

Arborfield Garrison – Bat Mitigation Strategy



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1 Introduction

1.1 Introduction

AECOM was commissioned by the Arborfield Garrison Landowners Consortium (AGLC) to deliver environmental services in support of planning for the development of Arborfield Garrison within the Strategic Development Location (SDL).

As part of the Environmental Statement (ES) (AECOM 2014) to accompany the development outline planning application, this accompanying bat mitigation strategy has been produced. This bat mitigation strategy report functions jointly as a standalone document and as an appendix to the Arborfield Garrison Environmental Statement (ES) (AECOM 2014). This report details the rationale, proposed methodology and details of the outline bat mitigation strategy.

This document accompanies the ES and should be read in conjunction with the following documents:

- Arborfield Environmental Statement (AECOM 2014)
- Bat Survey Report (ES Appendix 13.3, AECOM 2014)
- Hedgerow Survey and Strategy (ES Appendix 13.6, AECOM 2014)
- SANG Habitat Creation and Management Plan (ES Appendix 13.9, AECOM 2014)
- Arborfield BAP (ES Appendix 13.10, AECOM 2014)
- Tree Survey and Schedule (ES Appendix 13.7, Simon Jones Associates 2014).
- Reptile Mitigation Strategy (ES Appendix 13.5, AECOM 2014)
- Non-Native Invasive Species Strategy (ES Appendix 13.11, AECOM 2014)
- SANG Strategy (Murdock Wickham 2014)

1.2 The Site

The Site and adjoining land to the south has been identified as a Strategic Development Location (SDL) for large scale housing development in the Core Strategy for Wokingham Borough. The Site covers an area of around 167 hectares. The key components and design principles of the proposed development are as follows:

- Residential units – up to 2000 homes;
- Primary school;
- Secondary school;
- Commercial centre;
- Where possible the existing natural assets of the Site shall be retained and enhanced;
- Provide a Site wide multi-functional inter-connected green grid;
- Sustainable urban drainage systems (SUDS) will be incorporated;
- Two areas of 'Suitable alternative natural green space' (SANG);
- Flood risk information integral to defining the layout of the proposed development; and
- Network of footpaths and cycleways will be delivered through the green infrastructure.

1.3 Site Location and Setting

The proposed development Site lies approximately four kilometres (km) to the southwest of Wokingham town centre, 14km southeast of Reading and 5km south of the M4 junction 11. The Site is centred on Ordinance Survey (OS) Land Ranger Grid Reference (GR) SU 768 653. The nearby settlements of Arborfield and Arborfield Cross lie to the northwest; Barkham lies to the northeast and Finchampstead to the east; Lower Common to the south and Farley Hill to the west. Land uses in the area include the military Garrison, large areas of rural farmland and small nucleated villages such as Barkham and Arborfield Cross.

A single hybrid planning application to be submitted to Wokingham Borough Council for the development of the Site, outline for the residential development and detailed for the SANG elements.

1.4 Purpose of this Report

This report outlines the proposed approach to mitigating for potential impacts upon bats attributable to the scheme in order to maintain the 'Favourable Conservation Status' (Mitchell-Jones (2004)) of bats across the Site. It outlines how it is proposed that impacts due to loss of habitat are to be mitigated against, and how individual bats will be safeguarded and shows that the level of required mitigation is achievable within the proposed masterplan.

This report does not constitute a license document with regards to disturbance for bats which would be required (See section 1.7 below for further details on licensing procedures), however components of the strategy will be incorporated into subsequent licence documents. This document does provide the approach to bat mitigation which will be detailed in any subsequent licence documents.

1.5 Summary of Bat Ecology

Of the 18 species of bat found in Britain 17 are known to breed here, (14) of which have been recorded in Hampshire). They belong to one of two families: the Vesper family of bats (Vespertilionidae) and the Horseshoe family of bats (Rhinolophidae). The Vesper bats are found throughout Britain and are one of the most widespread mammalian groups in the world after man. The Horseshoe bats are generally found in south west England and throughout Wales. Bats are nocturnal and, in the UK, insectivorous. Bats gather to feed wherever there are lots of insects, so areas they are often found foraging include traditional pasture, woodland, marshes, ponds and slow moving rivers. Bats use a variety of roosts throughout the year in which to breed, hibernate, feed and give birth. Bats do not build nests; they hang from or creep into cracks and crevices. It is not common for bats to use the same roost throughout the year as they require different roost conditions for breeding and hibernating. The different types of roost sites are described below.

- Maternity sites, where young are born and raised to independence.
- Hibernation sites, where bats may be found during the winter.
- Mating sites, where males and females gather during the autumn.
- Feeding sites, where bats rest between feeding bouts during the night; they are rarely used by day.
- Transitional sites, where bats may gather during the spring or autumn.
- Summer roosts, used by males and non-breeding females.

Bats follow linear features such as tree lines, hedges, buildings and waterways as flight paths to commute between their roost sites to their feeding areas. Good commuting routes and foraging areas are essential to the survival of a roosting site. These routes are important in maintaining the “favourable conservation status¹” of bats by, for example, allowing bats to move in relative safety between roosts and feeding areas. Foraging areas are used by bats for feeding; although it is important to note that bats will also take the opportunity to forage while commuting.

1.6 Legislation and Planning Policy

All bat species protected from killing / injury / disturbance and their roosts from destruction / damage / obstruction by the Wildlife and Countryside Act 1981 (as amended) (known as WCA 1981) and the Conservation of Habitats and Species Regulations 2010 (as amended). Further details on how the legislation protects bats and their roosts, as well as outlining the Natural England licensing process, are provided in Appendix 1.

A conviction under the above legislation could result in penalties including, fines, imprisonment and confiscation of equipment/machinery used in committing the offence.

Planning policy at both national and local level applicable to general biodiversity and bats is summarised within Appendix 1. National planning policy requires local planning authorities “*to conserve and enhance biodiversity and to refuse planning permission if significant harm resulting from a development cannot be avoided...with regard to any protection afforded to sites, habitats and species*”.

1.7 Licensing Requirements

Licences may be granted by Natural England under Regulation 53 of the Conservation of Habitats and Species Regulations 2010 for certain purposes affecting bats, including development works. Regulation 53 (2)(e) states that such licences can be granted for the purpose of ‘preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment’. Those activities listed under Regulation 41 of the 2010 Regulations would not constitute an offence if carried out in accordance with the terms of such a licence.

Natural England will not grant such a licence unless they are satisfied that:

- ‘there is no satisfactory alternative’ (Regulation 53 (9)(a)); and

- 'the action authorised will not be detrimental to the maintenance of the population of the bat species at a favourable conservation status in their natural range' (Regulation 53 (9)(b)).

In order to obtain a licence to allow either to deliberately capture, injure or kill any bat, to deliberately disturb any bat, or to damage or destroy a breeding site or resting place of any bat, in advance of any otherwise legitimate development which may impact on the favourable conservation status of bats, it must be demonstrated by the applicant that all reasonable steps have been taken to minimise the impact in order to satisfy Regulation 53 (9)(a) of the 2010 Regulations and any remaining damage will be adequately compensated for (to satisfy Regulation 53 (9)(b)).

Examples of works that are likely to need a licence because they may result in the destruction of a breeding or resting place and/or disturbance of bats include:

- demolition of buildings known to be used by bats;
- conversion of barns or other building known to be used by bats; and
- removal of trees known to be used by bats, when carried out as part of a development.

A Natural England Bat Licence Application consists of a completed application form, two Method Statements, and a Reasoned Statement of Application. Mitigation measures would need to be put in place to mitigate for the impacts of the development on the local bat population. Details of the mitigation plans would need to be included in the Method Statement. Licences usually take at least 35 working days to be issued by Natural England. However, in our experience it can take up to three months for a licence to be granted. Information on the species and number of bats using the site is required for Natural England licensing purposes. It can take a number of surveys to establish this information. If bat roost(s) are present on site no work, that could cause disturbance to bats, can be undertaken until a licence has been granted. Generally a bat licence cannot be obtained for outline planning applications but only for detailed planning applications and then not before planning approval has been granted.

1.8 Quality Assurance

All AECOM Ecologists are members, at the appropriate level, of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct when undertaking ecological work.

AECOM is BS EN ISO 9001:2008, BS EN ISO 14001:2006 and OHSAS 18001:2007 Health and Safety accredited.

2 Baseline Information

2.1 Introduction

A brief summary of survey and data findings from the sources below is provided within this Chapter to provide an outline of the current Site baseline in terms of suitable habitat, roosts and roosting opportunities for bats;

- AECOM 2014 Environmental Statement (AECOM 2014);
- Thames Valley Record Centre Arborfield Garrison Biodiversity Report (TVERC 2014);
- Hampshire Biological Information Centre Data Requests 2014-2015, 4983 (HBIC, 2014)
- AMEC Environmental Statement and Appendices (AMEC 2013); and
- WSP Environmental 2006 Bat Surveys (GVA / WSP Environmental 2006)

2.2 Previous 2006-2012 Bat Surveys

Baseline information on the Site status of bats was collected during the years 2006 to 2012, and was later interpreted for a submission of a previous ES by AMEC Ltd in 2013 (AMEC, 2013). This data collection included a data search from the Thames Valley Record Centre (TVERC) and a suite of surveys summarised in Table 1 below.

Table 1: Previous site surveys Conducted

Methodology / Type of Surveys	Year	Month / No. of Survey Visits	Company
Unknown – likely building assessment and dusk/dawn building and transect surveys	2006	Unknown	GVA Grimley/ WSP Environmental
Initial building assessment (Bat Conservation Trust, 2007; and Mitchell-Jones and McLeish, 2004)	2008	1 visit (May)	Entec
Initial internal building inspections (buildings with roof voids where accessible)	2008	Not specified	Entec
Bat detector transects and emergence/re-entry surveys (Bat Conservation Trust, 2007; and Mitchell-Jones and McLeish, 2004)	2008	12 visits (July to September)	Entec
Initial building inspections	2012	Not specified	Amec (now includes Entec

2.3 AECOM 2014 Surveys

The following additional methods were used to collect further baseline data for the Environmental Statement (Biodiversity Chapter 13, AECOM 2014). Methodologies, results and limitations are described in detail within the Bat Survey Report (ES Appendix 13.3, AECOM 2014), with a summary shown in Table 2.

Table 2: AECOM 2014 Surveys

Methodology / Type of Surveys	Timing
Data Search - records of bats from a 5km radius of Site from both TVERC and Hampshire Biological Information Centre (HBIC).	May to June 2014
Extended Phase 1 Habitat Survey – Initial recording of potential roosts and commuting and foraging habitats.	April 2014
Building Reassessment for Roosting Bats – updated building reassessment taking into account previous survey results to target 2014 building surveys (Bat Conservation Trust, 2012).	May 2014

Methodology / Type of Surveys	Timing
Building Dusk and Dawn (Emergence / Re-Entry Surveys) – surveys to determine the presence of roosting bats within key buildings and to collect data on bat species and activity across the Site.	June to August 2014
Transect and Automatic Detector Surveys – additional activity surveys to identify additional roost locations and collect further data on bat species and activity across the Site.	June to August 2014

2.4 Future Surveys

Additional bats surveys are proposed on all buildings or trees to be lost or impacted as part of the Scheme. Such surveys will meet the survey requirement specified within the Bat Mitigation Guidelines (BCT, 2012) either through additional surveys to provide confidence in negative roost results or to provide sufficient roost information for the application of a Natural England development licence. Such surveys may include inspection work such as the use of endoscopes or tree climbing as required and where appropriate.

Where buildings or trees are to be removed without a known bat roost being present, removal will be carried out as part of a Method Statement which will stipulate the requirement for soft stripping or soft felling under ecological supervision, to mitigate against any 'last minute discoveries' of roosting bats.

2.5 Data Search Results Summary

Requested data searches from both the Thames Valley Records Centre (TVERC, 2014) and the Hampshire Biological Information Centre (HBIC, 2014) returned a number of records of bats from within a 5km radius of the Site. The data records are described and shown within ES Chapter 13 (Biodiversity, AECOM, 2014) and its accompanying Figures, showing species that are likely to use the Site and surrounding area including records of the following species;

- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Noctule (*Nyctalus noctula*);
- Brown-long-eared bat (*Plecotus auritus*);
- Unidentified myotis bats (*Myotis* sp.);
- Natterer's bat (*Myotis nattereri*); and
- Daubenton's bat (*Myotis daubentonii*).

2.6 Roosting Bats Results Summary

While the results of the bat surveys are described in further detail within the Bat Survey Report (ES Appendix 13.3, AECOM, 2014), a summary of the combined 2006-2014 surveys showing buildings with roosts, species and status is shown in Table 3 below for further clarity within this document. This is also shown in Figure A.

Table 3: Summary of Bat Roosts Recorded Across Site (2006-2014)

AECOM Building Ref.	Species	Years Recorded	Status
12	Unknown species	2008	Confirmed: Emergence/entry, 1 roosting bat
28	Common Pipistrelle	2014	Confirmed: 1 roosting bat
35a	Common Pipistrelle	2014	Confirmed: 1 roosting bat
40a	Common Pipistrelle	2008 2014	Confirmed: emergence/entry, 1 roosting bat Probable: emergence/entry, 1 roosting bat
	Brown long-eared	2008	Droppings from species
	Unknown species	2006	Droppings,

AECOM Building Ref.	Species	Years Recorded	Status
41	Common Pipistrelle	2014	Confirmed: emergence/entry, 1 roosting bat
	Unknown species	2006	Droppings
46a	Common Pipistrelle	2014	Confirmed: emergence/entry, 1 roosting bat
	Natterer's bat	2014	Confirmed: emergence/entry, 1 roosting bat
46d	Common Pipistrelle	2008	Confirmed: emergence/entry, 1 roosting bat
48	Common Pipistrelle	2014	Confirmed: emergence/entry, 6 roosting bats
	Pipistrelle species	2014	Probable emergence/entry of 1 bat
	Brown long-eared	2014	Probable emergence/entry of 1 bat
50	Common Pipistrelle	2014	Confirmed: emergence/entry, 3 roosting bat
	Brown long-eared	2008	Droppings from species
51	Common Pipistrelle	2014	Confirmed: emergence/entry, 6 roosting bats
	Soprano Pipistrelle	2014	Confirmed: emergence/entry, 1 roosting bat
	Brown long-eared	2014	Probable: emergence/entry, 1 roosting bat
52	Pipistrelle species	2014	Confirmed: emergence/entry, 2 roosting bats
53	Common Pipistrelle	2014	Confirmed: emergence/entry, 1 roosting bat
54a	Common Pipistrelle	2014	Confirmed: Emergence/entry, 1 roosting bat
54b	Common Pipistrelle	2014	Confirmed: Emergence/entry, 1 roosting bat
54c	Soprano Pipistrelle	2014	Probable: emergence/entry, 1 roosting bat
55	Common Pipistrelle	2014	Confirmed: emergence/entry, 1 roosting bat
	Soprano Pipistrelle	2014	Probable: emergence/entry, 1 roosting bat
	Pipistrelle species	2006 2008	Droppings
56	Common Pipistrelle	2014	Confirmed: emergence/entry, 4 roosting bats
	Brown long-eared	2008	Droppings probably from

AECOM Building Ref.	Species	Years Recorded	Status
			species
	Unknown species	2006	Droppings
57	Common Pipistrelle	2008	Confirmed: emergence/entry, 1 roosting bat
	Brown long-eared	2014	Confirmed: emergence/entry, 1 roosting bat
58	Unknown species	2006	Droppings
59	Brown long-eared	2006	Droppings Probable: emergence/entry of 1 bat
60	Common Pipistrelle	2014	Confirmed: Emergence/entry, 2 roosting bats Foraging inside the building
	Brown long-eared	2008	Probable: Feeding remains from species
	Unknown species	2006	Droppings
NW7	Common Pipistrelle	2014	Probable emergence/entry of 1 bat
	Natterer's bat	2014	Confirmed: emergence/entry, 1 roosting bat
Confirmed Tree Roost SU 77200 65018	Common Pipistrelle	2014	Confirmed: emergence/entry, 3 roosting bats
Probable Tree Roost SU 77482 65669	Pipistrelle species	2014	Probable: emergence/entry, 1 roosting bat
Probable Tree Roost SU 77503 65654	Pipistrelle species	2014	Probable: emergence/entry, 1 roosting bat

2.7 Bat Assemblage and Activity Summary

The combined results of the transect surveys, deployment of automatic detectors, observations during the building dusk / dawn surveys during 2014 combined with the survey results from previous years provide baseline information of the bats species assemblage and how these species utilise the Site. Further detail and analysis is given within the Bat Survey Report (ES Appendix 13.3, AECOM 2014), the following information is given to provide the Site's current baseline in context of habitats and species.

2.7.1 Bat Assemblage

The following bats species were recorded on Site during the surveys with usage of the Site (in terms of abundance and distribution) varying from species to species;

- Common pipistrelle;
- Soprano pipistrelle;
- Nathusius' pipistrelle;
- Noctule;
- Leisler's bat
- Serotine;
- Brown-long-eared bat;
- Unidentified Myotis bats;
- Natterer's bat; and

- Daubenton's bat.

Common and soprano pipistrelle formed the majority of the recorded bat activity recorded across Site. The remaining species were recorded less frequently and their activity was restricted to specific areas or habitat types.

2.7.2 Commuting Habitat

Visual confirmation of bats commuting along linear habitat features across and to / from the Site was recorded during transect and building dusk / dawn surveys. The results from the automatic detector surveys also provide an indication of habitats used for commuting.

Survey findings are fully described within the Bat Survey Report (ES Appendix 13.3, AECOM 2014) but in summary are as follows;

- The on Site tree lines and woodland in particular are used by a number of species as commuting corridors, in particular pipistrelle species bats and brown long-eared. Major commuting corridors are shown in Figure 13.3E of the Bat Survey Report (ES Appendix 13.3, AECOM 2014) including the southern boundaries of the site and the central wooded corridors leading to and from Garrison Lake;
- A number of generally higher flying, wider ranging species such as noctule also commute across the site, sometimes over grassland;
- On Site roosting bats do commute throughout the Site as they travel to and from their roosts, sometimes between buildings or along areas of soft landscaping in the built up areas within Rowcroft and Hazebrouck Barracks

2.7.3 Foraging Habitat

Site use by species for foraging is more variable than for commuting, as foraging activity by individual or small numbers of bats is more dispersed across the Site; although this is often directly associated with commuting activity.

- Foraging activity by pipistrelle bats in particular occurs throughout most of the Site;
- Light sensitive species such as brown long-eared and *Myotis* bats were generally recorded as being more restricted to the darker tree line and woodland Site habitats though they were sometimes recorded near buildings and urban areas;
- Garrison Lake represents a major foraging destination for bats associated with waterbodies such as Daubenton's bat and soprano pipistrelle.
- The wide open areas of poor-semi-improved grassland are more frequently used for foraging the larger species which forage in open habitats such as noctule and serotine.

The SANG areas (Figure 13.9A of the SANG Habitat Creation and Mitigation Plan, ES Appendix 13.9 AECOM 2014) are to be retained and enhanced, they contain a mix of open grass and enclosed woodland habitats, benefiting a wide variety of bat species.

3 Potential Impacts Upon Bats

3.1 Introduction

As a direct and indirect result of the Arborfield development there are multiple potential impacts upon individual bats and bat populations. The sections below outline these impacts. Habitat loss and fragmentation are considered to be operational impacts as without mitigation these would be permanent long term effects.

3.2 Effects During Construction

In addition to the impacts from the loss of habitat, the construction phase of the development will have impacts upon bats which will need to be controlled and mitigated against. These are primarily noise and lighting as an indirect result of construction activities.

3.2.1 Direct Mortality

During the preparation of the site and construction of the scheme there is the potential for direct mortality of bats, primarily due to the removal of buildings and trees containing bat roosts. These risks will need to be controlled, a full description of the approach to this will be outlined in a Natural England licence and associated method statement, however the generic approach is presented within Chapter 13 and also contained within this document.

3.2.2 Disturbance

Construction could disturb bats roosting during the daytime and any lighting used around dusk could potentially delay emergence.

3.3 Operational Impacts

There are multiple potential impacts from the operation of the site upon bats, once all of the construction phase is complete. These impacts are primarily associated with habitat loss, transport on and around the site, lighting disturbance, potential mortality of bats associated with pets, vandalism and accidental damage to replacement roost features.

3.3.1 Habitat Loss and Fragmentation

The completed Scheme will result in a loss of a number of habitats across Site, to occur during three phases as shown within the phasing masterplan. Habitat loss will result in the loss of areas of grassland, woodland, trees and a number of other habitats which are utilised by bats for roosting, commuting and foraging both throughout the Site and to areas in the wider landscape.

3.3.1.1 Roosts

There are multiple building roosts identified within the site which are to be removed or affected shown in Figure A. In summary these are shown below with further information provided within Table 4, the Bat Survey Report (ES Appendix 13.3, AECOM 2014) and Chapter 13 of the Environmental Statement.

Table 4: Minimum Number of Roosts to be Affected During Full Build Out

Species	Phase 1		Phase 2		Phase 3		Total
	Min. No of Roost Buildings	Building (s)	Min. No of Roost Buildings	Building (s)	Min. No of Roost Buildings	Building (s)	
Common pipistrelle	7 + 1 Tree Roost	40a, 41, 46a, 46d, 55, 56, 60, NW7 Confirmed Tree Roost SU 77200 65018	8	12, 35a, 54a, 54b, 48, 50, 51, 53, 57	1	28	18 + 1 Tree Roost
Soprano pipistrelle	2	55, 54c	1	51	0	N/A	3

Species	Phase 1		Phase 2		Phase 3		Total
	Min. No of Roost Buildings	Building (s)	Min. No of Roost Buildings	Building (s)	Min. No of Roost Buildings	Building (s)	
Unidentified Pipistrelle species	1	55	2	48, 52,	0	N/A	3
Unidentified bat	5	41, 40a, 56, 58 60	1	12	0	N/A	6
Brown long-eared bat	4	40a, 56, 59, 60	4	48, 50, 51, 57	0	N/A	8
Natterer's bat	2	46a, NW7	0	N/A	0	N/A	2

Although the mitigation of impacts upon these features will be fully outlined in Natural England Licence documents, this document outlines the generic approach and the approach to enhancement.

3.3.1.2 Commuting Routes / Dark Corridors

A number of tree lines and woodland parcels throughout the Site and along its boundaries were found to be used by a wide species assemblage of bats commuting to and from nearby roosts and foraging habitats such as Garrison Lake and Hogwood Shaw Local Nature Reserve (LNR). Some of these were found to be continuously used by bats at dusk and / or dawn during surveys and have been considered as the major on Site commuting routes.

The majority of these commuting routes should be retained as part of the finalised Scheme; however small lengths of hedgerow and some tree lines will however be removed to accommodate the Sites road network and development parcels. Additional post construction lighting will create an additional impact; this is addressed separately within this document.

3.3.1.3 Foraging Habitats

Extensive areas of habitat across Site were used by differing bats species as foraging habitat; including the areas of grassland (especially poor semi-improved), woodland and trees and the on Site waterbodies; especially Garrison Lake. Urban areas across the Site were also utilised as foraging habitat by light tolerant species such as pipistrelle and noctule.

3.3.2 Lighting (which could indirectly caused disturbance habitat loss and fragmentation)

Bats are known to be present within the site. As such, measures must be employed to ensure disturbance to these animals is minimised both during the construction and operation phases. The primary source of non direct disturbance is likely to be lighting employed. Table 5 below shows the known impacts of lighting upon different species of bats recorded at Arborfield.

Table 5: Bat Sensitiveness to Light by Species (known to occur on/near the Site)

Species and activity	Lux	Comments
Pipistrelle bat (Common and Soprano)	Emerge at 14 lux	Pipistrelle bats are more tolerant of light levels than some bat species and emerge from roosts at around 14 lux (Fure, 2006). Common and soprano pipistrelle bats are more tolerant of light; they are hawking bats and feed on the insect congregations around street lamps although this exposes them to predation. Using the site for roosting, commuting and foraging. Know roosts are often in well lit locations across Site
Natterer's bat/Myotis	Emerge and	Myotis species of bats are repelled by low levels of light, such as torchlight (Fure,

Species and activity	Lux	Comments
spp.	forage at below 1 lux	2006). Avoidance of lit areas by <i>Myotis</i> spp. (Rich and Longcore, 2006) <i>Natterer's Bat use the site for roosting in low numbers. Myotis species use the Site for commuting and foraging.</i>
Brown long-eared bat	Low lux levels similar to <i>Myotis</i> species of bat	Avoidance of lit areas by <i>Plectotus</i> spp. [including brown long-eared bat] bats (Rich and Longcore, 2006) Brown long-eared bats display a preference for deciduous woodland, and can glean insects from various surfaces (Entwistle <i>et al.</i> , 1996). <i>Using the site for roosting, commuting and foraging. Know roost sites not directly lit but often in proximity to street lighting.</i>
Noctule bat Serotine Leisler's	Similar to Pipistrelle bat	Noctule and similar bats are relatively light tolerant and will exploit invertebrates attracted to lighting. <i>Noctule Very likely to be using the site for roosting in trees, known to be using the site for commuting and foraging. Other species likely commuting and foraging only.</i>

3.3.3 Direct and Mortality

This could be caused during the operational phase by the increased traffic, pets and vandalism.

4 Safeguarding Individual Bats against Direct Mortality

4.1 Introduction

Individual bats are legally protected under British and EU law. As such, and in order to maintain the favourable conservation status of these species within the works area, these animals must be safeguarded throughout the works. The exact methodologies of protection are to be determined subsequent to further surveys, but are likely to include the following basic principles. The exact methodologies will be outlined in the relevant licence documents.

4.2 Phasing of Works

Suitable roost mitigation provision will be in place prior to the removal of any buildings. The construction of these features will likely be phased to come online as buildings are removed from the site. The exact phasing of the works is to be confirmed, but will involve the creation of the Northern SANG coming on line first with the first phases of the build and prior to any occupation of the Site.

4.3 Natural England Development Licensing and Non-licensed Method Statements

Where building or tree removal is to affect a known bat roost, then the removal can only take place with a Natural England Development Licence in place with removal only able to take place as specified within the licence.

Where a building or tree has not been found to support roosting bats despite an appropriate level of survey effort (BCT, 2012) a residual risk of roosting bats being discovered is likely to remain. Although this may not require a Natural England development licence a 'Method Statement' may be prepared on a case by case basis to mitigate for 'last-minute discoveries' of bats detailing removal timings, methods and alternative roost provision as required.

4.4 Building Removal Outline Methodology

A number of outline precautions are described below to be specified and enforced on a case by case basis within a Natural England licence or Method Statement according to tree and / or building type, bat roost present and other relevant factors.

4.4.1 Timings

The demolition of the majority of the buildings on site will be recommended to take place during the winter, ideally early in winter or from February to April. At this stage, no buildings have been confirmed as hibernation roosts from internal inspection surveys. None of the structures are suitable as significant hibernation roosts although crevice dwelling bats may hibernate in various locations (e.g. within mortar gaps on walls).

4.4.2 Site staff education

Prior to the start of works, a tool box talk will be given to the relevant contractors to make them aware of the presence of the bats and perceived risks due to bats and take them through the provisions of the Method Statement. The talk will outline:

- general information about bats (UK species numbers, foraging, lack of vampire bats etc);
- explanation of the law;
- description of the bats on site;
- explanation about the NE licence and Method Statement and how there are certain methods they should follow to ensure compliance with the licence; and
- explanation of what to do if they come across a bat (dead or alive, or if it flew away or fell on the ground).

4.4.3 Destructive search

Prior to demolition, in order to reduce unnecessary disturbance, injury, or death of any late discoveries of individual bats roosting in the other buildings or parts of buildings on site, a destructive search under the supervision of a licensed bat worker should be conducted. The areas where bats have been observed roosting, and areas where there is considered to be high risk of bats roosting, will be supervised during demolition, when this is considered necessary, by the licensed consultant or their accredited agents. This could include areas / features such as:

- crevices in brickwork and gaps in mortar;
- under tiles;
- mortise joints;

- around window and door frames;
- under wooden cladding;
- roofing felt
- under lead flashing; and
- between guttering and wall plate.

These may include periodic inspection using fibre optic endoscope to detect any roosting bats with structures removed in stages to allow bats to escape on their own accord. Once the bat ecologist is satisfied that no bats are present in an area or feature, this part of the building should be dismantled and lowered to the ground where possible.

In the event of any bat being found it will be captured by an experienced handler, either by hand, or using a static hand net, as described in the bat workers manual (Mitchell-Jones & McLeish 2004). The bat will be placed in a holding bag and transferred to either the new bat house or a bat box in the vicinity of its roost. If night time temperatures are $< 8^{\circ}\text{C}$ and torpid bats are discovered, it will be placed into a holding bag and transferred to a Schwegler 1FW Hibernation woodcrete box. These are designed to accommodate hibernating bats and will be placed within the SANG.

If the bat is aroused and night time temperatures are below 8°C it will be taken into care and later released following guidance within by the Bat Workers Manual (Mitchell-Jones & McLeish 2004, section 7.3, pages 64 – 66: 3rd edition 2004)

4.5 Soft felling

4.5.1 Introduction

No category A or B trees are to be removed as part of the development and none of the trees that have thus far been identified as potential bat roosts. However the number of category C trees to be removed may be in excess of 500 specimens. The majority of these are not suitable for roosting bats. However, if any trees with the potential to support roosting bats are to be removed, these will be fully surveyed prior to removal to the required effort level as stated within the Bat Conservation Trust Guidelines. If a tree is found to contain roosting bat(s), then felling will only occur in line with the requirements of any granted Natural England development licence and is likely to require specific replacement roost mitigation.

If it is determined that there is still a residual risk of bats being present, these trees will be removed using a soft felling methodology under a prepared Method Statement, outlined below.

4.5.2 Method Statement

A prepared Method Statement for tree felling will be prepared for any trees to be felled across Site. This will incorporate specific recommendations as a result of the pre-felling surveys and incorporate pre-felling inspection and soft felling as required. Where a tree is to be lost, appropriate alternative roost provision such as an appropriate bat box will be installed in a suitable nearby location to maintain the number and distribution of roosting opportunities for bats across the Site.

4.5.3 Pre-felling Inspections

The soft felling of trees must be supervised by an ecologist. Prior to felling each tree, the ecologist will first check for nesting birds. Tree climbing and endoscope inspections may be carried out, to be determined on a case by case basis.

4.5.4 Soft Felling Methodology

The following methodology is taken from the Design Manual for Road and Bridges Volume 10 Environmental Design and Management Section 4 Nature Conservation Part 3 Nature Conservation Advice in Relation to Bats and describes the method to be followed for tree felling:

“felling should be carried out by an experienced contractor, and limbs should be removed in sections, keeping (if at all possible) hollow sections intact. Limbs should be slowly lowered to the ground, inspected carefully, and left lying for at least 24 hours (48 hours in cold weather) for any concealed bats to escape. Many cracks and fissures are kept open only by the weight of the limb itself, and will tend to close once the limb is severed. In such cases, wedges should be used to ensure the fissures stay open before separating the limb from the tree.”

If a bat is found:

- In this unlikely event, works will stop immediately;

- Any bats found will be captured by an experienced handler, either by hand, or using a static hand net, as described in the Bat Workers' Manual (Mitchell-Jones & McLeish 2004). Captured bats will be placed in a bat box that will already have been installed on a tree in the grounds of the site; and
- Appropriate health and safety precautions will be observed at all times. Bats will only be handled by experienced ecologists, wearing gloves, who have been inoculated against rabies. If an injured bat is discovered, it will be cared for in line with guidance provided in the Bat Workers' Manual.

5 Minimisation of Indirect Disturbance from Construction

5.1 Introduction

During the construction phase bats could be indirectly disturbed through multiple pressures, primarily noise and lighting. This section of the report outlines how these impacts will be controlled.

5.2 Approach to Control

The approach to controlling construction phase impacts upon bats will be outlined in the *Construction Environmental Management Plan* (CEMP) accompanied with the ES. The sections below outline the general approach to these impacts.

5.3 Lighting

Due to the potential for construction lighting to indirectly disturb bats it must be ensured that disturbance to bats is kept to a minimum during the construction phase.

Lighting during the construction phase is likely to be specified by BSEN12464-2:2007 – Lighting of work places – part 2: Outdoor work places. This standard gives guidance together with recommended light levels for a variety of outdoor work places

Recommendations will be specified within the CEMP. This may include the following general mitigation methods to reducing light disturbance;

- Specified normal working hours (normally 08:00 to 18:00) to minimise nocturnal lighting;
- Where practical lighting should be erected on the outside edge of site and directed inwards to minimise any spill lighting.
- All lighting should be aimed downward to reduce upward light; accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.
- Any lighting required to be used that is not directional should be kept clear of the more sensitive areas of the site
- The height of lighting columns in general should be as short as is possible.
- It is recommended that White light lamps are utilised in the lighting equipment. White Light is any lamp with a colour rendering index (Ra) greater than or equal to 60.

As such, lighting of all 'dark corridors' identified in Figure B should be kept below 1 lux (the light levels at which species present are impacted) and light spill outside of construction corridors should also be minimised as far as practically possible.

5.4 Noise

Bats can be additionally impacted by noise. The CEMP will outline exactly how these impacts are to be controlled but will include:

- Information on buffer distances from retained habitat and works to reduce construction disturbance;
- Specified working hours (normally 08:00 to 18:00);
- Information on selecting construction methodologies to reduce noise disturbance;
- Considerate constructor's standard advice on limiting disturbance and noise pollution (shouting, machinery etc).

6 Roost Replacement and Alternative Roost Provision

6.1 Introduction

As part of the Scheme a number of both known bat roosts (shown in Figure A) and features which could be used by roosting bats (e.g. building and tree crevices) will be lost. This section details the use of the different roost mitigation types (bat barns, bricks and boxes) across Site for different bat species.

A proportion of the roost mitigation will be carried out under Natural England Development Licence(s) which will dictate the exact roost provision, location and timescales. As a general rule most roost mitigation must be in place prior to the removal of any buildings or trees (i.e. at the start of Phase 1 of the green grid installation, IDP (2014)).

6.2 General Placement Recommendations for Bat Bricks / Boxes

As a large proportion of alternative roost provision will be provided by bat bricks and boxes (shown by type, number and density within Table 7); the following principles should be followed when installing these bricks / boxes:

- Bat bricks / boxes should be positioned as high as possible, at least three to four meters above ground level, to protect any resident bats from disturbance or predation by domestic pets;
- More than one bat brick / box should be installed per building or tree as grouped boxes are more commonly used than single ones;
- Each brick / box should be positioned with a different orientation, ideally south, south-east and south-west;
- The bricks / boxes should also be exposed to sunlight for part of the day;
- The entrance to the bricks / boxes and a space of two meters below them should be clear of branches, vegetation or ledges to allow bats to safely exit the boxes; and
- Bat boxes should not be placed below or close to windows, or close to any external lighting.

Further advice on the placement of bat bricks and boxes is available from a number of sources such as the Bat Conservation Trust (BCT, undated) and 'Biodiversity for Low and Zero Carbon Buildings. A Technical Guide for New Build' (William, 2010).

6.3 Alternative Roost Provision by Type and Number

Alternative roost provision is the mitigation for known bat roosts to be replaced under a Natural England (NE) Development Licence and as replacement for general roosting opportunities (i.e. building crevices) to be lost across the Site. This will provide new roosting opportunities for bats; upon trees, as part of newly built buildings and in the form of purpose built bat barns.

Several forms of alternative roost provision are proposed as follows;

- Bespoke built bat barns (to be created before removal of known roosts, 3 will be created in total);
- Enhancement of existing buildings (such as the cricket pavilion to be completed before removal of known roosts);
- Bat bricks to be installed in newly built buildings (as part of construction) at a minimum density of 1 per 20 new buildings (approx 100 minimum). This can include combined swift /bat boxes to meet both density targets ; and
- Bat boxes to be installed on trees within the SANG and across the retained green corridors (prior to tree and known roost removal). A minimum of 4 hibernation boxes and 50 other box types should be installed within the SANG and a minimum provision of 20 boxes within the Site's dark corridor network (Figure B).

Roost provision is shown against the minimum loss of know roosts in Table 6 to show an indication of the proposed mitigation provision per known roost.

The types of alternative roost provision including purpose, number and location are outlined in Table 7

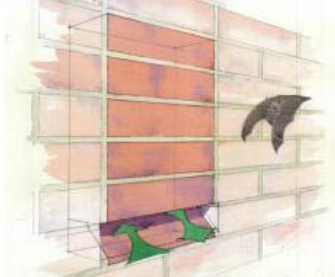
Table 6: Proposed Roost Mitigation per Known Roost to be Affected

Species	Minimum No. Of Known Roosts to Be Affected	No. of Applicable Roost Replacement and Alternative Provision	Minimum Ratio of Applicable Provision Per Known Roost	Combined Provision Ratio
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Species	Minimum No. Of Known Roosts to Be Affected	No. of Applicable Roost Replacement and Alternative Provision	Minimum Ratio of Applicable Provision Per Known Roost	Combined Provision Ratio
Common pipistrelle Soprano pipistrelle Unidentified Pipistrelle species Unidentified bat	20 Buildings + 1 Tree Roost	4 3 Bespoke Bat Barns & 1 minimum enhancement of existing Buildings	1 : 5.25 1 barns/ buildings per 5.25 known roosts	
		Minimum 100 Bat bricks/ boxes on buildings	4.8 : 1 4.8 bricks / boxes per 1 known roost	8.5 : 1 8.5 bricks / boxes per 1 known roost
		Minimum 75 & 4 hibernation boxes Bat boxes on trees	3.8 : 1 3.8 boxes per 1 known roost	
Brown long-eared bat	8 Buildings	4 3 Bespoke Bat Barns & 1 minimum enhancement of existing Buildings	1 : 2 1 barns/ buildings per 2 known roosts	
		Minimum 25 & 4 hibernation boxes (assuming 1/3 boxes suitable for BLE)	3.6 : 1 3.6 boxes per 1 known roost	
Natterer's bat	2 Buildings	4 3 Bespoke Bat Barns & 1 minimum enhancement of existing Buildings	2 : 1 2 barns/ buildings per 1 known roosts	
		Minimum 25 & 4 hibernation boxes (assuming 1/3 boxes suitable for Natterer's) Bat boxes on trees	14.5 : 1 14.5 boxes per 1 known roost	

Table 7: Overview of Alternative and Replacement Roost Provision

Alternative Roost Provision	Purpose	Location / Number & Density	Type / Roost Feature	Specification	Illustration
Bat Barns (Bespoke)	Summer, maternity and hibernation roosts for multiple species including brown long-eared bats (BLE) and <i>Myotis</i> bats.	3 bespoke bat barns within the SANG 2 will be situated within the Northern SANG and 1 in the West Court SANG. Refer to Figure B for locations.	Internal Bat Barn Roosting Features	Building: • Dimensions: 4m x 5m x 3m high (excluding roof void) • Roof void: 2.5m in height, 5m in length • Total building height: 5.5m • Entrance access hole: 600mm x 300mm on both gable ends • Floor: Concrete base. • Position: To be positioned so one side of the roof is south facing • Security: In order to be resistant to damage and vandalism the building should have a secure door which can be padlocked, and be surrounded by thorny shrubs e.g. hawthorn or secure fencing Walls: • Timber frame covered by wooden cladding, remnants of the buildings to be demolished will be used as internal features. • Bat boxes can be placed on the walls – some bat boxes will allow access into the building. Internal main building: • Weather boarding placed on internal walls in main part of building. Where not cladded, the internal walls will be rough to allow the bats to cling to them. • Bat boxes on internal walls • Ladder and loft hatch to access roof void • Cool box built of concrete blocks to be constructed in one corner. This will create a cool location for bats to roost in. • A water tub will be placed at one end, covered in thin wire mesh to increase humidity levels. The water tub can be fed from drainage pipes from the roof, with an overflow pipe leading to outside. Roof and Roof Void: • Roof pitch should be at 42 degrees • Made of dark coloured concrete tiles • Include morris bat slates / alternatives to allow bats to access the roof void, or roosting points under the roofing felt. • Leave a slight gap between the exterior wall and the eaves soffit, and a slight gap at the gable apex. • Baffles for roof void behind entrance gap to reduce light levels and wind (see diagram). Baffles to be Placed 900mm apart on rafters, painted black and made of plywood • Plywood to be placed between several rafters along one side of the roof to create a roosting space. • Bitumastic roofing underfelt to be placed under slates/ tiles – using the older rougher version. AVOID use of Breathable Roofing Membranes (BRMs) as these can cause bat mortalities. • Include mortice joints where possible –some of the buildings to be removed should be used (avoiding the transfer of asbestos). • Extra batons to be attached to rafters, in particular close to the gable apex • A ‘hot box’ made from plywood to be placed at one end of the roof void, painted black, with an inspection hatch. This will create a hot area for the bats to roost in. • The roof void will be load bearing.	 
			External Bat Barn Surrounds and Roosting Features	External Surroundings • Entrance will be close to appropriate habitat / vegetation– trees, shrubs, corridors – to provide tree cover, additional planting will be undertaken to achieve the final result if required. • No external lighting to spill on the bat house or key commuting corridors surrounding it. • Buildings can be fenced or enclosed with dense hedgerow to minimise the risk of vandalism. Roof Tiles • Tudor Roof Tiles Co or equivalent. Specially made tiles should be fitted allowing bats to access the roofing felt beneath the tiles, or the roof void, if a gap is created in the roofing felt. http://www.tudorrooftiles.co.uk/?content=bats • At least four of these tiles should be incorporated into the two buildings to contain the brown long-eared roof voids, under two tiles in each building, a hole should be made in the roofing felt to allow access into the roof void beneath.	
Modifications to Improve Existing Buildings for Bats	Summer, maternity and hibernation roosts for multiple species including pipistrelle, Natterer's and BLE bats	At a minimum the existing cricket pavilion (Building NW20, Figure A and B) is proposed for enhancement. Additional buildings for potential enhancement could include the former stable buildings (47a) or other	Internal Roosting Features	Internal roof void improvements • Brown long-eared bats require space to fly within a roost and have been found roosting on Site. As suitable mitigation, it is recommended an area within a roof void is created especially for use by the brown long-eared bats. This space would also be suitable for other bat species requiring an internal flight space. • A 2-2.8m height by 5m width by m length roof space is required to provide a flying area for species such as brown-long eared bat. • Materials for the roosts should be rough (for grip), non-toxic or corrosive, with no risk of entanglement. The materials should also have suitable thermal properties that reduce 24 hour fluctuations but allow maximum thermal gain for summer roosts. A range of addition roost features can be provided within the roof void such rough boarding and suitable timbers from on Site roosts if available along with additional roost entrances such as Tudor Roof tiles. • A variation in temperature should also be provided within the roof void, with a heat source such as an internal heater or a ‘hot box’ (as for the bat barn) to provide areas of roof at a temperature of between 30°C and 40°C. This should further increase the possibility of the roof void being used by bats as a maternity colony where warmer temperatures are preferred. • Internal improvements must not bring bats into contact with Breathable Roof Membranes (BRMs) which have been proven to cause bat mortalities through entrapment within worn fibres.	

Alternative Roost Provision	Purpose	Location / Number & Density	Type / Roost Feature	Specification	Illustration
		buildings such as the moat house (42) or church (NW19) dependent on further surveys.	External Roosting Features	External features - These should be installed on a case by case basis with consideration to avoid any building improvements that may impact upon the current use of buildings. External features are generally however unlikely to cause conflict with users, especially if due regard is given to placement in regards to lighting, entrances and any maintenance requirements. - A number of external features can be added to buildings to be retained such as bat bricks and boxes, as well as additional entrance points such as Tudor roof tiles. Note again that bats must not be bought into contact with Breathable Roof Membranes (BRMs). - Bat bricks are the preferred option being a permanent, low maintenance roost feature for crevice dwelling bats such as pipistrelle and Natterer's bat. - Heated external cavity boxes could be installed provide an additional type of roost provision such as for maternity colonies of crevice roosting species. These boxes normally incorporate a low wattage heater to minimise running costs and are available in different materials including wood. The requirement for their provision is likely to be dependent on further survey findings and the requirements of any Natural England development licences.	
Bat Bricks Within New Buildings	Replacement for building roosting features to be lost; primarily for crevice dwelling, urban tolerant species such as pipistrelle bat.	At a minimum of density of 1 in 20 newly constructed buildings.	Schwegler 1FR Bat Tube (Example)	Material - Woodcrete (75% wood sawdust, concrete and clay mixture) Dimensions: - Width: 20cm, Height: 47.5cm, Depth: 12.5cm, Weight: 13kg Description: "Brick boxes are designed for buildings, or underneath bridges, arches or tunnels, where conditions are relatively humid. They are particularly useful for new buildings or bridges to attract bats, or to provide new roost sites where existing buildings with bats are being renovated. This long box can be installed within brick masonry, beneath plasterwork or wood panelling, or incorporated into concrete structures such as factory buildings or bridges. Inside it contains a woodcrete surface, a roughened wood board, and a metal mesh, providing a choice of roosting areas depending on the weather conditions and the bats' habits. This box is maintenance-free as the entrance slit is at the bottom"	
		The combined bat / swift boxes can also used to meet both the required bat and swift densities; but at least 50% of bat provision should be using bat bricks. Within the newly constructed buildings across site preferably including each large public building at a minimum number of 3 per building.	Habibat Range (Example)	Material: "The box is constructed of a rough aggregate block with clay or stone angle plinth. The Habibat can be unfaced for render or have a common block work effect." Dimensions: - Width: 21.5cm, Length: 44.0cm, Depth: 10.3cm Description: "Habibat can be supplied with a number of faced products to match the current or new development needs. "Habibat can be faced in numerous products to create a feature within the building (example Terracotta Tudor rose or bat logo)". "Habibat can also personalise the box to include your name, or the name of a sponsor."	
		Multiple boxes can be placed on a single building to meet the required density, but each area (i.e. development parcel) should have some bat bricks present.	Schwegler 1WQ Summer and Winter Bat Roost	Material: - Woodcrete (75% wood sawdust, concrete and clay mixture) Dimensions: - Width: 38.0cm, Height: 58.0cm, Depth: 11.5cm, Weight: 22kg Description: "A sophisticated bat box designed for the safe hibernation of bats in winter as well as for roosting, forming colonies and raising their young during summer. It has an attractive design and is easy and convenient to install on the wall of a building. The combination of several well-insulating materials in a layer structure ensures outstanding insulation properties but still guaranties sufficient air-convection and permeability. The extremely durable material will last for many decades providing shelter for the bats. The insulation not only protects the bats in winter but also prevents overheating during summer. This box is self-cleaning and thus completely maintenance-free" □	
Combined Bat / Swift Boxes On Buildings	Replacement for building roosting features to be lost which also contribute to alternative nesting provision for swifts		Schwegler 1MF Bat and Swift Nest Box	Material: - Woodcrete (75% wood sawdust, concrete and clay mixture) Dimensions: - Width: 46.0cm, Height: 43.0cm, Depth: 22.5cm, Weight: 24kg Description: - The 1MF contains two nesting chambers for Swifts, each with its own entrance, allowing two pairs to breed and successfully raise their young separately from each other but in the same box. In addition a recess in the rear panel creates a space between the wall of the building and the box, making it ideal for bats that inhabit buildings, such as the Pipistrelle. If desired, the swift compartments can be accessed via a removable front panel. The bat recess at the rear requires no maintenance because the droppings simply fall out. - The 1MF can be built directly into the brickwork of a wall, with the box flush with the face of the wall. The bat slope still allows access to the rear for bats. This is often preferable for listed buildings or for other architectural reasons.	

Alternative Roost Provision	Purpose	Location / Number & Density	Type / Roost Feature	Specification	Illustration
Bat Boxes On Trees	Summer, maternity and hibernation roosts for all tree roosting and light sensitive species including noctule and BLE.	Across the SANG and within the dark corridor network (Figure B) across Site. Minimum of 4 hibernation boxes within the SANG A minimum of 50 boxes (25 within the Northern SANG and 25 within the West Court SANG) of other box types An additional 20 must be incorporated into dark corridors outside the SANG to increase the value of the connecting dark corridors and commuting routes Provision of bat boxes will also be specified by Natural England licences, non-licensed method statement and replacement for veteran tree cavities.	Schwegler 1FW Bat Hibernation Box Additional roost provision for wintering bats	Material: - Woodcrete (75% wood sawdust, concrete and clay mixture) Dimension: - Diameter: 38cm, Height: 50cm, Weight: 30kg Description: <i>"This extremely large bat box is designed to provide a stable and protected environment for roosting bats, particularly through the cold winter months when bats hibernate. The exterior is made of strong, durable WoodcretePLUS, with patented Schwegler double wall system for extra insulation, and three internal wooden panels imitating crevices attractive to roosting or hibernating bats".</i>	
			Schwegler 2F Bat Box General cavity woodcrete boxes for brown long-eared and pipistrelle bats	Material: - Woodcrete (75% wood sawdust, concrete and clay mixture) Dimension: - Diameter: 16cm, Height: 36cm, Weight: 4.3kg Description: <i>"This is an excellent 'general purpose' box for use in or around woodlands. This general purpose model is suitable for many situations, and has proven particularly successful for the brown long-eared bat".</i>	
			Schwegler 2FN Bat Box For woodland species such as noctule and other woodland bats requiring a larger cavity	Material: - Woodcrete (75% wood sawdust, concrete and clay mixture) Dimension: - Diameter: 16cm, Height: 36cm, Weight: 4.3kg Description: <i>"This model has two entrances, one at the rear against the tree trunk and one at the front. Bats often creep into the rear entrance but leave by the front. It has a domed roof to form clusters and an increased internal height. It is very suitable for woodland species like the noctule".</i>	
			1FF Schwegler Bat Box With Built-in Wooden Rear Panel For species requiring a narrow crevice such as pipistrelle and noctule	Material: - Woodcrete (75% wood sawdust, concrete and clay mixture) Dimension: - Height: 27cm, Depth 18cm Weight: 7.3kg Description: <i>"The rectangular shape of the 1FF bat box makes it suitable for either trees or buildings. It can be attached to the sides of buildings or in sites such as underneath bridges. The flatness of this box provides a narrow crevice-like internal space suitable for Pipistrelle and Noctule bats".</i>	

7 Habitat Mitigation - Creation, Enhancement and Connectivity

7.1 Introduction

Mitigation for the loss or fragmentation of commuting and habitats on Site will be achieved through the general habitat creation, enhancement and management proposed as part of the SANG areas, green corridors and SUDS with specific considerations for bats incorporated.

As a result habitat creation and enhancement is described further within the following ES documents;

- SANG Strategy (Murdock Wickham 2014);
- SANG Habitat Creation and Management Plan (ES Appendix 13.9, AECOM 2014)
- Arborfield BAP (ES Appendix 13.10, AECOM, 2014); and
- Hedgerow Survey and Strategy (ES Appendix 13.6, AECOM, 2014).

To be utilised fully by some light sensitive bats species, certain habitats must be kept below specific lux (lighting levels) to ensure their continued use as commuting, foraging and roosting habitat. Lighting specific mitigation is described within ES Chapter 8.

7.2 Habitat Creation Summary

Extensive areas of habitat to be created both across the Site and within the SANG are proposed as part of the Scheme. This will form the base of the commuting and foraging habitat mitigation for bats. These features include numerous waterbodies, additional and enhancement of hedgerows, managing woodland edges and grassland with increased biodiversity value.

A planting palette has been recommended to encourage nocturnal pollinating insects such as moths and so benefit foraging bats, and is further discussed as part of foraging habitat mitigation. The palette should be incorporated into any planting whenever possible including ornamental and amenity planting as well as within the SANG habitats. The planting palette bats for the three key habitat types is shown in Table 8 and has been incorporated into the SANGS Creation and Ecological Management Plan (ES Appendix 13.9, AECOM 2014) where appropriate

Table 8: Planting Palette for Bats by Habitat

Species	Scientific Name
Plants for Aquatic Habitats (Ponds, SUDS, Swales, Rain Garden)	
Angelica	<i>Angelica sylvestris</i>
Bog bean	<i>Menyanthes trifoliata</i>
Bugle	<i>Ajuga reptans</i>
Flag iris	<i>Iris pseudacorus</i>
Marsh marigold	<i>Caltha palustris</i>
Lady's smock	<i>Cardamine pratensis</i>
Hemp agrimony	<i>Eupatorium cannabinum</i>
Meadow sweet	<i>Filipendula ulmaria</i>
Creeping Jenny	<i>Lysimachia nummularia</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Water mint	<i>Mentha aquatica</i>
Water forget-me-not	<i>Myosotis scorpioides</i>
Fringed water lily	<i>Nymphoides peltata</i>
Water avens	<i>Geum rivale</i>
Plants for Woodland / Hedgerow / Scrub Habitats (Tree, Scrub and Climber Species)	
Bramble	<i>Rubus fruticosus</i>
Common alder	<i>Alnus glutinosa</i>
Dog rose	<i>Rosa canina</i>
Elder	<i>Sambucus nigra</i>
Gorse	<i>Ulex</i> sp.

Capabilities on project:
Environment

Guelder rose	<i>Viburnum opulus</i>
Hazel	<i>Corylus avellana</i>
Hawthorn	<i>Crataegus monogyna</i>
Hornbeam	<i>Carpinus betulus</i>
Ivy	<i>Hedera helix</i>
Honeysuckle	<i>Lonicera</i> sp.
Oak	<i>Quercus</i> sp.
Pussy willow	<i>Salix caprea</i>
Silver birch	<i>Betula pendula</i>
Plants for Grassland (Wildflower Meadow Species)	
Knapweed	<i>Centaurea nigra</i>
Cranesbills	<i>Geranium</i> sp.
Dames violet	<i>Hesperis matronalis</i>
St John's wort	<i>Hypericum</i> sp.
Scabious	<i>Knautia arvensis</i>
Mallow	<i>Lavatera</i> sp.
Ox-eye daisy	<i>Leucanthemum vulgare</i>
Honesty	<i>Lunaria rediva</i>
Night-scented stock	<i>Mattiola bicornia</i>
Forget-me-not	<i>Myosotis</i> sp.
Poppies	<i>Papaver</i> sp.
Cone flower	<i>Rudbeckia</i> sp.

The creation, enhancement, management and monitoring of habitat types is fully described within the Arborfield SANG Habitat Creation and Ecological Management Plan (ES Appendix, 13.8 AECOM 2014). All mitigation areas and features are to be maintained and protected in perpetuity. The responsibility for this will be held by the developer, unless transferred to the council or other suitable body.

7.3 Commuting Routes / Dark Corridors Mitigation

The major on Site commuting routes are to be maintained as a series of dark corridors shown in Figure B. These dark corridors will also link to the green corridors within the MFT development to the south; maintaining habitat connectivity across the wider landscape.

7.3.1 Retained Tree Lines

The primary mitigation for these corridors is their retention as part of the master plan without severance, as this maintains the links of these corridors to foraging and roosting habitats both on Site and within the wider landscape.

As the commuting routes shown in Figure B are primarily tree corridors, appropriate arboricultural and hedgerow management ensuring the structure, integrity and species diversity of these tree lines will help maintain their function as commuting routes for bats.

7.3.2 Additional SUDS Network

The additional SUDS network will have two main benefits for commuting bats;

- The strengthening of existing commuting routes with additional watercourses and associated pond habitats;
- The creation of a new length of watercourse within the former Hazebrouck barracks, designated as a new 'tertiary dark corridor'; shown in Figure B.

The additional SUDS network will strengthen the existing waterbody network across Site, providing aquatic habitat which bats can directly navigate along across the Site. This will also form additional foraging habitat; particularly for species associate with water courses such as Daubenton's bat and soprano pipistrelle.

Capabilities on project:
Environment

A stretch of proposed SUDS will link Garrison Lake with the north-west boundary of the Site and the wider landscape. Once established this has the potential to form an additional commuting corridor to the foraging habitats in and around Garrison Lake and further on to the Northern SANG. Due to the potential importance of this as a commuting corridor for bats, it has been designated as a 'tertiary dark corridor' for commuting bats as shown in Figure B.

7.3.3 Hedgerow Creation / Enhancement

Hedgerows identified for creation or enhancement within the 'Hedgerow Survey and Strategy Report' (AECOM 2014) may also function as additional commuting corridors for several species of bats, allowing them to cross open habitats while still being close to nearby cover.

7.4 Foraging Habitat Mitigation (Planting Palette)

Extensive habitat creation will occur with the SANG and enhancement of existing habitats across Site will also take place, summarised here according to habitat groupings with the planting palettes shown in Table 8.

7.4.1 Waterbodies

Extensive pond creation will take place within the SANG, providing high quality, new habitat for bats. At least nine new ponds are proposed within the SANG.

Improvement of existing drainage ditches through the additional of rain gardens and swales will provide further additional quality habitat both within the SANG and also across the Site.

Additional ponds across the SUDS network will also provide additional foraging habitat for bats across the Site. This could be further enhanced with the correct maintenance and planting.

7.4.2 Woodlands / Hedgerows / Trees

The creation of additional woodland and hedgerows combined with additional tree planting jointly function as commuting corridor mitigation and to create additional areas of woodland foraging habitat. In particular this will benefit species such as brown long-eared bat which forage underneath the woodland canopy

Extensive woodland creation and enhancement within the SANG will provide areas of additional habitat for both woodland associated and light sensitive bats species, particularly with the provision of additional roosts (bat barns and bat boxes) nearby.

Hedgerow creation and enhancement will function as foraging habitat for species associated with woodland edges such as pipistrelle bats, as well as functioning as commuting corridors. Further detail on hedgerow planting is provided with the Hedgerow Survey and Strategy (Appendix 13.6, AECOM 2014)

Both hedgerow and woodland planting and enhancement should include plants that will benefit foraging bats and can be further improved through the inclusion of tree standards.

Tree planting across the Site even in urban areas will benefit bats by additionally providing tree canopy foraging habitat for a wide variety of species.

7.4.3 Grassland

Due to the extent of grassland to be lost as part of the Scheme, extensive enhancement of currently species poor grassland into semi-improved grassland within the SANG is proposed to improve the quality of this habitat for a wide array of species; including bats. This enhanced grassland will also be in close proximity to woodland, scrub, pond and other habitats, alternative roost provision and commuting routes to other important foraging areas such as Garrison Lake.

Habitat creation and enhancement of grassland is described within the SANG Habitat Creation and Ecological Management Plan (Appendix 13.9, AECOM 2014). Specifically for bats, the inclusion of plants that will encourage nocturnal insects will increase the value of this habitat. The proposed layout of grassland habitat areas should provide open areas for aerial hawkers such as noctule and areas that border denser habitats such as scrub and woodland to act as a fringe habitat for species that remain closer to cover such as the brown long-eared bat.

Capabilities on project:
Environment

Plant species that benefit bats include an array of wildflower meadow species recommended for incorporation into the semi-improved grassland across Site. Note these could also be included in other areas where appropriate such as planting on reptile hibernacula or within soft landscaping.

8 Post Construction Lighting Recommendations

8.1 Introduction

This section of the report outlines the approach to maintaining appropriate light levels within key bat habitats across Site to enable their continued use by bats as roosting, commuting and foraging habitats. Note that generic recommendations have been made which should be incorporated into a later “Lighting Strategy” to be produced with the input of an ecologist and a lighting engineer at the detailed design stage following planning determination.

8.2 Dark Corridor Summary

The ‘Dark Corridors’ illustrated within Figure B shown key bat habitats in which specific measures for lighting minimisation should be employed. The corridors are summarised as follows;

8.2.1 Primary Dark Corridors:

Key commuting and foraging habitats generally unlit as part of the Scheme baseline (including the SANG and Garrison Lake) which are used by rarer species and as the on Site commuting routes for the largest numbers of common bats to locally important habitats such as Hogwood Shaw LNR and Garrison Lake. These are to be retained at as low a light level as possible for light sensitive species

8.2.2 Secondary Dark Corridors

Commuting and foraging habitats within generally more lit and urbanised areas but still with numbers of light sensitive bats commuting through. To be maintained at low light levels but with acceptance of some appropriate urban lighting; and

8.2.3 Tertiary Dark Corridors

New potential commuting routes to key habitats to be created as part of the Scheme, in particular to Garrison Lake. Currently lit within urban areas but with potential for increased use by bats with suitable design. To be maintained at low light levels but with acceptance of some appropriate urban lighting.

8.2.4 Rest of Site

Outside of the Dark Corridor network lighting should generally be minimised wherever possible. In particular light spill into adjacent dark corridors should be avoided.

8.3 General Lighting Targets for Dark Corridors

The target lighting levels described in Table 9 are based upon the ‘Environmental Zones’ within from the Institute of Lighting Engineers (ILE) Guidance Notes for the Reduction of Obtrusive Light (ILE, 2005). “Environmental Zones” further detail the limitation of sky glow and light trespass, depending on the nature of the area.

These Environmental Zones can be used as a base target along with overall Lux levels for the Dark Corridor network during the detailed design stage with reference to the ILE Guidance.

The targets within Table 9 have been provided as realistic objectives in line with the proposed masterplan that will allow bats to continue using key habitats across the Site. Target Lux levels, environmental zones and usage by bats are given to guide later detailed lighting design.

8.4 General Lighting Recommendations

In order to meet the specified Lux levels and Environmental Zone Targets within Table 9, lighting should be designed which will cause minimal disturbance for bats. This should be detailed in a specific lighting scheme developed in liaison with a suitably qualified ecologist. The presumption should be to reduce overall lighting levels across the Site as much as possible; however, as a minimum, predicted light levels across the Primary Dark Corridors and SANG (as indicated within Figure B) must be reduced to below 1 lux

In the scheme, the generic bat protection measures shown in Table 9 should be employed in relation to bats within the design of the lighting scheme.

Capabilities on project:
Environment

Table 9: Post Construction Lighting Targets and General Recommendations

Post Construction Lighting Targets and General Recommendations				
Lighting Level Targets for Dark Corridors				
Dark Corridor	Target Lux Level	Target Environmental Zone	Target Bat Usage	Potential Key Constraints
Primary (including SANG)	Below 1 Lux	E1 / E2 (E1 (Intrinsically dark landscapes / Low district brightness areas) As close to E1 as possible within the SANG, near Garrison Lake and near the Mill Pond)	By all on Site bat species for commuting and foraging with roosting opportunities where possible. SANG, Garrison Lake and the Mill Pond to be targeted for the lowest lux levels due to the importance of these habitats.	Some lighting may be required for cycle ways / footpaths; this could be installed as timed / motion sensing low level bollard lighting. Direct lighting within area to be generally avoided. Any lighting along Sheerlands Road should be designed in conjunction with a suitably qualified ecologist; to enable light sensitive bats to continue to cross while meeting road lighting requirements
Secondary	Below 1 Lux	E2 (Low district brightness areas)	As commuting and foraging habitat primarily by pipistrelle and light tolerant bats but also to accommodate pre-existing use by brown long-eared bats within urban areas.	Some light spill from existing and new road and adjacent buildings likely. Light modelling and design in conjunction with a suitably qualified ecologist should minimise this as far as reasonably possible.
Tertiary	As close to 1 Lux as possible	E2 (Low district brightness areas)	As commuting and foraging habitat by urban and light tolerant species such as pipistrelle and noctule. Where possible minimise lighting near Garrison Lake and Site boundaries to maximise habitat usage by light sensitive species.	Light spill expected from adjacent urban areas to be minimised as far as possible. Areas of tertiary corridor near the Site boundary and Garrison Lake to be prioritised for light minimisation to encourage use by light sensitive species and reduce light spill on adjacent important habitats.

Capabilities on project:
Environment

Post Construction Lighting Targets and General Recommendations				
Rest of Site (Non Dark Corridor)	14 lux or less across areas with no specific lighting requirements	E2 / E3 – (Low district brightness areas / Medium brightness district) (E2 should be the target for residential areas or where specific high level lighting is not required)	As commuting, foraging roosting habitat by urban and light tolerant species such as pipistrelle. Lighting to avoid bat bricks and known roost/mitigation locations. Detailed design should avoid light spill upon adjacent dark corridors and the surrounding landscape.	General lighting should be minimised as far as possible to encourage Site use by bats. Expected minimum lighting requirements for road network, public buildings, sports pitches etc. Avoidance of light spill from these areas wherever possible.
General Lighting Recommendations for Bats and Nocturnal Wildlife				
The light should be as low as guidelines permit. If lighting is not needed, don't light.				
Bat Roosts				
No bat roost or installed bat roosting feature (including access points) should be directly illuminated. If it is considered necessary to illuminate a building known to be used by roosting bats, the lights should be positioned to avoid the sensitive areas e.g. the exit and entrance points. Close offset accent lighting causes less light pollution; it is more specific and can be designed to avoid bat sensitive areas, and better highlights the features of the subject of the illumination.				
Type of Lighting				
The impact on bats can be minimised by the use of high pressure sodium lamps instead of mercury or metal halide lamps where glass glazing is preferred due to its UV filtration characteristics. The International Dark Sky Association (IDA) has issued a press release about the negative impacts of Bluish/White LED and induction lamps. They state that these lights have significant environmental impacts and urge light developers to limit blue light to wavelengths shorter than 500nm.				
Minimise lighting and spill				
Lighting should be directed to where it is needed and light spillage avoided, particularly onto surrounding vegetation and commuting routes. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only (Emery, 2008).. Strategic planting can also be used as a barrier or manmade features that are required within the build can be positioned so as to form a barrier. Any lighting columns near key bat habitats can be substituted with lower level lighting column				
Avoid light directed at the sky or horizontally out from the buildings				
The height of lighting columns in general should be as short as is possible as light at a low level reduces the ecological impact. Direct the light below the horizontal plane, preferably at an angle less than seventy degrees. There are cases where a taller column will enable light to be directed downwards at a more acute angle and thereby reduce horizontal spill. For pedestrian lighting this can take the form of low level lighting that is as directional as possible and below 3 lux at ground level. The acceptable level of lighting may vary dependent upon the surroundings and on the species of bat affected.				
Timing of lighting				
The times during which the lighting is on should be limited to provide some dark periods. Roads or trackways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10 metres in length either side of commuting route.				

9 Maintenance and Monitoring

9.1 Introduction

This section outlines the maintenance and monitoring recommended for the mitigation and enhancement features. Complete details of the proposed mitigation will be included in any subsequent licence, but is likely to include the following recommendations.

9.2 Management and Maintenance

All mitigation areas and features are to be maintained and protected in perpetuity. The responsibility for this will be held by the developer, unless transferred to the council or other suitable body as proposed for SANG management.

9.3 Site Maintenance

9.3.1 Bat House

The bat house will be subject to monitoring dependent on the conditions of the Natural England Development licence(s) in place. This could be every two years after construction until four years post-construction of the development.

9.3.2 Bat Bricks in Buildings

Bat bricks incorporated into the fabric of buildings will require no maintenance. The bricks will be owned by the owners of the buildings into which they are incorporated, and will be written into the deeds of the houses. The owners may be private individuals who will receive an information pack including details as to the location of the bat boxes and summary information on bat ecology, legal and nature conservation status.

9.3.3 Bat boxes on trees

Bat boxes must be erected on trees prior to the demolition of the existing roosts. These boxes will be subject to monitoring every two years after they have been erected until four years post completion of the development. Routine maintenance checks will be undertaken at the time of monitoring to ensure all fixtures and fittings are secure for any use by bats. This will be conducted during the autumn months to minimise disturbance to the bats.

9.3.4 Habitat features – commuting and foraging

The habitats created upon the site for foraging bats must be maintained in perpetuity. This will involve specific maintenance for each habitat, which will be outlined primarily in the SANG Strategy (Murdock Wickham 2014) and the SANG habitat Creation and Ecological Management Plan (ES Appendix 13.9, AECOM 2014).

9.4 Population Monitoring

Long-term monitoring of the bat populations on site will be on-going throughout the construction of the development and the installation of the bat mitigation, and will likely continue for four years post construction. The bat monitoring must be designed to assess the status of the bat populations on Site.

The monitoring will include emergence and re-entry surveys and internal inspections of the bespoke bat houses, checking of the bat boxes and activity surveys to assess if the retained hedgerows and tree lines which were identified as important foraging and commuting routes prior to development are still in use. Any changes in use or behaviour during the development phase will be interpreted and assist in 'fine tuning' the appropriate mitigation. Attempts will be made to establish the reasons behind the change in behaviour, for example lighting, lack of cover from vegetation or lack of suitable foraging habitat.

Where possible, measures will be implemented to rectify any issues that become apparent, for example, if lighting on site is spilling onto a bat roost access point. If there is a major change in the use of the site by bats during the development Natural England as the appropriate body will be contacted and consulted.

The internal inspections of the bat houses and the bat box checks will be undertaken by licensed bat surveyors or accredited agents in the autumn months, in order to avoid the sensitive maternity and hibernation periods. This will include endoscope, visual and internal inspections where appropriate. If bats are present within in a bat box, it will be accessed and the bat species

Capabilities on project:
Environment

will be identified. Within bat houses the bat species and roost use will be identified by the presence of droppings and through the emergence / re-entry surveys.

Temperature and humidity data loggers will be placed inside bat houses to measure the environmental conditions to feed back into improvements to the structure for bats e.g. structure adjustments to meet temperature or humidity targets. Any improvement measures required will be implemented during the winter months if the roosts are not in use by hibernating bats.

The results of the monitoring surveys will be submitted to Natural England, along with information regarding any improvement measures implemented within the new roost creations.

10 Summary and Conclusion

10.1 Summary

10.1.1 Roost Mitigation

Across the Site, four bat species have been found roosting within buildings and trees (common pipistrelle, soprano pipistrelle, brown long-eared and Natterer's bat).

The approach to mitigation for loss of roost Sites is the provision of alternative roosts for these species as part of Natural England development licence(s) which will also detail suitable timings and methods for building and tree removal, to be confirmed within any successfully granted licence.

Further surveys, inspections and ecological supervision will be required in order to apply for Natural England development licences and as part of RAMS (Reasonable Avoidance Measures) to avoid individual bat mortalities during works.

Additional roost provision has also been recommended across the Site in several different forms (bat barns, enhanced buildings, bat bricks and bat boxes) in order to ensure the continued provision of potential roost locations for a wide range of species.

10.1.2 Commuting Habitat Mitigation

The Site was found to contain commuting routes for a wide assemblage of bat species, many utilising the mature tree lines connecting the Site to the wider landscape and other important habitats.

The retention of the boundary tree lines, important mature tree lines and hedgerows will result in the preservation of the majority of the important commuting routes. This will be joined with recommendations for hedgerow and tree line enhancement, the provision of additional waterbody habitat (through SUDS) and recommendations for the control of lighting levels through 'dark corridors' to ensure commuting routes can continue to be used by light sensitive bat species.

10.1.3 Foraging Habitat Mitigation

The retention and ecological enhancement of the SANG through habitat creation and the incorporation of a planting palette suitable for bats will greatly increase the quality of SANG habitats for foraging bats. This will include created and enhanced woodland, grassland and scrub and at the creation of at least nine ponds.

The addition of a waterbody network (as part of a SUDS) throughout Site will create additional foraging habitat, much of this along known commuting routes. This will also include a large pond within the centre of the proposed 'linear park', south of Building 47.

Additional enhancement in the form of ponds, swales, marshy grassland and rain garden habitats will further enhance its value for bats.

The conversion of improved grassland fields with SANG to habitats of greater wildlife value will represent significant mitigation for the areas of grassland (including large areas of amenity and improved grassland of low value for wildlife) to be lost as part of the Scheme. Most woodland and hedgerow habitat across the Site is to be retained, as shown within the Environmental Statement (AECOM, 2014) Figure 13.1K.

Further habitat enhancement within the green corridors and SANG includes hedgerow creation and enhancement; detailed within the Hedgerow Survey and Strategy (ES Appendix 13.6, AECOM 2014).

10.2 Conclusion

If the measures outlined in this mitigation strategy are successfully implemented, known bat roosts, roosting opportunities, commuting routes and foraging habitats will be present within the completed Scheme of a comparable overall number and quality to the pre-existing baseline.

With the implementation of suitable maintenance and monitoring post construction the favourable conservation status of bats within the Site will be safeguarded and all legal and planning requirements will have been met.

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Environment

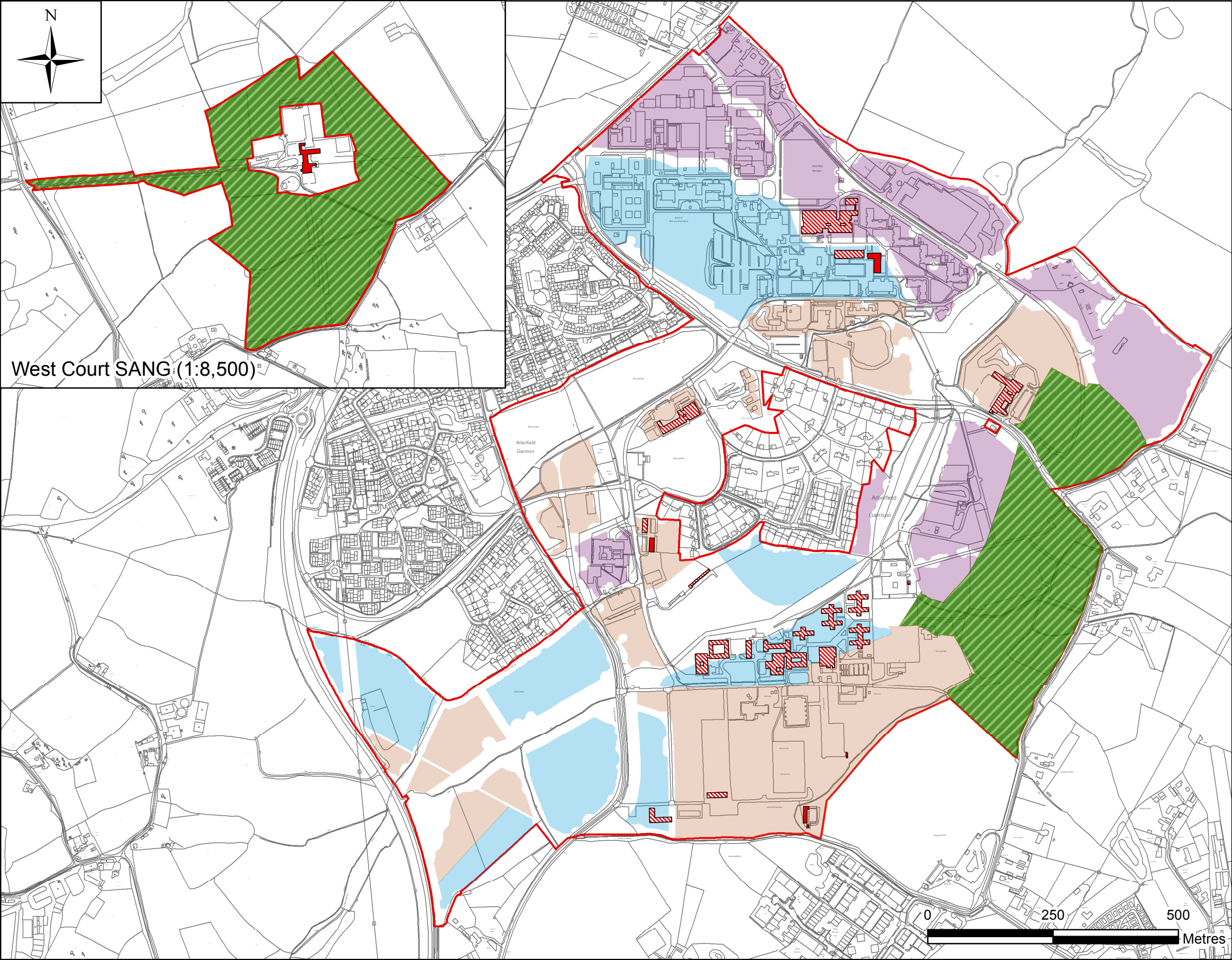
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Capabilities on project:
Environment

Figure A: Building Assessment with Known Roosts (overlaid with Phasing Plan)



LEGEND

Redline Boundary

Known Bat Roost Locations

Known Roost (2014 Surveys)

Known Roost (2006 - 2012 Surveys)

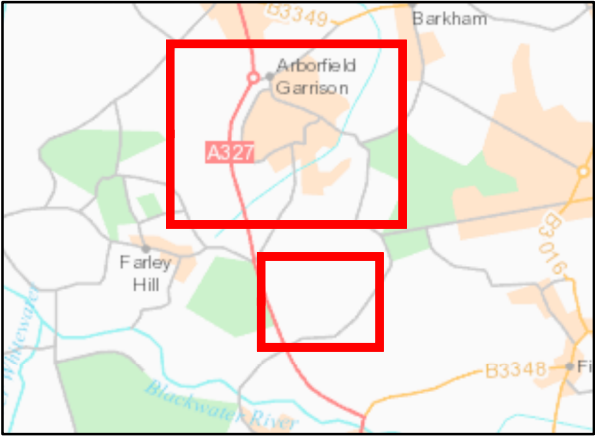
Phasing

Phase 1 (2015 - 2020)

Phase 2 (2020 - 2025)

Phase 3 (2025 - 2030)

SANG



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Client:

Project: ARBORFIELD GARRISON EIA

Title: KNOWN BAT BUILDING ROOSTS
(OVERLAID WITH PHASING PLAN)

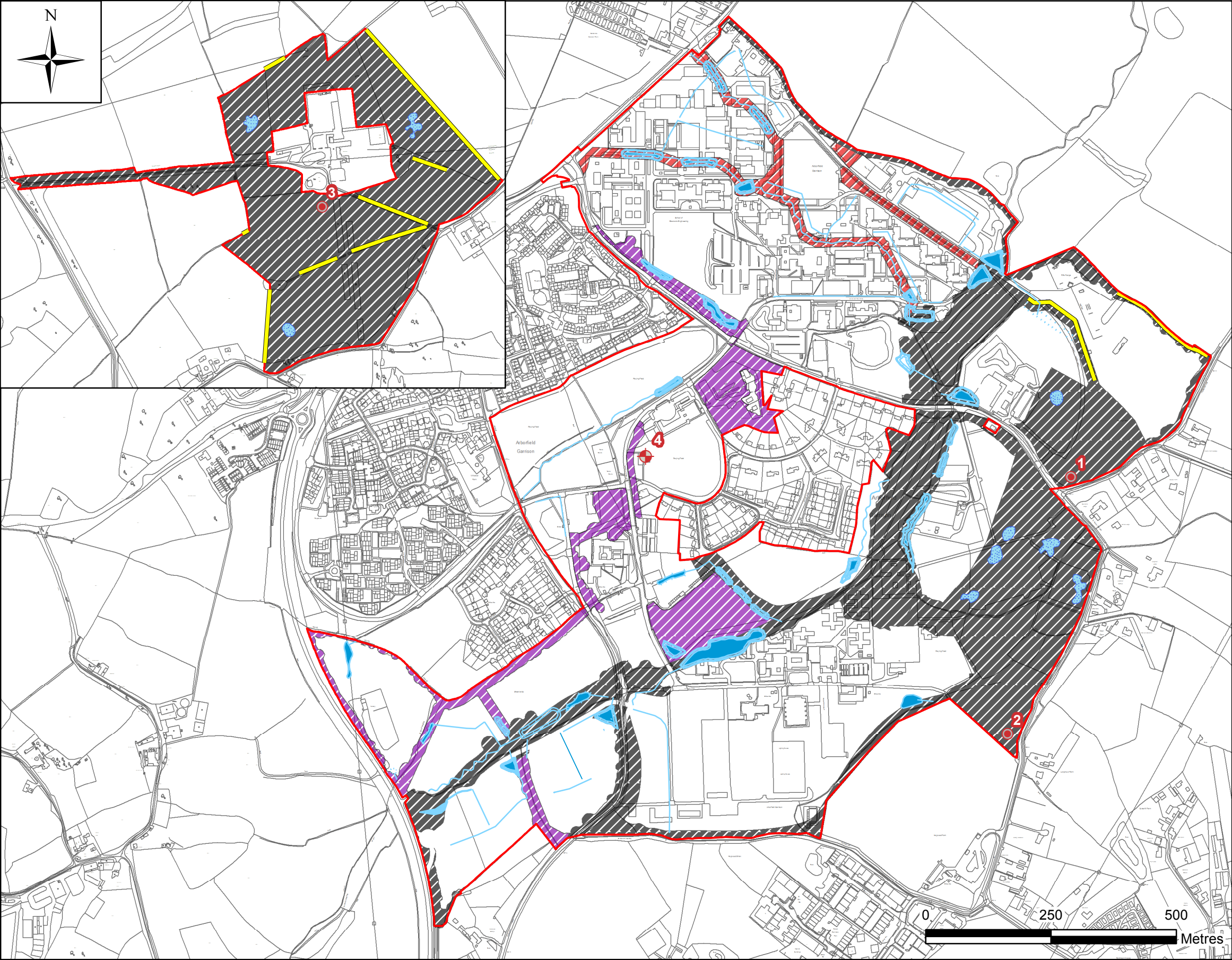
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Chk'd: MW	App'd: MG
Date: 19/09/2014	Scale at A3: 1:8,000
Drawing Number: FIGURE A	
A3	

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Environment

Figure B: Key Bat Mitigation Areas (Replacement Roosts and Retained / Enhanced Foraging and Commuting Corridors)



LEGEND

Redline Boundary

Created Habitats

- Bat Barn Location
- Enhanced Cricket Pavillion
- Proposed SUDS Corridors
- Proposed SUDS
- SANG Ponds
- Hedgerow (Enhanced and Created)

Retained Habitats

- Dark Corridors (Primary) - No / minimal light
- Dark Corridors (Secondary) - Low light
- New Potential Corridors (Tertiary) - Low light



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Client:

Project: ARBORFIELD GARRISON EIA

Title: KEY BAT MITIGATION AREAS
(REPLACEMENT ROOSTS AND
RETAINED AND ENHANCED FORAGING
AND COMMUTING COORIDORS)

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Date: 19/09/2014	Scale at A3: 1:8,000
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Appendix 1: Legislation Bats and Relevant Planning Policy

Legislation Summary

Due to their decline, bats are protected under the following two pieces of legislation.

Wildlife and Countryside Act 1981

The Wildlife and Countryside Act 1981 (as amended) provides protection to certain wild animals that are listed under Schedule 5 of the Act. The Schedule includes all bats including both horseshoe (*Rhinolophidae*) and typical (*Vespertilionidae*) species. The limited protection afforded to bats is detailed in Section 9(4)(b) and (c) and (5) only, under Part 1 of the Act.

The 1981 Act has been amended several times, notably by the Countryside and Rights of Way Act 2000, which inserted the term “recklessly” with respect to Section 9(4). More recently the Conservation (Natural Habitats, &c.) (Amendment) Regulations 2007 further amended Section 9(4) and removed Section 9(1)(2) and (4)(a) with respect to bats.

Bats are subject to the provisions of Section 9 of the Act, which make it an offence to:

- intentionally or recklessly disturb a bat whilst it is occupying a structure or place which it uses for shelter or protection (roost);
- intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a bat;
- sell, offer or expose for sale, or to possess or transport for sale a live or dead bat or any part of or anything derived from a bat.

The Conservation of Habitats and Species Regulations 2010 (as amended)

European Community Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora otherwise known as the Habitats Directive was transposed into national legislation as the Conservation (Natural Habitats &c.) Regulations 1994. The 1994 Regulations were amended several times since coming into force. These amendments were consolidated into the Conservation of Habitats and Species Regulations 2010 (as amended) which replaced the Conservation (Natural Habitats &c.) Regulations 1994, as of 1 April 2010 and which was subsequently amended in August 2012.

Part 3 of the 2010 Regulations is concerned with the protection of species. Animal species listed on Annex IV(a) of the Habitats Directive are regarded as European protected species and member states are required to put into place a system of strict protection. Those animal species included on Annex IV(a) that are present within Great Britain are listed in Schedule 2 of the 2010 Regulations. All bats including horseshoe (*Rhinolophidae*) and typical (*Vespertilionidae*) species are included in Schedule 2. Bats are subject to the provisions of Regulation 41 of the 2010 Regulations which makes it an offence to:

- deliberately capture, injure or kill a bat;
- deliberately disturb a bat (where disturbance is likely to impair their ability to survive, breed or reproduce, rear or nurture their young; or to hibernate or migrate; or to affect significantly the local distribution or abundance of the bat species concerned);
- damage or destroy a breeding site or resting place (roost) of a bat; and
- be in possession of, control, transport, sell or exchange, or offer for sale or exchange any live or dead wild bat or any part of a wild bat or anything derived from a bat or any part of a bat wild.

National Planning Policy

The NPPF (National Planning Policy Framework) Section 11 is concerned with conserving and enhancing the natural environment and states that the planning system should achieve this by “minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity”. When determining planning applications, it states that local planning authorities should aim to conserve and enhance biodiversity and to refuse planning permission “if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for” with regard to any protection afforded to sites, habitats and species.

Capabilities on project:
Environment

Section 118, states that “planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss”.

Planning and mitigation should recognise the wider benefits of ecosystem services and establishment of ecological networks to build in an element of resilience for our native species and habitats. Opportunities to enhance biodiversity are also encouraged.

Local Planning Policy

Wokingham Core Strategy Development Plan

The Wokingham Borough Local Development Framework Core Strategy Development Plan was adopted by Wokingham Borough Council on 29th January 2010. The Core Strategy sets out where development will take place in the Borough between 2006 and 2026. The policies contained in the Core Strategy detail how this will be achieved.

Core Strategy Policy CP7 is concerned with Biodiversity. The policy states that

“Sites designated as of importance for nature conservation at an international or national level will be conserved and enhanced and inappropriate development will be resisted. The degree of protection given will be appropriate to the status of the site in terms of its international or national importance.

Development

A) Which may harm county designated sites (Local Wildlife Sites in Berkshire), whether directly or indirectly, or

B) Which may harm habitats or, species of principle importance in England for nature conservation, veteran trees or features of the landscape that are of major importance for wild flora and fauna (including wildlife and river corridors), whether directly or indirectly, or

C) That compromises the implementation of the national, regional, county and local biodiversity action plans

will be only permitted if it has been clearly demonstrated that the need for the proposal outweighs the need to safeguard the nature conservation importance, that no alternative site that would result in less or no harm is available which will meet the need, and:

i) Mitigation measures can be put in place to prevent damaging impacts;

or

ii) Appropriate compensation measures to offset the scale and kind of losses are provided.”

Wokingham Managing Development Delivery Document

The Wokingham Borough Managing Development Delivery Local Plan Document was adopted by Wokingham Borough Council on 21st February 2014. The Managing Development Delivery Local Plan takes forward and develops the objectives laid down in the Core Strategy and provides extra detail to the policies of the Core Strategy.

Cross Cutting Policy CC03 is concerned with Green Infrastructure, Trees and Landscaping. The policy states that

“Development proposals should demonstrate how they have considered and achieved the following criteria within scheme proposals:

a) Provide new or protect and enhance the Borough’s Green Infrastructure networks, including the need to mitigate potential impacts of new development

b) Promote accessibility, linkages and permeability between and within existing green corridors including public rights of way such as footpaths, cycleways and bridleways

c) Promote the integration of the scheme with any adjoining public open space or countryside

Capabilities on project:
Environment

d) Protect and retain existing trees, hedges and other landscape features

e) Incorporate high quality, ideally, native planting and landscaping as an integral part of the scheme.

Development proposals which would result in the loss, fragmentation or isolation of areas of green infrastructure will not be acceptable."

Topic Base Policy TB23 is concerned with Biodiversity and Development. The policy states that

"Sites of national or international importance are shown and sites of local importance are defined on the Policies Map.

Planning permission for development proposals will only be granted where they comply with policy CP7 – Biodiversity of the Core Strategy and also demonstrate how they:

a) Provide opportunities, including through design, layout and landscaping to incorporate new biodiversity features or enhance existing

b) Provide appropriate buffer zones between development proposals and designated sites as well as habitats and species of principle importance for nature conservation

c) Ensure that all existing and new developments are ecologically permeable through the protection of existing and the provision of new continuous wildlife corridors, which shall be integrated and linked to the wider green infrastructure network."