

All trees on site were assess for their potential for roosting bats; three had low potential, 21 had moderate potential and nine had high potential for roosting bats. All trees are due to be retained so no further surveys are required.

Bats – emergence/re-entry surveys

As a result of the preliminary bat roost assessments ,further surveys were required on buildings that had roosting potential in order to determine if bat roosts were present. Sydney Lodge, the building confirmed as a roost during preliminary surveys, will not be affected by the proposals. As such, no further surveys were undertaken. Results of these surveys are provided in *Table 3*.

Table 3. Details of bat emergence/re-entry surveys

Building and Visit Number	Date	Surveyors	Time	Weather Conditions	Results
Old Canteen 1/1	29/08/2017	Errol Ibrahim, Alice Clarke	Start: 19:41	Warm and dry, Wind : 1-2,	No bats were observed

Building and Visit Number	Date	Surveyors	Time	Weather Conditions	Results
		and Sarah Kitchen	Finish: 21:26	Temp: 19°C	emerging.
Building 3 1/2	30/08/2017	Jan Skuriat and Sarah Kitchen	Start: 19:39 Finish: 21:24	Mild and dry, Wind : 1-2, Temp: 14°C	No bats were observed emerging.
Building 3 2/2	13/09/2017	Jan Skuriat and Sarah Kitchen	Start: 19:08 Finish: 20:53	Mild and dry, Wind : 3, Temp: 14°C	No bats were observed emerging.
Sports Pavilion 1/3	31/08/2017	Jade Brennan and Louis Edwards	Start: 19:37 Finish: 21:22	Warm and dry, Wind : 1-2, Temp: 15°C	A single Common Pipistrelle (*Pipistrellus pipistrellus)* was observed emerging from behind the scoreboard on the north-western elevation of the building at 20:29
Sports Pavilion 2/3	13/09/2017	Jan Skuriat Luke Burgess and Cecilia Montauban	Start: 05:07 Finish: 06:52	Mild and dry, Wind : 3, Temp: 13°C	No bats were observed emerging.
Sports Pavilion 3/3	28/09/2017	Jess Breeze, Cecilia Montauban and Sarah Kitchen	Start: 18:35 Finish: 20:20	Still and Clear. Wind : 1, Temp: 15°C	No bats were observed emerging.

No bats were recorded emerging from building 3 or the Old Canteen. It is therefore unlikely that bats are using these buildings for roosting purposes. No further survey work in relation to these buildings is required, and their proposed demolition can proceed without the requirement of a European Protected Species Licence. During the first dusk emergence survey on the Sports Pavilion, a Common Pipistrelle bat roost was identified and a further two surveys were required to provide survey data for an EPS license application to demolish the building. Based on the survey findings, the roost is considered to be a transitory day roost, likely being used by a male bat.

As ‘day roosts’ are considered roosts of low conservation importance, and a single common bat species was found to be using the roost it is eligible to be covered under a Low Impact Bat Class Licence.

Low Impact Bat Class Licences, granted by NE, permit activities that would otherwise be illegal such as the disturbance of bats or damaging or destroying bat roosts. They comprise a site registration form, which will provide details of all survey work carried out relating to the species concerned, a population assessment, an impact assessment and a strategy to minimise, mitigate or compensate for the impacts.

Although Low Impact Bat Class Licences do not require mitigation in the form of roost compensation, it is advisable that bat boxes are installed on a tree on site. This is so there is somewhere to place a bat should one be found during the supervised soft strip/demolition works.

Bats – foraging and commuting

During activity surveys in 2017, seven bat species were recorded. The most frequently recorded species was Common Pipistrelle, with Soprano Pipistrelle *Myotis* species recorded less often. Activity was concentrated around the tree line to the north and the mixed plantation woodland. The site is considered to be of 'County' value for commuting and foraging bats. The important commuting and foraging habitats are due to be retained. Coniferous tree lines within the site are due to be removed, but these are not connected to the wider habitats and little foraging and commuting activity was recorded around them. This vegetation clearance should be undertaken during the winter months to limit disturbance. Current proposals also aim to improve the connectivity of the site by planting additional tree lines and hedgerows (*Appendix 1*).

A 'bat-friendly' lighting strategy should be agreed for the development, including during construction from April to October. This should include details of the height of all lighting, the intensity of lighting (specified in Lux levels), spread of light, approximate light spillage levels (in metres), light colour, the times when the lighting would be illuminated, and any measures proposed to mitigate the impact of the new lighting or disturbance through glare (such as making use of cowls and hoods). Overall, the lighting strategy should ensure that light will only be directed as required (with minimal light-spill), should not be directed at those habitats on the site that are most often used by bats (see above).

Other Species

There is suitable habitat for Stag Beetles on site and there were multiple sightings of Hedgehogs during Bat activity surveys. Suitable Hedgehog refuge areas (*e.g.* piles of leaf litter and log piles) should be checked prior to clearing to ensure that no Hedgehogs are killed or injured in the process. This is of particular importance during the breeding period (April – September) and when the animals are hibernating (November – March). Checks can be made by the contractors carrying out the works and if any Hedgehogs are found works should stop in that area and the animal(s) left to disperse on their own accord. Where possible the removal of Hedgehog refugia should be avoided during the hibernation period, if this is not possible then any Hedgehogs found should be relocated to suitable habitat or a 'hedgehog house' by a suitably qualified ecologist.

Steps should be taken to ensure that fences around residential units do not form a barrier to Hedgehogs moving around the area. A solution is the installation of Hedgehog-friendly gravel boards at the base of each fence. These boards have a gap which allows the animals to pass freely between gardens and to exit into the wider landscape. If wooden gravel boards are not suitable then any solution which provides a 13 cm x 13 cm hole (large enough for an adult Hedgehog) at the base of every fence is acceptable. The new occupants of the development should be made aware of Hedgehog holes and encouraged to keep them clear. Labels advising residents of the purpose of the Hedgehog holes are available from PTES[1].

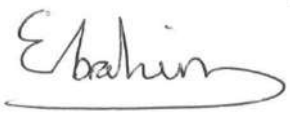
[1] https://www.jacksons-fencing.co.uk/product/sc_667610/hedgehog-gravel-board-for-use-with-slotted-posts-1.83m-x-150-x-28mm-incl.1-x-end-packer-1-x-length-packer-jakcured.aspx?tpc=AB&fmc=DS&fnc=AX&timber=1

Other enhancements for both Stage Beetles and Hedgehogs could include the provision of log piles (a useful way to use any wood cut during construction) in areas where they will not be disturbed.

If you have any questions regarding this letter please do not hesitate to contact me on 01442 416680 or email eibrahim@rsk.co.uk

Yours sincerely,

For RSK Company Limited



Errol Ibrahim

Ecological Consultant

Technical and Commercial review by:

Simon Boulter
Director
On behalf of RSK Environment

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Sketch

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Rev.	Description	Date
A	Amended to include new plot of land comprising 0.55 Ha	05.09.2017
B	Amended to accommodate Football Pitch and Bowling Green on site	20.10.2017
C	Amended to rellocate Football Pitch and Bowling Green on site	23.10.2017
D	Amended to revise Football Pitch and Bowling Green on site	24.10.2017
E	Amended to retain existing Bowling Green and Football Pitch	24.10.2017
F	Amended to incorporate Football Club facilities	25.10.2017
G	Amended to include GE multi storey car park	25.11.2017
H	Amended to include new GE Parking area and road amendments	10.11.2017
I	Amended to accommodate new road layout	15.01.2018
J	Amended to accommodate new road layout	15.01.2018
K	Amended following Team Meeting on 16.01.18	15.01.2018
L	Amended to incorporate new road layout and parking revision	25.01.2018
M	Amended to increase car parking provision for sports pitches and revised GE fencing proposal	02.02.2018
N	Amended to provide with second access to residential development	01.03.2018
O	Amended to respond to comments received from Eastleigh BC	03.04.2018
P	Amended to respond to comments received from Design Review Panel	23.04.2018
Q	Amended to incorporate new road and parking areas layout	30.04.2018
R	Amended to increase number of residential units and incorporate new road and access layout	08.06.2018
S	Amended following comments to revise mix and type of units	02.07.2018

Notes

	Area (m2)	Number
1 Bed	50 - 55	15
2 Bed	70 - 80	37
3 Bed	84 - 102	79
4 Bed	110-130	17
Total		148

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Project: GE Aviation
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Title: Proposed Site Layout

Status: S K E T C H

Scale: 1:1000 **Date:** 06/2017

Revision: S **Sheet:** A1

Drg No: FD 16 - 1431 - 55 - SK

Surveys

Bat Activity Survey Report

Bat Surveys Report

Preliminary Root Assessment Report

Wintering Bird Survey Report

Breeding Bird Survey Report

Hazel Dormouse Survey Report

Reptile Survey Report

GE Aviation

Bat Activity Survey Report

Hamble-le-Rice, Hampshire

856776

FEBRUARY 2018

RSK GENERAL NOTES

Project No.: 856776

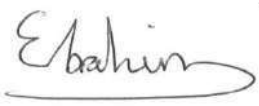
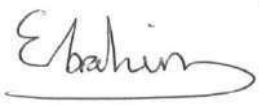
Title: GE Aviation Bat Activity Survey Report

Client: GE Aviation

Date: February 2018

Office: Hemel Hempstead

Status: Final

Author	Errol Ibrahim	**Technical reviewer**	R. Carter
Signature		Signature	
Date:	19.02.2018	Date:	19.02.2018
Project manager	Errol Ibrahim	**Quality reviewer**	R. Carter
Signature		Signature	
Date:	19.02.2018	Date:	19.02.2018

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report provides details of bat surveys carried out in connection with a planned residential development associated car parking, roads and landscaping.
2. The habitats were initially assessed on 7 February 2017 as having high suitability for bat commuting and foraging.
3. Bat transect surveys measuring activity across the site were carried out in spring, summer and autumn 2017, augmented by static bat detector surveys using automated units.
4. During the walked transects, bat activity was concentrated around the lines of trees and woodland edges.
5. Static bat detectors were deployed in the north and south-east of the site recording between 30 minutes before dusk until 30 minutes after dawn for periods of 5 days on each occasion. The detectors were deployed during April, May, June, July, August, September and October 2017.
6. At least seven species of bat were identified from recordings during the above surveys.
7. The site has been evaluated as of importance at a county level for foraging and commuting bats.
8. Recommendations have been included to help minimise effects on local bat populations from the planned development, primarily comprising the retention of natural foraging and commuting routes along the boundaries and measures to minimise light spill.

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1 INTRODUCTION

1.1 Purpose of Report

This report contains details of bat surveys and static bat detector surveys carried out in 2017 for a proposed residential development of *c.*145 units at the GE Aviation Campus in Hamble-le-rice, Hampshire. *Figure 1* shows the site location and boundary.

1.2 Ecological Context

The site – which is *c.*500 m from the coast – is part of a *c.*20 ha industrial campus comprising areas of hard-standing and industrial buildings alongside a sports ground and some broadleaved woodland (*Figure 1*). There is a large amount of ornamental planting throughout. To the north of the site is the Royal Victoria Country Park. To the west and south is Southampton Water, and to the east there are residential areas which form part of the village of Hamble-le-Rice. There are 28 designated sites within 5 km of the campus, some of which are directly adjacent to the site.

1.3 Structure of the Report

The remainder of this report is structured as follows:

- *Section 2* describes the survey and assessment methods;
- *Section 3* presents the survey results;
- *Section 4* gives an evaluation of the results;
- *Section 5* lists the references; and
- *Section 6* provides figures.
- *Appendix 1* provides the masterplan.

2 METHODS

2.1 Personnel

Bat activity surveys were by led by Jan Skuriat, an RSK Principal Ecologist, with Jess Breeze and Errol Ibrahim, both RSK Ecologists. Jan (2015-15428-CLS-CLS), Jess (2015-17895-CLS-CLS) and Errol (2017-32783-CLS-CLS) hold Class 2 Natural England licences allowing the disturbance of bats for the purposes of survey in all counties of England. All surveyors have membership to the Chartered Institute of Ecology and Environmental Management (CIEEM) and are experienced in surveys of this type.

2.2 Habitats

Habitats were assessed for their suitability for foraging and commuting bats during a preliminary ecological appraisal undertaken by RSK in January 2016. Areas of particular interest vary between bat species, but generally include sheltered areas and habitats with good numbers of insects such as woodland edges, hedgerows, watercourses and species-rich or rough grassland.

Habitats of particular interest to foraging and commuting bats that are present on the site are:

- hedgerows;
- tree lines; and
- woodland areas.

2.3 Transect Surveys

Bat surveys followed methodology outlined in published guidelines (Collins, 2016) to identify any areas of high commuting or foraging activity and also to confirm the species involved (large roosts can also sometimes be identified from patterns of activity). Survey visits were undertaken in April, May, June, July, August, September and October 2017.

Transects were completed at dusk or dawn and involved two surveyors walking a pre-defined route (continuously recording any signs of bat activity) and stopping for five minutes at 'random' locations before continuing; although the stops were 'random', monitoring locations were chosen to sample areas with high quality habitat where bats were likely to be encountered if present, but also to sample all habitat types present.

On each visit, the transect route was walked in weather conducive to bat activity (above 8°C with little or no rain and no strong winds) using an Elekon Batlogger M bat detector. Recordings of bat calls were made automatically by this detector during the survey in full spectrum format, with coordinates assigned to each recording by a GPS unit within the detector. These geo-referenced recordings were later uploaded to produce the transect maps shown in *Figures 3 to 10*. The start and end point of transects and the

direction they were walked was alternated between each visit to try and take into account changes in bat activity across the site throughout the evening.

Table 1 details the dates and survey times for each activity survey completed. Weather conditions recorded at the beginning and end of each survey were also recorded. These are provided in *Table 2*.

Table 1. Survey dates and timings for each transect survey

Date	Survey Type	Sunrise Time	Sunset Time	Start Time	End Time
20.04.2017	Dusk	n/a	20:09	20:09	22:10
23.05.2017	Dusk	n/a	20:59	20:59	23:00
28.06.2017	Dusk	n/a	21:22	21:23	23:22
10.07.2017	Dusk	n/a	21:17	21:17	23:20
11.07.2017	Dawn	05:04	n/a	03:00	05:05
08.08.2017	Dusk	n/a	20:38	20:38	22:40
06.09.2017	Dusk	n/a	19:39	19:39	21:40
09.10.2017	Dusk	n/a	18:25	18:25	20:30

Table 2. Weather conditions for activity surveys

Date	Air Temperature (°C)	Cloud Cover (Octas)	Wind Speed (Beaufort)	Precipitation
20.04.2017	14	3	1	None
23.05.2017	18	2	1	None
28.06.2017	14	8	2	None
10.07.2017	21	4	4	None
11.07.2017	17	7	3	None
08.08.2017	10	5	0	None
06.09.2017	16	5	3	None
09.10.2017	12	7	1	None

Levels of bat activity were quantified by the number of bat passes recorded along the route. A single pass by a bat is defined by a gap of one second or more between the end of one call and beginning of the next bat call. Species were identified either in the field or through the analysis of recordings using Elekon BatExplorer® and Wildlife Acoustics Kaleidoscope® software programs.

2.4 Automated Monitoring

Two Wildlife Acoustics Song Meter 2 Bat+ (SM2) detector were installed on site (see *Figure 2*) in two separate locations across the site in April, May, June, July, August, September and October 2017 as shown on *Table 3*.

Each detector was located alongside features typically used by foraging or commuting bats, such as hedgerows or tree lines.

In compliance with the Collins (2016) survey guidelines, the SM2s provided data collected over a minimum of five consecutive nights in each month of deployment to augment the data collected during the transect surveys. Survey dates were selected when the weather forecast indicated suitable weather for foraging and commuting bats (*i.e.* air temperature above 8°C, the absence of strong winds and minimal precipitation). The units were set up to record continuously from 30 minutes before sunset until 30 minutes after sunrise. Microphones were mounted on extension cables at least 3m off the ground.

Table 3. Survey dates for SM2 detector deployment

Survey Night	April 2017	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017
1	20.04.2017	23.05.2017	28.06.2017	10.07.2017	08.08.2017	07.09.2017	09.10.2017
2	21.04.2017	24.05.2017	29.06.2017	11.07.2017	09.08.2017	08.09.2017	10.10.2017
3	22.04.2017	25.05.2017	30.06.2017	12.07.2017	10.08.2017	09.09.2017	11.10.2017
4	23.04.2017	26.05.2017	01.06.2017	13.07.2017	11.08.2017	10.09.2017	12.10.2017
5	24.04.2017	27.05.2017	02.06.2017	14.07.2017	12.08.2017	11.09.2017	13.10.2017
6	25.04.2017	28.05.2017	03.06.2017	15.07.2017	13.08.2017	12.09.2017	14.10.2017
7		29.05.2017	04.06.2017	16.07.2017	14.08.2017		15.10.2017
8		30.05.2017	05.06.2017	17.07.2017	15.08.2017		16.10.2017
9				18.07.2017	16.08.2017		

All recordings were stored on memory cards and analysed using the Kaleidoscope Pro® software program. All automated identifications and 'no ID' files from the software were double checked by an experienced ecologist. In addition, a minimum of 10% of all 'Noise' files recorded during each deployment for each detector were reviewed for any bat echolocation calls hidden within, which had not been identified as a bat call by the software. For those deployments where up to *c.*1500 noise files or less were recorded, these were all checked by an experienced ecologist.

The Kaleidoscope Pro® analysis software produces a single file for each recording of ultrasonic activity. Where these ultrasonic recordings include bats, the level of bat activity was quantified by the number of files (for the purposes of this analysed deemed as bat 'passes') for each recorded species for each night and monitoring period. Note that there is no way of extrapolating how many bats were being recorded from this acoustic only data, just the level of activity.

2.5 Sound Analysis

Echolocation calls were identified down to species wherever possible; however, depending on the type of bat encountered and call recorded it is not always possible to reliably identify all bats beyond their genus. In particular, because of the similarities of their frequency modulated calls, Myotis bat species cannot reliably be separated.

It can also be difficult to distinguish between the two bats in the *Nyctalus* genus, Noctule (*N. noctula*) and Leisler's bat (*N. leisleri*), and occasionally alongside Serotine (*Eptesicus serotinus*). Some calls of Common Pipistrelle (*Pipistrellus pipistrellus*) also overlap with either Nathusius' Pipistrelle (*P. nathusii*) or Soprano Pipistrelle (*P.pygmaeus*). Analysis of cryptic calls can also be more difficult with feint or poor quality recordings.

Lastly, there are a number of variables that affect the 'detectability' of a bat, ranging from its biology and ecology, to the environmental conditions and condition of the equipment, and so there are limitations in drawing certain conclusions about bat activity on a site from the use of bat detectors and sound analysis alone.

2.6 Methods of Evaluation

To set the bat assemblages using the site in 2017 in a wider context, the monitoring results been evaluated against adapted criteria from Wray *et al*. (2010). This method has also been used in the absence of any other recognised approach.

For this method, where bats (species and likely number of) are found using certain habitats (to roost, commute or forage) their population is assigned a relative ecological value. This value is partly based upon how well used a habitat is and partly upon how rare the bat species is. The number of roosts nearby is also a factor.

In this method of assessment British bat species are subdivided into groups, dependent upon how common they are: common, rarer and rarest. These were further subdivided based upon the location of the site surveyed (i.e. in England), as shown in *Table 4.*

Table 4. Categorising bats by distribution and rarity in England

Rarity in England:	Bat Species:
Rarest (population estimated to be under 10,000)	Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) Bechstein's Bat (*Myotis Bechsteinii*) Alcathoe Bat (*Myotis Alcathoe*) Greater Mouse-Eared Bat (*Myotis myotis*) Barbastelle Bat (*Barbastella barbastellus*) Grey Long-Eared Bat (*Plecotus austriacus*)
Rarer (population estimated to be 10,000 to 100,000)	Lesser Horseshoe Bat (*Rhinolophus hipposideros*) Whiskered Bat (*Myotis mystacinus*) Brandt's Bat (*Myotis brandii*) Daubenton's Bat (*Myotis daubentonii*) Natterer's Bat (*Myotis nattereri*) Leisler's Bat (*Nyctalus leisleri*) Noctule (*Nyctalus noctula*) Nathusius' Pipistrelle (*Pipistrellus nathusii*) Serotine (*Eptesicus serotinus*)
Common (population estimated to be over 100,000)	Common Pipistrelle (*Pipistrellus pipistrellus*) Soprano Pipistrelle (*Pipistrellus pygmaeus*) Brown Long-Eared Bat (*Plecotus auritus*)

To calculate the score (shown in brackets in the tables below) for commuting routes or foraging areas according to Wray *et al.,* (2010), the numerical values in *Table 5* (commuting) are added together to give a total for each species recorded on the site, and the same is then also done for *Table 6* (foraging). The highest value obtained for a species across both tables is then used in the assessment. This value is applied to the overall scoring system shown in *Table 7* to give an assessment of the importance of the site to foraging and commuting bats within a geographic frame of reference.

Table 5. Valuing commuting routes

Species	Likely No. of Bats	Roosts / Potential Roosts Nearby	Type and Complexity of Linear Features
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
		Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number / Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes (3)
		Large number of roosts or close to a SSSI for the species (5)	Well grown and well connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and rivers/streams (5)

Table 6. Valuing foraging areas

Species	Likely No. of Bats	Roosts / Potential Roosts Nearby	Foraging Habitat Characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
		Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches less intensive arable and/or small towns and villages (3)
		Large number of roosts or close to a SSSI for the species (5)	Larger or connected woodland blocks, mixed agriculture and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

Table 7. Scoring system for valuing sites for commuting and foraging bats

Geographic Frame of Reference	Score
International	>50
National	41-50
Regional	31-40
County	21-30
District, local or parish	11-20
Not important	1-10

2.7 Survey Constraints

It is assumed that two of the automated SM2 detectors experienced failures – both deployed in July and SM2B in April – as they had no recordings. However, both areas were surveyed successfully by the other SM2 deployments.

The methodology described for Wray *et al*., (2010) above has been followed as closely as possible to assess the value of the bat habitats at this site. However, as described in previous sections, the term bat 'pass' is loosely defined and bat activity recorded during surveys is not synonymous with numbers of individual bats. There is also no specific guidance on what constitutes a 'small' or a 'large' number of bats. The 'number of bats' used in this evaluation process is therefore an estimate based on the level of recorded activity for each species and professional experience and judgement.

3 RESULTS

The following sections provide the findings of bat surveys completed in April, May, June, July, August, September and October 2017.

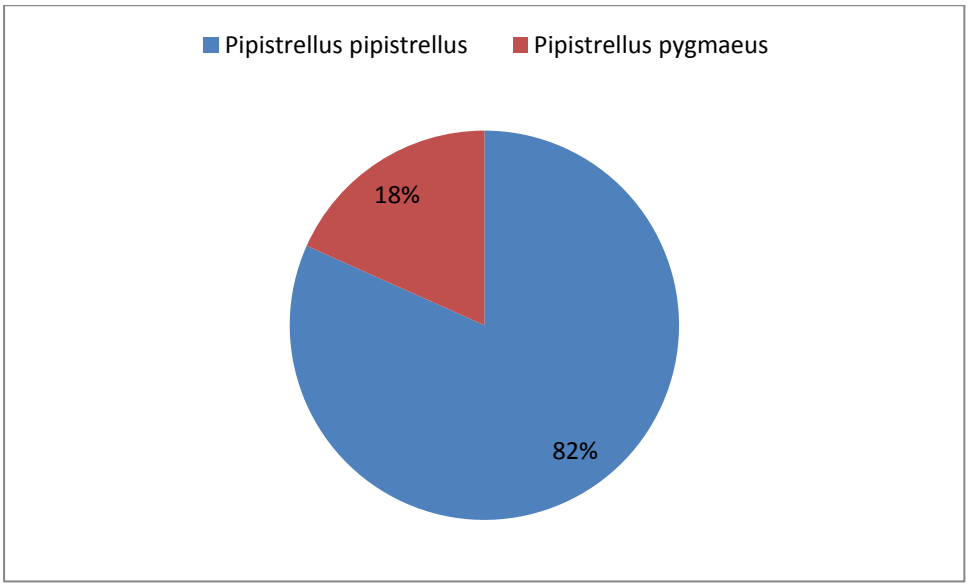
3.1 Transect Surveys

Table 8 describes the total number of bat passes recorded for each transect. At least two different species of bat were recorded during the surveys. Over the course of eight surveys, Common Pipistrelle (*Pipistrellus pipistrellus)* accounted for 82% of all activity recorded (foraging and commuting) on the site as shown in *Chart 1*. There were 65 records of Soprano Pipistrelle (*Pipistrellus pygmaeus*) contributing 18% of all activity recorded.

Table 8. Total numbers of bat passes recorded during each transect survey

Species	April 2017	May 2017	June 2017	July 2017 - Dusk	July 2017 - Dawn	August 2017	September 2017	October 2017	Total
Pipistrellus pipistrellus	29	13	52	40	51	48	49	8	**290 (82%)**
Pipistrellus pygmaeus	2	10	21	3	8	6	4	11	**65 (18%)**
Total	**31**	**23**	**73**	**43**	**59**	**54**	**53**	**19**	**355**

Chart 1. Species contributions to total level of bat activity recorded across the site



The dusk activity survey in June had the highest level of total bat activity recorded, which is probably because of bat activity progressively increasing during spring and early summer due to the formation of maternity colonies.

The highest levels of activity were along the boundaries where hedgerows and tree lines form linear routes suitable for bats to commute and forage along.

Transect survey results are illustrated in *Figures 3 – 10.*

3.2 Automated Monitoring

A summary of the results from each survey is presented in *Table 9*. Throughout the survey period, at least seven bat species were recorded; Common Pipistrelle, Soprano Pipistrelle, Nathusius Pipistrelle (*Pipistrellus nathusii*), Serotine (*Eptesicus serotinus*), Long-eared Bat (*Plecotus* species), Noctule (*Nyctalus noctula*), and *Myotis* species. *Pipistrellus* species were the most frequent across all seasons; this was followed by *Myotis* species. Noctule, Serotine and Long-eared Bats were recorded sporadically.

Overall, static detector surveys recorded significantly higher levels of bat activity than transect surveys. This is probably because of the extended period of monitoring using the static detector (transects surveys can only record a snapshot of the activity on one night; whereas a static detector will record for at least five consecutive nights). June had the highest level of total bat activity recorded using the static bat detector.

The column “Number of Files” represents the number of passes per species (intervals of one second between bat calls represents a new pass).

Charts 2 and 3 below show some of the information in *Table 9* displayed graphically.

Table 9. Summary of results from the static surveys

Species	April		May		June		July		August		September		October	
	Number of Files SM2A	Number of Files SM2B	Number of Files SM2A	Number of Files SM2B	Number of Files SM2A	Number of Files SM2B	No of Files SM2A	No. of Files SM2B	No of Files SM2A	No. of Files SM2B	No of Files SM2A	No. of Files SM2B	No of Files SM2A	No. of Files SM2B
Pipistrellus pipistrellus	25	0	4	613	1278	70	0	0	32	272	71	40	132	20
Myotis sp.	0	0	0	6	10	0	0	0	0	3	0	0	0	10
Nyctalus noctula	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Pipistrellus nathusii	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Pipistrellus pygmaeus	2	0	0	9	0	2	0	0	0	77	2	16	6	4
Plecotus auritus	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Eptesicus serotinus	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Total bat passes	**27**	**0**	**4**	**629**	**1278**	**72**	**0**	**0**	**32**	**353**	**73**	**58**	**138**	**34**

Chart 2. Number of bat 'passes' (files) recorded for SM2A

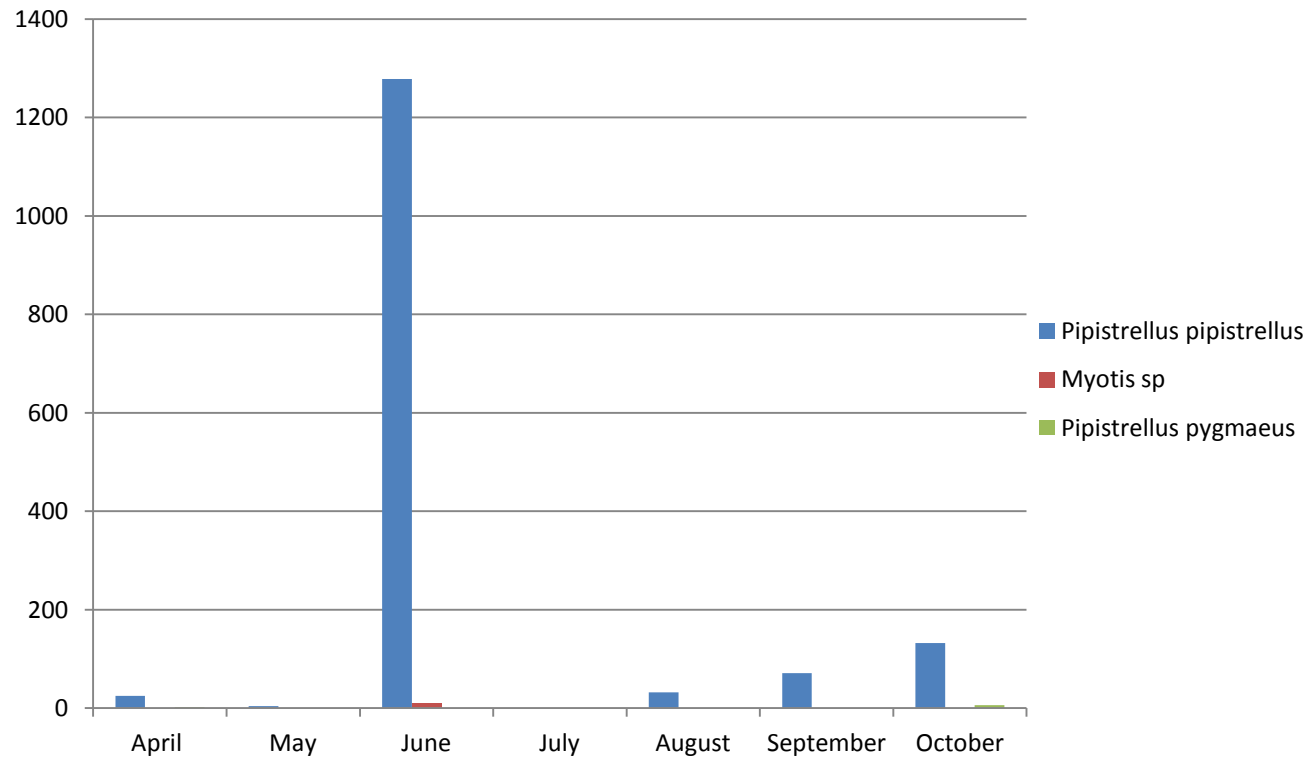
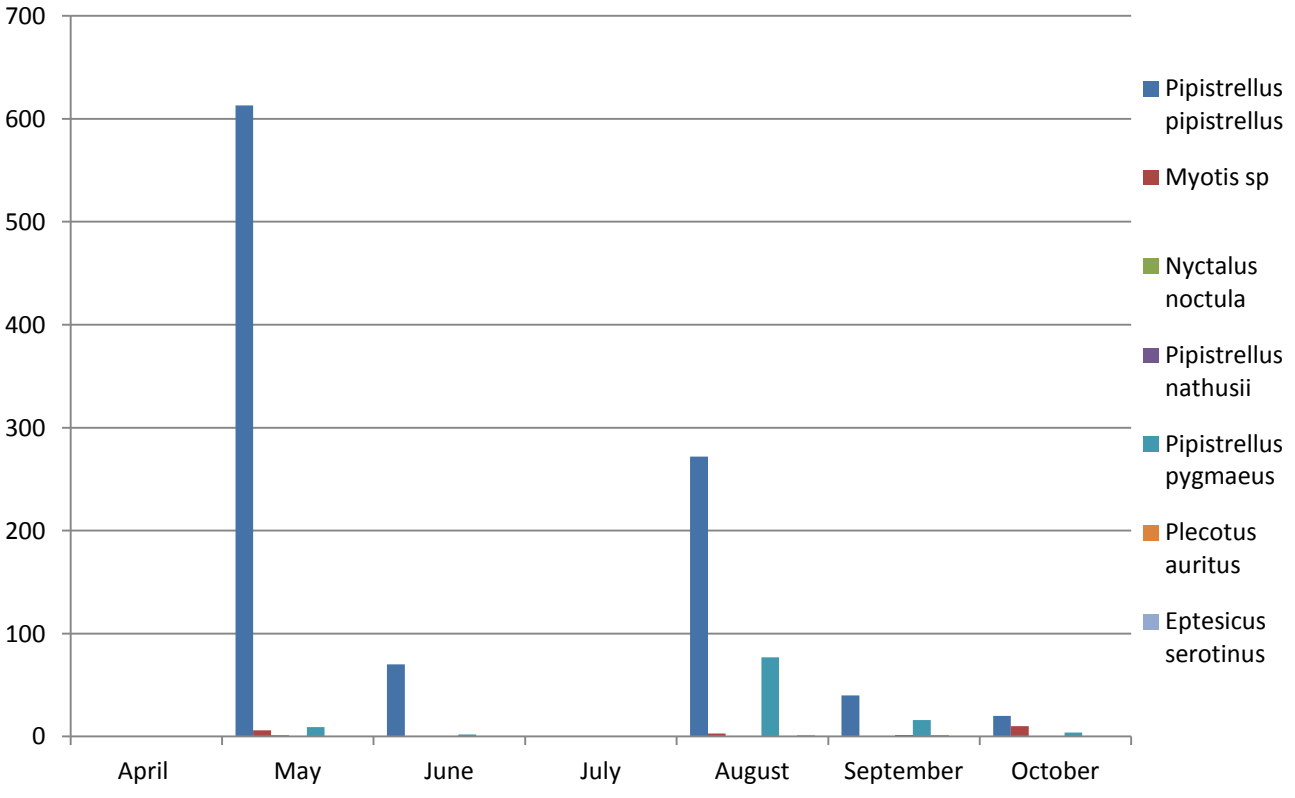


Chart 3. Number of bat 'passes' (files) recorded for SM2B



4 EVALUATION AND CONCLUSIONS

4.1 Habitats

Habitats within the survey area were found to provide suitable foraging and commuting opportunities for bats during the activity and static surveys which recorded at least seven bat species using the site. This is due to the quantity of woodland present on site and its connectivity to suitable surrounding habitat such as the Royal Victoria Country Park. The site forms one of very few wooded areas between the New Forest National Park and the South Downs National Park. It is within commuting distance of the larger bat species from the New Forest National Park and the wooded areas around site could form a natural stop off point for bats commuting across the Southampton Water.

During the transect surveys, peak bat foraging and commuting activity was recorded in connection with boundary tree lines.

Two static bat detectors were also deployed at the north-east corner of the sports field within the boundary trees and within the plantation woodland south of Sydney Lodge (*Figure 2*). Peak bat activity was recorded during June with the number of passes by all bat species on the static detector being highest during that deployment.

4.2 Bat Diversity and Levels of Activity

Two different species of bat were recorded during the monthly walked transect surveys, with at least five additional species' also confirmed by the automated monitoring with SM2 detectors. Recorded calls could clearly be attributed to the following species: Common Pipistrelle, Soprano Pipistrelle, Noctule, Brown Long-Eared Bat and Serotine. For Myotis bats, given the difficulties of attributing their calls to a species, it is difficult to say for certain which species have definitely been recorded on the site but it is possible that each of the four 'common' Myotids have at least been recorded at some point during the surveys.

Overall, it is therefore possible that 10 different bat species have at least commuted across the site during the 2017 surveys.

Common Pipistrelle activity accounted for a significant proportion of bat activity on the site, including over 80 % of the static detector data (*Table 2, Chart 2* and *3*). The next most frequently recorded species was the Soprano Pipistrelle accounting for *c.*16% of activity, followed by Myotid species accounting for 0.4 % of all activity and activity by the remaining species (see above) accounted for less than 0.1 % of all recorded passes. Results also show that most bat activity was recorded on SM2A (1, 552 bat 'passes') which was situated within a plantation woodland (*Figure 2*).

4.3 Overall Appraisal

Wray *et al*. (2010) was used to appraise the value of the site for commuting and foraging bats as per *section 2.6* above. *Tables 10* and *11* show the scores for the commuting value of the site and the foraging value respectively.

6 possible 'rarer' bat species, the Nathusius Pipistrelle, Serotine and the four 'common' Myotids, were recorded on the site. A single pass was recorded for the Nathusius Pipistrelle and Serotine, and 29 passes were recorded for Myotids across a combined total of over 50 nights of automated monitoring, and eight transects, and so it is a reasonable assumption that the site is used only by individuals of this species. Otherwise, the monitoring indicated that either small numbers of bats or individuals of each species were using the site, except for 'large' numbers of Common Pipistrelles as this species dominated the recorded bat activity. Given the absence of any information on any nearby roosts (see *section 2.7*), it was assumed that 'a moderate number' of roosts were nearby. In terms of commuting habitat for bats, the site was deemed to support '*well grown and well connected hedgerows, small field sizes*'. For evaluating foraging habitat the site (and surrounding landscape) was assessed as supporting *'Larger or connected woodland blocks, mixed agriculture and small villages/hamlets*'.

Table 10. Valuing commuting routes for each of the bat species recorded on the site during the bat activity monitoring

Species	Rarity	(Likely) 'Number' of Bats	Roosts / Potential Roosts Nearby	Type and Complexity of Linear Features	Score
Common Pipistrelle	Common (2)	Large number of bats (20)	Moderate number / Not known (4)	Well grown and well connected hedgerows, small field sizes (4)	30
Soprano Pipistrelle		Small no. of bats (10)			20
Brown Long-Eared Bat		Individual bats (5)			15
Noctule	Rarer (5)	Individual bats (5)			18
'Rarer' *Myotid spp*		Individual bats (5)			18
Serotine Bat		Individual bats (5)			18
Nathusius Pipistrelle		Individual bats (5)			18

Table 11. Valuing foraging areas for each of the bat species recorded on the site during the bat activity monitoring surveys

Species	Rarity	(Likely) 'Number' of Bats	Roosts / Potential Roosts Nearby	Type and Complexity of Linear Features	Score
Common Pipistrelle	Common (2)	Large number of bats (20)	Moderate number / Not known (4)	Larger or connected woodland blocks, mixed agriculture and small villages/hamlets (4)	30
Soprano Pipistrelle		Small no. of bats (10)			20
Brown Long-Eared Bat		Individual bats (5)			15
Noctule	Rarer (5)	Individual bats (5)			18
'Rarer' *Myotid spp*		Individual bats (5)			18
Serotine Bat		Individual bats (5)			18
Nathusius Pipistrelle		Individual bats (5)			18

Overall, the results tables above show a maximum score of 30 for the value of the both commuting and foraging habitats on the site for bats. Therefore, based on *Table 7*, these values indicate that the site is considered to be of 'County' value for commuting and foraging bats.

In terms of species, according to Wray *et al*. (2010) the site is most important for assemblages of Common Pipistrelle.

5 CONCLUSIONS AND RECOMMENDATIONS

Common Pipistrelle was the dominant bat species recorded on the site, with notable activity by Soprano Pipistrelle and Myotis bat species recorded on some SM2 deployments. Nathusius' Pipistrelle, Noctule and Serotine were recorded infrequently. Overall, according to Wray *et al*. (2010) the site continues to be of 'County importance' to foraging and commuting bats prior to construction.

The above therefore gives rise to the following recommendations for mitigation and compensation measures to help ensure that the effects on local bat assemblages from the development are minimal.

5.1 Habitats

According to current proposals (*Appendix 1*) all important commuting and foraging habitat is due to be retained (mixed plantation woodland and tree lines to the north of site), although coniferous tree lines within the site are due to be removed these are not connected to the wider habitats and little foraging and commuting activity was recorded around them. This vegetation clearance should be undertaken during the winter months to limit disturbance. Current proposals also aim to improve the connectivity of the site by planting additional tree lines and hedgerows (*Appendix 1*).

5.2 Lighting

All UK and European bat species are nocturnal and adapted to low-light conditions and the artificial lighting of areas in which they are active affects their activities. Artificial lighting can affect the entire composition of local bat communities at the ecosystem level (Rydell, 1992). In addition, some street or flood lights, particularly those with a high ultraviolet (UV) content, can also result in insect mortality and thereby reduce the overall availability of insect prey for all bats (Frank, 2006; Bruce-White & Shardlow, 2011). Stone (2013) provides a summary of the many studies where lighting has affected bats (p.45, Table 5.1) and the level of impact by species (p.51, Table 5.2).

Although some of the bat species recorded on this site (e.g. Common Pipistrelle, Soprano Pipistrelle, and Nyctalus bat species) may be more tolerant of artificial light than others (e.g. Eisenbeis, 2006, Stone *et al*., 2012, Lacoeuilhe *et al*., 2014), for some of the slower-flying 'woodland bats' present on the site, namely the Myotis bat species and Brown Long-Eared Bats, very low light levels are required for there to be minimal effects on their behaviour (e.g. Furlonger *et al*., 1987; Rydell, 1992; Lacoeuilhe *et al*., 2014). This includes from LED lighting (Stone *et al*., 2012). The potential impacts from artificial lighting on bats are also exacerbated where it illuminates woodland edges and hedgerows (BCT, 2014). As relevant examples here, Stone *et al*., (2012) found that light levels at 3.6 lux caused spatial avoidance of a preferred hedgerow commuting route by Myotis bats.

There is no "light threshold" where adverse effects on bats from artificial light are negligible (Stone, 2013). Therefore, it is important to achieve the minimal possible

illumination levels on the site when bats are typically active (April to October) during both the construction phase of this development and once complete. A full moon under clear, natural conditions is 0.1 to 0.3 lux; therefore, where complete 'natural' darkness cannot be ensured along the natural linear features and edge habitat described above, illumination levels should fall within this range, from at least April to October, when bats are typically most active.

With this in mind, it is recommended that a 'bat-friendly' lighting strategy should be agreed for the development, including during construction from April to October. This should include details of the height of all lighting, the intensity of lighting (specified in Lux levels), spread of light, approximate light spillage levels (in metres), light colour, the times when the lighting would be illuminated, and any measures proposed to mitigate the impact of the new lighting or disturbance through glare (such as making use of cowls and hoods). Overall, the lighting strategy should ensure that light will only be directed as required (with minimal light-spill), should not be directed at those habitats on the site that are most often used by bats (see above).

Adverse effects from increased lighting can be controlled with the use of low level lighting in certain areas, hoods and cowls directing lighting away from sensitive areas, the use of specific types of lighting (including avoiding lighting with a high UV output) and variable lighting regimes.

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7 FIGURES

Site Boundary

Scale = 1:125,000 @ A3

Scale = 1:10,000 @ A3

Rev	Date	Description	Drn	Chk	App
00	19.02.18	856776	SP	RG	EI

GE Aviation

RSK

Figure 1

Site Location Plan

0 300

Metres

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Site boundary

Static bat dectector location

Rev	Date	Description	Drn	Chk	App
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Figure 2

Locations of Static Bat Detectors

0 60

metres

Scale = 1:2,000 @ A3

N W E S

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Site boundary

Transect route and stop points

Common Pipistrelle

Soprano Pipistrelle

Rev	Date	Description	Drn	Chk	App
00	08.01.17	856776	SP	RG	EI

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Figure 3

Bat Activity Survey Results
April 2017

0 60
metres
Scale = 1:2,000 @ A3

N W E S

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Site boundary

Transect route and stop points

Common Pipistrelle

Soprano Pipistrelle

Rev	Date	Description	Drn	Chk	App
00	08.01.17	856776	SP	RG	EI

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Figure 4

Bat Activity Survey Results
May 2017

0 60
metres
Scale = 1:2,000 @ A3

N W E S

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Site boundary

Transect route and stop points

Common Pipistrelle

Soprano Pipistrelle

Rev	Date	Description	Drn	Chk	App
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Figure 5

Bat Activity Survey Results
June 2017

0 60
metres
Scale = 1:2,000 @ A3

N W E S

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Site boundary

Transect route and stop points

Common Pipistrelle

Soprano Pipistrelle

Rev	Date	Description	Drn	Chk	App
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Figure 6

Bat Activity Survey Results
July (Dusk) 2017

0 60
metres
Scale = 1:2,000 @ A3

N W E S

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Site boundary

Transect route and stop points

Common Pipistrelle

Soprano Pipistrelle

Rev	Date	Description	Drn	Chk	App
00	08.01.17	856776	SP	RG	EI

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Figure 7

Bat Activity Survey Results
July (Dawn) 2017

0 60
metres
Scale = 1:2,000 @ A3

N W E S

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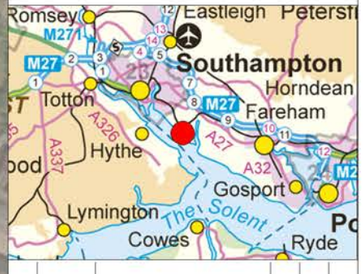
Site boundary

Transect route and stop points

Common Pipistrelle

Soprano Pipistrelle



Rev	Date	Description	Drn	Chk	App
00	08.01.17	856776	SP	RG	EI

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Figure 8

Bat Activity Survey Results
August 2017

0 60
metres
Scale = 1:2,000 @ A3

N W E S

REV 00

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Site boundary
Transect route and stop points
Common Pipistrelle
Soprano Pipistrelle

14
13
8
9
7
12
End
2
3
6
1
4
5
10
11
Start

Rev	Date	Description	Drn	Chk	App
00	08.01.17	856776	SP	RG	EI

GE Aviation

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Figure 9

Bat Activity Survey Results
September 2017

0 60
metres
Scale = 1:2,000 @ A3

N W E S

REV 00

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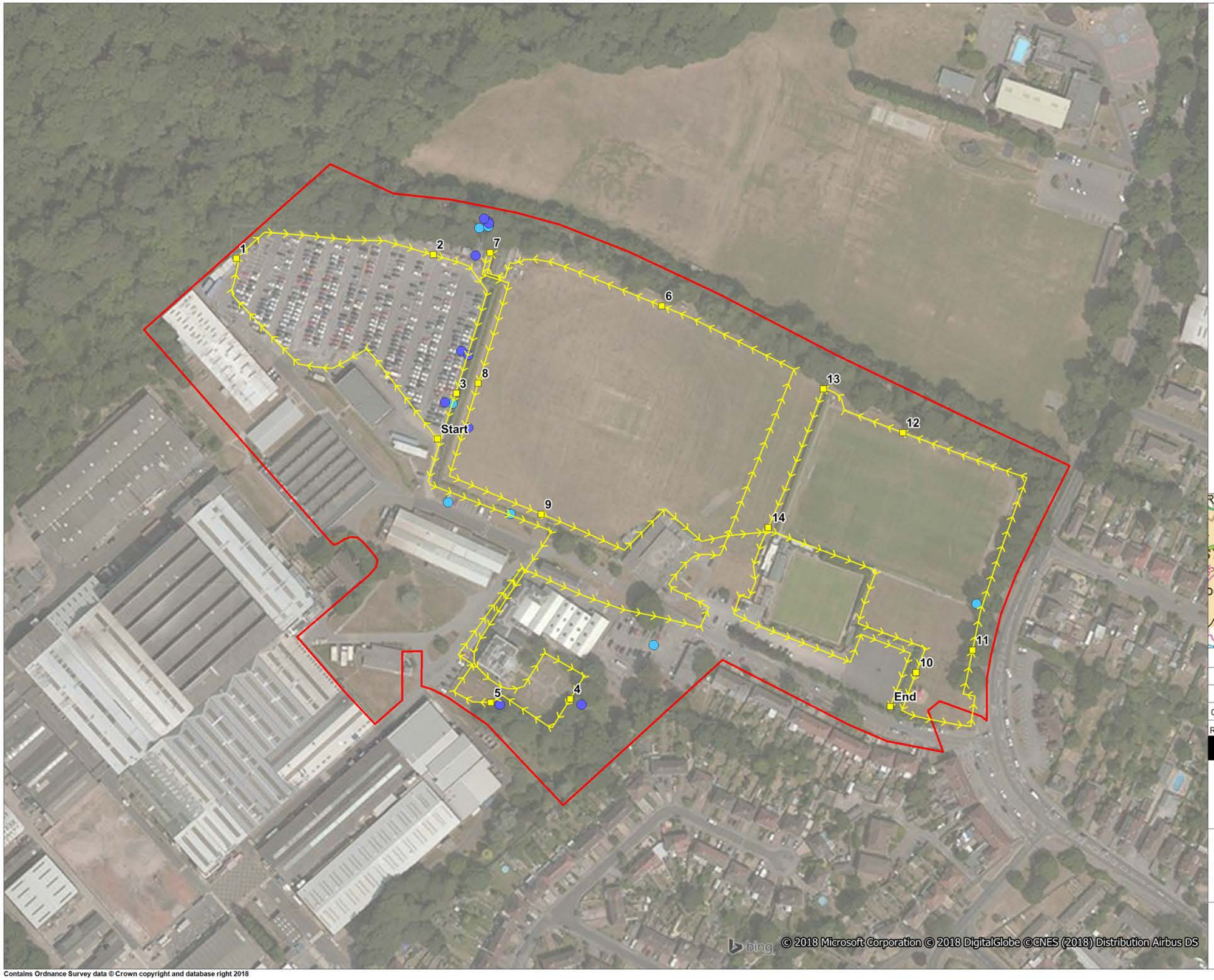

Rev	Date	Description	Drn	Chk	App
00	08.01.17	856776	SP	RG	EI

GE Aviation

RSK

Figure 10

Bat Activity Survey Results
October 2017

0 60
metres
Scale = 1:2,000 @ A3

N W E S

REV 00

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APPENDIX 1
MASTERPLAN

north

0 10m 20m 30m 40m 50m 60m 70m 80m 90m

1:1000

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Sketch

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This drawing illustrates a sketch proposal only and as such is subject to detailed site investigation, including ground conditions/contaminates, drainage design and planning/density negotiations. The layout may be based upon an enlargement of an O.S. sheet or other small scale plans and its accuracy needs to be verified by survey. CDM Regulations have not been fully considered.

Rev.	Description	Date
A	Amended to include new plot of land comprising 0.55 Ha	05.09.2017
B	Amended to accommodate Football Pitch and Bowling Green on site	20.10.2017
C	Amended to rellocate Football Pitch and Bowling Green on site	23.10.2017
D	Amended to revise Football Pitch and Bowling Green on site	24.10.2017
E	Amended to retain existing Bowling Green and Football Pitch	24.10.2017
F	Amended to incorporate Football Club facilities	25.10.2017
G	Amended to include GE multi storey car park	25.11.2017
H	Amended to include new GE Parking area and road amendments	10.11.2017
I	Amended to accommodate new road layout	15.01.2018
J	Amended to accommodate new road layout	15.01.2018
K	Amended following Team Meeting on 16.01.18	15.01.2018
L	Amended to incorporate new road layout and parking revision	25.01.2018
M	Amended to increase car parking provision for sports pitches and revised GE fencing proposal	02.02.2018

Notes

	Area (m2)	Number
1 Bed	50 - 55	12
2 Bed	70 - 80	38
3 Bed	84 - 102	75
4 Bed	110-130	20
Total		145

fluid

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www.fluid-design.co.uk

Client: GE Aviation

Project: GE Aviation
Kings Avenue
Hamble
Southampton, SO31 4NF

Title: Proposed Site Layout

Status: SKETCH

Scale: 1:1000 **Date:** 06/2017

Revision: M **Sheet:** A1

Drg No: FD 16 - 431 - 55 - SK

GE Aviation

Hamble-le-Rice Campus

Bat Surveys Report

857362

OCTOBER 2017

RSK GENERAL NOTES

Project No.: 857362

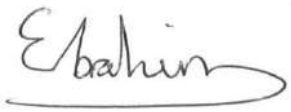
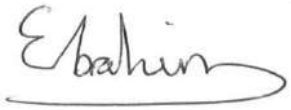
Title: Bat Surveys Report

Client: GE Aviation

Date: October 2017

Office: Hemel

Status: Rev00

Author	Errol Ibrahim	**Technical reviewer**	Corin Simmonds
Signature		Signature [delete row if not required]	
Date:	13.10.2017	Date:	13.10.2017
Project manager	Errol Ibrahim	**Quality reviewer**	Corin Simmonds
Signature		Signature	
Date:	13.10.2017	Date:	13.10.2017

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK ENVIRONMENT Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of a preliminary roost assessment of buildings 9 and 31 and emergence/re-entry surveys undertaken on building 3, the Old Canteen and the Sports Pavilion carried out at the GE Aviation at Hamble-le-Rice near Southampton, Hampshire (Ordnance Survey Grid References SU46890717) in August and September 2017.

2. The preliminary roost assessment confirmed buildings 31 and 9 to have negligible potential for roosting bats; no further surveys are required on these buildings.

3. Emergence surveys found no bats emerging from building 3 or the Old Canteen; no further surveys are required on these buildings.

4. A single Common Pipistrelle bat was observed emerging from the Sports Pavilion. If this building is to be demolished a Low Impact Bat Licence will be required prior to works taking place.

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1.2 Ecological Context 1
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1 INTRODUCTION

1.1 Purpose of this report

This report presents the result of preliminary roost assessments (PRA) of buildings 9 and 31 and emergence/re-entry surveys of building 3, the Old Canteen and the Sports Pavilion at the GE Aviation campus in Hamble-le-Rice, Southampton. A site location plan is given in *Figure 1*.

The work relates to a proposed development of *c.*240 dwellings and associated landscaping.

1.2 Ecological Context

The site – which is *c.*500 m from the coast – is part of a *c.*20 ha industrial campus comprising areas of hard-standing and industrial buildings alongside a sports ground and some broadleaved woodland. There is a large amount of ornamental planting throughout. To the north of the site is the Royal Victoria Country Park. To the west and south is Southampton Water, and to the east there are residential areas which form part of the village of Hamble-le-Rice. There are 28 designated sites within 5km of the campus, some of which are directly adjacent to the site.

1.3 Background Information

Preliminary roost assessments were undertaken by RSK in April and May 2017, building 3, the Old Canteen and the Sports Pavilion were found to provide suitable features for roosting bats. Building 3 and the Sports Pavilion had 'moderate' potential for roosting bats and the Old Canteen had 'low' potential for roosting bats. As a result further surveys were required to understand whether bats were roosting in these buildings.

Since the surveys in April and May 2017 the red line boundary has been extended to include Building 9 and 31 so preliminary roost assessments were required on these buildings.

1.4 Structure of the Report

The remainder of the report is set out as follows:

- Section 2 describes the survey and assessment methods;
- Section 3 presents the results of the surveys;
- Section 4 provides the evaluation and conclusions;
- Section 5 contains references;
- Section 6 provides the figures; and
- Appendix 1 summarises legislation relating to protected species

2 METHODS

2.1 General

Preliminary roost assessments of 'Building 9' and 'Building 31' were undertaken by Jessica Breeze with assistance from Cecilia Montauban, both of RSK, on 28 September 2017. Jessica is a licensed bat ecologist (Class 2 licence: 2015-17895-CLS-CLS), an Associate Member of CIEEM and is experienced at undertaking preliminary roost assessments.

Emergence/re-entry surveys were undertaken in August and September 2017 surveys were lead by Jan Skuriat (Class 2 & 3 licence: 2015-15428-CLS-CLS), Jessica Breeze and Errol Ibrahim and assisted by Alice Clarke, Sarah Kitchen, Cecilia Montauban, Luke Burgess and Louis Edwards. All surveyors are trained and experienced in the use of bat detecting equipment and bat surveying.

2.2 Preliminary Roost Assessment

The external features of the buildings were surveyed for characteristics that may be used by roosting bats. Potential access-points into roof voids were noted as well as crevices and voids in the external structure (where bats could roost). An internal survey was undertaken where possible. This survey provided an assessment of the buildings on the basis of which further surveys or suggestions for scheme design can be provided. Surveys followed the guidelines in Collins 2016[1].

The buildings were assessed according to the following factors that influence the likelihood of bats roosting.

- Surrounding habitat: whether there are potential fight-lines and foraging areas for bats nearby.
- Construction detail: the type and construction of architectural features such as attics, soffit boxes, lead flashing and hanging tiles that could be used by roosting bats.
- Building condition: whether disrepair has opened potential bat-access points (especially around roofs).
- Potential bat-access points: whether there is flight and crawl access.
- Potential roosting locations: description of all bat-accessible voids, cracks and crevices.

Descriptions of the building were recorded onto specially designed survey sheets, and digital photographs were taken. The criteria shown in *Table 1* were used to categorise the buildings according to their potential for roosting bats.

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

Table 1. Classification criteria for bat roosting suitability of buildings and built structures – adapted from Collins, 2016.

Category	Description
Negligible potential	Negligible habitat features on the site likely to be used by bats
Low potential	A structure 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.
Moderate potential	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, condition and surrounding habitat but unlikely for a roost of high conservation status.
High potential	A structure with one or more potential roost sites that are obviously suitable for large 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.
Confirmed roost	Bats or evidence of bats recorded within the building during the initial inspection surveys or during dusk/dawn surveys. A confirmed record (supplied by records centre/local bat group) would also apply.

The buildings were then inspected for evidence of bats. Visual, systematic examinations were made for bats and evidence of bats, both internally and externally, of the following:

- roof slopes and the ridge;
- wall, window and door surfaces;
- window and door frames;
- wall bases;
- wall ledges and wall tops;
- roof beams;
- cracks, crevices and sheltered voids;
- the floors and stored items; and
- external features such as soffits and lead flashing.

Evidence of roosting bats include droppings and in some cases the absence of cobwebs. Bat droppings can prove beyond doubt that bats have used a building and can help to identify roosting locations because piles often accumulate beneath roosting sites of entrance points.

2.3 Emergence/Re-entry Surveys

Dusk emergence and dawn re-entry surveys were undertaken following guidelines (Collins, 2016), a single survey was required on the Old Canteen and two surveys were required on both Building 3 and the Sports Pavilion. A further survey was required on the Sports Pavilion as a bat was observed emerging from the building.

The surveyors were positioned in locations with a good view of likely roost-access points indentified during the preliminary roost assessment (*Figure 3*). Emergence

surveys commenced 15 minutes prior to sunset and finished 1.5 hours after sunset. Re-entry surveys commenced 1.5 hours before sunrise and lasted until 15 minutes after sunrise.

All surveyors were equipped with bat detectors (Bat Box Baton XD), to listen for the echolocation calls of bats as they emerged. All calls were recorded using stereo recorders. If the identification of bats was in any doubt these recordings was analysed using BatSound® sound analysis software.

The emergence and dawn surveys were carried out in suitable weather conditions. Conditions were dry with no rain and were suitable for active bats (bat foraging and commuting was heard on all occasions). A summary of the survey conditions is presented in *Table 2*.

Table 2. Details of bat emergence/re-entry surveys

Building and Visit Number	Date	Surveyors	Time	Weather Conditions
Old Canteen 1/1	29/08/2017	Errol Ibrahim, Alice Clarke and Sarah Kitchen	Start: 19:41 Finish: 21:26	Warm and dry, Wind : 1-2, Temp: 19°C
Building 3 1/2	30/08/2017	Jan Skuriat and Sarah Kitchen	Start: 19:39 Finish: 21:24	Mild and dry, Wind : 1-2, Temp: 14°C
Sports Pavilion 1/3	31/08/2017	Jade Brennan and Louis Edwards	Start: 19:37 Finish: 21:22	Warm and dry, Wind : 1-2, Temp: 15°C
Building 3 2/2	13/09/2017	Jan Skuriat and Sarah Kitchen	Start: 19:08 Finish: 20:53	Mild and dry, Wind : 3, Temp: 14°C
Sports Pavilion 2/3	13/09/2017	Jan Skuriat Luke Burgess and Cecilia Montauban	Start: 05:07 Finish: 06:52	Mild and dry, Wind : 3, Temp: 13°C
Sports Pavilion 3/3	28/09/2017	Jess Breeze, Cecilia Montauban and Sarah Kitchen	Start: 18:35 Finish: 20:20	Still and Clear. Wind : 1, Temp: 15°C

3 RESULTS

3.1 Preliminary Roost Assessment

Results are shown in *Table 3* and *Figure 2*.

Table 3. Results of preliminary roost assessment

Building Reference	Building Description	Potential Bat Access Points/ Roost Locations	Bat Roost Potential
Building 9	This single-storey building has a shallow pitched roof comprising of metal sheeting. The brick cavity walls are in good condition with no gaps (see *Plate*).	Barge boards on the northern elevation have small gaps which could provide roosting opportunities for crevice dwelling bats. However, the gaps were full of cobwebs and showed no evidence of use by bats.	The building was assessed as having **negligible potential** for roosting bats. No further surveys are required.
Building 31	This is a brick walled building with a flat metal roof. It is comprised to two parts: an office section (two-storey) and a warehouse (single-storey). Flood lighting was present on the eastern elevation. The building has a suspended ceiling above the offices and there is no roof void above the warehouse (see *Plate*).	Wooden louvered doors, gaps above the wall, weep holes and missing bricks at the eaves offer potential access points, however they were heavily cobwebbed and internal conditions were unsuitable for roosting bats.	The building was assessed as having **negligible potential** for roosting bats. No further surveys are required.

3.2 Bat Emergence/Re-entry Surveys

3.2.1 Old Canteen

No bats were observed emerging from the Old Canteen.

3.2.2 Building 3

No bats were observed emerging from Building 3.

3.2.3 Sports Pavilion

A single Common Pipistrelle (*Pipistrellus pipistrellus)* was observed emerging from behind the scoreboard on the north-western elevation of the building at 20:29 (*Figure 4*). On the second and third survey visits no further bats were recorded emerging from or entering the building. Foraging and commuting Common Pipistrelle and Soprano Pipistrelle (*Pipistrellus pygmaeus*) bats were recorded around the building and in the surrounding area on all three survey visits. No other bat species was recorded.

4 EVALUATION AND CONCLUSION

4.1 Preliminary Roost Assessment

Both Building 9 and 31 were found to have to have negligible potential for roosting bats due to the lack of any suitable roosting features. No further surveys are required.

4.2 Emergence/Re-entry Surveys

No bats were recorded emerging from building 3 or the Old Canteen. It is therefore unlikely that bats are using these buildings for roosting purposes. No further survey work in relation to these buildings is required, and the proposed demolition can proceed without the requirement of a European Protected Species Licence.

During the first dusk emergence survey on the Sports Pavilion, a Common Pipistrelle bat roost was identified and a further two surveys were required to provide survey data for an EPS license application to demolish the building. Based on the findings the roost is considered to be a transitory day roost, likely being used by a male bat.

4.3 Further Requirements

All three required surveys to collect sufficient data to categorise the roost have been undertaken. The single emergence suggests a 'day roost', *i.e.* a place where individual bats, or small groups of males, rest or shelter in the day but are rarely found at night in the summer (Collins, 2016).

Typically a European Protected Species (EPS) Licence would be required for the Sports Pavilion prior to demolition works taking place. However, as 'day roosts' are considered roosts of low conservation importance, and a single common bat species was found to be using the roost it is eligible to be covered under a Low Impact Bat Class Licence.

Low Impact Bat Class Licences, granted by NE, permit activities that would otherwise be illegal such as the disturbance of bats or damaging or destroying bat roosts. They comprise a site registration form, which will provide details of all survey work carried out relating to the species concerned, a population assessment, an impact assessment and a strategy to minimise, mitigate or compensate for the impacts.

Although Low Impact Bat Class Licences do not require mitigation in the form of roost compensation, it is advisable that bat boxes are installed on a tree on site. This is so there is somewhere to place a bat should one be found during the supervised soft strip/demolition works.

Natural England aim to determine Low Impact Bat Class Licences and issue decisions within 10 working days (compared to 30 working days for an EPS licence). Once the licence has been granted works must commence within 12 weeks of the licence being awarded.

5 REFERENCES

Collins, J (Ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).* The Bat Conservation Trust, London.

RSK 2017, Hamble-le-Rice Campus, GE Aviation, Preliminary Roost Assessment Report.

https://www.gov.uk/government/publications/bats-licence-to-interfere-with-bat-roosts-cl21 (accessed on 3 October 2017)

6 FIGURES

Site Boundary

Scale = 1:125,000 @ A3

Scale = 1:10,000 @ A3

Rev	Date	Description	Drn	Chk	App
00	09.10.17	857362	SP	RG	EI

GE Aviation

RSK

Figure 1

Site Location Plan

0 300

Metres

REV 00

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Site boundary

Building - confirmed roost

Building - moderate bat roost potential

Building - low bat roost potential

Building - negligible bat roost potential

Rev	Date	Description	Drn	Chk	App
00	09.10.17	857362	SP	RG	EI

GE Aviation

RSK

Figure 2

Preliminary Bat Roost Assessment

0 50

metres

Scale = 1:1,500 @ A3

N W E S

REV 00

File Name : U:\Ecology\856000s\856776 - GE Aviation Hamble\07 - GIS

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Site boundary

Building - confirmed roost

Building - moderate bat roost potential

Building - low bat roost potential

Building - negligible bat roost potential

Old Canteen bat surveyor locations

Sports Pavilion bat surveyor locations

Building 3 bat surveyor locations

Rev	Date	Description	Drn	Chk	App
00	09.10.17	857362	SP	RG	EI

GE Aviation

RSK

Figure 3

Bat Surveyor Locations

0 50

metres

Scale = 1:1,500 @ A3

N W E S

REV 00

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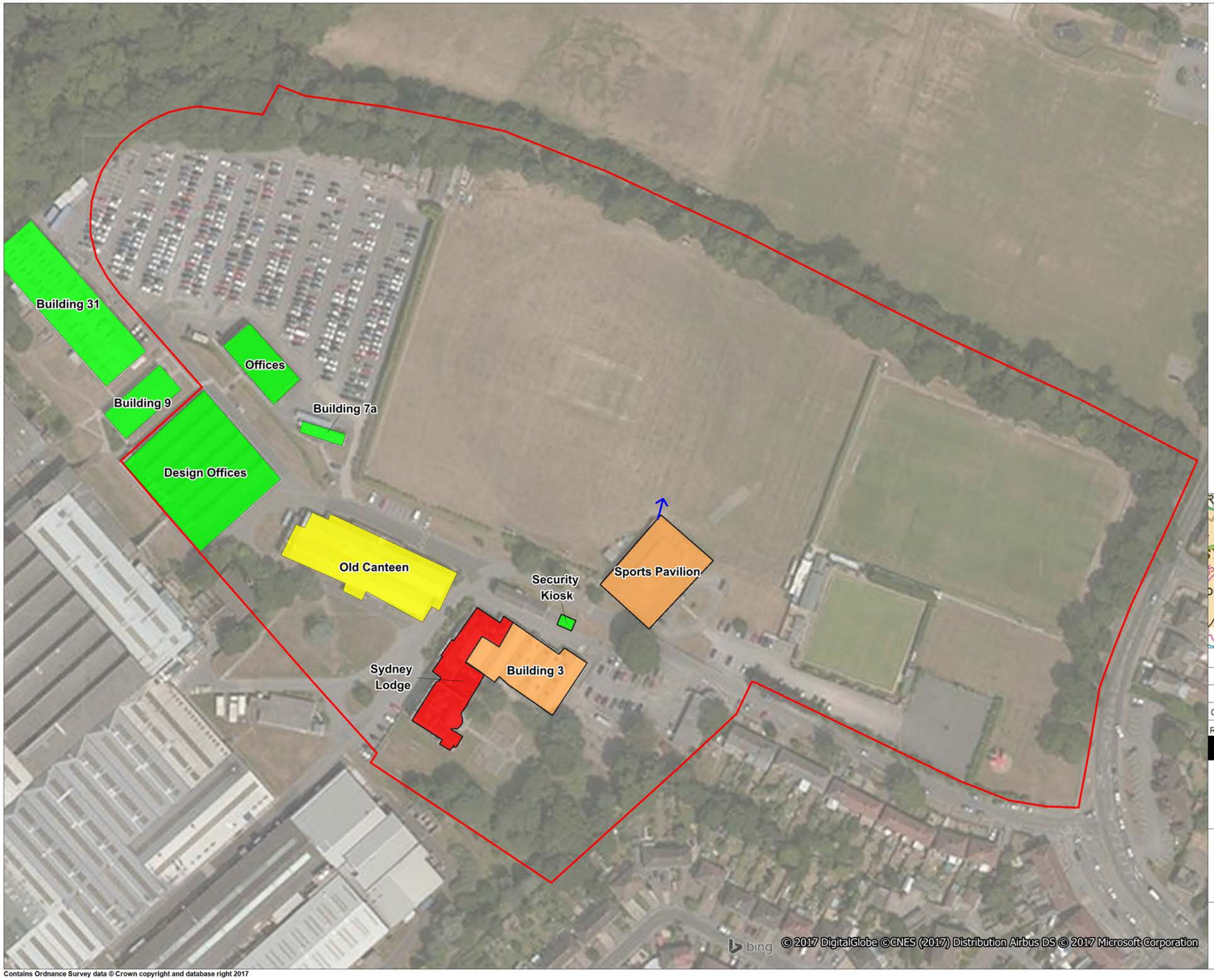

Site boundary

Building - confirmed roost

Building - moderate bat roost potential

Building - low bat roost potential

Building - negligible bat roost potential

Common Pipistrelle emergence 31.08.16

Rev	Date	Description	Drn	Chk	App
00	09.10.17	857362	SP	RG	EI

GE Aviation

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Figure 4

Emergence Survey Results

0 50

metres

Scale = 1:1,500 @ A3

N W E S

REV 00

File Name : U:\Ecology\856000s\856776 - GE Aviation Hamble\07 - GIS

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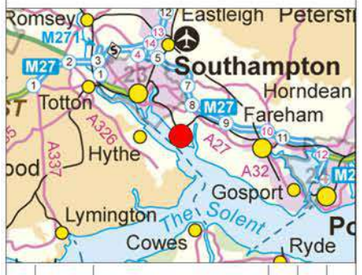
Photo 1

Photo 2

Photo 3

Photo 4

Photo 1	Building 8 - Overview, looking south west
Photo 2	Building 31 - Overview, looking west
Photo 3	Sports Pavilion - Bat Emergence Location
Photo 4	Sports Pavilion - North West Eleavation Showing Bat Emergence Location



Rev	Date	Description	Drn	Chk	App
00	09.10.17	857362	SP	RG	EI

GE Aviation

RSK

Plate 1

Photos 1-4 of 4

Not to Scale

REV 00

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APPENDIX 1 - LEGISLATION

Bats

All species of British bat are protected by *The Wildlife and Countryside Act 1981* (as amended) extended by the *Countryside and Rights of Way Act 2000*. This legislation makes it an offence to:

- intentionally kill, injure or take a bat;
- possess or control a bat;
- intentionally or recklessly damage, destroy or obstruct access to a bat roost; and
- intentionally or recklessly disturb a bat while is occupies a bat roost.

Bats are also European Protected Species listed on *The Conservation of Habitats and Species Regulations 2010*. This legislation makes it an offence to:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats, including in particular any disturbance which is likely (a) to impair their ability - (i) to survive, to breed or reproduce, or to rear or nurture their young; or (ii) hibernate or migrate, where relevant; or (b) to affect significantly the local distribution or abundance of the species to which they belong.
- damage or destroy a breeding site or resting place of a bat; and
- possess, control, transport, sell, exchange a bat, or offer a bat for sale or exchange.

All bat roosting sites receive legal protection even when bats are not present.

GE Aviation

Hamble-le-Rice Campus

Preliminary Roost Assessment Report

856776

MAY 2017

RSK GENERAL NOTES

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Date: June 2017

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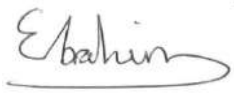
Signature		Signature [delete row if not required]	
Date:	05.06.2017	Date:	05.06.2017

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of a preliminary assessment of bat roosts carried out at the GE Aviation the site at Hamble-le-Rice near Southampton, Hampshire (Ordnance Survey Grid References SU46890717) on 27 April 2017 and 24 May 2017.

2. Surveys confirmed a Brown Long-eared Bat roost, two buildings with moderate potential for roosting bats, and a building with low potential for roosting bats.

3. Several trees on the site have suitable features for roosting bats.

4. Additional surveys will be required if works are likely to disturb bats or destroy a roost. They would aim to gather sufficient information on bats in the building or trees to allow for the design of mitigation and the preparation of any required license applications.

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1 INTRODUCTION

1.1 Purpose of this report

This report presents the result of preliminary bat-roosts assessments of buildings and trees at the GE Aviation campus in Hamble-le-Rice, Southampton. A site location plan is given in *Figure 1*.

1.2 Ecological Context

The site – which *c.*500 m from the coast – is part of a *c.*20 ha industrial campus comprising areas of hard-standing and industrial buildings alongside a sports ground and some broadleaved woodland. There is a large amount of ornamental planting throughout. To the north of the site is the Royal Victoria Country Park. To the west and south is Southampton Water, and to the east there are residential areas which form part of the village of Hamble-le-Rice. There are 28 designated sites within 5km of the campus, some of which are directly adjacent to the site.

1.3 Structure of the Report

The remainder of the report is set out as follows:

- Section 2 describes the survey and assessment methods;
- Section 3 presents the results of the surveys;
- Section 4 provides the evaluation and conclusions;
- Section 5 contains references;
- Section 6 provides the figures;
- Appendix A summarises legislation relating to protected species; and
- Appendix B presents results of the bat-dropping DNA analysis.

2 METHODS

2.1 General

Preliminary bat-roost assessments of all trees on the site and three buildings, *i.e.* Sydney Lodge, Building 3, a sports pavilion and a security kiosk were undertaken by John Daw of RSK with assistance from Olivia Guindon of RSK on 27 April 2017. John is a licensed bat ecologist (Class 2 licence: 2015-10716-CLS-CLS), a Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and is experienced at undertaking preliminary roost-assessments for bats.

Preliminary bat-roost assessments of other buildings – here called 'the old canteen', 'the design office' and 'the offices' - were undertaken by Jessica Breeze of RSK with assistance from Luke Burgess of RSK on 24 May 2017. Jessica is a licensed bat ecologist (Class 2 licence: 2015-17895-CLS-CLS), a Graduate Member of CIEEM and is experienced at undertaking Preliminary Roost Assessments for bats.

2.2 Preliminary Roost Assessments for Bats

2.2.1 Preliminary Roost Assessment – Trees

Following recommendations from the Preliminary Ecological Appraisal report (RSK 2017), RSK undertook a preliminary roost-assessment of all trees on the site to ascertain whether any were suitable for roosting bats.

This involved inspecting trees from ground-level using binoculars and a torch to identify any features which were considered to have potential as a bat roost and for any evidence of bats such as scratch marks, oil stains and dropping.

This included features such as:

- holes (e.g. woodpecker holes);
- cracks and splits (in trunks and limbs);
- cavities (e.g. formed by occluded stems or limbs);
- peeling bark;
- crevices formed by epicormic growth; and
- deadwood.

Trees and features were then categorised in accordance with *Table 1* below.

Table 1. Classification criteria for bat roosting potential of trees – adapted from Collins, 2016.

Category	Description
Negligible potential	Negligible habitat features on the site likely to be used by roosting bats.
Low potential	A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.

Category	Description
Moderate potential	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, condition and surrounding habitat but unlikely for a roost of high conservation status.
High potential	A tree with one or more potential roost sites that are obviously suitable for 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.
Confirmed roost	Bats or evidence of bats recorded during the initial inspection surveys or during dusk/dawn surveys. A confirmed record (supplied by records centre/local bat group) would also apply.

2.2.2 Preliminary Roost Assessment – Buildings

The external features of the buildings were surveyed for characteristics that may be used by roosting bats. Potential access-points into roof voids were noted as well as crevices and voids in the external structure (where bats could roost). An internal survey was undertaken where possible, and some of the roof features were assessed using ladders. This survey provided a rapid assessment of the buildings on the basis of which further surveys or suggestions for scheme design can be provided. Surveys followed the guidelines in Collins 2016[1].

The buildings were assessed according to the following factors that influence the likelihood of bats roosting.

- Surrounding habitat: whether there are potential fight-lines and foraging areas for bats nearby.
- Construction detail: the type and construction of architectural features such as attics, soffit boxes, lead flashing and hanging tiles that could be used by roosting bats.
- Building condition: whether disrepair has opened potential bat-access points (especially around roofs).
- Potential bat-access points: whether there is flight and crawl access.
- Potential roosting locations: description of all bat-accessible voids, cracks and crevices.

Descriptions of the building were recorded onto specially designed survey sheets, and digital photographs were taken. The criteria shown in *Table 2* were used to categorise the buildings according to their potential for roosting bats.

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

Table 2. Classification criteria for bat roosting suitability of buildings and built structures – adapted from Collins, 2016.

Category	Description
Negligible potential	Negligible habitat features on the site likely to be used by bats
Low potential	A structure 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.
Moderate potential	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, condition and surrounding habitat but unlikely for a roost of high conservation status.
High potential	A structure with one or more potential roost sites that are obviously suitable for large 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.
Confirmed roost	Bats or evidence of bats recorded within the building during the initial inspection surveys or during dusk/dawn surveys. A confirmed record (supplied by records centre/local bat group) would also apply.

The buildings were then inspected for evidence of bats. Visual, systematic examinations were made for bats and evidence of bats, both internally and externally, of the following:

- roof slopes and the ridge;
- wall, window and door surfaces;
- window and door frames;
- wall bases;
- wall ledges and wall tops;
- roof beams;
- cracks, crevices and sheltered voids;
- the floors and stored items; and
- external features such as soffits and lead flashing.

Evidence of roosting bats include droppings and in some cases the absence of cobwebs. Bat droppings can prove beyond doubt that bats have used a building and can help to identify roosting locations because piles often accumulate beneath roosting sites of entrance points.

3 RESULTS

3.1 Preliminary Roost Assessment

3.1.1 Preliminary Roost Assessment – Trees

Of the trees surveyed three were of low potential for roosting bats, twenty-one were assessed as having moderate potential and nine as having high potential. Tree locations are shown in *Figure 2.* Survey results are shown in *Table 3.*

Table 3. Results of preliminary roost assessment - trees

Tag No.	Species	Bat Roosting Features	Bat Roost Potential	Further Actions
0701	*Quercus robur* (Pedunculate Oak)	a. Large flake in bark with crevice both sides on north-east facing trunk, *c.* 5m from ground. b. Wound scar/hole on south facing trunk, *c.* 2m from ground. c. Wound scar/hole on south-west facing trunk, *c.* 4m from ground. d. Split/hole at base on south facing trunk.	High	Tree must be subject to further surveys prior to felling.
0702	*Taxus baccata* (Yew)	a. Rot hole with cavity in stem extending backwards on north facing trunk, *c.* 4m from ground. b. Fluting in stem and branches *c.* 4-8m from ground.	Moderate	Tree must be subject to further surveys prior to felling.
0705	*Acer pseudoplatanus* (Sycamore)	a. Rot hole on north facing trunk, *c.* 8m from ground. b. Split where limb meets trunk on north facing side, *c.* 6m above ground	Moderate	Tree must be subject to further surveys prior to felling.
0714	*Fraxinus excelsior* (Ash)	Woodpecker holes (x2) on west facing side of trunk, *c.* 5m above ground.	High	Tree must be subject to further surveys prior to felling.
0715	*Acer pseudoplatanus* (Sycamore)	Rot hole.	Low	Tree may be felled taking reasonable avoidance measures. The feature should be inspected using an endoscope immediately prior to

				felling.
0717	*Quercus robur* (Pedunculate Oak)	Rolled bark and rot on main trunk, *c.* 8m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0719	*Quercus robur* (Pedunculate Oak)	Rotten/broken limb with cracks in bark on south-west facing trunk, *c.* 6m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0720	*Quercus robur* (Pedunculate Oak)	a. Rot hole where limb has been taken off on west facing side of trunk, *c.* 4.5m above ground. b. Small Rot hole on north-east facing side of trunk, *c.* 6m above ground.	High	Tree must be subject to further surveys prior to felling.
0721	*Acer pseudoplatanus* (Sycamore)	Woodpecker hole in scar at crown 1 on south facing side of trunk, *c.* 12m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0722	*Quercus robur* (Pedunculate Oak)	a. Rot hole in cut limb on east facing side of trunk, *c.* 3.5m above ground. b. Split limb with cracks	Moderate	Tree must be subject to further surveys prior to felling.
0725	*Quercus robur* (Pedunculate Oak)	Rot hole on west facing side of trunk, *c.* 2.5m above ground.	High	Tree must be subject to further surveys prior to felling.
0600	*Acer pseudoplatanus* (Sycamore)	Duel stem split with rot on south-west facing side of trunk, *c.* 2m above ground.	High	Tree must be subject to further surveys prior to felling.
0599	*Acer pseudoplatanus* (Sycamore)	a. Dead trunk (hole), cluttered on east facing side of trunk, *c.* 2m above ground. b. Rot hole on end of limb on south-east facing side of trunk, *c.*	Moderate	Tree must be subject to further surveys prior to felling.

		3m above ground.		
0598	*Acer pseudoplatanus* (Sycamore)	Vertical hole (rot) on south-west facing side of trunk, *c.* 2m above ground.	High	Tree must be subject to further surveys prior to felling.
0728	*Acer pseudoplatanus* (Sycamore)	a. Scar extending up into hollow stem – rotted heartwood on south facing side of trunk, *c.* 2.5m above ground. b. Scar extending up into hollow stem – rotted heartwood on south-west side of trunk, *c.* 4m above ground.	High	Tree must be subject to further surveys prior to felling.
0729	*Quercus cerris* (Turkey Oak)	a. Wound hole on south-east facing side of trunk, *c.* 2m above ground. b. Cut limb hole on south-west facing side of trunk, *c.* 4m above ground. c. Rot hole on limb on south-west facing side of trunk, *c.* 4m above ground. d. Rot hole on limb on south-west facing trunk, *c.* 9km above ground. e. Longitudinal split at end of limb on south-west facing trunk, *c.* 6m above ground. f. Longitudinal split, back roll on north-west facing side of trunk, *c.* 4m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0730	*Aesculus hippocastanum* (Horse Chestnut)	Lifted bark on west facing side of trunk, *c.* 0.5m above ground	Low	Tree may be felled taking reasonable avoidance measures. The feature should be inspected using an endoscope immediately prior to

				felling.
0733	*Quercus cerris* (Turkey Oak)	Woodpecker hole on limb scar on west facing side of trunk, *c.* 7m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0597	*Crataegus monogyna* (Hawthorn)	Rolled bark on dead trunk, *c.* 2m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0739	*Tilia ×europaea* (Lime)	Rot hole on end of limb on south facing side of trunk, *c.* 5m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0746	*Aesculus hippocastanum* (Horse Chestnut)	a. Rolled bark at wound (Split crown) on south facing side of trunk, *c.* 10m above ground. b. Lifted bark 10-12m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0747	*Quercus cerris* (Turkey Oak)	Split at end of limb on south facing side of trunk, *c.* 8m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0748	*Tilia ×europaea* (Lime)	a. Multi stem – swell rot hole on east facing side of trunk, *c.* 4.5m above ground. b. Tear out on north-east facing side of trunk, *c.* 6m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0749	*Quercus cerris* (Turkey Oak)	Longitudinal crack with back rolls in high crown on north facing side of trunk, *c.* 11m above ground.	High	Tree must be subject to further surveys prior to felling.
0750	*Acer pseudoplatanus* (Sycamore)	Rotted stem in hole on north facing side of trunk, *c.* 2.5 m above ground.	High	Tree must be subject to further surveys prior to felling.

0751	*Quercus robur* (Pedunculate Oak)	a. Small rot hole on north-west facing side of trunk, *c.* 12m above ground. b. Small rot hole on south-west facing side of trunk, *c.* 9m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0834	*Quercus robur* (Pedunculate Oak)	a. Cavity at end of snapped branch on south-west facing side of trunk, *c.* 6m above ground. b. Desiccated dead branch with split on east facing side of trunk, *c.* 8m above ground. c. Flaking / Peeling bark on south facing side of trunk, *c.* 6m above ground. d. Flaking / Peeling bark 10-20m above ground. e. Branch socket wound on south facing side of trunk, *c.* 8m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
0840	*Taxus baccata* (Yew)	Fluting in stem and main branches	Low	Tree may be felled taking reasonable avoidance measures.
Area G847	*Rhododendron Sp.*	Rot hole near base if stem. Cavity in branch extending vertically into limb on south facing trunk, *c.* 2m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
Area G847	*Rhododendron Sp.*	Rot hole. Cavity in stem leading downwards into camber at base of stem on east facing side, *c.* 1m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
Area G847	Unknown Standing dead wood	a. Vertical split in stem with internal cavity on north facing side of trunk, *c.* 1.5m above ground. b. Peeling bark in upper stem and branches 4-8m above ground.	Moderate	Tree must be subject to further surveys prior to felling.

Area G847	Unknown Standing dead wood	a. Vertical split in stem with internal cavity on north facing side of tree, *c.* 1.5m above ground. b. Peeling bark in upper stem and branches 4-8m above ground.	Moderate	Tree must be subject to further surveys prior to felling.
Area G847	*Acer pseudoplatanus* (Sycamore)	Vertical split in stem with internal cavity on west facing side of trunk, *c.* 2m above ground.	Moderate	Tree must be subject to further surveys prior to felling.

3.1.2 Preliminary Roost Assessment – Buildings

Results are shown in *Table 4*.

Table 4. Results of preliminary roost assessment - buildings

Building Reference	Building Description	Potential Bat Access Points/Roost Locations	Bat Roost Potential
Sports Pavilion	The building consists of a single-storey, permanent structure of modern design and construction. The walls are formed by bricks and concrete. The roof comprises a well fixed flat concrete roof with a waterproof covering made of rubber/composite material. There is no loft space present. A void was present above the internal suspended ceiling from the flat concrete roof above. This area was cluttered and no obvious bat access or egress points were recorded.	There are several potential routes of entry into the building including small gaps above two windows on the north-west facing elevation, as well as a gap around a drainpipe at the concrete eave /overhang on the same side. The gap extends vertically adjacent to the pipe and appears to continue horizontally beneath the roof covering *c*.15cm. A gap underneath lead flashing was also found on the south-east facing elevation as well as a small gap above the wooded window frame on the east facing elevation. There is also an entrance into the building's cavity wall on the southern corner where the wall has been damaged. A similar hole giving access to the wall cavity is present on the south facing elevation.	No evidence of bats was found in the building; however, the building has a number of features which could support single or several roosting bats. The building was therefore assessed as having **Moderate Potential** for roosting bats. *Table 5* describes the addition surveys required.
Security Kiosk	This prefabricated building is made with plastic panelling with windows and a flat roof. There is no loft space present.	There are no potential bat access points or roost locations	The building was assessed as having **Negligible Potential** for roosting bats. No further surveys are required.
Sydney Lodge	Sydney Lodge is an 18th Century Grade II listed house and adjacent two storey buildings of Victorian/Georgian	There are several potential routes of entry into the building including gaps underneath	Two bat droppings were found on the floor of the WW2

Building Reference	Building Description	Potential Bat Access Points/Roost Locations	Bat Roost Potential
	construction. The house is a three-storey building with a basement. Windows are in wooden frames which are in poor condition. The walls are constructed from a yellow brick laid in Flemish bond, with brick banding. There is a grand circular shaped entrance reception and staircase through the building. The building contains a high pitched roof consisting of slate tiles and is surrounded by stone parapet. Two dormer windows and two chimneys are also present. The attached two-storey buildings are of similar design and construction, containing a pitched roof of slate tiles. A wooden clock tower is located in the northern end of this building. The building is used as offices and is in good condition internally. A WWII bunker was found below the main house, entrance at the rear. It contained abandoned electric utility equipment and had a domed corrugated roof.	lead flashing, tiles which have slipped or are broken, and missing mortar under ridge tile. These occurred on the north, west and east elevations of the roof offering potential access points for bats. There is a missing or damaged brick work on the north-facing wall of the building providing possible access to the wall cavity and soffit.	Bunker. They were sent to the University of Warwick's ecological forensic department, who are an approved laboratory for DNA analysis of bat droppings. The bat droppings collected from the WW2 bunker were confirmed as Brown Long-eared Bat droppings (*Plecotus auritus*). **Confirmed Roost.** *Table 5* describes the addition surveys required.
Building 3	This modern addition is a single storey warehouse type building and an annex to Sydney Lodge. The roof is composed of five corrugated pitches with a loft space underneath the western most pitch. The remaining pitches have a suspended ceilings beneath and insulation. The building contains double glazing windows in tightly fitted PVC frames. The exterior walls are rendered and are most likely brick or concrete.	No access points were identified within the western loft space. The area was fully inspected and no evidence of roosting bats was found. There are several potential entry points into the building including a hole in the metal covering providing access beneath the corrugated sheeting. However these lead to	No evidence of bats was found in the building. However the building had several entry points and roosting features. The building was therefore assessed as having **Moderate Potential** for roosting bats. *Table 5* describes the addition

Building Reference	Building Description	Potential Bat Access Points/Roost Locations	Bat Roost Potential
		unsuitable spaces between the external roof and the hanging ceiling of the building. A gap was present under the felt roof providing possible access beneath the plywood/felt at the north elevation. A large hole is present on the south facing wall of the building which provides access into central cavity of wall.	surveys required.
Old Canteen	This old canteen is a single storey building with a metal sheeting double pitched roof, with no roof void. The building has concrete capping with brick cavity walls.	There are multiple weep holes and air bricks which provide internal access. There are louvered doors that provide internal access into the control room and gaps where lighting has been installed.	No evidence of bats was found in the building. The building had features which could provide roosts for individual bats and was therefore assessed as having **Low Potential** for roosting bats. *Table 5* describes the addition surveys required.
Offices	The building is in good condition and is currently being used as offices. It is a 2-storey building with brick cavity walls and a flat roof with a brick chimney. Security lighting is present on all elevations.	There are no potential bat access points or roost locations.	The building was assessed as having **Negligible Potential** for roosting bats. All roosting features can be inspected using an endoscope.
Design Office	This building is single story with brick walls and a multi-pitched asbestos roof. It is currently being used as offices.	There are no potential bat access points or roost locations.	The building was assessed as having **Negligible Potential**

Building Reference	Building Description	Potential Bat Access Points/Roost Locations	Bat Roost Potential
			for roosting bats. No further surveys are required.
Building 7a	Building 7a is a single storey metal portable cabin.	There are no potential bat access points or roost locations.	The building was assessed as having **Negligible Potential** for roosting bats. No further surveys are required.

4 EVALUATION AND CONCLUSIONS

4.1 Preliminary Roost Assessment

4.1.1 Preliminary Roost Assessment – Trees

Of the trees assessed 3 had low potential, 21 had moderate potential and 9 had high potential for roosting bats.

Should the removal of any of these trees become necessary further surveys will be needed, as detailed in *Table 3*. The surveys should involve the aerial inspection of any suitable features using tree climbing and an endoscope to look for bats or evidence of bats. If, on inspection a feature is identified as having moderate or high potential for roosting bats then further surveys will be necessary. If features are found to have low potential the tree can be felled under precautionary measures (Collins, 2016).

4.1.2 Preliminary Roost Assessment - Buildings

Three of the eight buildings have been found to have moderate potential for roosting bats (the Sports Pavilion, Building 3 and the Warehouse), the Old Canteen has low potential for roosting bats and the remaining buildings have negligible potential for roosting bats.

Sydney Lodge has a confirmed bat roost; two Brown Long-eared Bat droppings were found in a WW2 bunker that is attached to the building. It is likely that the roost is a night roost given the limited number of droppings and the design of the structure and internal conditions. Internal conditions are considered to be unsuitable for hibernation due to the draughty conditions and likely fluctuations in temperature. Night roosts are roosts where bats rest or shelter during the evening. Brown Long-eared Bats commonly use porches or outbuildings separate from the main roost as night roosts (BCT/BMT Cordah Limited, 2005). Further nocturnal surveys are required to confirm roost classification.

Additional surveys will be required where works are likely to disturb bats or destroy a roost. These surveys will gather sufficient information on the presence of bats in the building and will be required prior to any works commencing on the building.

All bat roosts are protected under EU and UK law as set out in *Appendix 1* and as such if any of the planned works are likely to result in destruction of a roost or disturbance to bats then this could result in a breach of legislation.

Table 5 outlines the details of additional surveys that will be required prior to works taking place. These are based on the *Bat Surveys for Professional Ecologists, Good Practise Guidelines* (Collins 2016).

Table 5. Minimum number of survey visits required

Building Number	Number of surveys required	Survey timing
Sports Pavilion	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.	May to September with at least one of the surveys between May and August.
Sydney Lodge	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry. The third visit could be either dusk or dawn.	May to September with at least two of the surveys between May and August.
Building 3	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.	May to September with at least one of the surveys between May and August.
Old Canteen	Single survey. A detailed inspection of all roosting features with an endoscope should be undertaken by a licensed bat ecologist.	May to August.

5 REFERENCES

Collins, J (Ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).* The Bat Conservation Trust, London.

Bat Conservation Trust/BMT Cordah Limited (2005). *A Review and Synthesis of Published Information and Practical Experience on Bat Conservation within a Fragmented Landscape*. An occasional report by the Three Welsh National Parks, Pembrokeshire CC and the Countryside Council for Wales, Cardiff.

6 FIGURES

Site boundary

Rev	Date	Description	Drn	Chk	App
00	16.05.17	856776	RG	SP	EI

GE Aviation Hamble

RSK

Figure 1

Site Location Plan

0 150
metres
Scale = 1:5,000 @ A3

N W E S

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File Name : Z:\GIS\Projects\Ecology\Projects 856751 - 856800\856776 - GE Aviation Hamble

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Site boundary

Tree with high bat roost potential

Tree / tree group with moderate bat roost potential

Tree with low bat roost potential

Rev	Date	Description	Drn	Chk	App
00	16.05.17	856776	RG	SP	EI

GE Aviation Hamble

RSK

Figure 2

Preliminary Roost Assessment - Trees

0 45
metres
Scale = 1:1,500 @ A3

N W E S

REV 00

File Name : Z:\GIS\Projects\Ecology\Projects 856751 - 856800\856776 - GE Aviation Hamble

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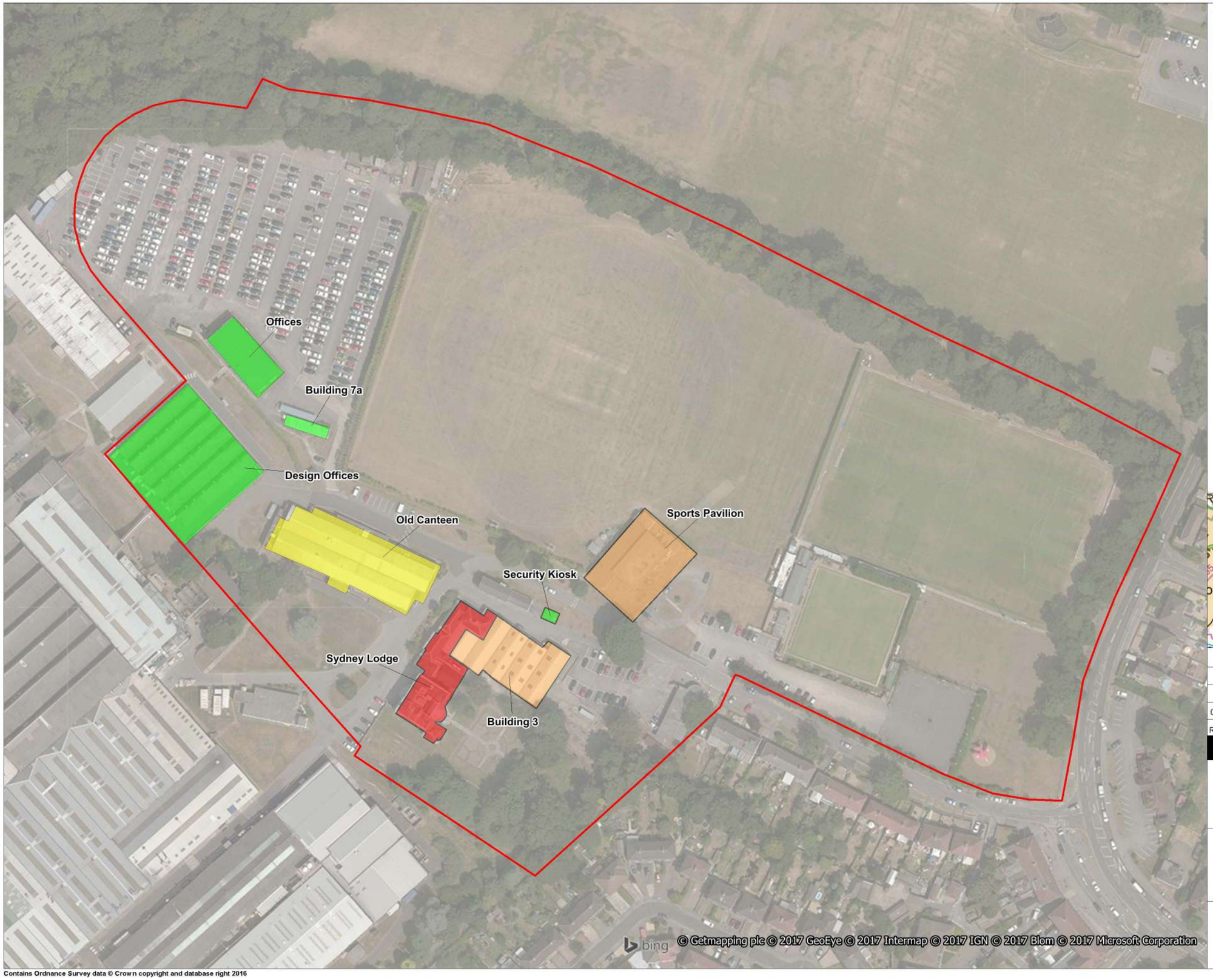

Site boundary

Building - confirmed roost

Building - moderate bat roost potential

Building - low bat roost potential

Building - negligible bat roost potential

Rev	Date	Description	Drn	Chk	App
00	01.06.17	856776	RG	SP	EI

GE Aviation Hamble

RSK

Figure 3

Preliminary Roost Assessment - Buildings

0 45
metres
Scale = 1:1,500 @ A3

N W E S

REV 00

File Name : Z:\GIS\Projects\Ecology\Projects 856751 - 856800\856776 - GE Aviation Hamble

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Design Office - Overview, looking south west

Offices building - Overview, looking north east

Old Canteen - Overview, looking south west

Old Canteen - Weep holes in brick work, south facing wall

Old Canteen - Gap in brick work, north facing wall

Single storey metal portable cabin. Overview, Looking north west

Sydney Lodge - Overview. Rear of building where bunker entrance is situated, east facing wall

Building 3 - Overview, East facing wall

Sydney Lodge - WWII Bunker entrance

Rev	Date	Description	Drn	Chk	App
00	01.06.17	856776	RG	SP	EI

GE Aviation Hamble

RSK

Photos

REV 00

File Name : Z:\GIS\Projects\Ecology\Projects 856751 - 856800\856776 - GE Aviation Hamble

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APPENDIX 1 - LEGISLATION

Bats

All species of British bat are protected by The Wildlife and Countryside Act 1981 (as amended) extended by the Countryside and Rights of Way Act 2000. This legislation makes it an offence to:

- intentionally kill, injure or take a bat;
- possess or control a bat;
- intentionally or recklessly damage, destroy or obstruct access to a bat roost; and
- intentionally or recklessly disturb a bat while is occupies a bat roost.
- Bats are also European Protected Species listed on The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended). This legislation makes it an offence to:
- deliberately capture, injure or kill a bat;
- deliberately disturb a bat (in such a way as to be likely to significantly affect: (i) the ability of a significant group of bats to survive, breed or rear/nuture their young; or (ii) the local distribution or abundance of the species concerned);
- damage or destroy a breeding site or resting place of a bat; and
- possess, control, transport, sell, exchange a bat, or offer a bat for sale or exchange.

All bat roosting sites receive legal protection even when bats are not present.

Where it is necessary to carry out an action that could result in an offence under The Conservation (Natural Habitats, & c.) Regulations 2010 (as amended) it is possible to apply for a European Protected Species (EPS) licence from Natural England. Licences are only issued where Natural England are satisfied that there is no satisfactory.

APPENDIX 2 - BAT DROPPING DNA ANALYSIS RESULTS

WARWICK
THE UNIVERSITY OF WARWICK

EcoWarwicker
Ecological Forensics

15 May 2017

Re: Bat Identification Results for Chloe Stephenson, RSK

Bat job number 9429, received 03 May 2017
Sample labelled: Sydney Lodge, Hamble. 856776. No named contact or email address with sample.
PCR amplification successful. DNA sequence:
ATGACCAACATTCGAAAGTCCCACCCTCTCATAAAAATTATCAATGACTCATTCATTG
ACTTACCTGCTCCCTCAAATATTTCATCATGATGAAACTTTGGATCTCTTCTAGGCATT
GCCTAGCACTAC

Phylogenetic analysis identification: *Plecotus auritus*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

Professor Robin Allaby

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GE Aviation

Wintering Bird Survey Report

Hamble-le-rice

856776

MARCH 2018

RSK GENERAL NOTES

Project No.: 856776

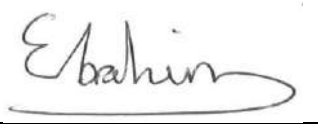
Title: Hamble-le-rice - Winter Bird Survey

Client: GE Aviation

Date: March 2018

Office: Deddington

Status: Rev0

Author	Alice Clarke	**Technical reviewer**	Tom Smith
Signature		Signature	
Date:	09/03/2018	Date:	14/03/18
Project manager	Errol Ibrahim	**Quality reviewer**	Tom Smith
Signature		Signature	
Date:	09/03/2018	Date:	14/03/18

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment.

EXECUTIVE SUMMARY

1. This report presents the results of wintering bird surveys carried out at the GE Aviation site at Hamble-le-Rice near Southampton, Hampshire (Ordnance Survey Grid References SU46890717) between October and December 2017.
2. The proposed residential development includes the construction of *c.*145 units with accompanying access roads, parking and landscaping. The site is within 300 m of Lee-on-the Solent to Itchen Estuary SSSI and Solent and Southampton Water RAMSAR SPA, important for several bird species.
3. When food availability is reduced for Brent geese in coastal mudflats, cereal fields and amenity grasslands become an important food resource for this species. Along with other wading bird species, Brent geese have the potential to be affected by increased recreational pressure caused by the development.
4. The site was assessed for its suitability for waders and Brent geese in accordance with a strategy outlined by the Hampshire & Isle of Wight Wildlife Trust, who were consulted throughout the process. Vantage point surveys were undertaken at nearby suitable locations. Searches for Brent Goose droppings were carried out on the sports pitches on the site.
5. No bird species were recorded in internationally or nationally important numbers. Three Schedule 1 species were recorded. Six species listed in the UKBAP were recorded. Five species on the Red List of Birds of Conservation Concern (BoCC, 2009) were recorded. Sixteen species on the Amber List of BoCC (2009) were recorded. Seven SPA/Ramsar qualifying species were recorded.
6. No Brent geese or other waders were recorded at the site and no droppings were found on the sports pitches. Relatively low numbers were identified at several sites during low tide, all of which were subject to regular and repeated disturbance by dog walkers and vehicles and/or boats.
7. Net increase in residential development as a result of the housing development may lead to a likely significant effect from disturbance; however, any significant effect will be reduced by the Solent Recreational Mitigation Strategy (SRMS). The strategy is backed by Natural England and provides sufficient mitigation to offset any disturbance from new developments within the Eastleigh borough. A financial levy is provided for each new dwelling within 5.6km of the SPA which funds the mitigation project
8. BoCC species are likely to benefit from the development with the current, design and mitigation areas, which incorporate habitats that they can use.

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1 INTRODUCTION

1.1 Purpose of the Report

This report presents the findings of wintering bird surveys undertaken to assess the wintering bird assemblage in connection with the proposed residential development of 145 units at the GE Aviation site in Hamble-le-Rice, Southampton. A site location plan is given in *Figure 1*. The works include construction of *c.*145 units with accompanying access roads, parking and landscaping.

1.2 Ecological Context

The site – which is c.500 m from the coast – is part of a 20 ha industrial campus comprising areas of hard-standing and industrial buildings alongside a sports ground and some broadleaved woodland. There is a large amount of ornamental planting throughout. To the north of the site is the Royal Victoria Country Park. To the west and south is Southampton Water, and to the east there are residential areas which form part of the village of Hamble-le-Rice. There are 28 designated sites within 5 km of the campus, some of which are directly adjacent to the site. Lee-on-the Solent to Itchen Estuary SSSI and Solent and Southampton Water RAMSAR SPA are both within 300 m. The area is of international importance for over-wintering dark-bellied Brent geese, and of national importance for three species of wildfowl (great-crested grebe, teal and wigeon) and five species of wader (black-tailed godwit, dunlin, grey plover, ringed plover, redshank).

1.3 Structure of the Report

The remainder of this report is structured as follows:

- Section 2 describes Brent goose ecology, and other notable species;
- Section 3 describes survey methods;
- Section 4 describes the results;
- Section 5 evaluates the results; and
- Section 6 gives references.

2 BRENT GOOSE ECOLOGY, & OTHER NOTABLE SPECIES

2.1 General

The data are compiled into summary tables giving information on location and species. Any *Schedule 1*, *Birds of Conservation Concern* (BoCC), or *UKBAP* species that are potentially of importance are then noted. Lists and tables of birds are compiled using the order and species used in the British Ornithologists Unions (BOU), 2017. *The British List: a checklist of the birds of Britain* (9th edition). Ibis 160: 190-240.

2.2 Brent Goose Ecology

Brent geese are a migrant species which arrive in the UK from mid-September, with highest numbers present in January. Exposed mud flats in coastal areas are an important feature for this species as they feed on eelgrass (*Zostera spp*.) and marine algae. When food availability is reduced in this habitat, cereal fields and amenity grasslands become an important food resource for Brent geese, whose nutritional requirements cannot be met by natural sources, mainly due to habitat loss.

Development in the Solent exemplifies pressure on grasslands used for foraging by this species, and as a roosting resource by wading birds, during the winter months.

Site suitability for Brent geese is discussed in the 'Solent Waders and Brent Goose Strategy, which states that:

"The suitability of sites for Brent geese depends on distance from the coast, the size of the grazing area, the type of grassland management, visibility and disturbance. Brent geese prefer large open sites where they have clear sight-lines and short, lush grass for grazing. They use a great deal of energy travelling between feeding areas, so tend to preferentially select sites adjacent to the coast. However, Brent geese are often seen to fly over some apparently suitable sites to reach others, so there are undoubtedly more subtle factors controlling the desirability of sites. Disturbance can have a marked effect on Brent geese. When mildly alarmed, they raise their heads but quickly resume feeding. When levels of disturbance increase, they fly away and resettle when the cause of disturbance has passed, or look for another quieter site nearby." (Hampshire & Isle of Wight Wildlife Trust, 2010)

2.3 Schedule 1 Birds

Wild birds are protected under *Section 1* of the *Wildlife and Countryside Act, 1981* (as amended). Protection was extended by the *Countryside Rights of Way Act, 2000*. It is an offence to:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; and

- take or destroy an egg of any wild bird.

Certain species of bird are listed on *Schedule 1* of the *Wildlife and Countryside Act, 1981* (as amended) and receive special protection under *Sections 1(4)* and *1(5)* which confers penalties where the above mentioned offences are committed in addition to making it an offence to:

- disturb any such bird whilst building its nest or whilst it is in or near a nest containing dependant young; and to
- disturb the dependant young of such a bird.

2.4 Birds of Conservation Concern: 2015 (Eaton et al.)

2.4.1 General

Leading governmental and non-governmental conservation organisations in the UK reviewed the population status of 244 bird species regularly found in Britain, and placed them onto one of three lists - red, amber or green. Although these listings offer no further legal protection, they are meant to help guide conservation action for individual species.

2.4.2 Red List Species

These are species of high conservation concern. They are Globally Threatened according to IUCN criteria, and include:

- those whose population or range has declined rapidly in recent years; and
- those that have declined historically and not shown a substantial recent recovery.

2.4.3 Amber List Species

These are species of medium conservation concern. They have an unfavourable conservation status in Europe, and include:

- those whose population or range has declined moderately in recent years;
- those whose population has declined historically but made a substantial recent recovery;
- rare breeders; and
- those with internationally important or localised populations.

2.4.4 Green List Species

These are the remaining species with stable or increasing populations and that are presently not of conservation concern.

2.5 UKBAP Species

The UK BAP (UK Biodiversity Steering Group, 1998a-f), is the Government's response to the Convention on Biological Diversity (1992). It describes the biological resources

of the UK, details plans for their protection and lists action plans for habitats and species.

The UK and Local Species Action Plans (SAPs) provide information and guidance for conservation for nearly 400 animal and plant species of conservation concern or priority status requiring national attention. At present there are UK SAPs for 59 species of birds.

2.6 SPA/Ramsar/SSSI Qualifying Species

Lee-on-the Solent to Itchen Estuary SSSI

The site is an integral part of Southampton Water which is of international importance for over-wintering Dark-bellied Brent geese, and of national importance for three species of wildfowl (Great-Crested Grebe, Teal and Wigeon) and five species of wader (Black-Tailed Godwit, Dunlin, Grey Plover, Ringed Plover, Redshank).

At low water the intertidal flats comprise major feeding grounds for waders and dark-bellied Brent geese. Total numbers of waders in Southampton Water in winter normally exceed 10,000, which is considered to be the qualifying level for national importance. Numbers of Brent geese can exceed 2,000. At times, most of the geese and more than half of the waders feed within the SSSI which is thus ornithologically a critically important component of the Southampton Water estuary. The SSSI provides important feeding areas for black-tailed godwit, dunlin, grey plover, ringed plover, redshank, curlew and turnstone. The Brent geese feed on green algae and eelgrass on the intertidal flats early in the winter, but later also exploit farmland outside the SSSI and the Hook Links grazing marsh within it. At high tide the very shallow water over the flats between the Hamble and Hillhead is an important feeding and roosting area for great-crested grebes, red-breasted mergansers and other marine birds; the numbers of great-crested grebes here can exceed 200 and are of national importance.

The full citation is included in *Appendix 1*.

Solent and Southampton Water RAMSAR SPA

The Solent and Southampton Water SPA is of European importance because it qualifies under **Article 4.1** of the Directive (79/409/EEC) by regularly supporting more than 1% or more of the Great Britain population of a species; listed in Annex 1 in any season, in this case Mediterranean Gull (*Larus melanocephalus*), Sandwich Tern (*Sterna sandvicensis*), Common Tern (*Sterna hirundo*), Little Tern (*Sterna albifrons*) and Roseate Tern (*Sterna dougalli*). It also qualifies under **Article 4.2** of the Birds Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographic population of a regularly occurring migratory species (other than those listed in Annex 1) in any season. These species are Dark-Bellied Brent Goose (*Branta bernicla bernicla*), Teal (*Anas crecca*), Ringed Plover (*Charadrius hiaticula*) and Black-Tailed Godwit (*Limosa limosa*). In addition, the site is used regularly by over 20,000 waterfowl or seabirds.

The full citation is included in *Appendix 1*.

3 METHODS

3.1 Survey Sites

The ornithological interest of the local area was assessed, concentrating on bird populations in selected key habitat. The key habitats were as follows:

1) Main site – sports pitches.
2) Main site – Netley Foreshore.
3) Hamble Spit Car Park at Hamble Point Marina.
4) Hamble Common Marshes off School Lane.
5) Mercury Marshes.

Additional incidental information from the following sites was obtained on an ad-hoc basis and is included for general information on Brent goose numbers in the area:

- Calshot Dusk counts.
- Mercury Yacht Harbour.
- Hamble Boat Club.
- Netley Yard.

All sites are illustrated in *Figure 1*. The development site has been assessed for its suitability for Brent geese according to a 'site factors table' (*Table 3*), in line with the Solent Waders and Brent Goose Strategy.

Statistical correlations have shown that factors that describe how urban the area surrounding a site is, e.g. distance to road, area of buildings, relative distance of buildings and number of homes at different travel times, all significantly correlate with Brent goose usage (Hampshire & Isle of Wight Wildlife Trust, 2010). Factors which describe the position and topography of the site, such as linear distance to high water, mean height and range in height (relative to sea level), also all significantly correlate with use. Many of the factors have been found to be interrelated i.e. large sites tended to have more uniform shapes, preferred habitats such as shingle banks tend to be long and thin, making it difficult to isolate the importance of particular factors (Hampshire & Isle of Wight Wildlife Trust, 2010). All the site factors and their relationship to use are listed in *Table 1* below.

Table 1. Site Factors - significant correlating factors and their effect on the suitability of sites for waders and Brent geese (Hampshire & Isle of Wight Wildlife Trust, 2010).

	Waders		Brent Geese	
Factor	**More suitable**	**Less suitable**	**More suitable**	**Less suitable**
Area (ha)	Larger	Smaller	Larger	Smaller
Shape – size/perimeter	Irregular – long and thin	Regular - square	Regular - square	Irregular – long and thin
Area of buildings (m^2) within 50 m zone	No buildings in this zone	Buildings in this zone	Not significant	Not significant
Area of buildings (m^2) within 50 – 500 m zone	No buildings in this zone	Buildings in this zone	No buildings in this zone	Buildings in this zone
Area of buildings (m^2) within 500 – 2500 m zone	No buildings in this zone	Buildings in this zone	Not significant	Not significant
Homes within 15 mins	No homes	Homes within	Not significant	Not significant
Homes within 30 mins	No homes	Homes within	Not significant	Not significant
Mean height (m)	Low flying	High ground	Low flying	High ground
Range in height (m)	Flat	Uneven	Flat	Uneven
Distance to road (km)	Further away	Closer	Not significant	Not significant
Distance to mean high water (km)	Closer	Further away	Closer	Further away
Isolation index	More isolated from other sites	Closer to other sites	Closer to other Brent sites	Further away from other Brent sites
Habitat	Coastal and grassland, then agricultural	All other habitats	Coastal and grassland, then agricultural	All other habitats

3.2 Survey Timings

Through consultation with The Hampshire & Isle of Wight Wildlife Trust it was deemed that two surveys per month from October to March (as recommended in their Brent goose and waders strategy) would not be sufficient as further surveys have found that the birds forage and roost on the intertidal habitats in the early part of the winter. The following schedule was therefore proposed:

- One survey at the end of October;
- Three surveys a month, November – February; and
- One Survey in early March.

An agreement was reached to review the results at the end of December and discontinue the surveys if there was no interest in the site by Brent geese and waders.

Survey visits were timed to observe birds at various tidal cycles; where possible low and/or high-tide peak counts were included within the survey. Details of dates, times, tides and weather conditions during the surveys are shown in *Appendix 2*.

3.3 Survey Methods

All birds observed from each survey location were counted and recorded with the aims of obtaining peak counts for all species, and locating significant feeding and/or roosting assemblages. Searches were conducted on the sports pitches on the main site, and on adjacent suitable habitat, for Brent geese droppings to indicate whether or not they are using the area.

Observations of terrestrial species of birds present around the sites were also recorded during all survey visits. All birds, seen or heard, were recorded using standardised BTO methodology codes and symbols. Special attention was given to undertaking counts of any notable assemblages of feeding and/or roosting birds and to *Schedule 1*, BoCC and *UKBAP/LBAP* species.

3.4 Interpretation of Survey Results

A full list of species observed in all survey areas is shown in *Table 3* and a summary of all *Schedule 1*, *Birds of Conservation Concern*, *UKBAP* and SPA/Ramsar qualifying species observed during the six visits is given *Table 4*.

4 RESULTS

Using a numerical system to assess the site's suitability according to *Table 1* the majority of the factors fall into the 'score more' category, suggesting that there is suitability for Brent geese, however there are high levels of recreational use and disturbance to the area could dissuade birds from using the area.

Table 2. Site Assessment of the potential development area (PDA) for Brent geese, using criteria outlined in *Table 1*.

Factor	More Suitable	Less Suitable	Score More	Score Less
Area (ha)	Larger	Smaller	1	0
Shape- size/perimeter	Regular, square	Irregular, long and thin	1	0
Area of buildings within 50-500 m	No buildings in this zone	Buildings in this zone	0	1
Mean height (m)	Low lying	High ground	1	0
Range in height (m)	Flat	Uneven	1	0
Distance to mean high water (km)	Closer	Further away	0.5	0.5
Isolation index	Closer to other Brent sites	Further away from other Brent sites	0	1
Habitat	Costal and grassland then agricultural	All other habitats	1	0
			Total: 5.5/8	**Total: 2.5/8**

No Brent geese were identified within the site boundary during the surveys and no droppings were found on the sports pitches or adjacent suitable habitat, however, they were identified in areas outside of the site boundary

A total of 40 bird species was recorded during the visits to all survey sites and a full list of these species is shown in *Table 3*. Full tabulated data sheets for each survey visit are provided in *Appendix 2*.

No species were recorded in internationally or nationally important numbers. Three Schedule 1 species were recorded. Six species listed in the UKBAP were recorded. Five species on the Red List of BoCC (2015) were recorded. Sixteen species on the Amber List of BoCC (2015) were recorded. Seven SPA/Ramsar qualifying species were recorded.

Patterns of bird movement appear to be dependent upon the tidal cycle. Typically at low tide, a range of bird species were seen feeding at Hamble Common Beach, Hamble Common Mudflats and Mercury Mudflats. All of these sites are subject to regular and repeated disturbance by dog walkers and passing vehicles and/or boats.

The highest number of Brent geese identified was 122 at Hamble Common Beach on 14 November 2017. There was a peak of 43 on the Mercury Mudflats site on 29 November 2017. 58 were also recorded on 7 and 8 December 2017. Peak counts on the Foreshore and Hamble Common Mudflats were 2 and 15 respectively.

Dog walkers were recorded at all sites and posed a regular and repeated disturbance to Brent geese and other wading birds on land or close to the shore. Species such as Turnstone appear to be less affected by this and will only flush at the last minute when a member of the public walks by.

Table 3. All bird species recorded during the surveys

English name	Latin name	English name	Latin name
Bar-Tailed Godwit*	*Limosa lapponica*	Eurasian Wigeon*	*Anas penelope*
Black-headed Gull*	*Larus ridibundus*	European Robin	*Erithacus rubecula*
Black-tailed Godwit**†‡	*Limosa limosa*	Golden Plover	*Pluvialis apricaria*
Brent Goose*†	*Branta bernicla*	Goldfinch	*Carduelis carduelis*
Canada Goose	*Branta canadensis*	Great Black-backed Gull*	*Larus marinus*
Carrion Crow	*Corvus corone*	Great Cormorant	*Phalacrorax carbo*
Chiffchaff	*Phylloscopus collybita*	Great Crested Grebe	*Podiceps cristatus*
Common Buzzard	*Buteo buteo*	Grey Heron	*Ardea cinerea*
Common Greenshank*	*Tringa nebularia*	Grey Plover*‡	*Pluvialis squatarola*
Common Kestrel*	*Falco tinnunculus*	Herring Gull**†	*Larus argentatus*
Common Kingfisher*‡	*Alcedo atthis*	House Sparrow**†	*Passer domesticus*
Common Redshank*	*Tringa totanus*	Little Egret	*Egretta garzetta*
Common Wood Pigeon	*Columba palumbus*	Mallard*	*Anas platyrhynchos*
Dunlin*	*Calidris alpina*	Meadow Pipit*	*Anthus pratensis*
Eurasian Blue Tit	*Cyanistes caeruleus*	Northern Lapwing**†	*Vanellus vanellus*
Eurasian Curlew**†	*Numenius arquata*	Pied Wagtail	*Motacilla alba*
Eurasian Jay	*Garrulus glandarius*	Ruddy Turnstone*	*Arenaria interpres*
Eurasian Magpie	*Pica pica*	Tawny Owl*	*Strix aluco*
Eurasian Oystercatcher*	*Haematopus ostralegus*	Tufted Duck	*Aythya fuligula*
Eurasian Sparrowhawk	*Accipiter nisus*	Water Rail	*Rallus aquaticus*

‡ Schedule 1 species

** Red list Birds of Conservation Concern

* Amber list Birds of Conservation Concern

† UKBAP species

4.1 Notable Species

All *Schedule 1*, *UKBAP, Red* and *Amber List Birds of Conservation Concern* and SPA/Ramsar qualifying species recorded during the visits have been summarised in *Table 4.*

Table 4. Notable wintering birds recorded during the visits

Species	Schedule 1 Species	UKBAP Species	Red List Species	Amber List Species	SPA/Ramsar/SSSI Qualifying Species
Brent Goose	-	✓	-	✓	✓
Eurasian Wigeon	-	-	-	✓	✓
Common Kingfisher	✓	-	-	✓	-
Mallard	-	-	-	✓	-
Great Crested Grebe	-	-	-	-	✓
Meadow Pipit	-	-	-	✓	-
Common Greenshank	-	-	-	✓	-
House Sparrow	-	✓	✓	-	-
Tawny Owl	-	-	-	✓	-
Northern Lapwing	-	✓	✓	-	-
Great Cormorant	-	-	-	-	-
Little Egret	-	-	-	-	-
Grey Heron	-	-	-	-	-
Common Kestrel	-	-	-	✓	-
Eurasian Oystercatcher	-	-	-	✓	-
Grey Plover	✓	-	-	✓	✓
Dunlin	-	-	-	✓	✓
Black-tailed Godwit	✓	✓	✓	-	✓
Bar-tailed Godwit	-	-	-	✓	-
Eurasian Curlew	-	✓	✓	-	-
Common Redshank	-	-	-	✓	✓
Ruddy Turnstone	-	-	-	✓	-
Black-headed Gull	-	-	-	✓	-
Herring Gull	-	✓	✓	-	-
Great Black-backed Gull	-	-	-	✓	-

5 EVALUATION

Surveys recorded 40 species of birds, including Schedule 1, UKBAP and BoCC species and species included in the Solent and Southampton Water SPAs and Ramsar sites.

Representatives from the Hampshire and Isle of Wight Wildlife Trust commented that this is an unusual year in that there appear to be very few juvenile Brent geese around. Typically they do not move to inland sites until resources on the intertidal zone are exhausted, but with so few juveniles around they may not move in land at all this winter.

The Hampshire and Isle of Wight Wildlife Trust agree that the survey effort undertaken is considered to be sufficient to demonstrate that the site is not currently used by waders and Brent geese and further surveys in January to March were not required, as a result of this consultation further surveys were not undertaken. Whilst the sports field within the PDA does offer features and is located such, that it appears to be suitable, there is no historic or current evidence of birds using the site. It appears that last year was a poor breeding season, certainly for Brent geese, and there are very few juveniles present this winter and birds are not moving to inland sites in this area. There is the potential for the site to be used in the future and as such the loss of this site is taking away the opportunity for enhancement in the future.

The net increase in residential development as a result of the housing development would lead to a likely significant effect from disturbance; however any significant effect will be reduced by the Solent Recreational Mitigation Strategy (SRMS). The strategy is backed by Natural England and provides sufficient mitigation to offset any disturbance from new developments within the Eastleigh borough. A financial levy is provided for each new dwelling within 5.6km of the SPA which funds the mitigation project.

BoCC species would benefit from future development with appropriately designed green spaces and mitigation areas, which incorporate habitats that they could use. These may include mown amenity grassland with low levels of disturbance, which may involve restricting or zoning recreational activity, and implementing a mowing regime, as part of the management strategy. A habitat management plan would provide appropriate advice and should be produced in consultation with a suitably qualified ecologist. BoCC species would also benefit from the Solent Recreational Mitigation Strategy (SRMS).

6 REFERENCES

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APPENDIX 1
CITATIONS FOR DESIGNATED SITES

File ref:

County: Hampshire **Site Name: Lee-on-The-Solent to Itchen Estuary SSSI**

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

Local Planning Authority: Hampshire County Council, Eastleigh Borough Council, Fareham Borough Council, Gosport Borough Council, Southampton City Council

National Grid Reference: SU 432133 – SZ 569994

Ordnance Survey Sheet 1:50,000: 196 **1:10,000**: SU 40 NE, NW, SE; SU 41 SW; SU 50 NW, SE, SW; SZ 59 NE

Area: 631.91 (ha) 1,561.44 (ac)

Date Notified (Under 1981 Act): 27 August 1992 **Date of Last Revision: –**

Confirmed: 21 May 1993

Other Information:

The SSSI includes in part three Local Nature Reserves (LNR) declared under Section 20 of the National Parks and Access to the Countryside Act, 1949. Chessel Bay LNR (14ha) is owned and managed by Southampton City Council, Hook-with-Warsash LNR (220ha) and Mercury Marshes LNR (6.7ha) are owned and managed by Hampshire County Council.

Reasons for Notification:

The Site of Special Scientific Interest extends along the eastern shore of Southampton Water from Lee-on-the-Solent to the mid-Itchen estuary and includes the lower estuary of the River Hamble. The site comprises extensive intertidal muds with a littoral fringe of vegetated shingle, saltmarsh, reedbed, marshy grasslands and deciduous woodland on alluvium, valley gravels (Hamble Common), and Bracklesham Beds (Hook Links). The site is an integral part of Southampton Water which is of international importance for over-wintering dark-bellied geese, and of national importance for three species of wildfowl (great-crested grebe, teal and wigeon) and five species of wader (black-tailed godwit, dunlin, grey plover, ringed plover, redshank). The SSSI supports an outstanding assemblage of nationally scarce coastal plants. In addition, the cliffs at Brownwich and the foreshore at Lee-on-The Solent are of national geological importance.

The intertidal flats achieve a maximum width of 0.6km at the mouths of the Itchen and Hamble estuaries. West of the Hamble they are mainly of gravelly mud, but eastward of the estuary mouth they grade to fine, muddy sand with intertidal banks of flint at Hillhead. The sediments, which in the Hamble estuary contain a high clay fraction, receive abundant organic matter which enable the intertidal flats to support high densities of benthic invertebrates (molluscs, crustacea, marine worms, etc.), including probably the largest remaining British population of the introduced hard shell clam *Mercenaria mercenaria*. On the lower shore, east of the Hamble, there are extensive beds of the eelgrasses *Zostera angustifolia* and *Z. noltii*, both of which are nationally scarce species. Green algae, mainly *Enteromorpha* and *Ulva lactuca*, are widespread in the intertidal zone. There is limited *Spartina* marsh development in the Hamble and Itchen estuaries, although the marsh is now in recession and the accreted mud platforms are disintegrating.

At low water the intertidal flats comprise major feeding grounds for waders and dark-bellied Brent geese. Total numbers of waders in Southampton Water in winter normally exceed 10,000, which is considered to be the qualifying level for national importance. Numbers of Brent geese can exceed 2,000. At times, most of the geese and more than half of the waders feed within the SSSI which is thus ornithologically a critically important component of the Southampton Water estuary. The SSSI provides important feeding areas for black-tailed godwit, dunlin, grey plover, ringed plover, redshank, curlew and turnstone. The Brent geese feed on green algae and eelgrass on the intertidal flats early in the winter, but later also exploit farmland outside the SSSI and the Hook Links grazing marsh within it. At high tide the very shallow water over the flats between the Hamble and Hillhead is an important feeding and roosting area for great-crested grebes, red-breasted mergansers and other marine birds; the numbers of great-crested grebes here can exceed 200 and are of national importance.

Adjoining the shore the SSSI includes a diversity of wetland habitats of intrinsic and collective importance ornithologically. They also support populations of a number of plant species which are nationally scarce.

At the mouth of the Hamble estuary the SSSI includes grazing marsh reclaimed from saltmarshes in the seventeenth century (Hook Links), a reed-fringed freshwater fleet (Hook Lake) and deciduous woodland extending inland along a former tidal re-entrant. The deciduous woodland is of ancient origin and is dominated by valley alder *Alnus glutinosa* grading into mixed oak *Quercus robur*, with ash *Fraxinus excelsior*, birch *Betula* species, and sycamore *Acer pseudoplatanus* woodland on the higher slopes. Willow carr occurs on the margins of the reedbed at Hook Lake. The shrub layer in the oak woodland is dominated by hazel *Corylus avellana* and holly *Ilex aquifolium*, with a variable ground flora of bracken *Pteridium aquilinum*, ivy *Hedera helix*, bluebell *Hyacinthoides non-scripta*, and, occasionally, climbing corydalis *Corydalis claviculata*. In the valley bottom greater tussock-sedge *Carex paniculata*, alternate-leaved golden-saxifrage *Chrysosplenium oppositifolium* and narrow buckler-fern *Dryopteris carthusiana* grow in abundance. In addition to the normal suite of breeding birds, the alder is attractive in autumn and winter to flocks of feeding goldfinch, redpoll and siskin.

The unimproved and semi-improved grasslands of the old grazing marshes at Hook Links are dominated by bent *Agrostis* species and fescue *Festuca* species grasses, with meadow foxtail *Alopecurus pratensis* and meadow barley *Hordeum secalinum*. The nationally scarce slender hare's-ear *Bupleurum tenuissimum* occurs on the seawall. Hook Links supports breeding lapwing, oystercatchers and redshank and is an important mid and late winter feeding ground for Brent geese. The excavation of the scrape has enhanced its function as a feeding and high water roost for waders and ducks.

Swamp and fen vegetation occurs at several points immediately beyond tidal influence and mainly within the Hamble estuary. Fine transitions from tidal flat to fen occur at Bunny Meadows, on the left bank of the estuary, and at Mercury Marshes, on the right bank. Here, common reed *Phragmites australis* is dominant together with patches of sea club-rush *Scirpus maritimus*. At Mercury Marshes hemlock water-dropwort *Oenanthe crocata*, lesser and greater pond-sedges *Carex acutiformis*, *C. riparia* respectively, and jointed rush *Juncus articulatus* are found. At Hook Lake, the large reedbed supports a good breeding bird population including little grebe, Cetti's warbler, reed bunting and reed warbler. Bearded tit visit in winter, but, as yet, do not breed.

Where the reed grades into saltmarsh, there can be found sea purslane *Halimione portulacoides* with varying combinations and amounts of sea aster *Aster tripolium*, common sea-lavender *Limonium vulgare* and common saltmarsh-grass *Puccinellia maritima*. The nationally scarce borrer's and stiff saltmarsh-grasses *P. fasciculata* and *P. rupestris* respectively, have also been found at Bunny Meadows. Cord-grass *Spartina* is also dominant over large, lower-lying areas, especially outside the

seawall at Bunny Meadows, where the saltmarsh has been the subject of erosion for the past 50 years. In places, algae-draped mud hags with just a few clumps of *Spartina* survive. At Hamble Common, the saltmarsh, partially blocked-off at the end of a tidal inlet, is dominated by saltmarsh and sea rushes *Juncus gerardii* and *J. maritimus* respectively.

At Chessel Bay the transition occurs from shingly mud through clumps of *Spartina* marsh to a fringe of common reed at the toe of a Brickearth terrace. The edge of the terrace is covered by mature oak woodland which is believed to be ancient in origin.

Vegetated shingle, a nationally restricted habitat, is found fronting the reedbed at Beach Close, at Hook Spit, and on the well-developed shingle ridges at Hook Links, where ringed plover nest. Typical plant species adapted to the relatively harsh environmental conditions found, include the nationally scarce sea-kale *Crambe maritima*, together with sea beet *Beta vulgaris* subspecies *maritima*, sea rocket *Cakile maritima*, sea bindweed *Calystegia soldanella*, yellow-horned poppy *Glaucium flavum*, sand couch *Elymus farctus*, sticky ragwort *Senecio viscosus* and sea campion *Silene maritima*. On the more stable substratum on the landward-most shingle ridge, additional species are found including thrift *Armeria maritima* subspecies *maritima*, sea wormwood *Artemisia maritima*, buck's-horn plantain *Plantago coronopus*, sea pearlwort *Sagina maritima*, biting stonecrop *Sedum acre* and spring vetch *Vicia lathyroides*.

On the western side of the Hamble estuary mouth, the SSSI includes a mosaic of acidic grassland and wet heath found on Hamble Common, with cross-leaved heath *Erica tetralix* and purple moor-grass *Molinia caerulea* dominant or co-dominant amongst patches of bracken or gorse. Bristle bend *Agrostis curtisii*, brown bent *A. vinealis* and saw-wort *Serratula tinctoria* are also present.

Geological importance:

The cliffs north of Hillhead provide important exposures in terrace gravels of the former Solent river system, in the area of its confluence with the tributary Test valley. These cliffs are also important as a rich source of Palaeolithic artefacts. They allow the study of gravel sedimentology over a large continuous exposure and, in conjunction with other sites along the Solent coast, provide a cross-section through the 'staircase' of Solent terraces. This adds significantly to the understanding of this geomorpholocal and geological phenomenon.

The important site at Lee-on-The-Solent yielded the first British bird fossils of mid-Eocene age. The avifauna includes type material for five species, and shows the continuity of typical Lower Eocene families such as the Rallidae and the Phasianidae; one of only a few locations to yield a mid-Eocene avifauna. Stratigraphically younger horizons have here yielded remains of three further species, one of which is the large flamingo-like duck *Headonornis hantoniensis* which has also been recorded from the upper Eocene and lower Oligocene of the Isle of Wight. This family, the Presbyornithidae, is unique to Britain from the mid-Eocene onwards.

Also at Lee-on-The-Solent, natural residues, derived from several horizons in the Bracklesham Beds, are building up here on the surface of the exposure, and these yield more large teeth than at the type locality of Bracklesham. The site is particularly rich in sharks teeth. Thirty-seven species of shark are recorded, including nineteen rays and five species of chimaeroids. This locality yields the unique species *Alopias leeensis* and a chimaeroid, *Elasmodus kempi*. Chimaeroids, poorly known cartilaginous fish are rarely found as fossils and the site yields important evidence of the order. Seventy-seven species of teleost have been recorded here, forty-five of these from otoliths.

EC Directive 79/409 on the Conservation of Wild Birds: Special Protection Area (SPA)

Name: Solent and Southampton Water

Unitary Authority/County: Hampshire County Council, New Forest District Council, Test Valley Borough Council, Southampton City Council Unitary Authority, Eastleigh Borough Council, Fareham District Council and Isle of Wight Council Unitary Authority.

Consultation proposal: The Solent and Southampton Water SPA site comprises a series of estuaries and adjacent coastal habitats important for breeding gulls and terns and wintering waterfowl. The following SSSIs; Lymington River Reedbeds, Sowley Pond, Hythe to Calshot Marshes, Eling and Bury Marshes, Lower Test Valley, Lincegrove and Hacketts Marshes and Titchfield Haven, and parts of Yar Estuary, Hurst Castle and Lymington River Estuary, North Solent, Lee-on-Solent to Itchen Estuary, Upper Hamble Estuary and Woods, Newtown Harbour, Thorness Bay, Medina Estuary, King's Quay Shore, Ryde Sands and Wootton Creek, Brading Marshes to St Helen's Ledges, Whitecliff Bay and Bembridge Ledges have been recommended as a Special Protection Area because of their European ornithological importance.

Status: Classified 1 October 1998.

Boundary of SPA: SPA boundary is coincident with Lymington River Reedbeds SSSI, Sowley Pond SSSI, Hythe to Calshot Marshes SSSI and Titchfield Haven SSSI and includes parts of the other SSSI listed above. See map for clarification of the SPA boundary.

European ornithological importance of SPA

Solent and Southampton Water SPA is of European importance because:

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

Annex 1 species	5 yr peak mean		Count years
Mediterranean Gull *Larus melanocephalus*	2 pairs	(8.2-13.9% GB)	1994-1998
Sandwich tern *Sterna sandvicensis*	231 pairs	(1.7 % GB)	1993-1997
Common tern *Sterna hirundo*	267 pairs	(2.2 % GB)	1993-1997
Little tern *Sterna albifrons*	49 pairs	(2 % GB)	1993-1997
Roseate tern *Sterna dougalli*	2 pairs	(3.1 % GB)	1993-1997

Bird Numbers from: JNCC Seabird Colony Register

b) The site qualifies under article 4.2 of the Birds Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographic population of a regularly occurring migratory species (other than those listed in Annex 1) in any season.

Non- Annex 1 migratory bird species	5 yr peak mean from -1992/93-1996/97	
Dark- bellied brent geese *Branta bernicla bernicla*	7506[I]	(2.5% W Siberia/W Europe)
Teal *Anas crecca*	4,400[I]	(1.1% NW Europe)
Ringed plover *Charadrius hiaticula*	552[I]	(1.1% Europe/NW Africa)
Black-tailed godwit *Limosa limosa*	1125[I]	(1.6 % Iceland)

Bird Numbers from: WeBS Wildfowl & Waders database

Unit of population size: I- individual birds wintering

c) The site is used regularly by over 20,000 waterfowl (waterfowl as defined by the Ramsar Convention) or 20,000 seabirds in any season.

5 yr peak mean from 1992/93- 1996/97	
51,361[1]	(21,401 wildfowl 29,960 waders)

Unit of population size: I- individual birds wintering

Additional non-qualifying interest

An outstanding assemblage of wintering and passage birds are dependent on wetland habitats within the site, including the following Annex 1 species not mentioned previously: red-throated diver *Gavia stellata*, black-throated diver *G. arctica*, great northern diver *G. immer*, Slavonian grebe *Podiceps auritus*, little egret *Egretta garzetta*, hen harrier *Circus cyaneus*, marsh harrier *Circus aeruginosus*, merlin *Falco columbarius*, peregrine *Falco peregrinus* and short-eared owl *Asio flammeus*.

This citation / map relates to a site entered in the Register of European sites for Great Britain.
Register reference number UK9010061
Date of registration ..... 199..
Signed .....
On behalf of the Secretary of State for the Environment

APPENDIX 2
SURVEY DATA

Survey No	Month	Date	Time of survey	Tide times	Survey Team	Wind	Cloud	Weather Observations	Comments
1	October	25/10/2017	18:35 to 11:30	See below	TCY & AC	2	6	Calm / Dry	Night time counts - high disturbance and lights as function being held at cricket club
	October	26/10/2017	09:30 to 14:31	See below	TCY & AC	1 to 2	8	Overcast / Rain Overnight	Disturbance of foreshore beach due to dog walkers etc

Survey No	Month	Date	Time of survey	Tide times	Survey Team	Wind	Cloud	Weather Observations	Comments
2	November	14/11/2017	08:45 to 13:00	See below	JS & AC	1	8	Light drizzel ends	
	November	15/11/2017	09:30 to 12:30	See below	JS & AC				

Survey No	Month	Date	Time of survey	Tide times	Survey Team	Wind	Cloud	Weather Observations	Comments
3	November	20/11/2017	12:00 to 14:30	See below	JS & AC	2	8	13C	Disturbance of foreshore beach due to dog walkers etc
	November	21/11/2017	11:40 to 14:00	See below	JS & AC	2	4	13C	

Survey No	Month	Date	Time of survey	Tide times	Survey Team	Wind	Cloud	Weather Observations	Comments
4	November	28/11/2017	13:30 to 17:00	See below	JS & EI	0	2	7C	
	November	29/11/2017	08:00 to 13:30	See below	JS & EI	1	4	4C	

Survey No	Month	Date	Time of survey	Tide times	Survey Team	Wind	Cloud	Weather Observations	Comments
5	December	07/12/2017	09:15 to 13:11	See below	TCY & DL	3 to 4	8	Heavy rain	
	December	08/12/2017	09:00 to 11:40	See below	TCY & DL	2	3	cold but bright	

Survey No	Month	Date	Time of survey	Tide times	Survey Team	Wind	Cloud	Weather Observations	Comments
6	December	12/12/2017	15:15 to 16:30	See below	TCY	3	7	5C	
	December	13/12/2017	09:15 to 14:30	See below	TCY	2	8	7C, light rain	

Survey No	Month	Date	Time of survey	Tide times	Survey Team	Wind	Cloud	Weather Observations	Comments
7	December	18/12/2017	13:15 to 17:00	See below	TCY & AC	2	4 to 8	frost overnight	
	December	19/12/2017	10:00 to 12:45	See below	TCY & AC	2	0 to 4		

Tide Times		
25/10/2017		
High Tide	02:56:00	(4.31m)
High Tide	04:49:00	(4.30m)
Low Tide	08:09:00	(1.69m)
High Tide	14:37:00	(4.21m)
High Tide	17:37:00	(4.13m)
Low Tide	20:24:00	(1.66m
26/10/2017		
High Tide	03:38:00	(4.21m)
High Tide	05:23:00	(4.18m)
Low Tide	08:42:00	(1.86m)
High Tide	15:16:00	(4.05m)
High Tide	18:13:00	(3.97m)
Low Tide	21:02:00	(1.85m)

Tide Times		
14/11/2017		
Low Tide	01:00:00	(1.77m)
High Tide	07:16:00	(4.12m)
High Tide	10:22:00	(4.29m)
Low Tide	13:28:00	(1.78m)
High Tide	19:41:00	(4.03m)
High Tide	22:51:00	(4.16m
15/11/2017		
Low Tide	01:52:00	(1.61m)
High Tide	08:14:00	(4.25m)
High Tide	11:15:00	(4.43m)
Low Tide	14:18:00	(1.55m)
High Tide	20:29:00	(4.13m)
High Tide	23:42:00	(4.30m

Tide Times		
21/11/2017		
High Tide	00:32:00	(4.41m)
High Tide	02:03:00	(4.46m)
Low Tide	05:53:00	(1.42m)
High Tide	12:40:00	(4.47m)
High Tide	13:36:00	(4.44m)
Low Tide	18:07:00	(1.39m)
22/11/2017		
High Tide	01:03:00	(4.39m)
High Tide	02:43:00	(4.44m)
Low Tide	06:20:00	(1.57m)
High Tide	12:41:00	(4.35m)
High Tide	15:32:00	(4.27m)
Low Tide	18:30:00	(1.49m)

Tide Times		
28/11/2017		
High Tide	05:08:00	(3.88m)
High Tide	08:19:00	(3.91m)
Low Tide	11:39:00	(2.17m)
High Tide	17:34:00	(3.74m)
High Tide	20:54:00	(3.71m)
29/11/2017		
Low Tide	00:10:00	(1.98m)
High Tide	06:20:00	(3.97m)
High Tide	09:20:00	(4.04m)
Low Tide	12:45:00	(1.96m)
High Tide	18:51:00	(3.91m)
High Tide	21:51:00	(3.89m)

Tide Times		
07/12/2017		
High Tide	01:09:00	(4.74m)
High Tide	03:38:00	(4.69m)
Low Tide	06:41:00	(1.04m)
High Tide	13:32:00	(4.69m)
High Tide	15:56:00	(4.56m)
Low Tide	19:06:00	(0.98m)
08/12/2017		
High Tide	02:07:00	(4.60m)
High Tide	04:25:00	(4.64m)
Low Tide	07:31:00	(1.27m)
High Tide	14:30:00	(4.49m)
High Tide	16:40:00	(4.44m)
Low Tide	19:59:00	(1.23m)

Tide Times		
12/12/2017		
High Tide	05:42:00	(4.07m)
High Tide	08:38:00	(4.11m)
Low Tide	11:50:00	(1.94m)
High Tide	18:08:00	(3.88m)
High Tide	21:18:00	(3.87m
13/12/2017		
Low Tide	00:19:00	(1.84m)
High Tide	06:39:00	(4.05m)
High Tide	09:49:00	(4.12m)
Low Tide	12:52:00	(1.87m)
High Tide	19:04:00	(3.88m)
High Tide	22:20:00	(3.98m)

Tide Times		
18/12/2017		
High Tide	01:25:00	(4.24m)
Low Tide	04:20:00	(1.35m)
High Tide	10:35:00	(4.38m)
High Tide	13:34:00	(4.29m)
Low Tide	16:42:00	(1.22m)
19/12/2017		
High Tide	01:56:00	(4.27m)
Low Tide	04:59:00	(1.37m)
High Tide	11:12:00	(4.38m)
High Tide	14:02:00	(4.30m)
Low Tide	17:19:00	(1.26m)
High Tide	23:37:00	(4.30m)

Main site (Sports pitch) 25/10/2016

Time of Count = 18:35 to 11:30

Species	Code	Cricket Pitch	Football Pitch
Tawny Owl (Heard)		2	

No Brent Goose or any other birds on the sports pitches at any time - high disturbance and lights on the cricket pitch

Foreshore 25/10/2016

Time of Count = 17:40 to 18:30

Species	Code	Beach	Flying past (notable)
Brent Goose	BG		10 flypast at 18:14 in an easterly direction
No other species observed			

Hamble Common Beach (Car Park) 26/10/2016

Time of Count = 11:30

Species	Code	
Oysetrcatcher	OC	7
Black-headed gull	BH	13
Herring Gull	HG	3

Hamble Common Mudflats 25/10/2016

Time of Count = 09:30

Species	Code	
Kingfisher	KF	1
Black-tailed Godwit	BA	6
Greenshank	GK	1
Redshank	RK	1
Cormorant	CA	1
Oysetrcatcher	OC	1
Mallard	MA	3
Little Egret	ET	1
Greenshank	GK	1

Mercury Mudflats (Kingfisher Close) 26/10/2016

Time of Count = 12:00

Species	Code	
Lapwing	L	10
Dunlin	DN	2
Black-headed gull	BH	2
Black-tailed Godwit	BA	6
Little Egret	ET	3
Golden Plover	GP	2
Redshank	RK	3
Cormorant	CA	2
Tufted Duck	TU	50
Brent Goose	BG	10 (Over)

Main site (Sports pitch) 26/10/2016

Time of Count = 10:00am

Species	Code	Cricket Pitch	Football Pitch

Conducted Goose dropping search of the sports pitches - gull feathers found but no evidence of Brent Goose. Woodpidgeon / Crow / Pied Wagtail / Magpie / Starling

Foreshore 26/10/2016

Time of Count = 11:00

Species	Code	Beach	Flying past (notable)
Brent Goose	BG	3	Flew west @ 11:00
Oysetrcatcher	OC	2	
Great Crested Grebe	GG	1	
Black-headed gull	BH	1	

7 people on beach - dog walking etc so high level of disturbance, no exposed mudflats

Hamble Common Beach (Car Park) 25/10/2016

Time of Count = 14:31

Species	Code	
Black-headed gull	BH	3

Dog walkers on beach

Hamble Common Mudflats 25/10/2016

Time of Count = 09:30

Species	Code	
Oysetrcatcher	OC	15
Black-tailed Godwit	BA	1
Black-headed gull	BH	4

Mercury Mudflats (Kingfisher Close) 25/10/2016

Time of Count = 09:30

Species	Code	

Main site (Sports pitch) 26/10/2016

Time of Count = 10:30

Species	Code	Cricket Pitch	Football Pitch

Checked the ajacent parkland for signs of Brent Goose (no droppings or feathers observed)

Foreshore 25/10/2016

Time of Count = 09:30

Species	Code	Beach	Flying past (notable)

Hamble Common Beach (Car Park) 25/10/2016

Time of Count = 09:30

Species	Code	
Oysetrcatcher	OC	7
Black-headed gull	BH	13
Herring Gull	HG	3

Hamble Common Mudflats 25/10/2016

Time of Count = 09:30

Species	Code	

Mercury Mudflats (Kingfisher Close) 25/10/2016

Time of Count = 09:30

Species	Code	

Main site (Sports pitch) 14/11/2017

Time of Count = 08:45

Species	Code	Cricket Pitch	Football Pitch
Goldfinch	GO	10	
Pied Wagtail	PW	15	
Woodpigeon	WP	8	
Magpie	MG	1	

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 14/11/2017

Time of Count = 10:00

Species	Code	Beach	Flying past (notable)
Chiffchaff	CC	1	2
Black-headed gull	BH		5
Herring Gull	HG		1
Cormorant	CA	1	

Hamble Common Beach (Car Park) 14/11/2017

Time of Count = 10:30

Species	Code	
Little Egret	ET	1
Oysetrcatcher	OC	2
Dark bellied Brent Goose	BG	9
Black-headed gull	BH	4
Herring Gull	HG	1

Hamble Common Mudflats 14/11/2017

Time of Count = 08:46

Species	Code	
Mallard	MA	4
Carrion Crow	OC	2
Dark bellied Brent Goose	BG	6
Sparrowhawk	SH	1
Meadow Pipit	MP	1
Goldfinch	GO	2

Mercury Mudflats (Kingfisher Close) 14/11/2017

Time of Count = 09:15

Species	Code	
Curlew	CU	1
Black-headed gull	BH	2
Dark bellied Brent Goose	BG	3
Cormorant	CA	1
Wigeon	WN	6
Redshank	RK	3
Dogwalker		1

Main site (Sports pitch) 14/11/2017

Time of Count = 09:30

Species	Code	Cricket Pitch	Football Pitch
Black-headed gull	BH	5	
Pied Wagtail	PW	2	
Woodpigeon	WP	8	
Magpie	MG	2	

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose. Dogwalker on sports pitches.

Foreshore 14/11/2017

Time of Count = 11:00

Species	Code	Beach	Flying past (notable)
Great Crested Grebe	GC	3	
Canada Goose	CG		22
Black-headed gull	BH	3	
Cormorant	CA		2
Herring Gull	HG	1	
Oysetrcatcher	OC	1	1

Hamble Common Beach (Car Park) 14/11/2017

Time of Count = 12:30

Species	Code	
Grey Plover	GV	1
Oysetrcatcher	OC	36
Dark bellied Brent Goose	BG	122
Redshank	RK	5
Canada Goose	CG	4
Dunlin	DN	88
Turnstone	TT	30
Black-headed gull	BH	10

Hamble Common Mudflats 14/11/2017

Time of Count = 09:45

Species	Code	
Little Egret	ET	1
Black-headed gull	BH	7
Redshank	RK	5
Magpie	MG	2
Dogwalkers		4

Mercury Mudflats (Kingfisher Close) 14/11/2017

Time of Count = 10:20

Species	Code	
Jay	J	1
Robin	R	1
Dark bellied Brent Goose	BG	5
Cormorant	CA	4
Bluetit	BT	1
Water Rail	WA	1
Redshank	RK	1
Black-headed gull	BH	3
Herring Gull	HG	1
Wigeon	WN	2

Main site (Sports pitch) 15/11/2017

Time of Count =

Species	Code	Cricket Pitch	Football Pitch

Foreshore 15/11/2017

Time of Count =

Species	Code	Beach	Flying past (notable)

Hamble Common Beach (Car Park) 15/11/2017

Time of Count =

Species	Code	

Hamble Common Mudflats 15/11/2017

Time of Count = 10:35

Species	Code	
Redshank	RK	6
Oysetrcatcher	OC	3
Jay	J	2
Black-headed gull	BH	2
Dogwalkers		1

Mercury Mudflats (Kingfisher Close) 15/11/2017

Time of Count = 11:31

Species	Code	
Curlew	CU	3
Oysetrcatcher	OC	2
Dark bellied Brent Goose	BG	20
Cormorant	CA	3
Lapwing	L	13
Greenshank	GK	3
GBB Gull	GB	1
Grey Plover	GV	1
Dogwalker		1

Main site (Sports pitch) 15/11/2017

Time of Count =

Species	Code	Cricket Pitch	Football Pitch

Foreshore 15/11/2017

Time of Count =

Species	Code	Beach	Flying past (notable)

Hamble Common Beach (Car Park) 15/11/2017

Time of Count =

Species	Code	

Hamble Common Mudflats 15/11/2017

Time of Count = 12:03

Species	Code	
Greenshank	GK	1
Oysetrcatcher	OC	3
Black-headed gull	BH	4
Redshank	RK	6
Mallard	MA	2
Dogwalkers		2

Mercury Mudflats (Kingfisher Close) 15/11/2017

Time of Count = 09:30

Species	Code	
Carrion Crow	C	1
Water Rail	WA	1
Dark bellied Brent Goose	BG	13
Cormorant	CA	6
Lapwing	L	12
Dunlin	DN	13
Black-headed gull	BH	3
Little Egret	ET	1
Redshank	HG	1
Grey Plover	GV	1

Main site (Sports pitch) 20/11/2017

Time of Count = 11:20

Species	Code	Cricket Pitch	Football Pitch
Carrion Crow	C	2	

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 20/11/2017

Time of Count = 14:20

Species	Code	Beach	Flying past (notable)
Carrion Crow	C	1	
Kestrel	K	1	
Black-headed gull	BH	3	

Hamble Common Beach (Car Park) 20/11/2017

Time of Count = 09:30

Species	Code	

Hamble Common Mudflats 20/11/2017

Time of Count = 11:43

Species	Code	
Mallard	MA	2
Little Egret	ET	1
Black-headed gull	BH	4
Herring Gull	HG	1
Dogwalkers		4

Mercury Mudflats (Kingfisher Close) 20/11/2017

Time of Count = 11:15

Species	Code	
Buzzard	BZ	1
Carrion Crow	C	1
House Sparrow	HS	10
Cormorant	CA	3
Black-headed gull	BH	9
Herring Gull	HG	2

Main site (Sports pitch) 20/11/2017

Time of Count = 11:40

Species	Code	Cricket Pitch	Football Pitch

Foreshore 20/11/2017

Time of Count =

Species	Code	Beach	Flying past (notable)

Hamble Common Beach (Car Park) 20/11/2017

Time of Count = 09:30

Species	Code	

Hamble Common Mudflats 20/11/2017

Time of Count = 12:45

Species	Code	
Black-headed gull	BH	6
Mallard	MA	3
Cormorant	CA	1
Dogwalkers		2

Mercury Mudflats (Kingfisher Close) 20/11/2017

Time of Count = 12:00

Species	Code	
Magpie	MG	1
Carrion Crow	C	2
Cormorant	CA	2
Black-headed gull	BH	5
Dogwalker		1

Main site (Sports pitch) 21/11/2017

Time of Count = 11:40

Species	Code	Cricket Pitch	Football Pitch
Carrion Crow	C	1	
Black-headed gull	BH	2	
Woodpigeon	WP	4	
Magpie	MG	1	
Pied Wagtail	PW	1	

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 21/11/2017

Time of Count = 12:00

Species	Code	Beach	Flying past (notable)
Herring Gull	HG	2	
Cormorant	CA		2
Black-headed gull	BH	4	
Dogwalkers	HG	6	

Hamble Common Beach (Car Park) 21/11/2017

Time of Count = 12:30

Species	Code	
Black-headed gull	BH	2
Great Crested Grebe	GG	1
Carrion Crow	C	2
Dogwalker		1

Hamble Common Mudflats 21/11/2017

Time of Count = 14:00

Species	Code	
Herring Gull	HG	1
Mallard	MA	1
Dark bellied Brent Goose	BG	2
Dogwalkers		2

Murcury Mudflats (Kingfisher Close) 21/11/2017

Time of Count = 14:22

Species	Code	
Black-headed gull	BH	5
Herring Gull	HG	2
Magpie	MG	1

Main site (Sports pitch) 21/11/2017

Time of Count = 09:30

Species	Code	Cricket Pitch	Football Pitch

Foreshore 21/11/2017

Time of Count =

Species	Code	Beach	Flying past (notable)

Hamble Common Beach (Car Park) 21/11/2017

Time of Count = 14:00

Species	Code	
Black-headed gull	BH	3
Great Crested Grebe	GG	1

Hamble Common Mudflats 21/11/2017

Time of Count = 15:00

Species	Code	
Herring Gull	HG	1
Oysetrcatcher	OC	1
Black-headed gull	BH	8
Redshank	RK	3
Mallard	MA	2

Murcury Mudflats (Kingfisher Close) 21/11/2017

Time of Count = 15:30

Species	Code	
Redshank	RK	4
Mallard	MA	2
Cormorant	CA	1
Black-headed gull	BH	6

Main site (Sports pitch) 28/11/2017

Time of Count = 13:30

Species	Code	Cricket Pitch	Football Pitch

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 28/11/2017

Time of Count = 14:42

Species	Code	Beach	Flying past (notable)
Black-headed gull	BH	2	
Herring Gull	HG	5	3
Dogwalkers		2	
Walkers		4	

Hamble Common Beach (Car Park) 28/11/2017

Time of Count

Species	Code	

Hamble Common Mudflats 28/11/2017

Time of Count = 13:20

Species	Code	
Greenshank	GK	1
Oystercatcher	OC	1
Redshank	RK	7
Cormorant	CA	2
Black-tailed Godwit	BA	3
Black-headed gull	BH	6
Dogwalker		1

Mercury Mudflats (Kingfisher Close) 28/11/2017

Time of Count = 13:50

Species	Code	
Wigeon	WN	4
Redshank	RK	4
Lapwing	L	4
Cormorant	CA	2
Dark bellied Brent Goose	BG	2
Little Egret	ET	1
Black -tailed Godwit	GW	1
Black-headed gull	BH	13
Herring Gull	HG	1

Main site (Sports pitch) 28/11/2017

Time of Count = 15:30

Species	Code	Cricket Pitch	Football Pitch

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 28/11/2017

Time of Count = 16:02

Species	Code	Beach	Flying past (notable)
Black-headed gull	BH	6	
Dogwalkers		6	
Walker		1	

Hamble Common Beach (Car Park) 28/11/2017

Time of Count

Species	Code	

Hamble Common Mudflats 28/11/2017

Time of Count = 16:10

Species	Code	
Mallard	MA	2
Redshank	RK	10
Dark bellied Brent Goose	BG	2
Black-tailed Godwit	BW	3
Black-headed gull	BH	4
Herring Gull	HG	1

Mercury Mudflats (Kingfisher Close) 28/11/2017

Time of Count = 14:45

Species	Code	
Curlew	CU	1
Oystercatcher	OC	2
Dark bellied Brent Goose	BG	4
Cormorant	CA	3
Wigeon	WN	4
Redshank	RK	2
Black-tailed Godwit	BW	3
Black-headed gull	BH	3
Dogwalker		1

Main site (Sports pitch) 29/11/2017

Time of Count = 08:00

Species	Code	Cricket Pitch	Football Pitch

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 29/11/2017

Time of Count = 08:40

Species	Code	Beach	Flying past (notable)
Black-headed gull	BH	7	
Herring Gull	HG	3	
Dogwalker		2	
Red throated diver	RH	2	

Hamble Common Beach (Car Park) 29/11/2017

Time of Count = 09:45

Species	Code	
Turnstone	TT	5
Dark bellied Brent Goose	BG	2
Black-headed gull	BH	4

Hamble Common Mudflats 29/11/2017

Time of Count = 08:55

Species	Code	
Grey Heron	H	1
Redshank	RK	6
Little Egret	ET	1
Black-headed gull	BH	5
Dogwalker		1

Mercury Mudflats (Kingfisher Close) 29/11/2017

Time of Count = 08:40

Species	Code	
Curlew	CU	1
Redshank	RK	12
Dark bellied Brent Goose	BG	2
Greenshank	GK	1
Black-headed gull	BH	5
Herring Gull	HG	1
Wigeon	WN	8
Dogwalker		1

Main site (Sports pitch) 29/11/2017

Time of Count = 10:30

Species	Code	Cricket Pitch	Football Pitch

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 29/11/2017

Time of Count = 11:15

Species	Code	Beach	Flying past (notable)

Hamble Common Beach (Car Park) 29/11/2017

Time of Count = 12:45

Species	Code	
Curlew	CU	1
Oystercatcher	OC	8
Dark bellied Brent Goose	BG	8
Turnstone	TT	3
Grey Plover	GV	1
Black-headed gull	BH	2
Herring Gull	HG	5

Hamble Common Mudflats 29/11/2017

Time of Count = 10:45

Species	Code	
Redshank	RK	6
Oystercatcher	OC	1
Greenshank	GK	1
Cormorant	CA	1
Little Egret	ET	1
Black-tailed Godwit	GW	1
Herring Gull	HG	1
Dark bellied Brent Goose	BG	15
Dogwalkers		5

Mercury Mudflats (Kingfisher Close) 29/11/2017

Time of Count = 10:05

Species	Code	
Curlew	CU	4
Oystercatcher	OC	2
Dark bellied Brent Goose	BG	43
Cormorant	CA	5
Little Egret	ET	1
Lapwing	L	6
Greenshank	GK	1
Redshank	RK	5
Black-headed gull	BH	4

Main site (Sports pitch) 07/12/2016

Time of Count = 09:15

Species	Code	Cricket Pitch	Football Pitch
Herring Gull	HG	2	0

Foreshore 07/12/2016

Time of Count = 09:25

Species	Code	Beach	Flying past (notable)

No birds on beach or flying over.

Hamble Common Beach (Car Park) 07/12/2016

Time of Count = 10:14

Species	Code	
Oysetrcatcher	OC	3
Dark bellied Brent Goose	BG	58

Hamble Common Mudflats 07/12/2016

Time of Count = 09:30

Species	Code	
Oysetrcatcher	OC	4
Mallard	MA	6
Redshank	RK	2
Little Egret	ET	1
Little Grebe	LG	2
Bar-tailed Godwit	BA	5

Mercury Mudflats (Kingfisher Close) 07/12/2016

Species	Code	

High tide - no birds present

Main site (Sports pitch) 07/12/2016

Time of Count = 10:45 and 13:11

Species	Code	Cricket Pitch	Football Pitch
Herring Gull	HG	2	0

Foreshore 07/12/2016

Time of Count = 11:15

Species	Code	Beach	Flying past (notable)
Black-headed gull	BH	1	0
Oysetrcatcher	OC	3	0

Hamble Common Beach (Car Park) 07/12/2016

Time of Count = 09:30

Species	Code	
Black-headed gull	BH	2
Oysetrcatcher	OC	36
Dark bellied Brent Goose	BG	15
Great Crested Grebe	GG	2
Turnstone	TT	16

Hamble Common Mudflats 07/12/2016

Time of Count = 09:30

Species	Code	
Curlew	CU	1
Mallard	MA	4
Dark bellied Brent Goose	BG	15
Redshank	RK	2
Dogwalkers		2

Mercury Mudflats (Kingfisher Close) 07/12/2016

Species	Code	

Main site (Sports pitch) 08/12/2016

Time of Count = 10:40

Species	Code	Cricket Pitch	Football Pitch
Black-headed gull	BH	0	4

Foreshore 08/12/2016

Time of Count = 11:00

Species	Code	Beach	Flying past (notable)
Black-headed gull	BH	2	0

Hamble Common Beach (Car Park) 08/12/2016

Time of Count = 09:00

Species	Code	
Curlew	CU	1
Oysetrcatcher	OC	86
Dark bellied Brent Goose	BG	58
Turnstone	TT	10
Golden Plover	GP	5
Redshank	RK	4
Dogwalkers		2

Hamble Common Mudflats 08/12/2016

Time of Count = 09:45

Species	Code	
Redshank	RK	1
Oysetrcatcher	OC	1
Dark bellied Brent Goose	BG	5
Little Egret	ET	1
Bar-tailed Godwit	BA	4

Mercury Mudflats (Kingfisher Close) 08/12/2016

Time of Count = 09:30

Species	Code	

Main site (Sports pitch)

Species	Code	Cricket Pitch	Football Pitch

Foreshore

Species	Code	Beach	Flying past (notable)

Hamble Common Beach (Car Park)

Species	Code	

Hamble Common Mudflats

Species	Code	

Mercury Mudflats (Kingfisher Close)

Species	Code	

Main site (Sports pitch) 12/12/2017

Time of Count = 15:15

Species	Code	Cricket Pitch	Football Pitch
Black-headed gull	BH	2	4
Herring Gull	HG	1	0

Foreshore 12/12/2017

Time of Count = 15:35

Species	Code	Beach	Flying past (notable)
Black-headed gull	BH	4	
Oysetrcatcher	OC	6	

Hamble Common Beach (Car Park) 12/12/2017

Time of Count = 15:50

Species	Code	
Oysetrcatcher	OC	24
Dark bellied Brent Goose	BG	38
Black-headed gull	BH	77
Dogwalker		1

Hamble Common Mudflats 12/12/2017

Time of Count = 16:00

Species	Code	
Oysetrcatcher	OC	2
Mallard	MA	4
Redshank	RK	8

Mercury Mudflats (Kingfisher Close) 12/12/2017

Time of Count = 16:20

Species	Code	

Visit at dusk - high water and no birds visible

No dog walkers

Main site (Sports pitch) 13/12/2017

Time of Count = 10:00

Species	Code	Cricket Pitch	Football Pitch

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 13/12/2017

Time of Count = 10:45

Species	Code	Beach	Flying past (notable)
Cormorant	CA	1	
Black-headed gull	BH	2	
Herring Gull	HG	1	
Dogwalker		7	

Hamble Common Beach (Car Park) 13/12/2017

Time of Count = 09:32

Species	Code	
Black-headed gull	BH	2
Oysetrcatcher	OC	1
Herring Gull	HG	1
Turnstone	TT	5
Dogwalker		1

Hamble Common Mudflats 13/12/2017

Time of Count = 13:05

Species	Code	

No Birds present - Dog walkers

Mercury Mudflats (Kingfisher Close) 13/12/2017

Time of Count = 12:50

Species	Code	
Curlew	CU	4
Golden Plover	GP	20
Dark bellied Brent Goose	BG	7
Wigeon	WN	6
Grey Plover	GV	1
Redshank	RK	1
Lapwing	L	23

Main site (Sports pitch) 13/12/2017

Time of Count = 14:30

Species	Code	Cricket Pitch	Football Pitch

Conducted Goose dropping search of the sports pitches - no evidence of Brent Goose.

Foreshore 13/12/2017

Time of Count = 13:55

Species	Code	Beach	Flying past (notable)
Curlew	CU	2	
Oysetrcatcher	OC	11	
Black-headed gull	BH	2	

Hamble Common Beach (Car Park) 13/12/2017

Time of Count = 13:35

Species	Code	
Black-headed gull	BH	25
Oysetrcatcher	OC	41
Dunlin	D	30
Golden Plover	GP	10
Dogwalkers		2

Hamble Common Mudflats 13/12/2017

Species	Code	

Mercury Mudflats (Kingfisher Close) 13/12/2017

Species	Code	

Main site (Sports pitch) 18/12/2017

Time of Count = 13:15

Species	Code	Cricket Pitch	Football Pitch
Herring Gull	HG	1	

Conducted Goose dropping search of the sports pitches - gull feathers found but no evidence of Brent Goose. Woodpidgeon / Carion Crow / Pied Wagtail / Magpie / Starling

Foreshore 18/12/2017

Time of Count = 13:55

Species	Code	Beach	Flying past (notable)
Black-headed gull	BH	3	
Herring Gull	HG	1	
Dogwalkers		5	

Hamble Common Beach (Car Park) 18/12/2017

Time of Count = 13:35

Species	Code	
Turnstone	TS	3
Dogwalkers		1
Cars parked		10+

Hamble Common Mudflats 18/12/2017

Time of Count = 13:50

Species	Code	
Redhsank	RK	8
Kingfisher	KF	1
Mallard	MA	5
Little Egret	ET	1
Black-headed gull	BH	2
Dogwalkers		2

Mercury Mudflats (Kingfisher Close) 18/12/2017

Time of Count = 14:30

Species	Code	
Dark bellied Brent Goose	BG	5
Little Egret	ET	1
Black-headed gull	BH	3
Lapwing	L	1
Redshank	RK	5
Dogwalker		1

Main site (Sports pitch) 18/12/2017

Time of Count = 14:20

Species	Code	Cricket Pitch	Football Pitch
Black-headed gull	BH		3
Herring Gull	HG	1	
Carrion Crow	C		2

Main site (Sports pitch) 18/12/2017

Time of Count = 17:30

Species	Code	Beach	Flying past (notable)

No Birds observed

Main site (Sports pitch) 19/12/2017

Time of Count = 11:10

Species	Code	Cricket Pitch	Football Pitch
Black-headed gull	BH		4
Herring Gull	HG	2	

Conducted Goose dropping search of the sports pitches - nothing found.

Foreshore 19/12/2017

Time of Count = 10:30

Species	Code	Beach	
Dark bellied Brent Goose	BG	2	Swimming off-shore
Black-headed gull	BH	1	
Great Crested Grebe	GG	1	
Little Egret	ET	1	
Dogwalkers		4	

Hamble Common Beach (Car Park) 19/12/2017

Time of Count = 10:20

Species	Code	
Cormorant	CA	1
Great Crested Grebe	GG	1
Dogwalkers		2

Hamble Common Mudflats 19/12/2017

Time of Count = 10:45

Species	Code	
Redshank	RK	13
Mallard	MA	4
Dark bellied Brent Goose	BG	2
Little Grebe	LG	1
Little Egret	ET	1
Dogwalker		2

Mercury Mudflats (Kingfisher Close) 19/12/2017

Time of Count = 10:30

Species	Code	
Dark bellied Brent Goose	BG	20
Cormorant	CA	4
Dunlin	DN	7
Black-headed gull	BH	1
Herring Gull	HG	1
Lapwing	L	1

Main site (Sports pitch) 19/12/2017

Time of Count = 12:30

Species	Code	Cricket Pitch	Football Pitch

No Birds Observed

Foreshore 19/12/2017

Time of Count = 12:00

Species	Code	Beach	Flying past (notable)

No Birds Observed on shore
Hight tide - only shingle bank exposed
BH Flyover only

Hamble Common Beach (Car Park) 19/12/2017

Time of Count = 12:12

Species	Code	
Turnstone	TS	5
Cars parked		5

High tide - no exposed mud

Hamble Common Mudflats 19/12/2017

Time of Count = 12:10

Species	Code	
Cormorant	CA	1
Greenshank	GK	1
Redshank	RK	1
Dogwalkers		6

Mercury Mudflats (Kingfisher Close) 19/12/2017

Time of Count = 11:45

Species	Code	
Kingfisher	KF	1
Cormorant	CA	2
Dunlin	DN	2
Herring Gull	HG	2

FIGURES

Site Boundary

Scale = 1:125,000 @ A3

Scale = 1:10,000 @ A3

Rev	Date	Description	Drn	Chk	App
00	19.02.18	856776	SP	RG	EI

GE Aviation

RSK

Figure 1

Site Location Plan

0 300

Metres

REV 00

File Name : U:\Ecology\856000s\856776 - GE Aviation Hamble\07 - GIS

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Site boundary

Surveyor location

Rev	Date	Description	Drn	Chk	App
00	12.03.18	856776	SP	RG	EI

GE Aviation

RSK

Figure 2

Surveyor Locations for Wintering Birds Survey

0 225

metres

Scale = 1:7,500 @ A3

N W E S

REV 00

File Name : U:\Ecology\856000s\856776 - GE Aviation Hamble\07 - GIS

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GE Aviation

Breeding Bird Survey Report

GE Aviation, Hamble-le-rice

856776

OCTOBER2017

RSK GENERAL NOTES

Project No.: 856776

Title: Breeding Bird Survey Report

Client: GE Aviation

Date: October2017

Office: Hemel Hempstead

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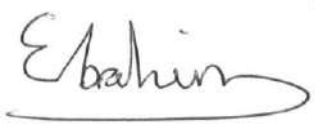
Signature		Signature [delete row if not required]	
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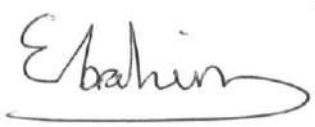
Signature		Signature [delete row if not required]	
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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of breeding bird surveys carried out at the GE Aviation site at Hamble-le-Rice near Southampton, Hampshire (Ordnance Survey Grid References SU46890717) on April, May and June 2017.
2. The site supports 24 species of breeding birds owing to the range of habitats (hedgerows, scattered broad-leaved semi natural woodland and scattered broad-leaved trees) that are present.
3. A number of species of Birds of Conservation Concern (BoCC) have been identified at the site including Black-headed Gull, Dunnock, Song Thrush, Starling and Tawny Owl.
4. The majority of breeding birds were recorded in the scattered broad-leaved trees and woodland.
5. The majority of habitats being used by breeding birds are due to be retained and BoCC species are likely to benefit from the development if the design and mitigation areas incorporate appropriate habitat provision.

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1 INTRODUCTION

1.1 Purpose of the Report

This report presents the result of breeding bird surveys at the GE Aviation campus in Hamble-le-Rice, Southampton. A site location plan is given in *Figure 1*.

The work relates to a proposed development of *c.*150 dwellings and associated landscaping, access roads and parking.

1.2 Ecological Context

The site – which *c.*500 m from the coast – is part of a *c.*20 ha industrial campus comprising areas of hard-standing and industrial buildings alongside a sports ground and some broadleaved woodland. There is a large amount of ornamental planting throughout. To the north of the site is the Royal Victoria Country Park. To the west and south is Southampton Water, and to the east there are residential areas which form part of the village of Hamble-le-Rice. There are 28 designated sites within 5 km of the campus, some of which are directly adjacent to the site.

1.3 Structure of the Report

The remainder of the report is set out as follows:

- Section 2 describes the survey and assessment methods;
- Section 3 presents the results of the surveys;
- Section 4 provides the evaluation and conclusions;
- Section 5 contains references;
- Section 6 provides the figures;
- Appendix 1 contains the full species list ; and
- Appendix 2 provides the species legislation.
- Appendix 3 provides the definitions of breeding characteristics

2 METHODS

2.1 Objectives

The objectives of the breeding bird surveys were to:

- identify the distribution of breeding birds across the site;
- locate any birds protected under *Schedule 1* of *The Wildlife and Countryside Act 1981*;
- identify any species which may require special mitigation during the works; and
- identify any further, species-specific surveys that may be required.

2.2 Breeding Bird Survey

Breeding bird surveys were undertaken by Jan Skuriat and Tom Coyne, both of RSK. Jan and Tom are both experienced at undertaking breeding bird surveys. Jan is a Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and Tom is an Associate Member of CIEEM.

The survey methodology is based on the Common Bird Census (CBC) methodology devised jointly by the British Trust for Ornithology (BTO), the Royal Society for the Protection of Birds (RSPB) and the Joint Nature Conservancy Council (JNCC), (Gilbert et al. 1998). All surveys were undertaken early in the morning at or just after sunrise to coincide with the period of peak bird activity. A route was walked incorporating all features that may function as nesting bird habitat within and immediately adjacent to the site, routes were reversed during each survey in order to survey different areas at different times. All birds seen or heard were recorded onto base maps along with notes of behaviour that may indicate breeding.

Three breeding bird surveys were undertaken in April, May and June 2017.

2.3 Survey Dates and Weather

The dates of the surveys and general weather conditions are shown in *Table 1*.

Table 1. Dates of breeding bird surveys and weather conditions

Survey Visit	Start and Finish	Date	Weather
1	Start: 0530 Finish: 0845	25/04/2017	2°C Wind – 2 Cloud - 1
2	Start: 0400 Finish: 0845	03/05/2017	12°C Wind - 2 Cloud - 1
3	Start: 0600	06/06/2017	13°C Wind - 3 Cloud - 8 Heavy rain over night intermittent showers during survey.

Survey Visit	Start and Finish	Date	Weather
	Finish: 0900		

2.4 Limitations

Surveys were undertaken at the ideal time of year and during good weather for breeding bird surveys. *Table 1* shows all weather data.

In spite of the good conditions, generally it is not realistic to expect to record every bird using a site during the survey visits. However, the surveys were sufficient to record any important assemblages, and to identify areas of particular importance to breeding birds.

2.5 Data Search

A detailed background data search was undertaken for all species and designated sites as part of the Preliminary Ecological Appraisal (RSK, 2017). The detailed results of the data search are provided in the 2017 report although the relevant bird records are reproduced.

2.6 Criteria for Evaluation

2.6.1 Determination of Breeding Status

The breeding status of each species is classified into three categories: Confirmed breeding; Probable breeding; and Possible breeding. The behaviour, sex, age and location of individual birds allow conclusions to be drawn about breeding status, based on categories devised by the European Ornithology Atlas Committee (EOAC), 1979. It is also possible that species are merely present in a habitat and are not actually breeding. Breeding evidence used in this report follows EOAC guidelines, 1979 and these are given in *Appendix 3*. Birds not thought to be breeding and birds flying-over are classed as non-breeding.

2.6.2 Species Richness

Fuller (1980) measured the diversity of a sites breeding assemblage using certain criteria for a simple site assessment. For the purposes of this survey Fullers (1980) criteria for the diversity of a sites breeding assemblage have been adapted to allow for the species diversity decline since the criteria was developed (*Eaton et al* 2015). The original criteria and the adapted criteria are provided in *Table 2*.

Table 2. Site Assessment Methods

Level of Importance	Number of Breeding Bird Species	
	Fuller (1980)	Adapted Criteria
Local	25-49	< 25

Level of Importance	Number of Breeding Bird Species	
	Fuller (1980)	Adapted Criteria
District	-	25-49
County	50-69	50-69
Regional	70-84	70-84
National	85+	85+

2.6.3 Identification of Birds of Conservation Concern

A number of criteria are available to determine the conservation status of those bird species recorded. These criteria aid in evaluating the function of the site for breeding birds and thus the value of the breeding bird assemblage. The most appropriate of these are:

- The Birds Directive - Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended) is the EU's oldest piece of nature legislation and one of the most important, creating a comprehensive scheme of protection for all wild bird species naturally occurring in the Union. Its was adopted unanimously by the Members States in 1979 as a response to increasing concern about the declines in Europe's wild bird populations resulting from pollution, loss of habitats as well as unsustainable use. It was also in recognition that wild birds, many of which are migratory, are a shared heritage of the Member States and that their effective conservation required international co-operation. The Birds Directive bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds.
- *Wildlife and Countryside act 1981 Schedule 1 Species* – All bird species are protected from intentionally killing and injuring, and to the destruction of nests, eggs and dependent young. *Schedule 1* species are also protected from disturbance whilst nesting or attempting to make a nest.
- *Birds of Conservation Concern 4 (Eaton et al. 2015)* – Under this approach bird populations are assessed, using quantitative criteria, to determine the population status of each species and then placed on one of three lists: Red, Amber or Green. Red list species are of high conservation concern, being either globally threatened, having historical UK population declines between 1800 and 1995 or a rapid population decline or breeding range contraction by 50% or more in the last 25 years. Amber list species are of medium conservation concern due to a number of factors, for example having suffered between 25% and 49% contraction of UK breeding range or a 25-49% reduction in breeding or non-breeding populations over the last 25 years. Species that have a five year mean of 1-300 breeding pairs (bp) in the UK or an unfavourable European conservation status or for which the

breeding population in the UK represents 20% or more of the European breeding populations are also listed on the Amber list. Green list species have a favourable conservation status.

- *National and Local Biodiversity Action Plans (BAP)* – The United Kingdom BAP (UK Biodiversity Steering Group 1995, reviewed 2007) lists a number of bird species of conservation concern, for which national targets and priorities have been set in order to address those species' needs. In June 2007 after a review of the UK BAP an additional 22 priority bird species were added to the list of species for which Species Action Plans (SAPs) will be prepared.

2.7 Importance Thresholds

When assessing the importance of sites used by birds a system was developed and thresholds set where if 1% of a species (or subspecies) population is represented at a site then the site is important for this species for the size of the population. For example where a site supports 1% of the international population the site is important at international level, where a site supports 1% of the national population the site is important at the national level etc.

We have adopted these thresholds of importance in assessing the importance of some breeding species indentified during these surveys. For example if 1% of a species breeding population is identified at any population size then it is important at that level.

2.8 Nomenclature

The nomenclature for common and scientific names and the taxonomic ordering of species accounts follows that contained in The British List: A checklist of Birds of Britain (7th edition), Dudley et al. 2006, also taking into account amendments that have been made by the British Ornithological Union (BOU) since its publication.

3 RESULTS

3.1 Background Data Search

3.1.1 Biodiversity Action Plans

The latest Hampshire Local Biodiversity Action Plan (LBAP) lists 14 Habitat Action Plans (HAPs) and 28 Species or Species Group Action Plans (SAPs).

3.1.2 Designated Sites

3.1.2.1 Statutory Sites

There are 26 statutory designated sites within 5 km of the site boundary, comprising 2 Ramsar Sites, 2 Special Protection Areas (SPAs), 2 Special Areas of Conservation (SACs), 6 Sites of Special Scientific Interest (SSSIs), 10 Local Nature Reserves (LNRs), 1 National Park (NP) and 3 Country Parks (CPs). A lot of the sites cover the same areas. A lot of the sites overlap, covering the same areas. These sites are listed in *Table 3* in order of proximity to the site; short descriptions are also provided.

Table 3. Statutory sites within 5 km of the site boundary

Site Name	Designation	Approximate Distance (m)
Royal Victoria	CP	40
The Royal Victoria CP covers 50 ha to the north-west of the site boundary. Habitats in the CP include ancient woodland, broad-leaved woodland, standing water, grassland, a sensory garden and buildings. The CP runs along the shoreline, adjacent to the Lee-on-the Solent to Itchen Estuary SSSI / Solent and Southampton Water Ramsar & SPA. The site is important for birds.		
Lee-on-the Solent to Itchen Estuary	SSSI	320
Lee-on-the Solent to Itchen Estuary SSSI extends along the eastern shore of Southampton Water from Lee-on-the-Solent to the mid-Itchen estuary. The site comprises extensive intertidal mud flats with a fringe of vegetated shingle, saltmarsh, reedbed, swamp, marshy grasslands and ancient woodland. There are extensive beds of the eelgrasses *Zostera angustifolia* and *Z. noltii*, and green algae species are widespread in the intertidal zone. The ancient woodland is dominated by *Alnus glutinosa* (Alder), *Fraxinus excelsior* (Ash) and *Quercus robur* (Pedunculate Oak). The marshy grassland is unimproved and semi-improved grasslands of old grazing marshes; *Agrostis sp*. (Bent) and *Festuca sp.* (Fescue) are frequent with *Alopecurus pratensis* (Meadow Foxtail) and *Hordeum secalinum* (Meadow Barley). The saltmarsh is dominated by Halimione portulacoides (Sea Purslane) with *Aster tripolium* (Sea Aster), *Limonium vulgare* (Sea-lavender), *Puccinellia maritima* (Common Saltmarsh-grass) and *Spartina* sp. (Cord-grass). There are areas of vegetated shingle which is a nationally restricted habitat. The SSSI supports an outstanding assemblage of nationally scarce coastal plants; species of note include *Bupleurum tenuissimum* (Slender hare's-ear), *Crambe maritima* (Sea-kale), *Puccinellia fasciculata* (Borrer's Saltmarsh-grass) and *P. rupestris*		

Site Name	Designation	Approximate Distance (m)
(Stiff Saltmarsh-grass). The site is also of geological importance. The sediments support high densities of benthic invertebrates that help support a diverse assemblage of wildfowl and waders. The SSSI also supports a diverse assemblage of breeding birds. The site is also designated as Solent & Southampton Water Ramsar and SPA and the bird interest of the site is described below. The SSSI lies to the south of the site boundary, running along the shoreline.		
Solent and Southampton Water	Ramsar & SPA	320
Solent and Southampton Water Ramsar & SPA comprises saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs. The diversity of habitats supports internationally important numbers of wintering waterfowl as well as important breeding gull and tern populations. Species with populations of note include Black-headed Gull, Black-necked Grebe, Black-tailed Godwit, Common Greenshank, Common Tern, Curlew, Dark-bellied Brent Goose, Dunlin, Great Cormorant, Great-crested Grebe, Greenshank, Grey Plover, Little Egret, Little Grebe, Little Tern, Mediterranean Gull, Pintail, Redshank, Roseate Tern, Ringed Plover, Sandwich Tern, Shelduck, Shoveler, Slavonian Grebe, Spotted Redshank, Teal, Water Rail and Wigeon. The site also supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site.		
Solent Maritime	SAC	1,080
The Solent Maritime SAC is designated for the following Annex 1 habitats: - Estuaries – the Solent and its inlets are unique in Britain for having four tides a day. There are diverse and complex estuarine habitats which include mudflats, sandflats, Zostera sp. (Eelgrass) beds, a sandy reef and sand and shingle spits. - Spartina swards – the site supports rare cord-grass species such as Spartina alterniflora (Smooth Cord-grass), S. maritima (Small Cord-grass) and Spartina ×townsendii (Townsend's Cord-grass). - Atlantic salt meadows (Glauco-Puccinellietalia maritimae) – the site has a large number of separate areas of saltmarsh. The saltmarsh is ungrazed and supports communities dominated by Armeria maritima (Thrift), Atriplex portulacoides (Sea-purslane) and Limonium vulgare (Sea Lavender). The site has transitions to freshwater reedswamp and alluvial woodland as well as coastal grassland. - Coastal lagoons The site supports rare fauna including rare sponges, Harbour Seal and Desmoulin's Whorl Snail.		
Mercury Marshes	LNR	1,100
Mercury Marshes LNR is on the western bank of the River Hamble and is predominantly reedbed with patches of *Salix sp*. (Willow) carr, saltmarsh and intertidal mud. The LNR is important for invertebrates and birds. Species include Golden Plover, Reed Bunting and Water Rail. The LNR is within the Solent and Southampton Water Ramsar & SPA, Solent Maritime SAC and Lee-on-the Solent to Itchen Estuary SSSI.		
Hook with Warsash	LNR	1,340
Hook with Warsash LNR comprises reedbed, coastal grazing marsh, scrub, saltmarsh, inter-tidal mud, stable shingle ridge and woodland. The site is important for a range of		

Site Name	Designation	Approximate Distance (m)
fauna; species of note include Black Tailed Godwit, Dark-bellied Brent Goose, Lapwing, Golden-ringed Dragonfly, Grizzled Skipper, White-letter Hairstreak, Long-eared bats, Adder and Grass Snake. The majority of theLNR is within the Solent and Southampton Water Ramsar & SPA, Solent Maritime SAC and Lee-on-the Solent to Itchen Estuary SSSI.		
Lincegrove and Hackett's Marshes	SSSI	1,370
Lincegrove and Hackett's Marshes SSSI covers an area of mature saltmarsh on the west bank of the River Hamble estuary. The saltmarsh is dominated by *Halimione portulacoides* (Sea Purslane) and *Spartina anglica* (Common Cord-grass). The saltmarsh grades into a *Elymus pycnanthus* (Sea Couch) or *Phragmites australis* (Common Reed) zone. The SSSI is within the Solent and Southampton Water Ramsar & SPA and Solent Maritime SAC.		
Holly Hill Woodland Park	LNR & CP	1,740
Holly Hill Woodland Park LNR & CP has two distinct areas; Winnards Copse and Cawtes Copse. Winnards Copse is a more formal woodland that includes non-native species and lakes. Cawtes Copse is broad-leaved semi-natural woodland and includes some areas of ancient woodland.		
Hythe to Calshot Marshes	SSSI	1,790
Hythe to Calshot Marshes SSSI comprises an extensive area of saltmarsh and mudflats. There are a range of saltmarsh communities; the dominant species tend to be *Halimione portulacoides* (Sea Purslane), *Puccinellia maritima* (Common Saltmarsh-grass), and *Spartina anglica* (Common Cord-grass). The SSSI has a wide range of *Spartina* species and hybrids whose genetic material is of great scientific importance. There are margins of shell and shingle banks which support an interesting strandline flora. The outer fringe of the saltmarsh has reed beds and fringing *Quercus sp*. (Oak), *Salix sp*. (Willow) and *Ulex europaeus* (Gorse). The site has high densities of benthic invertebrates inhabiting the mudflats and is important for birds. The SSSI supports important numbers of Black-tailed Godwit, Dark-bellied Brent Goose Dunlin, Grey Plover, Redshank, Ringed Plover, Teal and Wigeon. The SSSI is within the Solent and Southampton Water Ramsar & SPA and Solent Maritime SAC.		
Hackett's Marsh	LNR	1,880
Hackett's Marsh LNR comprises species-rich meadows and saltmarsh. The reserve is important for insects and wildfowl and waders. The saltmarsh area of the site is within the Solent and Southampton Water Ramsar & SPA, Solent Maritime SAC and Lincegrove and Hackett's Marshes SSSI.		
Westwood Woodland Park	LNR	2,030
Westwood Woodland Park LNR comprises ancient woodland and grassland.		
Warsash Common	LNR	2,900
Warsash Common LNR is a mix of rough grassland and heathland with areas of broad-leaved woodland, open meadows, wet woodland and seasonal ponds.		
New Forest	NP	3,300
The New Forest NP covers over 56,000 hectares that is designated for its landscape interest. The majority of the NP is also designated as a SSSI, Ramsar, SPA & SAC as		

Site Name	Designation	Approximate Distance (m)
described below.		
Millers Pond	LNR	3,790
Millers Pond LNR comprises semi-natural woodland, acid grassland and a pond.		
The New Forest	SSSI	3,880
The New Forest SSSI covers a large area of unsown vegetation. Habitats include lowland heath, mires, fen, acid grassland, neutral grassland and ancient pasture woodland including riparian and bog woodland. There is also a network of small streams and ponds. The wide range of habitats support an assemblage of nationally rare and scarce plants. Species of note include *Chamaemelum nobile* (Chamomile), *Eriophorum gracile* (Slender Cottongrass), *Gentiana pneumonanthe* (Marsh Gentian), *Gladiolus illyricus* (Wild Gladiolus), *Hammarbya paludosa* (Bog Orchid), *Ludwigia palustris* (Hampshire-purslane), *Mentha pulegium* (Pennyroyal), *Pulicaria vulgaris* (Small Fleabane) and *Rhynchospora fusca* (Brown Beak-sedge). The SSSI also has a rich bryophyte and lichen flora and is rich in fungi; species of note include the lichens *Cladonia incrassate* and the rare dung fungus *Poronia punctata.* The SSSI is important for a wide variety of fauna. The site supports internationally important bird populations and much of the SSSI is also designated as an SPA and Ramsar site. Species of note include Dartford Warbler, Hen Harrier, Nightjar, Redstart, Ringed Plover and Woodlark. The SSSI has a nationally important assemblage of rare and scarce invertebrates. Over half of the 2,500 species of British butterflies and moths have been recorded in the SSSI and a third of the British beetle species. The wetland habitats are exceptionally diverse in dragonflies. Species of note include Silver-washed Fritillary, Southern Damselfly, Stag Beetle and White Admiral. Several of the streams in the SSSI support Otter and the woodland provides roosting sites for several species of bats including Bechstein's Bat. Great Crested Newt can be found in the less acidic ponds and all of Britain's native reptiles have been recorded, including Sand Lizard and Smooth Snake.		
Upper Hamble Estuary and Woods	SSSI	3,910
Upper Hamble Estuary and Woods SSSI comprises the uppermost section of the estuary of the River Hamble and its flanking zones of saltmarsh, reed swamp and ancient semi-natural woodland. The SSSI has 12 types of ancient broad-leaved woodland giving rise to a diverse flora. Uncommon woodland types include stands of *Tilia cordata* (Small-leaved Lime), wet *Fraxinus excelsior* (Ash) / *Ulmus glabra* (Wych Elm) woodland and an estuarine form of *Alnus glutinosa* (Alder) woods. The woodland grades into neutral grassland, swamp and estuarine saltmarsh. The SSSI supports a rich invertebrate fauna including Purple Emperor, the rare leaf beetle *Orsodacne lineola* and the rare marshland beetle *Mecinus collaris*. The site is also important for warblers and water birds.		
Manor Farm	LNR & CP	4,010
Manor Farm LNR & CP is a historic farm and visitor centre with areas of woodland, grassland and standing water. The site has a diverse flora and fauna.		
Netley Common	LNR	4.110
Netley Common LNR comprises open heathland with areas of grassland, scrub and a mixed woodland fringe.		
Calshot Marshes	LNR	4.360

Site Name	Designation	Approximate Distance (m)
Calshot Marshes LNR is an area of saltmarsh that is important for birds. The site supports important populations of wintering Black-tailed Godwit, Dark-bellied Brent Goose, Dunlin, Grey Plover, Redshank, Ringed Plover, Teal and Wigeon. The LNR is within the Solent and Southampton Water Ramsar & SPA, Solent Maritime SAC and Hythe to Calshot Marshes SSSI.		
The New Forest	Ramsar, SPA & SAC	4,850
The New Forest is designated as an SAC for the following habitats and species: - Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) - Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and / or of the Isoëto-Nanojuncetea - Northern Atlantic wet heaths with Erica tetralix - European dry heaths - Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) - Depressions on peat substrates of the Rhynchosporion - Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrub layer (Quercion robori-petraeae or Ilici-Fagenion) - Asperulo-Fagetum beech forests - Old acidophilous oak woods with Quercus robur on sandy plains - Bog woodland - Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) - Southern Damselfly - Stag Beetle Animal species mentioned in the SPA and Ramsar citations include Brook Lamprey, Bullhead, Dartford Warbler, Great Crested Newt, Hen Harrier, Hobby, Honey Buzzard, Nightjar, Stag Beetle, Woodlark and Wood Warbler. The site is also designated as a SSSI; as described above.		
Dibden Bay	SSSI	4,970
Dibden Bay SSSI was formed between the 1930s and 1973 by the deposition of marine dredgings over a complex of coastal habitats. The reclaimed land was allowed to colonise naturally with plants, and now supports wet and dry grassland together with saltmarsh vegetation, saltpans, swamp, reedbed, scrub and open water. The SSSI has a nationally important assemblage of invertebrates including 21 nationally rare and 67 nationally scarce species. The site is also important for wintering and breeding birds.		

3.1.2.2 Non-statutory Sites

There are 21 non-statutory designated sites within 2 km of the site boundary, all of which are Sites of Importance for Nature Conservation (SINCs). These sites are listed in *Table 4* in order of proximity to the site; the criteria based on which the SINC was selected has been noted.

Table 4. Non-statutory sites within 2 km of the Site Boundary

Site Name	Designation	Approximate Distance (m)
West Wood (Royal Victoria Country Park)	SINC	70
- Ancient semi-natural woodlands. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods.		
Netley to Hamble Shore	SINC	320
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.		
Petters Copse	SINC	460
Ancient semi-natural woodlands.		
Netley Lodge	SINC	830
- Ancient semi-natural woodlands. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods. - Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.		
Hamble Common West	SINC	830
- Areas of heathland vegetation; including matrices of dwarf shrub, acid grassland, valley mires and scrub. - Areas of heathland which are afforested or have succeeded to woodland that are contiguous with, or form an integral part of an open area of heathland.		
Spear Pond Gully	SINC	1020
- Other woodland where there is a significant element of ancient semi-natural woodland surviving.		
Mercury Marsh South	SINC	1,020
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.		
St. Mary's Road Wood	SINC	1,100
- Pasture woodland and wooded commons, not included in any of the above, which are of considerable biological and historical interest.		
Badnum Copse	SINC	1,160
- Ancient semi-natural woodlands. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods. - Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.		
Hamble Common North	SINC	1,160
- Agriculturally unimproved grasslands.		
Mercury Marina Saltmarsh	SINC	1,280
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands. - Sites which support one or more notable species.		

Site Name	Designation	Approximate Distance (m)
Priors Hill Copse / Hound Grove	SINC	1,290
- Ancient semi-natural woodlands.		
Mallards Moor	SINC	1,500
- Ancient semi-natural woodlands. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods.		
Hook-With-Warsash LNR (Wendleholme)	SINC	1,610
- Grasslands which have become impoverished through inappropriate management but which retain sufficient elements of relic unimproved grassland to enable recovery.		
Winnard's & Cawte's Copses	SINC	1,670
- Ancient semi-natural woodlands. - Other woodland where there is a significant element of ancient semi-natural woodland surviving.		
Downkiln Copse	SINC	1,740
- Ancient semi-natural woodlands. - Other woodland where there is a significant element of ancient semi-natural woodland surviving.		
Fawley Polders	SINC	1,790
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands. - Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions. - Sites which support one or more notable species.		
Priors Hill Brickworks	SINC	1,830
- Other woodland where there is a significant element of ancient semi-natural woodland surviving. - Grasslands which have become impoverished through inappropriate management but which retain sufficient elements of relic unimproved grassland to enable recovery. - Areas of heathland which are afforested or have succeeded to woodland that retain significant remnants of heathland vegetation which would enable their recovery.		
Brook Wood, Fareham	SINC	1,870
- Other woodland where there is a significant element of ancient semi-natural woodland surviving. - Other semi-natural woodland that comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods.		
River Hamble Mudflats & Saltmarsh - 1	SINC	1,870
- Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.		
Piland's Wood (Lower)	SINC	1,870

Site Name	Designation	Approximate Distance (m)
- Ancient semi-natural woodlands.		

3.1.3 Bird Records

Records of 108 species of bird were supplied in 2017 by Hampshire Biodiversity Information Centre. Species that are protected by law under *The Wildlife and Countryside Act 1981* (as amended) and have been recorded in the search area are listed in *Table 5.*

Table 5. Bird Records within 2 km of Site

Latin Name	Common Name	Designation	Most Recent	No of records	Within 100m	Within 2km	Within 5km
Alcedo atthis	Kingfisher	WCA1.1	2015	337		☒	
Anas querquedula	Garganey	WCA1.1	2010	1		☒	
Aythya marila	Scaup	WCA1.1	2009	1		**P**	☒
Botaurus stellaris	Bittern	WCA1.1	2015	1		☒	
Calidris pugnax	Ruff	WCA1.1	2015	7		☒	
Cettia cetti	Cetti's Warbler	WCA1.1	2015	157	☒		
Charadrius dubius	Little Ringed Plover	WCA1.1	2015	14	**P**	☒	
Chlidonias niger	Black Tern	WCA1.1	2010	3		☒	
Circus aeruginosus	Marsh Harrier	WCA1.1	2015	6		**P**	☒
Clangula hyemalis	Long-tailed Duck	WCA1.1	2013	5		**P**	☒
Falco columbarius	Merlin	WCA1.1	2006	1		**P**	☒
Falco subbuteo	Hobby	WCA1.1	2012	7		**P**	☒
Fringilla montifringilla	Brambling	WCA1.1	2013	5		☒	
Gavia arctica	Black-throated Diver	WCA1.1	2013	2		☒	
Gavia immer	Great Northern Diver	WCA1.1	2014	48	**P**	☒	
Gavia stellata	Red-throated Diver	WCA1.1	2013	15		☒	
Hydrocoloeus minutus	Little Gull	WCA1.1	2014	6	**P**	☒	
Ixobrychus minutus	Little Bittern	WCA1.1	2009	1		**P**	☒
Jynx torquilla	Wryneck	WCA1.1	2015	2		☒	
Larus melanocephalus	Mediterranean Gull	WCA1.1	2015	109	**P**	☒	
Limosa limosa	Black-tailed	WCA1.1	2015	364		☒	

Latin Name	Common Name	Designation	Most Recent	No of records	Within 100m	Within 2km	Within 5km
	Godwit						
Loxia curvirostra	Common Crossbill	WCA1.1	2011	3		**P**	☒
Lullula arborea	Woodlark	WCA1.1	2009	2	**P**	☒	
Luscinia svecica	Bluethroat	WCA1.1	2002	1		**P**	☒
Melanitta nigra	Common Scoter	WCA1.1	2015	28		☒	
Milvus milvus	Red Kite	WCA1.1	2015	11	**P**	☒	
Numenius phaeopus	Whimbrel	WCA1.1	2015	177		☒	
Oceanodroma leucorhoa	Leach's Petrel	WCA1.1	2012	2		**P**	☒
Pandion haliaetus	Osprey	WCA1.1	2015	11		☒	
Panurus biarmicus	Bearded Tit	WCA1.1	2015	46		**P**	☒
Phoenicurus ochruros	Black Redstart	WCA1.1	2015	25	**P**	☒	
Platalea leucorodia	Spoonbill	WCA1.1	2015	4		**P**	☒
Plectrophenax nivalis	Snow Bunting	WCA1.1	2011	2		☒	
Podiceps auritus	Slavonian Grebe	WCA1.1	2013	16		☒	
Podiceps nigricollis	Black-necked Grebe	WCA1.1	2013	3		☒	
Porzana porzana	Spotted Crake	WCA1.1	2003	2		**P**	☒
Recurvirostra avosetta	Avocet	WCA1.1	2014	14		☒	
Regulus ignicapilla	Firecrest	WCA1.1	2015	118	☒		
Sternula albifrons	Little Tern	WCA1.1	2001	1		☒	
Sylvia undata	Dartford Warbler	WCA1.1	2015	72	**P**	☒	
Tringa glareola	Wood Sandpiper	WCA1.1	2015	3		**P**	☒
Tringa nebularia	Greenshank	WCA1.1	2015	719	**P**	☒	
Tringa ochropus	Green Sandpiper	WCA1.1	2015	18	**P**	☒	
Turdus iliacus	Redwing	WCA1.1	2015	8	**P**	☒	
Turdus pilaris	Fieldfare	WCA1.1	2011	8		**P**	☒
Tyto alba	Barn Owl	WCA1.1	2015	15	**P**	☒	
Upupa epops	Hoopoe	WCA1.1	2007	1		**P**	☒

3.2 Summary of Survey Results

Figures for the April, May and June surveys detailing survey results are presented in *Figure 2*.

Thirty species of bird were recorded – of these 24 species were either confirmed breeding (five), probable breeding (eight) or possible breeding (11). A complete species

list summarising the breeding status, based on the EOAC criteria is presented in *Appendix 1*.

3.2.1 Breeding Status

Interpreting the data using the EOAC criteria, five species (17%) are confirmed as breeding, eight (27%) are categorised as probable breeding species and 11 (36%) as possible breeding species. In addition, six species (20%) are categorised as either non-breeding species or were simply recorded flying over the site.

3.2.2 Birds of Conservation Concern

Of all the bird species recorded, nine are Species of Conservation Concern and their associated conservation and breeding status are presented in *Table 6*.

Table 6. Bird species of conservation concern recorded during the breeding bird survey

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red/Amber	UK or Local BAP	Species Summary	Breeding Status
Black-headed Gull	*Larus ridibundus*			**Amber**		Only seen in April. Multiple seen flying overhead	**Non Breeding**
Dunnock	*Prunella modularis*			**Amber**		Seen on all three visits. Multiple seen and heard singing	**Probable**
Herring Gull	*Larus argentatus*			**Red**	**UK BAP**	Seen on all three visits. Flying overhead	**Non Breeding**
House Sparrow	*Passer domesticus*			**Red**	**UK BAP**	Seen on all three visits. Heard singing.	**Possible**
Common Kestrel	*Falco tinnunculus*			**Amber**		Only seen flying	**Non Breeding**

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red/Amber	UK or Local BAP	Species Summary	Breeding Status
						overhead in May.	
Song Thrush	*Turdus philomelos*			**Red**	**UK BAP**	Seen in May and June. Multiple heard singing.	**Possible**
Common Starling	*Sturnus vulgaris*			**Red**	**UK BAP**	Seen on all three visits. Multiple seen flying overhead. Two pairs seen on site. Two nests identified on site.	**Confirmed**
Stock Dove	*Columba oenas*			**Amber**		Only seen in May. Pair seen on site.	**Possible**
Tawny Owl	*Strix aluco*			**Amber**		Heard singing in May.	**Possible**

Table 7. A summary of the number of designated bird species recorded

Designation	Confirmed Breeding	Probable Breeding	Possible Breeding	Non Breeding	Total
EU Birds Directive Annex 1	0	0	0	0	**0**

Designation	Confirmed Breeding	Probable Breeding	Possible Breeding	Non Breeding	Total
WCA 1981 Schedule 1	0	0	0	0	**0**
BoCC Red List	1	0	2	1	**4**
BoCC Amber List	0	1	2	2	**5**
UK BAP	1	0	2	1	**4**
No Designation	4	7	7	3	**21**

4 EVALUATION AND CONCLUSIONS

4.1 Assemblage

Thirty species were recorded of which 24 confirmed breeding, probable breeding or possible are breeding species.

Using the adapted Fuller (1980) criteria the site has a breeding bird assemblage that is of importance at a Local level (<25 species).

The value of the sites breeding bird assemblage including BoCC and UK BAP species is due to the mosaic of habitats present at the site. The site comprises primarily amenity grassland and hardstanding but there are areas of hedgerows, scattered trees and woodland present. These habitats allow species of conservation concern to breed and forage on site.

4.2 Species of Conservation Concern

Species of conservation concerned recorded on site are common species in Hampshire. Some of the species recorded are documented to be suffering severe national declines, with a major factor being loss of breeding habitat.

Although none of the species recorded were at population levels over a site level importance it should be considered that these are nationally declining species. Where possible mitigation should be put in place to maintain or improve their habitat.

4.3 Designated Sites

The Solent and Southampton Water RAMSAR & SPA is within 400 m of site, due to the distance from site and the presence of woodland, hedgerows and the GE Aviation campus between the proposed construction site and the SPA it is not expected that construction would result in the disturbance of any key species on the designated site. A net increase in residential development would likely lead to disturbance, however, this would be controlled by the Solent Recreational Mitigation Strategy, a financial levy is provided for each new dwelling within 5.6 km of the SPA which fund the mitigation project, this development will therefore be subject to the levy.

4.4 Implications for Development

Based on the results of the survey it is clear that the majority of species are typically breeding around the boundary of the site in the scattered broad-leaved trees, broad-leaved semi-natural woodland and mixed plantation woodland. These majority of these habitats are due to be retained and as a result species using these are likely to remain unaffected by any future development. However, there is potential for disturbance during construction of the development that could temporarily affect species density.

The current proposals retains the majority of breeding bird habitat on site, some scattered coniferous and broad-laved trees are due to be removed. However the planned planting of hedgerows and trees will benefit some BoCC species by providing

more nesting or foraging habitat (*e.g.* Song Thrush, Dunnock and Starling). Owl boxes should also be considered for Tawny Owls which were recorded during the surveys.

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6 FIGURES

Site Boundary

Scale = 1:125,000 @ A3

Scale = 1:10,000 @ A3

Rev	Date	Description	Drn	Chk	App
00	09.10.17	857362	SP	RG	EI

GE Aviation

RSK

Figure 1

Site Location Plan

0 300

Metres

REV 00

File Name : U:\Ecology\856000s\856776 - GE Aviation Hamble\07 - GIS

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© 2017 DigitalGlobe ©CNES (2017) Distribution Airbus DS © 2017 Microsoft Corporation © 2017 HERE

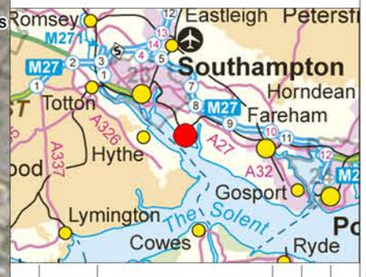
Site boundary (May 2017)

Bird Activity Codes

2B.	Number of birds
B.pr	Pair of birds
B.mat	Bird carrying nesting material
B.*	Birds nest
B.**	Old birds nest
B.juv	Juvenile bird
(B.)	Bird singing
B.→	Bird in flight

Bird Species Codes

B.	Blackbird
BH	Black-headed Gull
BT	Blue Tit
C.	Carrion Crow
CC	Chiffchaff
CD	Collared Dove
D.	Dunnock
FP	Feral Pigeon
G.	Green Woodpecker
GC	Goldcrest
GO	Goldfinch
GS	Great Spotted Woodpecker
GT	Great Tit
HG	Herring Gull
HS	House Sparrow
J.	Jay
JD	Jackdaw
MG	Magpie
R.	Robin
SG	Starling
WP	Woodpigeon
WR	Wren



Rev	Date	Description	Drn	Chk	App
00	28.04.17	856776	SP	RG	TC

GE Aviation Hamble

RSK

Figure 2

Breeding Birds Survey
Visit 1 25th April 2017

0 50
metres
Scale = 1:1,500 @ A3

N W E S

REV 00

File Name : T:\Projects\Projects 856751 - 856800\856776 - GE Aviation Hamble\07 - GIS

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Site boundary (May 2017)

Bird Activity Codes

2B.	Number of birds
B.m	Male bird
B.f	Female bird
B.pr	Pair of birds
B.*	Birds nest
B.fam	Family of birds
(B.)	Bird singing
B.→	Bird in flight

Bird Species Codes

B.	Blackbird
BT	Blue Tit
C.	Carrion Crow
CH	Chaffinch
D.	Dunnock
GO	Goldfinch
GR	Greenfinch
GS	Great Spotted Woodpecker
GT	Great Tit
HG	Herring Gull
HS	House Sparrow
JD	Jackdaw
K.	Kestral
MG	Magpie
PW	Pied Wagtail
R.	Robin
SD	Stock Dove
SG	Starling
ST	Songthrush
TO	Tawny Owl
WP	Woodpigeon
WR	Wren

Rev	Date	Description	Drn	Chk	App
00	28.04.17	856776	SP	RG	TC

GE Aviation Hamble

RSK

Figure 3

Breeding Birds Survey
Visit 2 3rd May 2017

0 50
metres
Scale = 1:1,500 @ A3

N W E S

REV 00

File Name : T:\Projects\Projects 856751 - 856800\856776 - GE Aviation Hamble\07 - GIS

Site boundary (May 2017)

Bird Activity Codes

2B.	Number of birds
B.m	Male bird
B.f	Female bird
B.pr	Pair of birds
B.*	Birds nest
B.fam	Family of birds
(B.)	Bird singing
—B.→	Bird in flight

Bird Species Codes

B.	Blackbird
BC	Blackcap
BT	Blue Tit
C.	Carrion Crow
CH	Chaffinch
D.	Dunnock
FP	Feral Pigeon
GO	Goldfinch
GR	Greenfinch
GS	Great Spotted Woodpecker
GT	Great Tit
HG	Herring Gull
HS	House Sparrow
JD	Jackdaw
MG	Magpie
PW	Pied Wagtail
R.	Robin
SG	Starling
ST	Songthrush
WP	Woodpigeon
WR	Wren

Rev	Date	Description	Drn	Chk	App
00	21.06.17	856776	SP	RG	EI

GE Aviation Hamble

RSK

Figure 4

Breeding Birds Survey
Visit 3 6th June 2017

0 50
metres
Scale = 1:1,500 @ A3

N W E S

REV 00

File Name : T:\Projects\Projects 856751 - 856800\856776 - GE Aviation Hamble\07 - GIS

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APPENDIX 1- DETAILED SURVEY RESULTS

Table 8. All bird species recorded during the breeding bird surveys

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red/Amber	UK or Local BAP	Species Summary	Breeding Status
Blackbird	*Turdus merula*					Seen on all three visits. Multiple seen and heard singing on site. Nest identified. Pair seen on site.	**Confirmed**
Blackcap	*Sylvia atricapilla*					Only seen in June. Heard singing	**Possible**
Black-headed Gull	*Larus ridibundus*			**Amber**		Only seen in April. Multiple seen flying overhead	**Non Breeding**
Blue Tit	*Cyanistes caeruleus*					Seen on all three visits. Pair seen, individuals singing, family seen and nest present.	**Confirmed**

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red/Amber	UK or Local BAP	Species Summary	Breeding Status
Carrion Crow	*Corvus corone*					Seen on all three visits. One pair seen on site and individuals seen flying overhead.	**Probable**
Chaffinch	*Fringilla coelebs*					Seen in May and June. Seen and heard singing	**Possible**
Common Chiffchaff	*Phylloscopus collybita*					Seen in April and June. Heard singing on multiple occasions	**Possible**
Eurasian Collared Dove	*Streptopelia decaocto*					Only seen in April. Heard signing	**Possible**
Dunnock	*Prunella modularis*			**Amber**		Seen on all three visits. Multiple seen and heard singing	**Probable**
Feral Pigeon	*Columba livia* (domestic)					Seen in April and June. Multiple seen flying	**Possible**

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red/Amber	UK or Local BAP	Species Summary	Breeding Status
						overhead	
Goldcrest	*Regulus regulus*					Only seen in April. Individuals seen	**Non Breeding**
European Goldfinch	*Carduelis carduelis*					Seen on all three visits. Multiple individuals seen and heard singing. Pair seen on site.	**Probable**
Great Spotted Woodpecker	*Dendrocopos major*					Seen in April and May. Flying overhead and heard singing.	**Possible**
Great Tit	*Parus major*					Seen on all three visits. Female seen on site. Multiple heard signing and family seen on site.	**Confirmed**
Green Woodpecker	*Picus viridis*					Only seen in April. Seen on	**Non Breeding**

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red/Amber	UK or Local BAP	Species Summary	Breeding Status
						site.	
European Greenfinch	*Chloris chloris*					Seen in May and June. Heard signing	**Possible**
Herring Gull	*Larus argentatus*			**Red**	**UK BAP**	Seen on all three visits. Flying overhead	**Non Breeding**
House Sparrow	*Passer domesticus*			**Red**	**UK BAP**	Seen on all three visits. Heard singing.	**Possible**
Eurasian Jackdaw	*Corvus monedula*					Seen in My and June. Multiple flying overhead. Seen carrying nesting material. Pair of birds seen.	**Probable**
Eurasian Jay	*Garrulus glandarius*					Only seen in April.	**Non Breeding**
Common Kestrel	*Falco tinnunculus*			**Amber**		Only seen flying overhead in May.	**Non Breeding**

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red/Amber	UK or Local BAP	Species Summary	Breeding Status
Black-billed Magpie	*Pica pica*					Seen on all three visits. Multiple individuals seen on site. Two pairs seen on site.	**Probable**
White (Pied) Wagtail	*Motacilla alba*					Seen in May and June. Seen flying overhead. Pair seen on site.	**Probable**
European Robin	*Erithacus rubecula*					Seen on all three visits. Multiple heard singing. Old nest identified. Pair seen on site.	**Probable**
Song Thrush	*Turdus philomelos*			**Red**	**UK BAP**	Seen in May and June. Multiple heard singing.	**Possible**
Common Starling	*Sturnus vulgaris*			**Red**	**UK BAP**	Seen on all three visits. Multiple seen flying overhead. Two pairs seen on site. Two nests	**Confirmed**

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red/Amber	UK or Local BAP	Species Summary	Breeding Status
						identified on site.	
Stock Dove	*Columba oenas*			**Amber**		Only seen in May. Pair seen on site.	**Possible**
Tawny Owl	*Strix aluco*			**Amber**		Heard singing in May.	**Possible**
Common Wood Pigeon	*Columba palumbus*					Seen on all three visits. Multiple heard singing and multiple pairs seen on site. 2 juveniles seen on site.	**Confirmed**
Wren	*Troglodytes troglodytes*					Seen on all three visits. Multiple seen and heard singing.	**Probable**

APPENDIX 2 - LEGISLATION

All breeding birds are protected under *Section 1* of The *Wildlife and Countryside Act 1981* (as amended). This protection extends to intentionally killing and injuring, and to the destruction of nests, eggs and dependent young. The only exceptions are with certain game species (listed in *Schedule 2*), which can be killed during specific seasons (see *Section 2*), and to certain pest species, which can be controlled under licence (Statutory Instrument 3010, 1986).

Additional protection is offered to bird species listed on *Schedule 1* of the *Wildlife and Countryside Act 1981*, which are protected for example, from disturbance whilst nesting or attempting to make a nest. The *Countryside and Rights of Way Act 2000* added reckless disturbance to intentional disturbance of Schedule 1 species as an offence.

The above is a summary of the legislation and the original Acts and Schedules should be referred to for the precise wording.

APPENDIX 3 - DEFINITIONS

The following evidence is used to define breeding categories during breeding bird surveys.

Possible Breeding

1. Species observed in breeding season in possible nesting habitat.

2. Singing male(s) present (or breeding calls heard) in breeding season

Probable Breeding

1. Pair observed in suitable nesting habitat in breeding season

2. Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two different days a week or more apart at the same place

3. Courtship and display

4. Visiting a probable nest site

5. Agitated behaviour or anxiety calls from adults

6. Brood patch on adult examined in the hand

7. Nest building or excavating nest-hole

Confirmed Breeding

1. Distraction-display or injury feigning

2. Used nest or eggshells found (occupied or laid within period of survey)

3. Recently fledged young (nidicolous species) or downy young (nidifugous species)

4. Adults entering or leaving nest-site in circumstances indicating occupied nest (including high nest or nest-holes, the contents of which cannot be seen) or adult seen incubating

5. Adult carrying faecal sac or food for young

6. Nest containing eggs

7. Nest with young seen or heard

GE Aviation

Hamble-le-Rice Campus

Hazel Dormouse Survey Report

856776

OCTOBER 2017

RSK GENERAL NOTES

Project No.: 856776

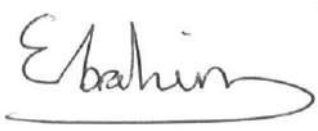
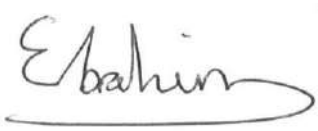
Title: Hamble-le-rice Campus - Hazel Dormouse Survey Report

Client: GE Aviation

Date: October 2017

Office: Hemel Hempstead

Status: Final

Author	Errol Ibrahim	**Technical reviewer**	Victoria Gilbey
Signature		Signature	
Date:	31.10.2017	Date:	31.10.2017
Project manager	Errol Ibrahim	**Quality reviewer**	Victoria Gilbey
Signature		Signature	
Date:	31.10.2017	Date:	31.10.2017

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of Hazel Dormouse (*Muscardinus avellanarius*) surveys carried out at the GE Aviation site in Hamble-le-Rice near Southampton, Hampshire (Ordnance Survey Grid References SU46890717) between June and October 2017.
2. A total of 100 artificial nest-tubes were placed in suitable areas of habitat and checked once in June, August, September and October 2017.
3. No evidence of Hazel Dormouse was found, no further actions are required in relation to this protected species.

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1 INTRODUCTION

1.1 Purpose of this Report

This report represents the results of Hazel Dormouse (*Muscardinus avellanarius*) surveys at the GE Aviation Campus in Hamble-le-Rice, Southampton. A site plan is given in *Figure 1*. The work relates to a proposed development of *c.*240 dwellings and associated landscaping.

1.2 Ecological Context

The site – which is *c.*500 m from the coast – is part of a *c.*20 ha industrial campus comprising areas of hard-standing and industrial buildings alongside a sports ground and some broadleaved woodland. There is a large amount of ornamental planting throughout. To the north of the site is the Royal Victoria Country Park. To the west and south is Southampton Water, and to the east there are residential areas which form part of the village of Hamble-le-Rice. There are 28 designated sites within 5km of the campus, some of which are directly adjacent to the site.

1.3 Structure of the Report

The remainder of the report is set out as follows:

- Section 2 describes the survey and assessment methods;
- Section 3 presents the results of the surveys;
- Section 4 provides the evaluation and conclusions;
- Section 5 contains references;
- Section 6 provides the figures; and
- Appendix A summarises legislation relating to protected species.

2 METHODS

Habitats on site were assessed for their suitability to support Hazel Dormice by RSK in February 2017. Hazel Dormice generally use areas of dense woody vegetation cover, and are more likely to be found where there is a wide diversity of woody species contributing to three-dimensional habitat complexity, a number of food sources, plants suitable for nest-building material, and good connectivity to other areas of suitable habitat.

According to the guidance outlined in Natural England's Hazel Dormouse Conservation Handbook (Bright *et al.* 2006), a total of 100 artificial nest-tubes were placed in suitable areas of habitat along the site and checked on four occasions. Locations of these nest-tubes are shown in *Figure 2*.

As detailed in *Table 1*, monthly scores for the period over which the tubes are in place are added together and a minimum score of 20 must be reached in order to determine presence/likely absence.

Table 1.Index of probability for Hazel Dormouse surveys

Month	Index of Probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

Hazel Dormouse nest tubes were placed out in suitable habitat in May 2017 and checks were carried out when evidence (*e.g.* nests) is most likely to be detected (June, August, September and October). An index of probability score of 22 was achieved.

Each survey visit involved checking the nest-tubes for the presence of Hazel Dormice nests and also a search for any signs of Hazel Dormice *i.e* feeding remains, evidence of bark stripping for nest building or sightings.

3 RESULTS

Table 2 shows the results of the nest-tube surveys. No evidence of Hazel Dormice was found during the surveys. Evidence of Wood Mice (*Apodemus sylvaticus*) was found during the August visit in area B.

Table 2. Results of Hazel Dormouse surveys

Survey Area	Visit 1 – June 2017	Visit 2 – August 2017	Visit 3 – September 2017	Visit 4 – October 2017	Survey Score
A	No signs of Hazel Dormice	No signs of Hazel Dormice	No signs of Hazel Dormice	No signs of Hazel Dormice	22
B	No signs of Hazel Dormice	No signs of Hazel Dormice Wood mouse feeding remains found.	No signs of Hazel Dormice.	No signs of Hazel Dormice	
C	No signs of Hazel Dormice	No signs of Hazel Dormice	No signs of Hazel Dormice	No signs of Hazel Dormice	
D	No signs of Hazel Dormice	No signs of Hazel Dormice	No signs of Hazel Dormice	No signs of Hazel Dormice	

4 EVALUATION AND CONCLUSIONS

With an appropriate level of survey effort expended, and no evidence of Hazel Dormice found, it can be concluded that there are no Hazel Dormice present at this site. Therefore, it is safe for planned work to proceed in these areas without further survey work or mitigation with regard to this species.

5 REFERENCES

Bright, P., Morris, P. And Mitchell-Jones, T. (2006) *The Hazel Dormouse conservation handbook (2nd edition)*, Peterborough, English Nature 73pp.

RSK (2016) *GE Aviation Preliminary Ecological Appraisal Report*

6 FIGURES

Figure 1. Site Location Plan

Site boundary

Rev	Date	Description	Drn	Chk	App
00	16.05.17	856776	RG	SP	EI

GE Aviation Hamble

RSK

Figure 1

Site Location Plan

0 150
metres
Scale = 1:5,000 @ A3

N W E S

REV 00

File Name : Z:\GIS\Projects\Ecology\Projects 856751 - 856800\856776 - GE Aviation Hamble

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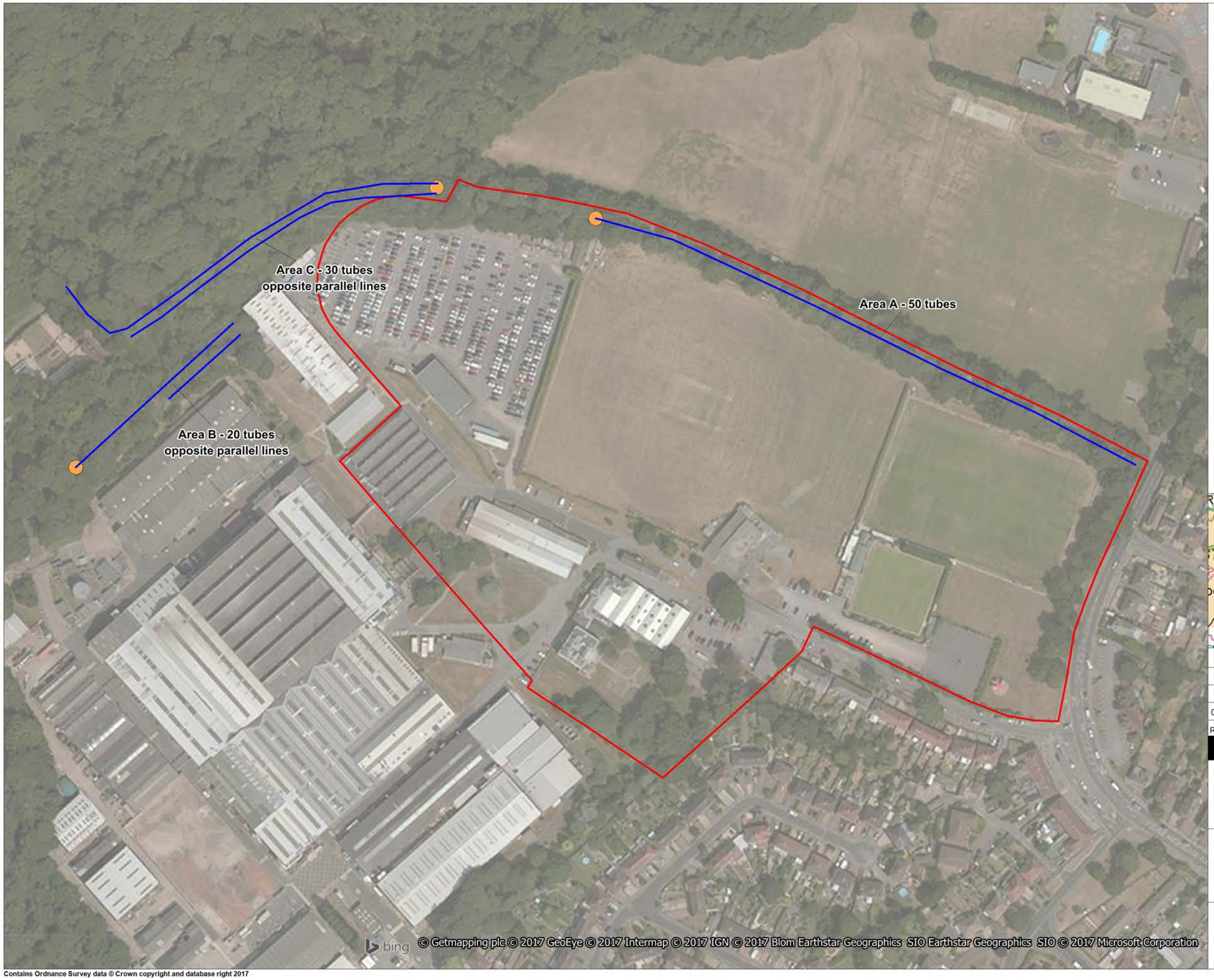

Site boundary (May 2017)

Start of dormouse tube area

Dormouse tube area

Rev	Date	Description	Drn	Chk	App
00	21.06.17	856776	SP	RG	EI

GE Aviation Hamble

RSK

Figure 2

Locations of Dormouse Tubes

0 60

metres

Scale = 1:2,000 @ A3

N W E S

REV 00

File Name : T:\Projects\Projects 856751 - 856800\856776 - GE Aviation Hamble\07 - GIS

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APPENDIX A – LEGISLSATION

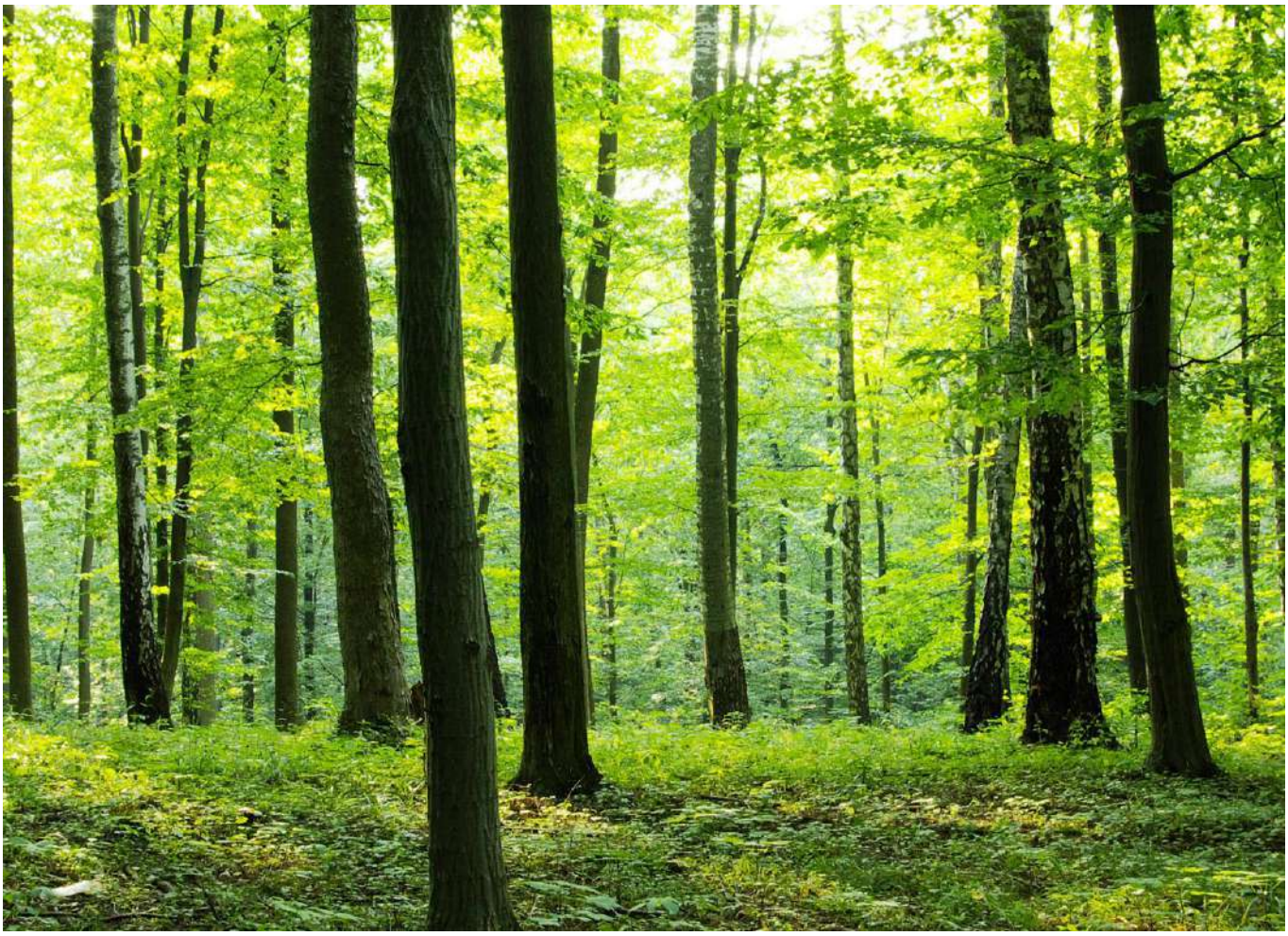
Hazel Dormouse

The Hazel Dormouse is protected by *The Wildlife and Countryside Act 1981 (as amended),* extended by the *Countryside and Rights of Way Act 2000*. This legislation makes it an offence to:

- Intentionally kill, injure or take a Hazel Dormouse;
- Possess or control any live or dead specimen or anything derived from a Hazel Dormouse (unless it can be shown to have been legally acquired);
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a Hazel Dormouse; or
- Intentionally or recklessly disturb a Hazel Dormouse while it is occupying a structure or place which it uses for that purpose.

The Hazel Dormouse is also European Protected Species listed on *The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended).* This legislation makes it an offence to:

- Deliberately capture or kill a Hazel Dormouse;
- Deliberately disturb a Hazel Dormouse;
- Damage or destroy a breeding site or resting place of a Hazel Dormouse;
- Keep, transport, sell or exchange, or offer for sale or exchange a live or dead Hazel Dormouse or any part of a Hazel Dormouse.



GE Aviation

Hamble-le-Rice Campus

Reptile Survey Report

856776

August 2017

RSK GENERAL NOTES

Project No.: 856776- (00)

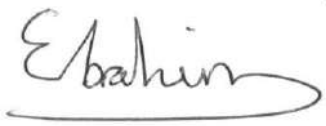
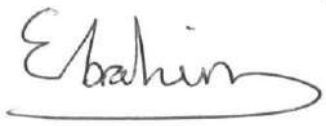
Title: Reptile survey Report

Client: GE Aviation

Date: August 2017

Office: Hemel Hempstead

Status: Rev00

Author	Errol Ibrahim	**Technical reviewer**	Roberta Epps
Signature		Signature	
Date:	13.07.2017	Date:	18 July 2017
Project manager	Errol Ibrahim	**Quality reviewer**	Roberta Epps
Signature		Signature	
Date:	13.07.2017	Date:	18 July 2017

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK COMPANY Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of reptile surveys carried out at the GE Aviation site in Hamble-le-Rice near Southampton, Hampshire (Ordnance Survey Grid Reference: SU46890717) between April and June 2017.
2. The habitats were initially assessed on the 7 February 2017 and several habitats were suitable for reptiles, including the dense scrub and woodland.
3. Reptile surveys of the site were carried out from 20 April to 29 June 2017. The surveys identified a medium population of Slow Worm (*Anguis fragilis)*.
4. Recommendations have been included within the report to enhance and manage the landscape buffers.
5. A method statement will also be required to ensure that no reptiles are harmed during these works and it will outline the precautionary measures to be followed during the works.

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2.2 Daytime searches 2
2.3 Artificial Refuge Survey 2
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1 INTRODUCTION

1.1 Purpose of this report

This report presents the findings from reptile surveys carried out at the GE Aviation campus in Hamble-le-Rice, Southampton. A site location plan is given in *Figure 1*. Each survey comprised of a presence/absence survey using artificial refugia placed in areas of suitable habitat and daytime searches. Surveys were carried out between April and June 2017.

These surveys were required to inform a planning application, and the work relates to a 'disposable land' plan in which GE Aviation has identified parts of the campus that could be sold.

1.2 Ecological Context

The site is a *c.*20 ha industrial campus comprising areas of hard-standing and industrial buildings alongside a sports ground and some broadleaved woodland. There is a large amount of ornamental planting throughout. To the north of the site is the Royal Victoria Country Park. To the west and south is Southampton Water, and to the east there are residential areas which form part of the village of Hamble-le-Rice.

1.3 Structure of the Report

The remainder of the report is set out as follows:

- *Section 2* describes the survey and assessment methods;
- *Section 3* presents the results of the surveys and assessment;
- *Section 4* provides the evaluation and conclusions;
- *Section 5* contains references;
- *Section 6* provides the figures;

- *Appendix A* presents the relevant legislation; and
- *Appendix B* lists the complete survey data.
- *Appendix C* lists the current proposal.

2 METHODS

2.1 Habitat assessment

A Preliminary Ecological Appraisal (PEA) of the site was undertaken by RSK in February 2017 which identified areas with potential to support one or more of the four commoner reptile species. Subsequent presence/absence surveys for reptiles were undertaken between April and June 2017.

2.2 Daytime searches

Natural England's standing advice for reptile survey now includes day time searches. Surveyors walk a transect survey designed to incorporate the areas of habitat most suitable for reptiles. Surveyors search for basking animals on areas such as banks, piles of wood and on the edges of woodland. RSK combined the day time searches with the artificial refuge surveys as below.

2.3 Artificial Refuge Survey

The standard method for detecting reptiles is to use reptile 'tinning' surveys. Artificial refuges (roofing felt tiles called 'tins' *c.*0.5 m^2) were placed in the areas identified as potentially suitable for reptiles during the habitat assessment. The felt tiles attract reptiles, which use them for shelter and to aid temperature regulation, which allows surveyors to find reptiles that would otherwise be widely dispersed and well-hidden.

Reptile surveys were carried out in the reptile active season, and 130 tins were placed on the site (*Figure 2*). Tins were checked for reptiles on seven occasions during suitable weather (ideally in bright sunshine between the hours of 08.30 to 11.00 and 16.00 to 18.30 with air temperatures between 9 and 15ºC, or if there is hazy or intermittent sunshine and little wind then between 9 and 18ºC, not during rain) (Froglife, 1999).

When checking tins, a general watch was kept for other signs of reptiles, *e.g.* Grass Snake eggs, excrement or sloughed skins (which are often found beneath refuges).

2.4 Population Assessment

Population estimates have been made following best practice guidelines issued by the *Herpetofauna Groups of Britain and Ireland* (HGBI 1998). The population categories used per species is shown in *Table 1*. Reptile numbers relate to the maximum number of adults of each species spotted during one reptile survey conducted on one day in suitable weather conditions.

The population classification is then used to determine the number of days trapping that is needed to clear the site of reptiles. Population assessment using peak counts does not include juveniles because they are often very abundant but they have a high rate of mortality in their first year so inclusion can provide incorrect population assessments.

Table 1.Population classification according to HGBI guidelines.

Species	Low Population	Medium Population	High Population
Adder	<2/ha	2-4/ha	> 4/ha
Common Lizard	<20/ha	>40/ha	>80/ha
Grass Snake	<2/ha	2-4/ha	>4/ha
Slow Worm	<50/ha	>50/ha	>100/ha

3 RESULTS

3.1 Reptiles

The results of the surveys are presented in *Table 2* below. Sufficient survey visits were conducted to allow an estimation of population size class assessment to be made.

Weather data and a full table of results are given in *Appendix B.* The code used in the table is as follows:

- Af (*Anguis fragillis*) – Slow-worm

Table 2. Reptile survey results

Survey Location	Check 1	Check 2	Check 3	Check 4	Check 5	Check 6	Check 7
A	Af (2)	Af (3)	Af (3)	Af (1)	-	Af (1)	Af (1)
B	Af (3)	-	-	-	Af (3)	Af (1)	-
C	-	-	-	-	-	-	-
D	Af (2)	Af (1)	-	Af (2)	Af (1)	-	Af (1)
E	-	Af (11)	Af (7)	Af (5)	Af (9)	Af (17)	-
F	-	Af (1)	-	Af (2)	Af (3)	-	-
G	-	Af (6)	Af (17)	Af (14)	Af (22)	Af (20)	-
Totals:	**Af (7)**	**Af (22)**	**Af (27)**	**Af (24)**	**Af (38)**	**Af (39)**	**Af (2)**

3.1.1 Population Estimate

The average maximum number of each species per hectare of suitable habitat (*c.*0.4 ha) (excluding juvenile animals) spotted during one reptile survey on one day in suitable weather conditions is shown in *Table 3*. Numbers have been rounded up.

Table 3. Maximum counts and population estimates

Species	Peak Count (excluding juveniles)	Peak Count calculated per hectare	Population Estimate
Slow worm	32	80	Medium

4 EVALUATION AND CONCLUSIONS

The site supports a medium population of Slow Worms, concentrated around the northern and southern boundaries of the site in areas of scattered broad-leaved trees and mixed plantation woodland. The majority of the site is amenity grassland and hardstanding which is not suitable habitat for common reptiles.

Under current proposals (*Appendix C*) a section of suitable reptile habitat will be lost along the north eastern boundary of the proposed development to create an access route to the recreational grounds. Current proposals include the retention of existing landscape buffers. It is recommended that the easting buffers are extended to 20 m and enhanced (in line with the National Planning Policy Framework) through the addition of refuges (*e.g.* log piles) and the creation of rough grassland.

The 20 m buffer would also protect the surrounding ancient woodland from urbanising and recreational impacts.

In order to ensure that no reptiles are harmed during works a method statement should be produced by a suitably qualified ecologist outlining precautionary measures to be followed during the works. This is likely to include undertaking habitat manipulation and tool box talks to site staff to highlight the risks and provide contact details of an ecologist to call should any issues arise. Any reptiles found will be released in adjacent suitable habitats that will be protected and retained during construction.

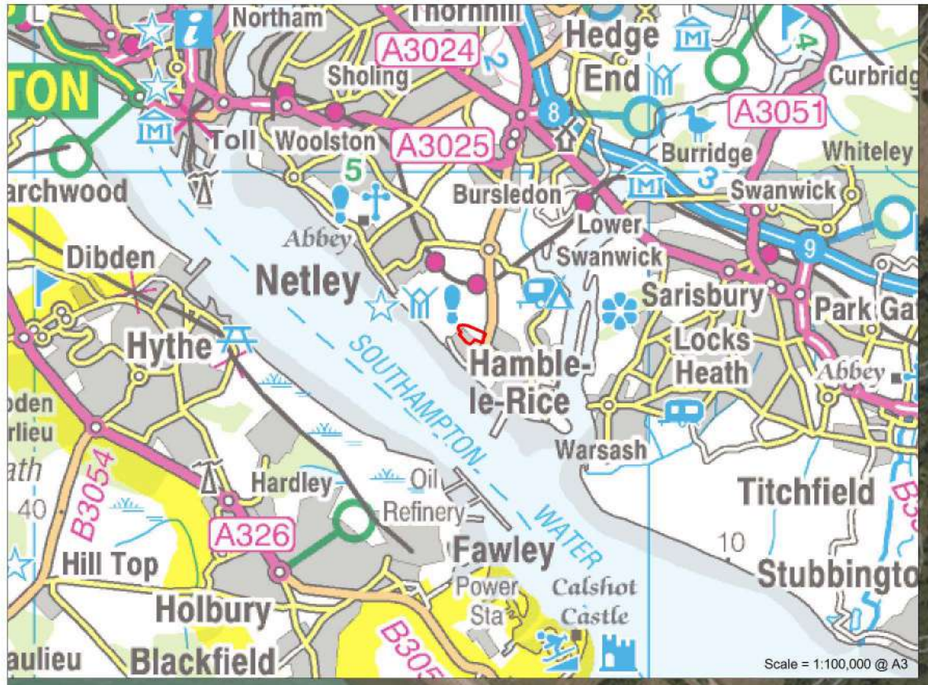
5 REFERENCES

Froglife (1999). *Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife, Halesworth.

Gent, A.H. & Gibson, S.D. (2003). Herpetofauna Workers Manual. Joint Nature Conservation Committee, Peterborough.

Herpetofauna Groups of Britain and Ireland. (1998). Evaluating local mitigation/translocation programmes: Maintaining Best Practice and lawful standards.

6 FIGURES



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Rev	Date	Description	Drn	Chk	App
00	16.05.17	856776	RG	SP	EI

GE Aviation Hamble

RSK

Figure 1

Site Location Plan

0 150

metres

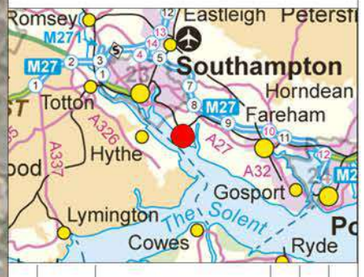
Scale = 1:5,000 @ A3

REV 00

File Name : Z:\GIS\Projects\Ecology\Projects 856751 - 856800\856776 - GE Aviation Hamble

Site boundary (May 2017)

Reptile felt transect



Rev	Date	Description	Drn	Chk	App
00	07.08.17	856776	SP	RG	EI

GE Aviation Hamble

RSK

Figure 2

Locations of Reptile Felt Transects

0 45

metres

Scale = 1:x1,500 @ A3

N W E S

REV 00

File Name : U:\Ecology\856000s\856776 - GE Aviation Hamble\07 - GIS

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APPENDIX A – LEGISLATION

Common Reptiles

Lacerta vivipara (Common Lizard), *Natrix natrix* (Grass Snake), *Anguis fragilis* (Slow-worm), and *Vipera berus* (Adder) are listed under *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), in respect of *Section 9(5)* and part of *Section 9(1).* This protection was extended by the *Countryside and Rights of Way Act 2000* (the CRoW Act).

Under the above legislation it is an offence to:

- intentionally or deliberately kill or injure any individual of such a species; or
- sell or attempt to sell any part of the species alive or dead.

APPENDIX B – COMPLETE SURVEY RESULTS

In addition to the species codes explained in the report the following codes are used in *Table 4* are:

- Af- Slow-worm *(Anguis fragilis*).
- A – Adult
- SA – Sub-adult
- J- Juvenille
- M- Male
- F- Female
- UN- Unidentified

Table 4. Full results of the reptile surveys

Survey Location	Check 1 (24.05.2017)	Check 2 (31.05.2017)	Check 3 (02.06.2017)	Check 4 (07.06.2017)	Check 5 (15.06.2017)	Check 6 (23.06.2017)	Check 7 (29.06.2017)
A	2 Af (1 AF, 1 *SA*)	3 Af (AF)	3 Af (AF)	1 Af (SA)		1 Af (AM)	1 Af (AM)
B	3 Af (1 AF, 2 SA)	-	-	-	3 Af (1 AM, 2 AF)	1 Af (AM)	-
C	-	-	-	-	-	-	-
D	2 Af (2 AF)	1 Af (AF)	-	2 Af (1 AM,1 AF)	1 Af (AF)	-	1 Af (J)
E	-	11Af (3 AM, 5 AF 3 SA)	7 Af (2 AM,4 AF,1 SA)	5 Af (4 AM,1 J)	9 Af (2 AM,3 AF, 1UNA, 3J)	17 Af (3 AM,4 AF, 2SA, 8J)	-
F	-	1 Af (AM)	-	2 Af (1 AF,1 SA)	3 Af (1 AM,2 AF)	-	-
G	-	6 Af (3 AM,1 AF, 2 SA)-	17 Af (3 AM,11 AF, 3 SA)	14 Af (3 AM, 2 AF,4 SA, 5 J)	22 Af (3 AM, 7 AF,9 UNA 3 SA)	20 Af (2 AM, 6 AF, 6 SA, 6 J)	-
Total	7 Af (4AF, 3SA	22 Af (17 A, 5 J)	27 Af (5 AM, 18 AF, 4 SA)	24 Af (8 AM, 4 AF,6 SA, 6 J)	38 Af (7 AM, 15 AF, 10 UNA, 3 SA, 3 J)	39 Af (7 AM, 10 AF, 8 SA, 14 J)	2 Af (1 AM, 1 J)

Table 5. Weather conditions during the surveys

Survey Visit	Date	Time	Temp. (Air)	Wind (Beaufort)	Cloud (Octas)	Rain (0-5)	Suitable Conditions (Yes, No or Fair)
1	24.05.17	9.15	14.2	1	2	0	Yes
2	31.05.2017	9.45	15.7	1	7	0	Yes
3	02.06.2017	8.30	15.5.	1	7	0	Yes
4	07.06.2017	9.10	17.2	4	2	0	Yes
5	15.06.2017	9.15	15.9	1	2	0	Yes
6	23.06.2017	8.30	17.8	3	5	0	Yes
7	29.06.2017	8.30	13.6	1	8	0	Fair

APPENDIX C – CURRENT PROPOSALS

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Rev.	Description	Date

Notes

	Area (m2)	Number
☐ 1 Bed	50 - 55	20
☐ 2 Bed	70 - 80	47
☐ 3 Bed	84 - 102	95
☐ 3 Bed	84 - 102	28
Total		190

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Client:	GE Aviation
Project:	GE Aviation Kings Avenue Hamble Southampton, SO31 4NF
Title:	Proposed Site Layout
Status:	S K E T C H
Scale:	1:1000
Date:	06/2017
Revision:	/
Sheet:	A1
Drg No:	FD 16 - 431 - 55 - SK