MKA
ECOLOGY

Preliminary Ecological Appraisal and Preliminary Roost Assessment

88 and 100 Grays Inn Road, London

Site	*88 and 100 Grays Inn Road, London*
Project number	*133022*
Client name / Address	*Lawnmist Limited, Greenways 173 City Way, Rochester, Kent, ME1 2BG*

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1.0	*30 September 2022*	*Original*

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Declaration of compliance

This Preliminary Ecological Appraisal has been undertaken in accordance with British Standard 42020:2013 "Biodiversity, Code of practice for planning and development". The information which we have provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

MKA Ecology Ltd is a CIEEM Registered Practice. This means that MKA Ecology Ltd are formally recognised for high professional standards, working at the forefront of our profession.

Validity of data

Unless stated otherwise the information provided within this report is valid for a maximum period of 24 months from the date of survey. If works at the site have not progressed by this time an updated site visit may be required in order to determine any changes in site composition and ecological constraints.

CONTENTS

1. EXECUTIVE SUMMARY

In September 2022, MKA Ecology Limited was commissioned to undertake a Preliminary Ecological Appraisal and Preliminary Roost Assessment of 88 and 100 Grays Inn Road, London. The appraisal included a habitat survey, protected species scoping survey and desktop study of protected and notable sites and species in the area. A site visit was undertaken on 15th September 2022.

The Site is dominated by the two multi-storey buildings present, along with associated hardstanding and soft landscaping. The development proposals involve the redevelopment of building B1 (100 Grays Inn Road) and the refurbishment of building B2 (88 Grays Inn Road).

The following ecological constraints were identified at the Site with recommendations made as follows;

- **Designated sites:** A Construction Ecological Management Plan (CEMP) should be produced to protect the integrity of the nearby Spa Fields Gardens, St Andrew's Gardens, and Coram's Fields Sites of Importance for Nature Conservation (SINCs);
- **Invasive species:** Butterfly-bush is present across the Site, which is an invasive non-native species that is common across London and, whilst not subject to legal parameters, is listed as a species of concern on the London's Invasive Species Initiative (LISI, 2019). As such, it is recommended it is disposed of appropriately during the proposed works, as this would also result in an ecological benefit under the proposals; and
- **Habitats:** The to-be-demolished introduced shrub area should be replaced with ecologically valuable habitat in the design scheme so as not to suffer a net loss in biodiversity;
- **Nesting birds:** It is recommended that any building and vegetation clearance works be undertaken outside of bird breeding season (September – February inclusive). Should these timings not be possible, a nesting bird check by a suitably qualified ecologist should take place prior to any clearance.

Opportunities exist to enhance the biodiversity on the Site post-development. These include the provision of bird boxes targeted to London Priority species, the provision of bat boxes and the inclusion of green infrastructure, such as green roofs and green walls, which are included within the current design proposals. The inclusion of such features is in line with National Planning Policy Framework and will also contribute to ensuring a sustainable development that helps to achieve both local and national biodiversity targets.

Biodiversity Net Gain and Urban Greening Factor assessments have been undertaken to ensure that the proposed development is able to demonstrate a significant increase in biodiversity and green infrastructure provision within the Site. These assessments should be updated following any design revisions.

2. INTRODUCTION

2.1. Aims and scope of Preliminary Ecological Appraisal and Preliminary Roost Assessment

In September 2022, MKA Ecology Limited was commissioned to undertake a Preliminary Ecological Appraisal and Preliminary Roost Assessment (PEA and PRA) at 88 and 100 Grays Inn Road, London in order to support a planning application for the redevelopment of the Site.

The aims of the Preliminary Ecological Appraisal and Preliminary Roost Assessment were to:

- Undertake a desktop study to identify the extent of protected and notable species and habitats within close proximity of the Site;
- Prepare a habitat map for the Site;
- Identify evidence of protected species/species of conservation concern at the Site;
- Assess the potential impacts of the proposed development, using existing plans;
- Detail recommendations for further survey effort where required;
- Undertake a Preliminary Roost Assessment to establish the suitability of the buildings and trees at the Site for roosting bats, and record any evidence of bat presence;
- Assess the need for further survey effort, a European Protected Species Licence or mitigation for bats, if required; and
- Detail recommendations for biodiversity enhancements.

2.2. Site description and context

The survey area is shown on the map in Figure 1. Within this report this area is referred to as the Site or Grays Inn Road, London. The Site is located to the east of Grays Inn Road, London (centred on National Grid Reference TQ 31025 81938), and falls under the authority of London Borough of Camden Council.

2.3. Proposed development

The current development proposals for the Site involve the redevelopment of building B1 (100 Grays Inn Road) and the refurbishment of building B2 (88 Grays Inn Road).

2.4. Legislation and planning policy

This Preliminary Ecological Appraisal and Preliminary Roost Assessment has been undertaken with reference to relevant wildlife legislation and planning policy.

Relevant legislation considered within the scope of this document includes the following:

- The Environment Act 2021;
- The Wildlife and Countryside Act 1981 (as amended);
- The Conservation of Habitats and Species Regulations 2017 (as amended);
- Natural Environment and Rural Communities (NERC) Act 2006;
- The Countryside and Rights of Way (CRoW) Act 2000;
- Protection of Badgers Act 1992; and
- Wild Mammals (Protection) Act 1996.

Further information is provided in Appendix 1, including levels of protection granted to the species considered in Section 3.3.

In addition to obligations under wildlife legislation, the revised National Planning Policy Framework (NPPF) updated on 20 July 2021 requires planning decisions to contribute to conserving and enhancing the local environment. Further details are provided in Appendix 1.

London Borough of Camden Council has produced an adopted Local Plan (2017) that sets out the Council's planning policies. In particular, Policy A3: Biodiversity discusses matters regarding biodiversity and habitat conservation.

Additionally, given that the Site is located within London, consideration of the London Plan 2021 has also been given. The London Plan contains a number of policies relating to biodiversity, a brief summary of which are set out below:

- Policy G1 Green infrastructure;
- Policy G5 Urban greening;
- Policy G6 Biodiversity and access to nature;
- Policy G7 Trees and woodlands; and
- Policy G8 Food growing.

Further details of the above policies are provided in Appendix 1. Where relevant these are discussed in further detail in Section 5.

3. METHODOLOGIES

This Preliminary Ecological Appraisal and Preliminary Roost Assessment have been undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Preliminary Ecological Appraisal, 2nd edition (CIEEM, 2017) and Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edition) (Collins, 2016).

3.1. Desktop study

A data search was conducted for the Site and the surrounding 10km for internationally designated sites, and surrounding 2km for protected and notable species, statutorily and non-statutorily sites. Data was retrieved from the sources listed in Table 1.

Table 1: Sources of data for desktop study

Organisation	Data collected	Date collected
Multi-agency Geographic Information for the Countryside (MAGIC) www.magic.gov.uk	Information on local, national and international statutory protected areas.	28/09/2022
Greenspace Information for Greater London (GiGL)	Information on protected and notable sites and species within 2km of the Site (TQ 31025 81938).	28/09/2022
Ordnance Survey maps and aerial photography	Information on habitats and connectivity between the Site and the surrounding landscape.	28/09/2022
Plantlife Important Plant Areas (IPA)	Information on important plant areas within 2km of the Site (TQ 31025 81938).	28/09/2022
Buglife Important Invertebrate Areas (IIA)	Information on important invertebrate areas within 2km of the Site (TQ 31025 81938).	28/09/2022

The London Borough of Camden planning portal was also referred to in order to understand the scope of further development surrounding the Site.

3.2. UK Habitat Classification

Habitats were surveyed using the standardised UK Habitat classification and mapping methodology (UK Habs) (Butcher et al, 2020). Data were recorded onto a Samsung Tablet in a Geographic Information System (GIS), in this instance QField, following a modified UK Habs Colour Mapping Pallet.

Dominant plant species were observed and recorded within each habitat type. The plant species nomenclature follows that of Stace (2019).

The DAFOR scale is used to describe the relative abundance of species. The scale is shown in Table 2. It is important to note that where a species is described as rare this description refers to its relative abundance within the Site and is not a description of its abundance within the wider landscape. Therefore, a species with a rare relative abundance within the Site may be common within the wider landscape.

Table 2: DAFOR scale

DAFOR code	Relative abundance
D	Dominant
A	Abundant
F	Frequent
O	Occasional
R	Rare

3.3. Protected and notable species scoping survey

As part of the Preliminary Ecological Appraisal, an assessment of the potential for the habitats on site to support protected or notable species was made. This assessment was based on the quality, extent and interconnectivity of suitable habitats, along with the results of the desktop study detailed in Section 3.1. This includes Species of Principal Importance (SPI) as listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006), and Red and Amber listed Birds of Conservation Concern (BoCC) as per Stanbury *et al*., 2021 (see Appendix 1).

Protected and notable species considered within the protected species scoping survey for 88 and 100 Grays Inn Road, London include the following:

- Plants and fungi: Cornflower *Centaurea cyanus*, box *Buxus sempervirens* and Deptford pink *Dianthus armeria*.
- Invertebrates: Stag beetle *Lucanus cervus* and cinnabar moth *Tyria jacobaeae*.
- Fish: European eel *Anguilla anguilla*, river lamprey *Lampetra fluviatilis*, brown trout *Salmo trutta subsp. fario*.
- Amphibians: Natterjack toad *Epidalea calamita*, great crested newt *Triturus cristatus* and common toad *Bufo bufo*.
- Reptiles: Adder *Vipera berus*, common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix helvetica helvetica*.

- Birds: With special reference to species listed under Schedule 1 of The Wildlife and Countryside Act 1981 (as amended) and SPI.
- Mammals: Badger *Meles meles*, bats (all species), water vole *Arvicola amphibius*, otter *Lutra lutra*, hazel dormouse *Muscardinus avellanarius*, hedgehog *Erinaceus europaeus*, brown hare *Lepus europaeus*, harvest mouse *Micromys minutus* and polecat *Mustela putorius*.

In each case the likelihood of presence of these protected species at the Site was classified as being either confirmed, high, moderate, low or negligible.

- **Confirmed**: The species is confirmed on the site during the Preliminary Ecological Appraisal, previous survey effort or recent records.
- **High**: Habitats are available onsite which are highly suitable for this species and there are records within the desktop study. The surrounding areas also provide widespread opportunities for the species which are well connected to the Site.
- **Moderate**: Some suitable habitat available on site for the species although not of optimum quality. Species is present with the desktop study.
- **Low**: Some suitable habitat available on site for the species but this is low value and possibly of small scale or with poor connectivity. No, or very few, records returned in the desktop study.
- **Negligible**: No suitable habitat available for the species, or very little poor-quality habitat.

This protected species scoping survey is designed to assess the *potential* for presence or absence of a particular species or species group, and does not constitute a full survey for these species.

3.4. Preliminary Roost Assessment

An internal and external inspection of buildings within the Site was undertaken following guidance set out in *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edition)* (Collins, 2016). All buildings within the Site were inspected and the locations of these are shown in Figure 1.

The following features were recorded for buildings:

- Location;
- Type;
- Dimensions;
- Age;
- Construction materials; and
- Current use.

Descriptions of potential and actual access points and roosting places were recorded (including height above ground level and aspect), as well as descriptions of evidence of bats found. The following types of evidence of use by bats were recorded:

- Location and number of any live bats;
- Location and number of any bat corpses or skeletons;
- Locations and number of bat droppings;
- Notes on relative freshness, shape and size of bat droppings;
- Location and quantity of any bat feeding remains;
- Location of clean, cobweb-free timbers, crevices and holes;
- Location of characteristic staining from urine and/or grease marks;
- Location and quantity of bat-fly (Nycteribiidae) pupal cases;
- Location of known and potential access points to the roost; and
- Location of the characteristic smell of bats.

Buildings were assessed for their bat roost suitability according to the scheme presented in Collins (2016). These categories are shown in Table 3.

Table 3: Categories to assess roost suitability in buildings (adapted from Collins, 2016)

Roost suitability	Description
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions* and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potential for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

*For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

The guidelines for categorisation of bats in England by distribution and rarity (adapted from Wray *et al*., 2010) are shown in the tables below.

Table 4: Rarity of bat species within England

Rarity within range (England)	Species
Rarest (population under 10,000)	Greater horseshoe bat *Rhinolophus ferrumequinum* Bechstein's bat *Myotis bechsteinii* Alcathoe's bat *Myotis alcathoe* Greater mouse-eared bat *Myotis myotis* Barbastelle *Barbastella barbastellus* Grey long-eared bat *Plecotus austriacus*
Rarer (population 10,000 to 100,000)	Lesser horseshoe bat *Rhinolophus hipposideros* Whiskered bat *Myotis mystacinus* Brandt's bat *Myotis brandtii* Daubenton's bat *Myotis daubentonii* Natterer's bat *Myotis nattereri* Leisler's bat *Nyctalus leisleri* Noctule *Nyctalus noctula* Serotine *Eptesicus serotinus* Nathusius's pipistrelle *Pipistrellus nathusii*
Common (population over 100,000)	Common pipistrelle *Pipistrellus pipistrellus* Soprano pipistrelle *Pipistrellus pygmaeus* Brown long-eared bat *Plecotus auritus*

Table 5: Level of importance of roost type

Geographic frame of reference	Roost type
District, Local or Parish	Feeding perches (common species) Individual bats (common species) Small numbers of non-breeding bats (common species) Mating sites (common species)
County	Maternity sites (common species) Small numbers of hibernating bats (common and rarer species) Feeding perches (rarer/rarest species) Individual bats (rarer/rarest species) Small numbers of non-breeding bats (rarer/rarest species)
Regional	Mating sites (rarer/rarest species) including well-used swarming sites Maternity sites (rarer species) Hibernation sites (rarest species)

Geographic frame of reference	Roost type
	Significant hibernation sites for rarer/rarest species or all species assemblages
National/UK	Maternity sites (rarest species) Sites meeting SSSI guidelines*
International	SAC sites

*Sites meeting SSSI (Sites of Special Scientific Interest) selection guidelines include Barbastelle maternity roosts and mixed species hibernacula assemblages

3.5. Equipment

The inspection of buildings was conducted using a variety of equipment including ladders, digital video endoscope, inspection mirrors, binoculars, high-powered torch and a digital camera.

3.6. Surveyor, author and reviewer

The survey was undertaken by Jo Sykes Qualifying CIEEM, Ecologist at MKA Ecology Ltd. Jo has three years' experience within the industry conducting Preliminary Ecological Appraisals and Preliminary Roost Assessments, and holds a Natural England bat licence. This report has been written by Ross Oliver Qualifying CIEEM, Graduate Ecologist at MKA Ecology Ltd. Ross is within his first year in the industry.

This report has been reviewed and authorised by Rory Roche ACIEEM, Senior Ecologist at MKA Ecology Ltd. Rory has six years' experience within the industry conducting Preliminary Ecological Appraisals and Preliminary Roost Assessments, and holds a Natural England bat licence.

3.7. Date, time and weather conditions

See Table 6 below for details of the date, time and prevailing weather conditions recorded during the site visit for the Preliminary Ecological Appraisal.

Table 6: Date, time and weather conditions of survey visit

Date	Time of survey	Weather conditions*
15/09/2022	10:00	Wind: BF2 Cloud: 1/8 Temp: 16°C Rain: None

*Wind as per Beaufort Scale / Cloud cover given in Oktas.

3.8. Constraints

A single visit cannot always ascertain the presence or absence of a protected species. However, an assessment is made of the likelihood for protected species to occur based on habitat characteristics and the ecology of each species. Where there is potential for protected species, additional survey work may be required to ascertain their presence or absence.

Data on species records obtained from local biological records centres are sometimes only available at low spatial resolutions and are constrained by the voluntary nature of the contributions and what has been chosen to be submitted as records. While these records provide a useful indication of species recorded in the local area, in particular protected or notable species, the data is not necessarily an accurate reflection of species assemblages or abundance in the vicinity.

4. RESULTS

4.1. Desktop study

An ecological desktop study was completed for the Site and the surrounding 10km for internationally protected sites, and the surrounding 2km for species data, nationally protected sites and locally protected sites. Data provided by Greenspace Information for Greater London (GiGL) identified a number of UK and European protected species, Species and Habitats of Principal Importance (as listed under Section 41 of the NERC Act 2006), and species of conservation concern within 2km of the Site. It should be noted that this is not a comprehensive list of the distribution or extent of the local flora and fauna of conservation importance. These species records are discussed in greater detail in the protected species scoping survey section (Section 4.3 below).

Details of international statutorily designated sites identified as part of the desktop study are displayed in Table 7 below. These consist of one Special Protection Area (SPA) and Ramsar site.

Table 7: International statutorily designated sites within 10km of 88 and 100 Grays Inn Road

Site name	Area (ha)	Distance and direction	Reasons for selection
Lee Valley Ramsar and SPA	451.30	6.9km NE	A series of embanked water supply reservoirs, sewage treatment lagoons, and former gravel pits extending along about 24km of the valley from near Ware southward to Finsbury Park in London. These water bodies support internationally important numbers of wintering gadwall *Mareca strepera* and Shoveler *Spatula clypeata* and nationally important numbers of several other bird species. The site also contains a range of wetland and valley bottom habitats, both human-made and semi-natural, which support a diverse array of wetland fauna and flora.

Details of statutorily designated sites identified as part of the desktop study are displayed in Table 8 below. These consist of a single Local Nature Reserve (LNR).

Table 8: Statutorily designated sites within 2km of 88 and 100 Grays Inn Road

Site name	Area (ha)	Distance and direction	Reasons for selection
Camley Street Nature Park LNR	0.84	1.8km NW	This site is an urban wild space containing a range of habitat examples created on former vacant land. The wildlife interest is of high local educational and social value owing to the severe deficiency of wildlife sites in Greater London. The site is primarily an educational resource and a means of increasing local community awareness of the natural environment.

Details of non-statutorily designated sites identified as part of the desktop study are displayed in Table 9 below. Whilst 43 Sites of Importance for Nature Conservation (SINCs) and one proposed SINC are present within the immediate 2km surrounds of the Site, due to the extent and nature of the proposed works, it is considered appropriate to only consider those immediately adjacent to or within the Site. Accordingly, only non-statutorily designated sites within 0.5km of the Site are set out in Table 9 below.

Table 9: Non-statutorily designated sites within 0.5km of 88 and 100 Grays Inn Road

Site name	Area (ha)	Distance and direction	Reasons for selection
Spa Fields Gardens SINC (Local Grade)	0.84	0.5km NE	A medium sized, recently landscaped park with a range of habitats including species-rich ornamental flower beds, amenity grassland lawns, areas where ornamental grape vines are being grown, scattered trees and ornamental shrubs.
St Andrew's SINC (Local Grade)	0.66	0.5km N	A former churchyard that is now managed as a small public park.
Coram's Fields SINC (Local Grade)	2.7	0.5km NW	A park with many facilities for children, including playgrounds, sports facilities and a pets' corner.

The landscape surrounding the Site is dominated by industrial buildings, associated hardstanding and roads, with limited greenspace. Nearby significant habitats are limited to the above designated sites and there is limited connectivity between these habitats and the Site.

The Site lies within a Natural England Site of Special Scientific Interest (SSSI) Impact Risk Zone (IRZ) (Natural England, 2019), however this IRZ criteria does not apply to commercial development and,

accordingly, local planning authority (LPA) consultation with Natural England on the likely ecological risks associated with the proposed development will not be required.

The Site lies within the Thames Estuary Important Invertebrate Area (IPA); the Site does not lie within any Important Plant Areas (IPAs).

4.2. UK Habitat Classification

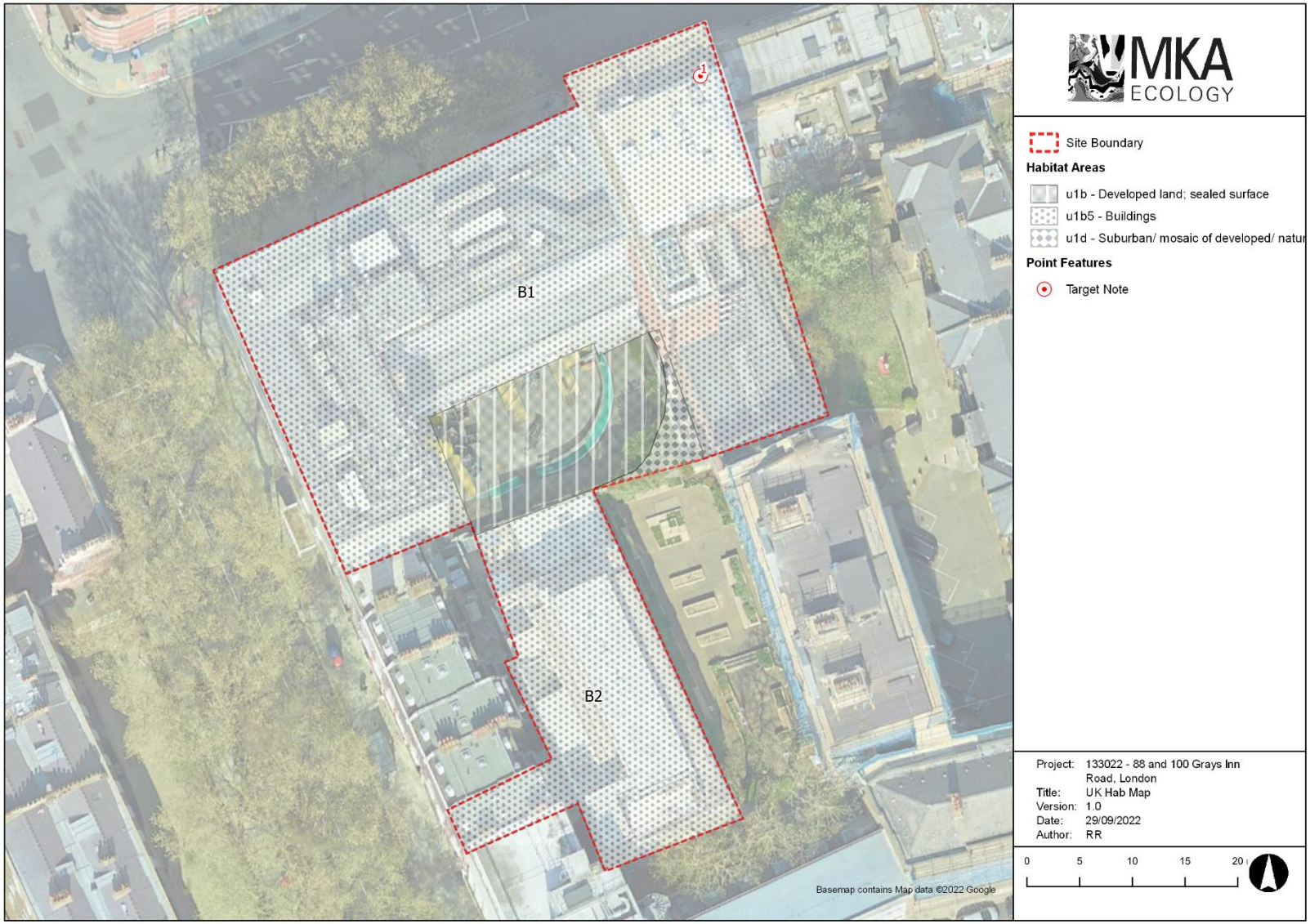
The Site was found to comprise buildings, hardstanding and an area of introduced shrub. More detailed species lists, along with their relative abundance, can be found in Appendix 2. The UK habitat classification survey map is provided in Figure 1, at the end of this section. Descriptions of the habitat types present along with dominant species compositions are provided below.

Buildings (u1b5)
The Site is dominated by two large office buildings. Building B1 (100 Grays Inn Road) is a brick-built seven-storey block with metal and glass panels on the exterior and supports various levels of terraces and flat roof sections (Photograph 1, Appendix 3). Building B2 (88 Grays Inn Road) is a four-storey brick-built building with a flat paved roof (Photograph 2, Appendix 3). These buildings were noted to be largely devoid of vegetation at the time of survey, however instances of butterfly-bush *Buddleja davidii* were also recorded on the roof of building B1 (Target Note 1, Figure 1; Photograph 3, Appendix 3). Further discussion of this species is set out within in Section 4.3 below.

Developed land; sealed surface (u1b)
There are areas of hardstanding within the Site in the form of areas of car parking and a storage yard (Photograph 4, Appendix 3). These areas of hardstanding were recorded to be in good condition and were devoid of vegetation at the time of survey.

Suburban/ mosaic of developed/ natural surface (u1d)
There is an area of introduced shrub within the car park/storage yard area of the Site (Photograph 5, Appendix 3). Species present include ivy *Hedera helix*, jasmine *Jasminum* sp., Japanese laurel *Aucuba japonica,* Wilson's honeysuckle *Lonicera nitida*, New Zealand flax *Phormium tenax* and bamboo *Bambusa* sp*.*.

Figure 1: UK Habitat Classification map of 88 and 100 Grays Inn Road, London



4.3. Target notes

1. Butterfly-bush (LISI species)

4.4. Protected species scoping survey

Plants and fungi

The data search returned a number of records for protected or notable plant species within 2km of the Site. These included SPI listed under Section 41 of the NERC Act (2006), Schedule 8 of the Wildlife and Countryside Act 1981 (as amended), as well as nationally scare, and red listed species. Species of note included cornflower *Centaurea cyanus*, box *Buxus sempervirens* and Deptford pink *Dianthus armeria*. No protected or notable species were recorded on Site. Given that the Site is dominated by built form, there has been assessed to be a **negligible** likelihood that it supports protected or notable plant species or assemblages.

An individual instance of butterfly-bush was recorded on the north east corner of building B1. Butterfly-bush is listed as a species of concern on the London's Invasive Species Initiative (LISI, 2019). Safeguards to be put in place to prevent the spread of this species during the proposed development works are discussed in Section 5 below. The presence of invasive plant species on site is **confirmed**.

Invertebrates

The data search returned a number of records for protected or notable invertebrate species within 2km of the Site; species of note include stag beetle and cinnabar moth. The nearest stag beetle record returned was returned from 0.2km to the north of the Site and dated from 2017; the most recent stag beetle record is from 2020. The nearest cinnabar moth record was returned from 1.1km to the east of the Site and dated from 2019; this is also the most recent record of cinnabar moth. Stag beetles are listed on the Wildlife and Countryside Act (1981). Both stag beetle and cinnabar moth are SPI Importance under the NERC Act (2006).

Given the heavily urban nature of the Site and the lack of significantly vegetated habitats with any connectivity to the wider landscape or established deadwood features, there has been assessed to be a **negligible** likelihood that it supports notable or protected invertebrate populations.

Amphibians

The data search returned a number of records for amphibian species within 2km of the Site; species include common toad *Bufo bufo* and common frog *Rana temporaria*. The data search returned no records for great crested newt and a search of Defra's MAGIC website returned no European Protected Species Licences granted for great crested newt within 2km of the Site.

The Site lacks any form of aquatic habitat and the existing built form offers no suitable terrestrial habitat for amphibians. The only vegetated habitat present is a small area of introduced shrub which is isolated from any amphibian-suitable habitat in the surrounding area. As such, the likelihood that the Site supports notable or protected amphibian populations has been assessed to be **negligible**.

Reptiles

The data search returned a small number records for reptiles within 2km of the Site, all of which are for common lizard *Zootoca vivipara*. The closest and most recent record for common lizard was returned from 1.1km east of the Site and dated from 2021.

The existing built infrastructure offer no suitable terrestrial habitat for reptiles. The only vegetated habitat present is a small area of introduced shrub which is isolated any reptile-suitable habitat in the surrounding area. As such, the likelihood that the Site supports notable or protected reptile populations has been assessed to be **negligible**.

Birds

Two bird species were recorded during the Site visit. These species are shown in Table 10 together with their conservation status. It is important to note that this is not a full inventory of species for the Site.

Table 10: Bird species recorded during Site visit

Common name	Systematic name	S1 W&CA[1]	BoCC[2] Status	S41 SPI[3]	Local PrSp[4]
Carrion crow	*Corvus corone*	-	Green	-	-
Rose necked parakeet	*Psittacula krameri*	-	Invasive	-	-

[1] Schedule 1 of The Wildlife and Countryside Act 1981 (see Appendix 1)
[2] Birds of Conservation Concern (see Appendix 1)
[3] Section 41 (NERC Act 2006) 'Species of Principal Importance' (see Appendix 1)
[4] Local Priority Species

The data search returned numerous records for protected and notable bird species within 2km of the Site, including species listed on Annex 1 of the Birds Directive, Schedule 1 of the Wildlife and Countryside Act 1981, Section 41 of the NERC Act (2006) and birds listed as Amber or Red under the Birds of Conservation Concern (Eaton et al., 2015). All wild birds, their active nests and eggs are protected under The Wildlife and Countryside Act 1981 (as amended), which makes it an offence deliberately, or recklessly, to kill or injure any wild bird or damage or destroy any active birds' nest or eggs. Species returned by the data search include house sparrow *Passer domesticus*, black redstart, spotted flycatcher *Muscicapa striata* and herring gull *Larus argentatus*. The data search also returned a number of confidential records of peregrine falcon *Falco peregrinus* from within 2km of the Site, the most recent of which is dated from 2021.

Black redstart is a red listed species and a London Priority Species. This species is known to be present in areas close to open water and requires suitable areas of sparely vegetated and stony ground for feeding. Whilst the Site is considered unlikely to support this species in its current state, given the location of the Site, recommendations have been set out in Section 5 below to enhance the opportunities present post-development.

Peregrine falcon are also listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and are also listed as a London Priority Species. Within urban settings, peregrine falcons are known to favour tall buildings and structures to use as nest sites, roosts and feeding perches. The abundance of feral pigeons *Columba livia* within urban settings further increases the suitability for peregrine falcon, as these are a favoured prey species.

The flat roofs on the buildings offer nesting opportunities for gull species including herring gulls, which are nationally red listed. Gulls regularly nest in urban environments, especially in areas that are in close proximity to water bodies. Given the flat roofs and the Site's proximity to the Thames, there has been assessed to be a **low** likelihood that the Site supports nesting gulls.

The area of introduced shrub may provide suitable nesting habitat for common bird species. There has been assessed to be a **moderate** likelihood that the Site supports common nesting bird species.

Safeguards for nesting birds are recommended in Section 5 below. However, given the habitats present, the likelihood that the Site supports important assemblages of birds is **negligible**.

Badgers

The data search returned two confidential records for badger from within 2km of the Site, dated from 2013 and 2021. There are no badger-suitable habitats present at the Site. The likelihood that the Site supports badger has been assessed to be **negligible**.

Other mammals

The data search returned records for water vole *Arvicola amphibius*, otter *Lutra lutra* and hedgehog *Erinaceus europaeus*, however there are no habitats suitable to support these protected mammal species present at the Site. The likelihood that the site supports protected terrestrial or riparian mammals has been assessed to be **negligible**.

4.5. Preliminary Roost Assessment

The data search returned a small number of records for bats within 2km of The Site. Records for three species were returned in total, including Nathusius' pipistrelle, common pipistrelle and soprano pipistrelle. The data search also returned records for unidentified bats (*Chiroptera*, *Pipistrellus*, *Vespertilionidae*).

A search of Defra's MAGIC returned two records for European Protected Species Licences granted within 2km of the Site. A licence for the destruction of a common pipistrelle resting place was granted 1.7km west of the site in 2015 and a licence for the destruction of a soprano pipistrelle resting place was granted 1.9km north west of the site in 2017.

The Site offers very limited suitable habitat for foraging and commuting bats, given the limited extent of vegetated habitats and the heavily-lit nature of the surrounding environment. As such, the likelihood that the Site supports foraging or commuting bats has been assessed to be **negligible**.

No direct evidence of roosting bats was observed during the survey work undertaken and no features of bat roosting potential were identified at the Site. The lack of suitable roost features, lack of significantly vegetated habitats, and heavily-lit nature of the surrounding landscape has led to the assessment that there is a **negligible** likelihood that the Site supports roosting bats.

Further detailed information regarding the results of the Preliminary Roost Assessment is set out below in Table 11.

Table 11: Building roost assessment results

Building	Roost suitability	Description	Bat roost evidence and potential
B1	Negligible	A brick-built seven-storey block with metal and glass panels on the exterior. There are various levels of terraces and flat roof sections.	No evidence of roosting bats was identified during the internal and external inspection of this building, nor were any features of bat roost potential.
B2	Negligible	A four-storey brick-built building with a flat paved roof.	No evidence of roosting bats was identified during the internal and external inspection of this building, nor were any features of bat roost potential.

5. ECOLOGICAL CONSTRAINTS, OPPORTUNITIES AND RECOMMENDATIONS

This section outlines key ecological issues for consideration, recommendations for further work and ecological enhancements where appropriate.

Off-site habitats

Spa Fields Gardens, St Andrew's Gardens, and Coram's Fields SINCs all lie within 0.5km of the Site. Given the proximity of these designations, pollutants and dust associated with construction works may accidently impact the SINCs. Should clearance and construction activities be designed to minimise impacts from pollutants (such as surface run-off, dust, wind-blown litter), the integrity of the nearby SINCs would be unlikely to be affected by the proposals. The mitigation measures to be adopted throughout the construction phase of the development should be documented within a Construction and Environmental Management Plan (CEMP) and include:

- Measures to minimise dust arising, when necessary, including the use of dust control machinery and wet machinery;
- Measures to prevent pollution / contamination events through surface run-off; and
- Measures to minimise other pollution events such as noise, vibration and wind-blown litter.

Recommendation 1

Produce a Construction Environmental Management Plan (CEMP) detailing measures by which the proposed works will minimise disturbance to the nearby SINCs.

On-site habitats

Butterfly-bush was recorded at the Site. Whilst this species is not listed on Schedule 9 of the Wildlife and Countryside Act 1981, it is listed as species of concern on the London Invasive Species Initiative (LISI, 2019). Butterfly-bush is a non-native species and has the potential to become invasive and out-compete native flora. Whilst there is no legal obligation to control LISI species within the Site or to remove them as controlled waste, it would be good practice to remove all incidences of butterfly-bush, and to dispose of the arisings as controlled waste in order to avoid its spread.

Recommendation 2

Remove butterfly-bush from the Site and dispose of the arisings as controlled waste in order to avoid their spread. Include the appropriate methodology for this within the CEMP.

The introduced shrub is the only area of ecological value at the Site, which will be lost under the current development proposals. The National Planning Policy Framework (NPPF; see Appendix 1) states that

all planning decisions should aim to maintain and enhance, restore or add to biodiversity. As such, it is recommended that this habitat be replaced by new ecologically valuable habitat incorporated into the design scheme.

Recommendation 3

Replace the to-be-destroyed introduced shrubs with new ecologically valuable habitats incorporated into the design scheme.

Birds

The Site's flat roofs and its proximity to the Thames has led to the assessment that there is a **low** likelihood that the Site supports nesting gulls. There has been assessed to be a **moderate** likelihood that the area of introduced shrub supports common nesting bird species.

All wild birds, their active nests and eggs are protected under The Wildlife and Countryside Act 1981 (as amended), which makes it an offence deliberately, or recklessly, to kill or injure any wild bird or damage or destroy any active birds' nest or eggs.

Scheduling demolition and vegetation clearance works between the months of September and February inclusive (i.e. outside of the bird season) would avoid impacts on breeding birds.

Where works are required during the breeding bird season (between the months of March and August inclusive), they can only proceed following the completion of a nesting bird check undertaken by an experienced ornithologist. Any active birds' nest identified during this check must be protected from harm until the nesting attempt is complete. This will require a buffer to be left around the nest, the size of which will depend upon the species involved (as a general rule, this will be 10m in all directions around the nest). Any buffers established as a result of the initial nesting bird check must be subjected to a second check after the original nesting attempt is completed, before such areas can be removed during the breeding bird season.

Recommendation 4

Schedule any demolition and vegetation clearance works for outside the breeding bird season. Where this is not feasible, nesting bird checks must be carried out by an experienced ornithologist prior to the commencement of works.

It is strongly recommended that any potential nesting bird habitat is cleared outside the breeding bird season in order to avoid potentially lengthy delays if nests are found during nesting bird checks.

Opportunities for biodiversity enhancement

Following the issue of the National Planning Policy Framework (NPPF; see Appendix 1), all planning decisions should aim to maintain and enhance, restore or add to biodiversity and geological conservation interests. Ecological enhancements should aim to deliver biodiversity gains for the proposed development Site.

It has been recommended that a Biodiversity Net Gain assessment is undertaken to ensure that the proposed development is able to demonstrate a significant increase in biodiversity within the Site. This Biodiversity Net Gain assessment has been undertaken (MKA Ecology Ltd, 2022) and will be provided alongside this report as part of the planning application for the development of the Site. It is recommended that this document be updated following any revision to the design of the Site. This will directly address the aims of the Environment Act (2021).

Recommendation 5

Ensure that the development delivers a biodiversity net gain of at least 10% by updating the Biodiversity Net Gain assessment following any design revisions.

To provide further resources for invertebrates within the Site, it is recorded that the creation of deadwood features and bug hotels within the green roofs to be provided. The provision of such features would in turn provide benefits a range of other species, including bats and birds. This could include rotting roots or tree stumps spread around various locations. The drilling of holes or cutting of notches can add even more value for invertebrates.

Recommendation 6

Incorporate biodiversity enhancement measures at the Site, including the provision of deadwood features or bug hotels.

Enhanced opportunities for breeding birds should also be incorporated into the design scheme. It is recommended that integrated boxes are included within the final development and that there is focus on black redstart. Black redstart is known to breed in disused buildings and urban areas and is listed on Schedule 1 of the Wildlife and Countryside Act (1981), nationally red-listed and a London Priority Species. The inclusion of specific nest boxes for this species, in combination with the proposed biodiverse green roofs, would significantly enhance the opportunities afforded to this local priority species. .

It is recommended that there is also a focus on swift, together with the provision of generalist bird boxes. Swift boxes have the added advantage of being used by house sparrow, which is also a London Priority Species. Given the records for peregrine falcon within 2km of the Site, it is recommended that a nesting tray is also provided for this species within the Site post development. Examples of suitable boxes are

shown in Appendix 4 together with information concerning the correct siting of these enhancement features.

Recommendation 7

A minimum of eight bird boxes should be installed at the Site, to include black redstart (two) and swift (six). A nesting tray should also be provided for peregrine falcon.

The wider landscape has the potential for use by foraging bats. With this in mind, enhanced opportunities for roosting bats should also be provided at the Site through installation of bat boxes.

Recommendation 8

Provisions should be made for roosting bats at the Site post-development, to include a minimum of four integrated or wall mounted bat bricks or bat boxes.

It is recommended that the green infrastructure to be incorporated into the design scheme be retained in any future design iterations. Green roofs and green walls have been identified as opportunities to maximise biodiversity within urban and sub-urban areas within Policies G1 Green infrastructure and G5 Urban greening within the London Plan, as set out in Appendix 1; their inclusion would address local planning policy targets.

Green roofs can be installed on any flat, or slightly sloping, roof surface and can be highly beneficial for a wide variety of species. The principle behind a green roof is that it is intentionally planted to some extent. Design specifications should focus upon creating a structurally diverse open mosaic habitat, incorporating a variety of substrate types and pollinator-friendly plant species.

Green walls are essentially walls with living plants growing on them, where plants serve to enhance otherwise featureless areas. The process of allowing and encouraging plants to grow on and up walls allows the natural environment to be extended into urban areas. Green walls that comprise climbers and light weight support structures such as wires and trellis are relatively cheap to develop and maintain. Creating green walls by allowing climbing species to attach themselves to the actual structure of existing walls or fences is also a viable option.

Recommendation 9

Retain the biodiversity-friendly green infrastructure (green roofs and green walls) into the design scheme; this will directly address Policies G1 and G5 of the London Plan.

Urban greening has become a fundamental element of site and building design, and can be achieved by incorporating features such as high-quality landscaping, green roofs and green walls within developments. Policy G5 of the London Plan aims to encourage greening of infrastructure in urban areas on previously developed land which has little or no existing natural surface. Given the dominance

of the Site by buildings and hardstanding, which form sealed surfaces, the current green infrastructure value of the Site is minimal. It is considered that green infrastructure provision will contribute to achieving the goals of this policy. In order to address the requirements of the London Plan, a formal Urban Greening Factor should be undertaken and updated following any revision to the design of the Site.

Recommendation 10

Ensure that the development delivers a sufficient green infrastructure by updating the Urban Greening Factor assessment following any design revisions. This will ensure the proposed development will address both national and local policy. This should be updated following any design revisions.

Summary of recommendations

Table 12 below summarises the recommendations made within this report, and specifies the stage of the development at which action is required. Colour coding of cells within the table is as follows:

Key:

No action required for this species group at this stage

Action required (see notes for details)

Level of action required will be determined following the further survey work

Table 12: Summary of recommendations at 88 and 100 Grays Inn Road, London

Species	Pre-planning action required?	Pre-construction action required?	Construction phase mitigation required?	Enhancements proposed?
Designated Sites	No	Production of a CEMP.	Implementation of mitigatory measures as detailed in the CEMP.	No
Onsite habitats	No	No	No	Ecologically valuable habitat creation.
Plants	No	No	Removal of butterfly-bush, with arisings disposed of as controlled waste.	Native planting.
Invertebrates	No	No	No	Native planting, including, UK native, pollinator friendly planting. Provision of

Species	Pre-planning action required?	Pre-construction action required?	Construction phase mitigation required?	Enhancements proposed?
				deadwood on the biodiverse green roofing.
Birds	No	No	Timing of works for building demolition OR further survey work.	Bird boxes and native planting.
Bats	No	No	No	Bat boxes and native planting

6. CONCLUSIONS

A Preliminary Ecological Appraisal and Preliminary Roost Assessment were conducted at 88 and 100 Grays Inn Road, London in September 2022 by MKA Ecology Ltd. The current development proposals involve the redevelopment of the 100 Grays Inn Road site and the refurbishment of the 88 Grays Inn Road site.

The Site lies within close proximity to Spa Fields Gardens, St Andrew's Gardens, and Coram's Fields SINCs. Mitigation measures to minimise any residual impacts from the development of the Site, including dust and airborne pollutants should be put in place, in order to protect the designated sites during construction. A CEMP should be produced to detail these measures for construction teams.

Butterfly-bush, a species listed as invasive on London's Invasive Species Initiative, is present at the Site. In order to prevent its spread, all instances of buddleja should be removed from the Site and disposed of as controlled waste.

The Site is currently of limited ecological value, being dominated by built form. The Site currently has a small area of introduced shrub which is of elevated value in the context of the Site, which is to be lost under the proposals. New ecologically valuable habitats should be created at the Site in order to replace this to-be-lost habitat. The design plans should incorporate green infrastructure, including green roofs and green walls where possible. This would address policy G1 of the London plan.

The potential protected species constraints that were identified are limited to nesting birds. The flat roofs present offer nesting suitability for gull species including herring gulls, which are nationally red-listed. The introduced shrub offers suitability for common nesting bird species. Works should be timed sensitively in order to avoid impacts on active bird nests; in the event that works are deemed necessary during the breeding bird season, it is recommended that a nesting bird check be undertaken immediately prior to their commencement.

A number of biodiversity enhancements have been suggested that could be implemented in order to promote biodiversity at the Site, including the provision of bird boxes targeted to London Priority species, the provision of bat boxes and the provision of increased invertebrate opportunities. In addition, the current design proposals include green infrastructure, in the form of biodiverse green roofs and pergola planting which will act as green walls. The inclusion of such features will also contribute to ensuring a sustainable development that helps to achieve both local and national biodiversity targets.

A Biodiversity Net Gain and Urban Greening Factor assessment has been undertaken to ensure that the proposed development is able to demonstrate a significant increase in biodiversity and green infrastructure provision within the Site, which should be updated following any design revisions.

7. REFERENCES

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8. APPENDICES

8.1. Appendix 1: Relevant wildlife legislation and planning policy

Please note that the following is not an exhaustive list, and is solely intended to cover the most relevant legislation pertaining to species commonly associated with development sites.

Subject	Legislation (England)	Relevant prohibited actions
Amphibians		
Great crested newt *Triturus cristatus* Natterjack toad *Epidalea calamita*	Schedule 2 of Conservation of Habitats and Species Regulations (2017) Schedule 5 of The Wildlife and Countryside Act 1981 (as amended)	• Deliberately capture or kill, or intentionally injure; • Deliberately disturb or recklessly disturb them in a place used for shelter or protection; • Damage or destroy a breeding site or resting place; • Intentionally or recklessly damage, destroy or obstruct access to a place used for shelter or protection; and • Possess an individual, or any part of it, unless acquired lawfully.
Reptiles		
Common lizard *Zootoca vivipara* Adder *Vipera berus* Slow-worm *Anguis fragilis* Grass snake *Natrix helvetica helvetica*	Part of Sub-section 9(1) of Schedule 5 of The Wildlife and Countryside Act 1981 (as amended)	• Intentionally kill or injure individuals of these species (Section 9(1)).

Subject	Legislation (England)	Relevant prohibited actions
Sand lizard *Lacerta agilis* Smooth snake *Coronella austriaca*	Full protection under Section 9 of Schedule 5 of The Wildlife and Countryside Act 1981 (as amended)	• Deliberately or intentionally kill, capture (take) or intentionally injure; • Deliberately disturb; • Deliberately take or destroy eggs; • Damage or destroy a breeding site or resting place or intentionally damage a place used for shelter; or • Intentionally obstruct access to a place used for shelter.
Birds		
All wild birds	Wildlife and Countryside Act 1981 (as amended)	• Intentionally kill, injure, or take any wild bird or their eggs or nests.
'Schedule 1' birds	Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)	• Disturb any wild bird listed on Schedule 1 whilst it is building a nest or is in, on, or near a nest containing eggs or young; or • Disturb the dependent young of any wild bird listed on Schedule 1.
Mammals		
Bats (all UK species)	Schedule 2 of Conservation of Habitats and Species Regulations (2017)	• Deliberately capture, injure or kill a bat; • Deliberately disturb a bat (disturbance is defined as an action which is likely to: (i) Impair their ability to survive, to breed or reproduce, or to rear or nurture their young; (ii) Impair their ability to hibernate or migrate; or (iii) Affect significantly the local

Subject	Legislation (England)	Relevant prohibited actions
	Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	distribution or abundance of the species); • Damage or destroy a bat roost; • Intentionally or recklessly disturb a bat at a roost; or • Intentionally or recklessly obstruct access to a roost. In this interpretation, a bat roost is "*any structure or place which any wild [bat]...uses for shelter or protection*". Legal opinion is that the roost is protected whether or not the bats are present at the time.
Badger *Meles meles*	Protection of Badgers Act 1992	Under Section 3 of the Act: • Damage a sett or any part of it; • Destroy a sett; • Obstruct access to, or any entrance of, a sett; or • Disturb a badger when it is occupying a sett. A sett is defined legally as any structure or place which displays signs indicating current use by a badger (Natural England 2007).
Hazel dormouse *Muscardinus avellanarius*	Schedule 2 of Conservation of Habitats and Species Regulations (2017)	• Intentionally or deliberately capture or kill, or intentionally injure;

Subject	Legislation (England)	Relevant prohibited actions
	Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	• Deliberately disturb or intentionally or recklessly disturb them in a place used for shelter or protection; • Damage or destroy a breeding site or resting place; • Intentionally or recklessly damage, destroy or obstruct access to a place used for shelter or protection; and • Possess an individual, or any part of it, unless acquired lawfully.
Otter *Lutra lutra*	Schedule 2 of Conservation of Habitats and Species Regulations (2017) Section 9(4)(b) and (c) of Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	• Deliberately capture, injure or kill an otter; • Deliberately disturb an otter in such a way as to be likely to significantly affect the local distribution or abundance of otters or the ability of any significant group of otters to survive, breed, rear or nurture their young; • Intentionally or recklessly disturb any otter whilst it is occupying a holt; • Damage or destroy or intentionally or recklessly obstruct access to an otter holt.
Water vole *Arvicola amphibius*	Section 9 of Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	• Intentionally kill, injure or take water voles; • Possess or control live or dead water voles or derivatives; • Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection; or • Intentionally or recklessly disturb water voles whilst occupying a structure or place used for that purpose.

Subject	Legislation (England)	Relevant prohibited actions
Crustaceans		
White-clawed crayfish *Austropotamobius pallipes*	Section 9(1) of Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	• Intentionally kill, injure or take white-clawed crayfish by any method.

The Environment Act 2021

The Environment Act 2021, sets out key legislation after the UK's exit from the European Union. With the largest changes to green regulations in decades, the Act includes the establishment of an Office for Environmental Protection, targets on air pollution, water quality and biodiversity, and the enshrinement of the 25 Year Environment Plan in law. The Act also makes provisions for a mandatory 10% net gain in biodiversity for all developments covered by the Town and Country Planning Act and it also introduces a statutory requirement for Local Nature Recovery Strategies.

Full legislation text available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted

The Conservation of Habitats and Species Regulations 2017 (as amended)

Full legislation text available at: The Conservation of Habitats and Species Regulations 2017 (as amended) (legislation.gov.uk)

The Wildlife and Countryside Act 1981 (as amended)

Full legislation text available at: http://www.legislation.gov.uk/ukpga/1981/69/contents.

Countryside and Rights of Way Act 2000

Full legislation text available at: http://www.legislation.gov.uk/ukpga/2000/37/contents

Protection of Badgers Act 1992

Full legislation text available at: http://www.legislation.gov.uk/ukpga/1992/51/contents

Section 41 of Natural Environments and Rural Communities (NERC) Act 2006

Full legislation text available at: http://www.legislation.gov.uk/ukpga/2006/16/section/41

Many of the species above, along with a host of others not afforded additional protection, are listed on Section 41 of the NERC Act 2006.

Section 41 (S41) of the Natural Environment and Rural Communities (NERC Act 2006) requires the Secretary of State to publish a list of habitats and species that are of principal importance for the conservation of biodiversity in England. The list (including 56 habitats and 943 species) has been drawn up in consultation with Natural England and draws upon the UK Biodiversity Action Plan (BAP) List of Priority Species and Habitats.

The S41 list should be used to guide decision-makers such as local and regional authorities to have regard to the conservation of biodiversity in the exercise of their normal functions – as required under Section 40 of the NERC Act 2006. The duty applies to all local authorities and extends beyond just conserving what is already there, to carrying out, supporting and requiring actions that may also restore or enhance biodiversity.

Schedule 9 of Wildlife and Countryside Act 1981 (as amended)

In addition to affording protection to some species, The Wildlife and Countryside Act 1981 (as amended) also names species which are considered invasive and require control. Section 14 of the Act prohibits the introduction into the wild of any animal of a kind which is not ordinarily resident in, and is not a regular visitor to, Great Britain in a wild state, or any species of animal or plant listed in Schedule 9 to the Act. In the main, Schedule 9 lists non-native species that are already established in the wild, but which continue to pose a conservation threat to native biodiversity and habitats, such that further releases should be regulated.

Wild Mammals (Protection) Act 1996

Full legislation text is available at: http://www.legislation.gov.uk/ukpga/1996/3/contents

Under this legislation it is an offence to cause unnecessary suffering to wild mammals, including by crushing and asphyxiation. It largely deals with issues of animal welfare, and covers all non-domestic mammals including commonly encountered mammals on development sites such as rabbits, foxes and field voles.

Birds of Conservation Concern (BoCC)

This is a quantitative assessment of the status of populations of bird species which regularly occur in the UK, undertaken by the UK's leading bird conservation organisations. It assesses a total of 245 species against a set of objective criteria to place each on one of three lists – Green, Amber and Red – indicating an increasing level of conservation concern. There are currently 70 species on the Red list, 103 on the Amber list and 72 on the Green list. The classifications described have no statutory implications, and are used merely as a tool for assessing scarcity and conservation value of a given species.

National Planning Policy Framework (NPPF)

Full text is available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

The revised NPPF was updated on 20 July 2021 setting out the Government's planning policies for England and the process by which these should be applied. The policies within the NPPF are a material consideration in the planning process. The key principle of the NPPF is a presumption in favour of

sustainable development, with sustainable development defined as a balance between economic, social and environmental needs.

Policies 174 to 188 of the NPPF address conserving and enhancing the natural environment, stating that the planning system should:

- Contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes;
- Recognise the wider benefits of ecosystem services; and
- Minimise impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity.

Furthermore, there is a focus on re-use of existing brownfield sites or sites of low environmental value as a priority, and discouraging development in National Parks, Sites of Specific Scientific Interest, the Broads or Areas of Outstanding Natural Beauty other than in exceptional circumstances.

Where possible, planning policies should also

"Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity".

Local Planning Policy

London Borough of Camden Council has produced an adopted Local Plan (2017) that sets out the Council's planning policies. In particular, Policy A3: Biodiversity discusses matters regarding biodiversity and habitat conservation as is presented below.

Policy A3: Biodiversity

The Council will protect and enhance sites of nature conservation and biodiversity. We will:

- *Designate and protect nature conservation sites and safeguard protected and priority habitats and species;*
- *Grant permission for development unless it would directly or indirectly result in the loss or harm to a designated nature conservation site or adversely affect the status or population of priority habitats and species;*
- *Seek the protection of other features with nature conservation value, including gardens, wherever possible;*

- *Assess developments against their ability to realise benefits for biodiversity through the layout, design and materials used in the built structure and landscaping elements of a proposed development, proportionate to the scale of development proposed;*
- *Secure improvements to green corridors, particularly where a development scheme is adjacent to an existing corridor;*
- Seek to improve opportunities to experience nature, in particular where such opportunities are lacking;
- Require the demolition and construction phase of development, including the movement of works vehicles, to be planned to avoid disturbance to habitats and species and ecologically sensitive areas, and the spread of invasive species;
- Secure management plans, where appropriate, to ensure that nature conservation objectives are met; and
- Work with The Royal Parks, The City of London Corporation, the London Wildlife Trust, friends of park groups and local nature conservation groups to protect and improve open spaces and nature conservation in Camden.

The Council will protect, and seek to secure additional, trees and vegetation. We will:

- Resist the loss of trees and vegetation of significant amenity, historic, cultural or ecological value including proposals which may threaten the continued wellbeing of such trees and vegetation;
- Require trees and vegetation which are to be retained to be satisfactorily protected during the demolition and construction phase of development in line with BS5837:2012 'Trees in relation to Design, Demolition and Construction' and positively integrated as part of the site layout;
- Expect replacement trees or vegetation to be provided where the loss of significant trees or vegetation or harm to the wellbeing of these trees and vegetation has been justified in the context of the proposed development; and
- Expect developments to incorporate additional trees and vegetation wherever possible.

Given that the Site is located within London, consideration of the policies relating to biodiversity within the London Plan 2021 has also been given. These include policies G1 and G5 to G8, as detailed below:

- Policy G1 Green infrastructure
  - *a) London's network of green and open spaces, and green features in the built environment, should be protected and enhanced. Green infrastructure should be planned, designed and managed in an integrated way to achieve multiple benefits.*
  - *b) Boroughs should prepare green infrastructure strategies that identify opportunities for cross-borough collaboration, ensure green infrastructure is optimised and consider green infrastructure in an integrated way.*
  - *c) Development Plans and area-based strategies should use evidence, including green infrastructure strategies, to:*

1. *identify key green infrastructure assets, their function and their potential function*
2. *identify opportunities for addressing environmental and social challenges through strategic green infrastructure interventions.*

d) Development proposals should incorporate appropriate elements of green infrastructure that are integrated into London's wider green infrastructure network.

- Policy G5 Urban greening

a) Major development proposals should contribute to the greening of London by including urban greening as a fundamental element of site and building design, and by incorporating measures such as high-quality landscaping (including trees), green roofs, green walls and nature-based sustainable drainage.

b) Boroughs should develop an Urban Greening Factor (UGF) to identify the appropriate amount of urban greening required in new developments. The UGF should be based on the factors set out in within the London Plan, but tailored to local circumstances. In the interim, the Mayor recommends a target score of 0.4 for developments that are predominately residential, and a target score of 0.3 for predominately commercial development (excluding B2 and B8 uses).

c) Existing green cover retained on site should count towards developments meeting the interim target scores set out in (B) based on the factors set out in the London Plan

- Policy G6 Biodiversity and access to nature

a) Sites of Importance for Nature Conservation (SINCs) should be protected.

b) Boroughs, in developing Development Plans, should:

1. *use up-to-date information about the natural environment and the relevant procedures to identify SINCs and ecological corridors to identify coherent ecological networks*
2. *identify areas of deficiency in access to nature (i.e. areas that are more than 1km walking distance from an accessible Metropolitan or Borough SINC) and seek opportunities to address them*
3. *support the protection and conservation of priority species and habitats that sit outside the SINC network, and promote opportunities for enhancing them using Biodiversity Action Plans*
4. *seek opportunities to create other habitats, or features such as artificial nest sites, that are of particular relevance and benefit in an urban context*
5. *ensure designated sites of European or national nature conservation importance are clearly identified and impacts assessed in accordance with legislative requirements.*

c) Where harm to a SINC is unavoidable, and where the benefits of the development proposal clearly outweigh the impacts on biodiversity, the following mitigation hierarchy should be applied to minimise development impacts:

1. *avoid damaging the significant ecological features of the site*
2. *minimise the overall spatial impact and mitigate it by improving the quality or management of the rest of the site*
3. *deliver off-site compensation of better biodiversity value.*

d) Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain. This should be informed by the best available ecological information and addressed from the start of the development process.

e) Proposals which reduce deficiencies in access to nature should be considered positively.

- Policy G7 Trees and woodlands

a) London's urban forest and woodlands should be protected and maintained, and new trees and woodlands should be planted in appropriate locations in order to increase the extent of London's urban forest – the area of London under the canopy of trees.

b) In their Development Plans, boroughs should:

1. *protect 'veteran' trees and ancient woodland where these are not already part of a protected site*
2. *identify opportunities for tree planting in strategic locations.*

c) Development proposals should ensure that, wherever possible, existing trees of value are retained. If planning permission is granted that necessitates the removal of trees there should be adequate replacement based on the existing value of the benefits of the trees removed, determined by, for example, i-tree or CAVAT or another appropriate valuation system. The planting of additional trees should generally be included in new developments – particularly large-canopied species which provide a wider range of benefits because of the larger surface area of their canopy.

- Policy G8 Food growing

a) In Development Plans, boroughs should:

1. *protect existing allotments and encourage provision of space for urban agriculture, including community gardening, and food growing within new developments and as a meanwhile use on vacant or under-utilised sites*
2. *identify potential sites that could be used for food production.*

8.2. Appendix 2: UK Habitat Classification species list

Please note that these lists are intended to be incidental records and do not constitute a full botanical survey of the site. Relative abundance is given using the DAFOR scale. Please see Table 2 for details.

Buildings (u1b5)

Common Name	Systematic Name	Relative abundance
Butterfly-bush	*Buddleja davidii*	R

Suburban/ mosaic of developed/ natural surface (u1d)

Common Name	Systematic Name	Relative abundance
Ivy	*Hedera helix*	O
Jasmine	*Jasminum* sp.	O
Japanese laurel	*Laurus* sp.	O
Wilson's honeysuckle	*Lonicera nitida*	O
New Zealand flax	*Phormium tenax*	O
Bamboo	*Bambusa* sp.	O

8.3. Appendix 3: Site photographs

Photograph 1: Building B1 (100 Grays Inn Road)

Photograph 2: Building B2 (88 Grays Inn Road)

Photograph 3: Butterfly-bush recorded on the roof of building B1 (Target Note 1, Figure 1)

Photograph 4: Area of hardstanding car park and storage

Photograph 5: Introduced shrub planting within the Site

8.4. Appendix 4: Bird and bat box recommendations

Bird box recommendations

A large number of bird boxes are available, designed for the specific needs of individual species. These are normally either designed to be mounted onto trees, external walls or integrated into a building. In general, bird boxes should be mounted out of direct sunlight and prevailing winds, out of reach of predators, with suitable foraging habitat for the subject species close by. Bird boxes should also be left up over winter as they can provide useful roosting sites for birds in bad weather.

Nest boxes should be cleaned at the end of each bird breeding season. All nesting material and other debris should be removed from the box. It should then be scrubbed clean with boiling water to kill any parasites (avoid using any chemicals). Once the box is clean, it should be left to dry out thoroughly. Under the Wildlife and Countryside Act 1981 it is an offence to disturb breeding birds and therefore annual cleaning is best undertaken from October to January when there is no risk of disturbing breeding birds.

Generalist boxes

Boxes to attract garden birds and woodland breeding species such as tits, nuthatch and redstart can be placed in gardens, orchards, woodlands and a wide variety of other habitats. The species of birds attracted to the box will depend upon the size of the entrance hole (see table below). Boxes should be fixed two to five metres up a tree or wall, out of the reach of predators such as domestic cats. Unless there are trees or buildings, which give permanent shelter, it is best facing between north and east.

House sparrow typically nest in loose colonies of around 10-20 pairs and, as they do not defend a territory, boxes can be placed as close as 20-30cm apart. Several individual boxes can be placed together or a terrace (see below) can be installed. House Sparrow's typical range is less than 2km; however, during breeding season adult birds will forage within just 60–70 m metres of their nest site with residential gardens, with native deciduous shrubbery, trees and grassland being favourable foraging habitat.

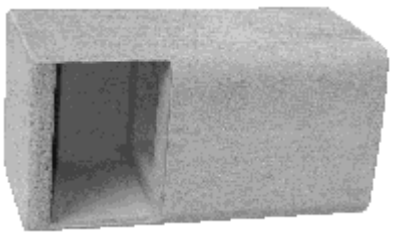
General		
Example	**Description**	**Picture**
Schwegler No. 1B General Purpose Nest	www.schwegler-nature.com Suitable for various garden and woodland birds, including house	

General		
Example	**Description**	**Picture**
box (32mm entrance hole)	sparrow. Other variations (e.g. 2M) can be free hanging, to deter predators.	

Black redstart box recommendations

Providing nest boxes for black redstart is often only successful when suitable foraging habitat is available in the surrounding area, such as areas of sparse wasteland vegetation and a stony substrate, as well as areas for perching and singing. The provision of such habitats can be achieved by creating foraging areas through the green roof to be included within the final development.

Black redstart typically nests on a building ledge or within a hole in the wall. The ideal nest box would therefore be built into the wall with an open front. Boxes for black redstart should be open fronted with a narrow entrance to present access by predators.

Black redstart		
Example	**Description**	**Picture**
Schwegler open fronted brick box 1HE	www.schwegler-nature.com This brick design can be built into the wall of the new development and the external surface, excluding the hole, can be rendered to match the surrounding wall. It has the added benefit of a narrow entrance which can help to prevent predation.	

Swift boxes

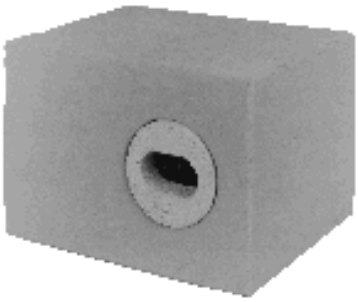
Swifts are colonial nesters and it is important to have several nest sites in one area. It is recommended that most buildings should have between 4 and 10 nest provisions. Swifts also feed almost exclusively

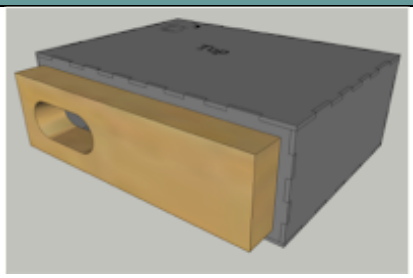
on the aerial plankton of flying insects and airborne spiders of small to moderate size, so therefore require habitats which support these invertebrates.

Nest boxes designed for Swifts should be installed at least 5m high, around the eaves of the building or under deeply overhanging eaves to allow Swifts to drop into the air to forage. The boxes should be positioned away from climbing plants to avoid access for predators such as rodents.

Swifts typically nest in flat spaces within buildings or within a crevice or cavity. The ideal nest box should have an oval or rectangular hole around 30mm (h) x 65mm (w). The internal dimensions of the box should be approximately 400mm (w) x 200mm (d) x 150mm (h).

Swifts can be attracted to areas that they have not previously colonised using 'Swift response calls'. Audio CDs are available for this purpose and are available on the Schwegler website (www.schwegler-nature.com).

Swift		
Example	**Description**	**Picture**
Ibstock Swift Box	www.Ibstock.com This Swift brick can be built into a wall on new buildings.	
Schwegler Brick Box Type 25	www.schwegler-nature.com This brick design can be built into the wall of the new development and the external surface, excluding the hole, can be rendered to match the surrounding wall.	
S Brick	https://actionforswifts.blogspot.com/p/s-brick.html The S Brick is Simply for Swifts and Sparrows and it Spans a Single course of bricks. The S Brick comprises a laser cut nest	

Swift		
Example	**Description**	**Picture**
	chamber, a built-in nest form and a brick slip front. It can be tailored for different brick sizes, cavity widths and brick facings.	
Triple Genesis Swift Nest Box	https://www.wildcare.co.uk/ It can be mounted on an external wall to provide three swift nesting sites.	

Peregrine falcon boxes

Peregrine falcons require extensive open terrain for hunting with habitat suitable for its prey. It has become increasingly difficult for Peregrines to find suitably sheltered spaces to nest, as a result of building renovation and/or the construction of new buildings with relatively smooth facades and roofs.

Peregrine falcons typically nest on ledges at over 20m high. As a nesting provision, it is recommended that a ledge is provided at this height with the dimension 450mm (l) x 600mm (w) x 40mm (h). This ledge should have raised edges with some drainage to prevent excessive water and can be covered with a substrate such as gravel or pea shingle.

The ledge should be positioned to avoid human disturbance. Peregrine falcons can be vocal so disturbance for the users of the building should be considered when positioning this nesting site. In addition, the falcon will produce pellets which may accumulate beneath the ledge, so positioning of the ledge should again be carefully considered.

It is important that additional ledges or perches are provided lower down the building to provide safe landing platforms for young when they start to fledge. Consequently, it is not advised to position artificial nests on buildings with smooth, vertical facades without ledges or other niches which young birds can reach if they fail to return to the nest site.

Peregrine falcon		
Example	**Description**	**Picture**
Peregrine Falcon nest box	www.schwegler-nature.com Boxes are designed to provide a spacious, protected and securely attached breeding space in a robust, long-lasting structure that requires little maintenance. Boxes can be placed in quarries or on high buildings such as towers, silos, high rise buildings, highway bridges (for example on or around the abutments).	 
Large open fronted nestboxes	http://www.londonperegrines.com/services/index.php Constructed of wood or metal and can be secured to the outside of a structure or on top of a building on an elevated tower or frame. Installation often requires scaffolding or hoists.	
Open trays	http://www.londonperegrines.com/services/index.php A shallow tray with raised edges, containing substrate that is secured to a sheltered ledge or within the structure.	

A wide range of bat boxes are available to suit a variety of species and design requirements. Bat boxes can be mounted externally on buildings, built directly into the wall structure or mounted on trees (dependent on box design). Boxes are more likely to be inhabited if they are located where bats feed and it may help to place the box close to features such as tree lines or hedgerows, which bats are known to use for navigation and can provide immediate cover for bats leaving the roost. Boxes should be placed in areas sheltered from strong winds and are exposed to the sun for part of the day. Access

to any bat roosting features should not be lit and should also be at a reasonable height to avoid predation (at least 2m if possible, preferably 4-5m).

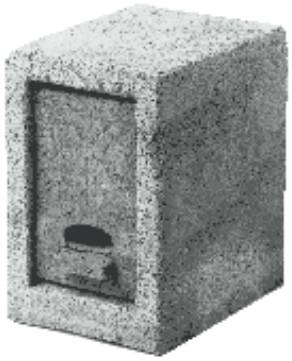
Mounted to building externals

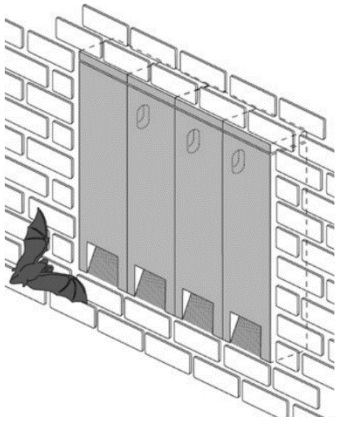
Example	Description	Picture
Beaumaris bat box	https://www.wildcare.co.uk Dimensions: Small: (h) 40 x (w) 28 x (d) 6.5 cm Large: (h) 50 x (w) 38 x (d) 6.5 cm Suitable for crevice dwelling bats, the Beaumaris Bat Box is made from 100% woodstone and is available in two sizes. These boxes have a rough interior to provide grip. They have good thermal insulation, reducing temperature fluctuations within the box. They are painted black to best absorb the sun's heat, which is important as bats need to increase their body temperature before they emerge in the evening. Suitable for wall mounting.	
Vivara Pro Low Profile Woodstone bat box	https://www.nhbs.com/low-profile-woodstone-bat-box Dimensions: (h) 440 x (w) 290 x (d) 90 mm, Weight: 4.7 kg Installation: attached to most external walls at least 3m high This box is manufactured from WoodStone, a breathable and insulating material made from concrete and FSC Certified wood fibres. WoodStone is designed to be robust and hard-wearing, providing a warm and stable temperature for summer bat roosts.	

Example	Description	Picture
Schwegler 1FQ	www.schwegler-nature.com Dimensions: (h) 60 x (w) 35 x (d) 9 cm Weight: 15.8kg Installation: Attached to most external brick, timber or concrete walls at least 3m high. Can also be placed inside roof space or historic buildings. This box is ideal for all types of bats that inhabit buildings. The box is weather-resistant, provides varied roosting environments for each species requirements and is also temperature controlled and self-cleaning. The front panel of the box can also be painted during manufacture, to match an existing colour.	
Schwegler 1WQ	www.schwegler-nature.com Dimensions: (h) 58 x (w) 38 x (d) 11.5 cm Weight: approx. 21 kg Installation: Attached to most types of external brick, timber or concrete walls at least 3.5m. It will also attract bats if it is placed inside a roof space or inside historic buildings. This box typically attracts building-inhabiting bat species. It is weather-resistant and designed for both winter hibernation and larger colonies in summer, including nursery roosts. The box has a double walled system which provides insolation and self-ventilation. The box as a variety of roosting features, making it suitable for different species, allowing individuals to find optimum conditions and it is self-cleaning.	

Integrated into fabric of building

Example	Description	Picture
Ibstock brick enclosed bat boxes	https://ibstockbrick.co.uk/kevington/eco-products/ Dimensions: 215 x 215 or 215 x 290 (mm) These boxes are ideal for new-build homes and are designed specifically for pipistrelle bats. They come in a range of sizes brick types. They are self-cleaning, so require no maintenance.	 
Habibat integrated bat boxes	http://www.habibat.co.uk/integrated-bat-boxes These integrated bat boxes are made of insulating concrete which provides an internal roost space, and can be integrated into the fabric of a building as it is built or renovated. They offer boxes in a range of sizes and styles, and can all be customised with a range of finishes. This includes, brick, block, stone, wood or a rendered finish, ensuring the box is unobtrusive and aesthetically pleasing	 
Bird Brick House bat box	https://www.birdbrickhouses.co.uk/brick-nesting-boxes/bat-box/ These bat boxes can be supplied in brick fronted, half bond and quarter bond brickwork or alternatively with a stainless steel mesh fitted to the front. The mesh is designed for optimum adhesion in render and stonework applications. A basic version can be fitted directly behind weatherboarding or into studwork. These bat boxes are suitable for a range of bat species, the entrance hole and internal design can be tailored to suit different species of bat	 

Example	Description	Picture
Brick Box Type 27	www.schwegler-nature.com Dimensions: (h) 26.5 x (w) 18 x (d) 24 cm Weight: 9.5kg Installation: Can be flush with outside wall and rendered or covered so only the entrance hole is visible. This box is ideal for all types of bats that inhabit buildings. This box is designed to be similar to a natural woodpecker hole with the same shallow, oval depression in the floor.	
Schwegler 1FE	www.schwegler-nature.com Dimensions: (h) 30 x (w) 30 x (d) 8 cm Weight: 5.1kg Installation: Fixed to external walls or set into masonry and rendered. This box is ideal for all types of bats that inhabit buildings. This box is suitable for roosting and can be used to allow bats to crawl into existing roosting areas, such as cavities within buildings or used as a complete bat roost itself, without requiring cavities behind it. The box is self- cleaning and can be painted over with air-permeable paint.	 

Example	Description	Picture
Built-in Woodstone bat box	https://www.nhbs.com/build-in-woodstone-bat-box Dimensions: (H) 500 x (W) 210 x (D) 160mm, Weight: 9.48kg This bat box has been specifically designed to fit into the cavity of house walls, with the entrance sitting flush with the outside bricks. It is manufactured from WoodStone with removable side panels so that several boxes can be placed side by side. WoodStone is a mixture of sawdust from FSC wood sources and concrete, and it is designed to last for years. It is breathable and Woodstone maintains a consistent temperature inside, providing excellent insulation for roosting bats.	
Schwegler 1FR and 2FR	www.schwegler-nature.com Dimensions: (h) 47 x (w) 20 x (d) 12.5 Weight: 9.8kg Installation: Can be installed on external walls – either flush or beneath a rendered surface in concrete and, during renovation work, under wooden panelling or in building cavities. Comes as single tube (1FR) or multiple tubes (2FR). This box is ideal for all types of bats that inhabit buildings and is designed as a summer roost. It provides a variety of roosting features and is designed to maintain climatic conditions. It is self-cleaning and weather-resistant. By installing boxes side by side, colony roosts can be created with any size requirement. This box has three different environmental partitions inside, attracting different species and can be connected to another box by preformed passages made in the sides of the units.	  

Example	Description	Picture
Schwegler 1WI	www.schwegler-nature.com Dimensions: (h) 55 x (w) 35 x (d) 9.5 cm Weight: 15kg Installation: Attached to most types of external brick, timber or concrete walls. It can be installed flush-mounted and rendered over or simply against the wall. It should be installed at a height of at least 3m. This box is weather-resistant and designed for both winter hibernation and larger colonies in summer, including nursery roosts. the box is self-cleaning.	

Sensitive lighting

Artificial lighting has been shown to have a negative impact on bats. It can cause bats to desert or become entombed within a roost, affect feeding behaviour and create barriers which bats cannot cross. There are several factors to consider within a sensitive lighting scheme in order to minimise light spill onto features identified as important for bats during previous survey effort.

Avoid lighting the key habitats and features

Where possible, there should be no artificial lighting on any roost entrances or associated flight paths, as well as habitats or features used by large numbers of bats, rare species or highly light-averse species. An unlit 'dark zone' should be created around the features of importance through the careful placement of artificial lighting and structures such as walls or fences. It is important to remember that there is no legislation requiring a road or area to be lit.

Appropriate luminaire recommendations

Bats are particularly sensitive to blue, green and UV light and therefore luminaries should be selected which emit "warm white" light (2700K to 3000K) and wavelengths with peaks greater than 550nm. LED lights should be used where possible as they fit these criteria and have other advantageous characteristics such as sharp cut-offs, usability at lower intensities and dimming capabilities.

Column height and timing

Column height should be carefully considered in order to minimise light spill. Luminaires should always be mounted on the horizontal and only luminaires with an upward light ratio of 0% and with good optical control should be used. Low-level lighting from bollards should be avoided where possible, and

specialist bollard or low-level downward directional luminaires should only be used as directed by the lighting professional. Any external security lighting should be set on motion sensors and short (one minute) timers.

Internal lighting

Where possible, the site design should minimise the number and size of windows facing the features of importance. Where windows are required, recessed lighting should be used rather than pendant lighting to minimise light spill. Furthermore, factory-tinted glazing treatments can be used to minimise internal light transmission

8.5. Appendix 5: Green infrastructure recommendations

Green Roof and Green Walls

It is recommended that any green roofs are designed with biodiversity in mind and be sown with drought tolerant species that would rely on rainwater topped up by incidental watering by facilities, unless an inbuilt irrigation system could be incorporated. Examples of green shelters are shown in Figures A to B below.

Figure A. Example of green roofed cycle store http://greenroofshelters.co.uk/

Figure B. Example of green roofed shelter http://greenroofshelters.co.uk/

By choosing a good mix of drought-tolerant foodplants, as well as some bare ground, green roofs can be very cheap and extremely effective in boosting biodiversity. The key is to connect their functionality with the landscaping across the rest of the site. The green roofed areas are also suitable for ground-nesting pollinators along with a suite of supplementary pollen, nectar and foliage provision that wouldn't compete with the more robust planting at ground level, comprising a mix of sedums with annual/biennial species in order to ensure a self-sustaining pattern of bare ground and seasonal cover. Such species could comprise viper's bugloss *Echium vulgare*, common centaury *Centaurium erythraea*, yellow rattle *Rhinanthus minor*, mignonette *Reseda sp*. and borage *Borago officinalis*, along with some low-growing hardy species such as dog violet *Viola riviniana* and germander speedwell *Veronica chamaedrys*.

Green roofs are considered a part of urban biodiversity conservation in the UK. Green roofs can be intensive ornamental roof gardens and extensive roofs with more naturalistic plantings or self-established vegetation. Several species identified under a review of the UK Biodiversity Action Plans have been linked to green roofs such as bats, several birds, beetles, flies, bees, wasps and spiders. Green roofs support many invertebrate species including Red Data Book species, this also provides foraging habitat for bird species including black redstart.

Green roofs are often an ideal way of increasing biodiversity in an urban location. There are many other advantages of green roofs, such as a reduction in the urban heat island effect, reduction of surface run off volumes and rates of rainfall leaving roofs, thermal and sound insulation and improving air quality. Green roofs can be installed on any flat, or slightly sloping, roof surface and can be highly beneficial for a wide variety of species. Green roofs involve a mixture of inorganic substrate and flora being planted, whereas brown roofs involve a substrate based on recycled brick and concrete from a local recycling plant being installed and then left to colonise naturally.

Extensive green roof

The primary function of an extensive green roof is that of an ecological landscape, they are intended to be viewed from another location and are not usually trafficked. They are designed specifically to create habitats for plants and animals and are extremely valuable in urban environments in order to create habitats lost by development. Extensive green roofs are more lightweight than other types of green roof, therefore they require less maintenance and are easier and less costly to install. In general, they do not require irrigation although they should be watered when first installed. Biodiverse roofs are a type of extensive green roof that are created primarily for biodiversity purposes and aim to recreate the habitat that was lost when the building was created. They are based on shallow, low nutrient substrates (an average depth of 130mm with no more than 20% organic material) and have low maintenance requirements. By varying substrate depth, the roof can support a greater diversity of plants and therefore biodiversity. In general, biodiverse roofs use a native plant mix, however they can also include a range of sedums. Additional features such as log piles and bug hotels can all be added in order to maximise the biodiversity of the green roof.

Variation in substrate depth contributes to biodiversity, with thin substrate being less vegetated, providing bare, open areas, whilst deeper areas of substrate are likely to hold more moisture and be more substantially vegetated. Varying substrate depth will also create localised variations in topography and microclimate, encouraging the development of structurally diverse vegetation. Bare, loose substrate provides opportunities for burrowing bee and wasp species and warms up quickly, providing an important resource for warmth loving invertebrates to bask. Open areas also provide good foraging areas for visual predators such as spiders and ground beetles.

In order to provide additional benefits to black redstart, and to aid in the colonisation of the recommended nest boxes, it is recommended that structural diversity be achieved by using a variety of substrate grades and built features, this can be achieved by using an aggregate mixture of crushed brick and concrete graded from 25mm to dust. This substrate would ideally be sourced directly from the development site and would then be colonised by local species. Features such as logs or wooden planks would also be of benefit, which will provide a more varied topography and further opportunities for perching, singing and shelter.

Green walls

It is recommended that a green wall system be installed within the Site. Green walls are walls with vegetation growing on them, enhancing otherwise featureless areas of bare wall. They may be natural, such as brick or stone-built walls which have been naturally colonized by lichens, mosses, ferns and flowering plants or they can be large scale engineered green walls. The process of allowing and encouraging plants to grow on and up walls allows the natural environment to be extended into urban areas.

Green walls can provide a food source for invertebrates on which, in turn, other invertebrates and birds may feed. They also provide breeding and nesting habitat for invertebrates, birds (including house sparrow, a London biodiversity action plan priority species) and possibly bats and are ideal for including artificial animal breeding structures such as nest boxes or bat roosting boxes. Green walls can mimic natural rock faces of cliff and rock slopes and provide resting and feeding places for birds, invertebrates and even small mammals. Climbers provide nesting habitat for birds such as wrens, blackbirds, song thrushes and house sparrows. The combination of green walls with green roofs provides a route for wildlife between habitats at ground and roof level.

Green walls that comprise climbers and light weight support structures such as wires and trellis are relatively cheap to develop and maintain. The installation of trellises and wires on walls can aid vegetation growth and limit direct contact between the wall and plants. However, creating green walls by allowing climbing species to attach themselves to the actual structure of existing walls is also a viable option. Fruits trees such as apples and pears can also be used to form a green wall by training them as espaliers.

Careful choice of species and the orientation of these walls will increase the potential of a living wall to harbour other forms of wildlife. For north facing walls, the shade and relative cold offered in these positions, along with the potential for dry soil caused by the wall's 'rain shadow', requires careful consideration of shade tolerant species, such as ivy *Hedera Helix* and hydrangea *Hydrangea sp*. to ensure success. Creating green walls from climbing species such as ivy and hydrangea is often a cheap and simple process, as these species naturally cling to existing wall structures with small roots. Ivy is also a valuable food source for innumerable invertebrates which feed on its leaves, flowers and nectar, and it also provides valuable over-wintering and hibernation habitat.

Engineered green walls, or ‘vertical gardening’, provide an opportunity for impressive visual impact whilst providing a living vertical habitat with biodiversity value. They may be either designed as a large structure attached to a wall containing a variety of planted species and an irrigation system which provides the plants with water and nutrients, or as a hanging wall at the top of a building where plants are allowed to hang down from suspended planters, entailing no direct contact between the plants and the wall. Whilst providing impressive displays many engineered green walls comprise mainly non-native plants and can be expensive to maintain and as such their inclusion needs careful consideration.

Figure C: Example of ivy growing directly on an existing wall
https://www.rhs.org.uk/advice/

Figure D. Example wire screen ivy green wall
www.green-tech.co.uk/green-roofs-and-living-wall

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