

150 HOLBORN ECOLOGICAL APPRAISAL

DAH REAL ESTATES SARL

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dar al-handasah
shair and partners

150 HOLBORN – PRELIMINARY ECOLOGICAL APPRAISAL

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1 INTRODUCTION

This Preliminary Ecological Appraisal report has been prepared by Dar Al Handasah (Shair and Partners) in support of a planning application for the redevelopment of 150 Holborn, hereafter referred to as 'The Site' which is bound by Holborn to the south, Gray's Inn Road to the west and Brooke Street to the east.

The redevelopment will provide a mix of office accommodation (Class B1), retail floor space (Class A1 – A3), residential units (Class C3) and public realm improvements. The description of the development is:

"Demolition of existing building and redevelopment for a mixed use development up to 9 storeys in height comprising 14,604 sqm GEA office floorspace (Use Class B1), 1,450sqm GEA retail floorspace (Use Class A1-A3), 13 residential units (Use Class C3), improvements to the public realm and all other necessary enabling works."

1.1 REPORT OBJECTIVES

The objectives of this report are to:

- Establish baseline conditions at the Project Site;
- Provide an assessment of the potential for protected species and habitats and inform the requirement for further surveys;
- Determine the importance of ecological features present, or potentially present within the Project Site;
- Identify key constraints to the project and make recommendations for design options to avoid significant effects on important ecological features/resources at an early stage;
- Identify mitigation measures as far as possible; and
- Identify enhancement opportunities

This Preliminary Ecological Appraisal has been conducted in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Preliminary Ecological Appraisal, 2013.

1.2 SITE OVERVIEW

The Site is located at 150 Holborn, in the London Borough of Camden. The Site comprises a single large seven-storey U-shaped brick building with a three-storey section to the east, and a central hardstanding courtyard. Lead flashing covers the top storey of the building. The building is connected to another building at its north-western end, which is outside the Site boundary. The Site is currently unoccupied with the exception of the ground floor and sections of the basement and first floor, and has been so for several years. Internally the building has been stripped back to the brick and plaster walls, and all furnishings have been removed. Roads lie immediately adjacent to the eastern, southern and western Site boundaries, and the adjoining building lies to the north of the courtyard. Five London Plane (*Platanus × hispanica*) trees line Gray's Inn Road, along the western Site boundary. The Site is situated in a very urban location, however a number of small green open spaces are located within 300 m, in particular to the north and southwest. An ecological site visit and assessment has been conducted to allow an assessment of potential to support protected species and to ascertain the ecological value of the Project Site.

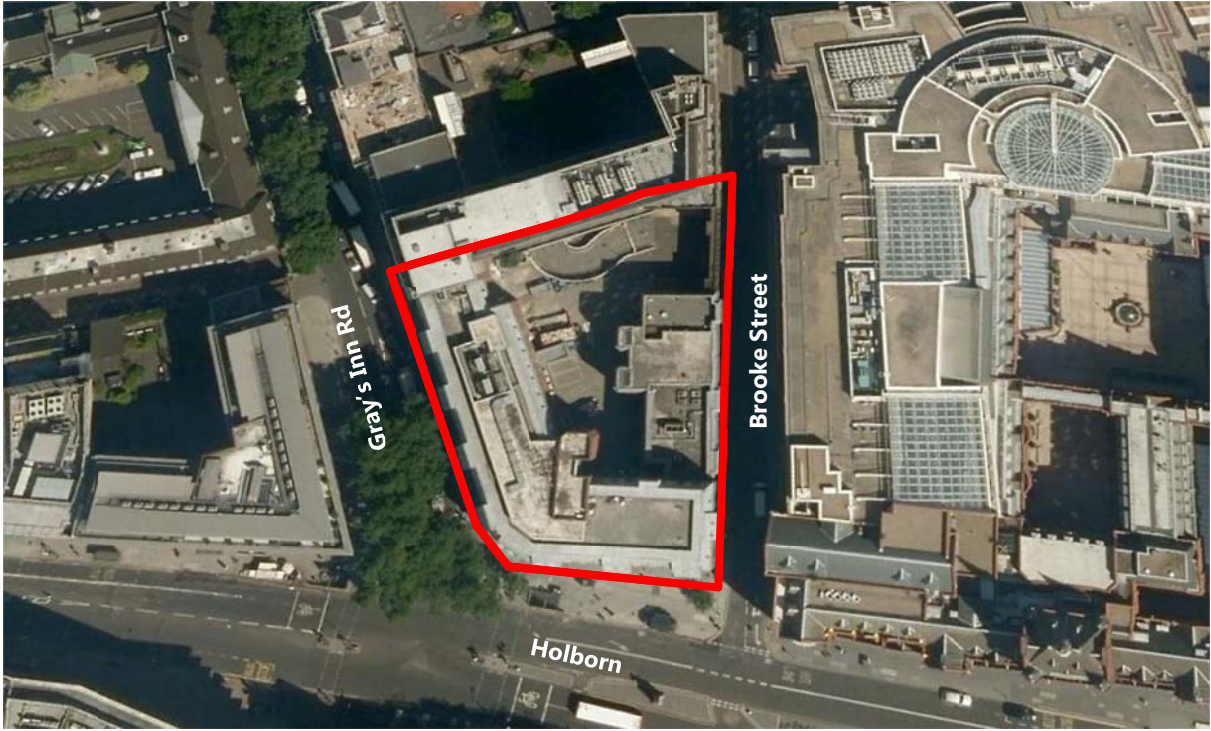


Figure 1-1: Project Location (Red line indicates site boundary)

2 METHODOLOGY

2.1 DESK STUDY

A desk study was undertaken to identify notable and/or protected sites, habitats or species potentially affected by the Project. This involved a desk top search to gather information on the existing conditions at the Project Site. Sources of data included:

- Publically available online data and records:
 - MAGIC (www.magic.gov.uk)
 - National Biodiversity Network (NBN) Gateway Website (<https://data.nbn.org.uk>)
 - Freely available online aerial photography
- Local plans:
 - The London Plan (Mayor of London, 2015)
 - Replacement Unitary Development Plan 2006 (London Borough of Camden, 2006)
 - Camden Biodiversity Action Plan (London Borough of Camden, 2013)

2.2 SURVEYS

2.2.1 PRELIMINARY SITE VISIT

A preliminary ecological site visit was conducted on the 27th August 2015. The objective of this visit was to assess the potential suitability of the Project site to support protected species and habitats and to identify ecological features of note.

The ecologist conducted a visual inspection of the building perimeter and external features, and internal areas including the basement and all other floors in the buildings, including the roof and plant rooms. This allowed the survey area to be classified and mapped in accordance with Phase 1 habitat survey guidance (JNCC, 2010). The surveyor collected photographs of the site and made detailed notes to identify any notable or protected habitats or species, and features of interest within the survey area requiring further investigation.

2.2.2 FAUNAL SURVEYS

2.2.2.1 Initial Inspection for Bats

Following the preliminary site visit, a recommendation for detailed surveys to assess the Project Site's potential for roosting bats was made. On the basis of this recommendation, a licenced bat surveyor was commissioned to undertake an Initial Inspection and subsequent Bat survey in August and September 2015 respectively. The reports are contained within Appendix C and D to this report.

Undertaken in August 2015, the aims of the bat inspection were to:

- Identify, where possible, if bats are currently using or have historically used the building as a roost;
- Identify if the building has the potential to support roosting bats;
- Advise on any further survey work if necessary.

The objectives of the survey included:

- Completion of a bat inspection in accordance with best practise guidelines;
- Review of legislation relating to bats; and
- Identify potential ecological constraints to works based on survey findings.

The initial inspection for bats comprised the following steps:

1. Review of the existing bat records within 5 km of the Site.

2. Review of surrounding habitat through aerial photography to identify suitable commuting and foraging habitat within the vicinity of the Site.
3. Internal and external bat inspection of the building within the Site.

Following completion of the initial inspection, in accordance with best practice guidelines (Hundt, 2012), the bat surveyor recommended that a single dusk bat activity survey was undertaken to assess the level of bat activity within the vicinity of the Site and the risk of bats roosting within the building.

2.2.2.2 Bat Survey

The objectives of the survey included:

- Completion of a bat activity survey, using static automated and mobile transect methodologies; and
- Identify potential ecological constraints to works based on survey findings.

The survey consisted of:

- A dusk bat activity survey to determine the bat species present and record the level of bat activity on site. Two surveyors were deployed and were situated within the courtyard of the Site for periods of the survey and also walked a transect around the outside of the Site. The survey was designed to cover the bat access points and roosting opportunities identified during the internal and external inspection as well as assess the level of bat activity across the overall Site. The location of each bat pass, the direction of flight, the species and the behaviour of the bat were recorded on standardised survey forms and field maps. Although not the principal focus of the study, efforts were made to identify potential bat emergence behaviour and thus determine the presence of any roosts. For the purposes of the survey, a bat pass is defined as *“two or more bat calls in a continuous sequence; each sequence or pass is separated by 1 second or more in which no calls are recorded”* (Hundt, 2012). The dusk activity survey commenced up to 15 minutes before sunset and continued for approximately 1.5 hours after sunset.
- A static bat detector was installed on the 6th floor of the building on 3rd September 2015 and was left in place for 11 nights to record any bat activity within the building, following the discovery of a number of potential bat roosting opportunities during the internal inspection.

The bat survey was undertaken by Anna McDermott MCIEEM, holder of Natural England Class Licences WML CL-18, from Aven Ecology and Natalie Andersen from the Dar Group Ltd.

The equipment used during the survey included:

- Batbox Duet
- Batlogger
- Anabat Express

All bat calls were recorded and later analysed using Analook and BatExplorer sound analysis software.

2.3 LIMITATIONS AND ASSUMPTIONS

The desk search was limited to publically available information and data. Consultations with local interest groups have not been undertaken at this stage.

A data request has been submitted to the London Borough of Camden Tree Preservation Team regarding the London Plane trees directly adjacent to the site. This request is currently outstanding at the time of writing.

During the preliminary site visit, access was granted to the building, its basement, and roof areas. As far as possible, the ecologist conducted a visual inspection of all accessible areas; however some areas and rooms could not be accessed due to safety concerns, confined spaces, or unavailability/locked doors. This is not considered to materially affect the findings of this report however it is possible that a feature of note could have been overlooked.

Any ecological survey represents a snapshot of ecological conditions at the time of survey; ecological conditions may change over time. The details within this report will therefore remain valid for a period of up to 24 months; beyond that date it is advised that a review of ecological conditions is undertaken.

3 RESULTS

3.1 DESK STUDY

A desk study was carried out with the aim of informing and supplementing the initial site visit results by collating and reviewing existing ecological information relevant to the Site and the local area. The results of the Desk Study are contained in Appendix A for reference.

3.1.1 ECOLOGICAL DESIGNATIONS

3.1.1.1 Statutory and Non-Statutory Designated Sites

A MAgiC Data Search was carried out for statutory designations within 1 km of the Site (Source: www.magic.gov.uk). There were no statutory or non-statutory nature conservation designations located in or within a 1km radius of the Site.

3.1.1.2 Ancient Woodland

There are no areas of ancient woodland situated within or a 1km radius of the Site.

3.1.1.3 Protected Trees

Tree Preservation Orders are issued to give legal protection to trees or woodland. They prevent the cutting down, uprooting, topping, lopping, wilful damage or destruction of trees, including cutting roots, without our permission. Their purpose is to protect trees for the public's enjoyment.

An information request was issued to the Tree Preservation Team at the London Borough of Camden with regards to the avenue of London Plane trees adjacent to the Project Site. The results of this request are outstanding at the time of writing. This section will be updated in the final report.

3.1.2 PROTECTED SPECIES

According to the Camden Biodiversity Action Plan (2013 – 2018 in Appendix B) the following species of conservation concern have been recorded in the London Borough of Camden:

- 66 Bird Species;
- 12 Flowering Plant Species;
- 31 Insect and Spider Species;
- 15 Terrestrial Mammal Species; and
- 7 Reptile and Amphibian Species.

Potential bat foraging and commuting habitat was identified within the vicinity of the Site. Gray's Inn Square and South Square Gardens, and Gray's Inn Gardens, both lie less than 200 m north-west of the Site, connected by the trees lining Gray's Inn Road. Lincoln's Inn Fields is located less than 250 m south-west, however this is not directly connected by a treeline. Small gardens / areas containing trees are also situated within the near vicinity. The following records of bat species have been identified within the 10 km TQ 38 grid square in which the Site is located:

Eptesicus serotinus – Serotine

Myotis daubentonii – Daubenton's

Myotis myotis – Mouse-eared bat

Nyctalus noctula – Noctule

Pipistrellus pipistrellus – Common pipistrelle

Pipistrellus pygmaeus – Soprano pipistrelle

Plecotus auritus – Brown long-eared bat

3.2 SURVEYS

3.2.1 PRELIMINARY SITE VISIT

A preliminary site visit was conducted on the 27th August 2015. The objective of this visit was to assess the potential suitability of the 150 Holborn site to support protected species and habitats. The ecologist conducted a visual inspection of the building perimeter and external features, and internal areas including the basement and all other floors in the buildings, including the roof and plant rooms. Figure 3-1 presents a phase 1 habitat map for the site, with accompanying target notes and photographs in Table 3-1.





The site is currently comprised of hard standing and buildings, with no landscaping or vegetation within the site itself. There are a number of mature London Plane trees located on Gray's Inn Road directly adjacent to the site, however these are not anticipated to be affected within the plans for the site as they fall on the public highway beyond the site boundary.





The potential for roosting bats was highlighted due to the presence of access points (open windows, service shafts, and other small openings) and a number of dark, dry cracks, crevices and voids which a bat may utilise as a roost. In order to better understand the potential of the site for bats, a licenced bat ecologist was commissioned to undertake an inspection and subsequent bat survey, the results of which are presented within Appendix C and D. There was no potential for other protected species or habitats on the Site. There was no evidence of invasive species such as Japanese Knotweed (*Fallopia japonica*) observed on the site.




Figure 3-1 Phase 1 Habitat Map

Table 3-1: Site visit target notes and selected photographs

Target Note	Comment	Image
1.	Central courtyard at ground level. Hardstanding, no vegetation or planting. Waste storage areas and loading bays for retail units.	
2.	Basement – storage area. Presence of expansion joints with small voids, however these were generally damp suggesting low suitability for roosting bats. No evidence of bats was observed (staining, feeding remains etc).	
3.	Basement - office rooms. Evidence of rats and mice was observed, large numbers of droppings and characteristic odour.	
4.	Office floors 2 to 6. All fixtures and fittings have been removed from the office areas, toilets, kitchens, etc. The building is currently empty (except for occupied retail units on the ground floor). Some floors have open windows and other potential access points (such as utility shafts) for bats adjacent to the tree canopy along Gray’s Inn Road. The interior of the building is generally dry and subject to very little disturbance (limited to daily security inspection, occasional visits for building maintenance, and temporary lighting). A number of potential roosting locations were observed, such as disused storage cupboards, cracks in brickwork, and other voids. No evidence of bats was found, with the exception of some suspected droppings in a cupboard located on the 2 nd floor. On discovery, advice	

Target Note	Comment	Image
	<p>was sought from a licensed bat worker who confirmed the droppings to be rodent.</p>	
<p>5.</p>	<p>Roof of building. Open and generally exposed, with large areas of lead flashing. No evidence of wildlife.</p>	
<p>6.</p>	<p>Roof voids and service areas were observed to be used as roosting areas by a large number of Feral Pigeon (<i>Columba livia</i>), as evidenced by large amounts of droppings, feathers and presence of birds.</p>	
<p>7.</p>	<p>Exterior view from Holborn towards the Project Site. Advertising hoarding and scaffolding covers the front of building.</p>	

Target Note	Comment	Image
8.	Exterior view from Gray's Inn Road. Avenue of mature London Plane (<i>Platanus x hispanica</i>) trees directly adjacent to the Site.	

3.2.2 FAUNAL SURVEYS

3.2.2.1 Bat Inspection

Aven Ecology Ltd was commissioned by Dar Al-Handasah Consultants (Shair and Partners) UK Ltd to carry out an inspection survey in respect of bats at 150 Holborn, London, in August 2015. The need for the survey was identified following suspected bat droppings being found within the building in the course of a preliminary inspection by the Dar Group. The purpose of the survey was to search for evidence of bats and to determine the potential of the building to support bats. The Bat Inspection Report is contained within Appendix C to this report.

No evidence of bats was recorded during the external inspection of the buildings, however a number of features were noted as providing potential bat roosting opportunities, for example weep holes in brickwork leaving crevices (Figure 3-2), and gaps where the lead flashing meets the brick wall on the roof (Figure 3-3).



Figure 3-2: Weep holes in brickwork leaving crevices provide potential roosting and/or access for bats



Figure 3-3: Gap where lead flashing meets the brick wall on the roof providing potential roost for bats

Each of the seven storeys and the basement were inspected for evidence of bats, with the exception of the ground floor and sections of the basement and 1st floor, which were occupied by tenants at the time of the survey. With the exception of the basement and the occupied storeys, each floor had a similar layout and all were bare and had been stripped of furnishings. The windows on the 6th floor were mostly open to enable the scaffolding to reach inside, which supported a billboard on the southern side of the building; however the windows were netted to prevent pigeons entering, with the exception of a single window on the 4th floor, which was open but not netted. The greatest number of cracks in the brickwork and holes in the plaster were found on the 6th floor; these features were also present on the on the lower floors albeit in lower numbers.

No evidence of bats was recorded during the internal inspection of the building. Droppings were found at the same location as droppings previously found and reported to be bat droppings; however, the droppings found on the occasion of the current survey were identified as mouse droppings. A number of features were noted as providing potential bat roosting opportunities, such as holes/cracks/crevices in the brickwork (Figure 3-4).



Figure 3-4: Typical holes/cracks/crevices in brickwork observed during the internal inspection.

3.2.2.2 Bat Survey

Two survey techniques were used, the results of which are described in detail in the Bat Survey Report in Appendix D. The results can be summarised as follows:

Bat Activity Survey

Dusk Survey - 3rd September 2015

No bats were seen emerging from 150 Holborn and no bats were recorded during the transect survey around the building.

Static Monitoring Survey

No bats were recorded flying around the 6th floor of the building during the static monitoring survey.

4 DISCUSSION

4.1 ECOLOGICAL DESIGNATIONS

There are no statutory and non-statutory designated sites within a 1km radius of the Project Site as discussed in Section 3.1.1.

The Project Site is considered sufficiently removed from statutory and non-statutory designated sites due to the urban setting and lack of ecological connectivity to mean that the proposals are unlikely to result in any adverse effect on ecological designations.

4.2 HABITATS AND ECOLOGICAL FEATURES

The following habitats/ecological features were identified within and directly adjacent to the site:

- Buildings
- Hardstanding and associated features
- Broadleaved scattered trees

The locations of these habitat types and features were presented in Figure 3-1 and each habitat type is described below. In addition, consideration is given to the offsite broadleaved trees situated adjacent to the western Site boundary on Greys Inn Road.

Buildings

The site is dominated by the existing 7 storey building, which was recorded to be in use by a number of retail units at the ground floor, but empty and disused at the higher levels and in a poor state of repair.

The building supports negligible vegetation and, following a bat inspection and survey, is considered to be of low value to bats. Its loss to the proposals would be of no ecological importance.

Hardstanding

The remainder of the site is dominated by hardstanding, largely in the form of a car park, loading bays and courtyard area.

The hardstanding areas support negligible vegetation, and accordingly this habitat type offers negligible ecological value and its removal would be of no ecological importance.

Broadleaved trees

The only significant vegetation within the vicinity of the site comprises a line of London Plane (*Platanus x hispanica*), with two mature specimens located directly adjacent to the project site on Grey's Inn Road and situated within hardstanding. These trees may provide a foraging or transient route for bats, invertebrates or birds in an otherwise urban area. As such they are assessed as being of low ecological value. Notwithstanding this, the trees adjacent to the site should be considered within construction safeguards and project planning, as described within Section 5.

4.2.1 HABITAT SUMMARY

Overall the habitats present within the site boundary are dominated by buildings and hardstanding of low or negligible ecological value. The proposals will not result in any loss of ecologically valuable habitats or features.

4.3 INVASIVE PLANT SPECIES

There was no evidence for the presence of any species included within Schedule 9 Part II of the Wildlife and Countryside Act (1981), such as Japanese Knotweed or Giant Hogweed (*Heracleum mantegazzianum*). On the basis of the current survey work undertaken, such species appear to be absent from the site and do not present a constraint to the proposals.

4.4 FAUNA

66 bird species, 31 insect and spider species, 15 terrestrial mammal species and 7 reptile and amphibian species were identified from the desk study as occurring within the London Borough of Camden in which the Site is located (Source: Camden Biodiversity Action Plan, 2013). However, following a preliminary site survey the potential for protected or notable species occurring at the 150 site is considered to be negligible due to the absence of suitable habitat or features, with the exception of bat species.

Bats

All species of bat found in the UK are listed under Schedule 5 of The Wildlife and Countryside Act 1981 (as amended) and are afforded protection under Section 9(4)(b&c) and Section 9(5) of Part 1 of the Act. Under this legislation, a person is guilty of an offence if he intentionally or recklessly:

- Kills or injures any bat;
- Disturbs any bat while it is occupying a structure or place which it uses for shelter or protection; or
- Obstructs access to any structure or place which any bat uses for shelter or protection.

Bats are afforded additional protection through their inclusion on Schedule 2 of The Conservation of Species and Habitats Regulations 2010 (as amended). Under Part 3 of this legislation, a person is guilty of an offence if he:

- Deliberately captures, injures or kills a bat;
- Deliberately disturbs a bat; or
- Damages or destroys a bat breeding site or resting place.

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, breed or reproduce, rear or nurture their young, migrate or hibernate. It also includes any disturbance likely to affect significantly the local distribution or abundance of the species. Consequently, attention should be given to dealing with the modification or development of an area if aspects of it are deemed important to bats, such as flight corridors and foraging areas.

150 Holborn was assessed as having low potential to support roosting bats during a bat inspection survey undertaken in August 2015 (Aven Ecology, 2015). In accordance with good practice guidelines, a dusk activity survey and a period of static monitoring was recommended; these surveys were carried out in September 2015.

No bats were observed emerging from 150 Holborn and no bats were recorded during the activity survey, indicating the Site has a very low level of bat activity. The static detector installed on the 6th floor also recorded no bats flying around inside the building. It is therefore considered highly unlikely bats are roosting within the building despite the presence of a number of bat roosting opportunities. The buildings on site are considered to be of low ecological value for bat species, and its removal is considered to be of no ecological importance provided that safeguards are adhered to during demolition.

Birds

All wild birds and their nests receive protection under Section 1 of the Wildlife and Countryside Act 1981 (as amended) in respect of killing and injury, and their nests, whilst being built or in use, cannot be taken, damaged or destroyed. Species included on Schedule 1 of the Act receive greater protection and are subject to special penalties.

The presence of Rock Dove, otherwise known as the Feral Pigeon was confirmed during the site visit within a number of service rooms and voids at the roof level. These areas provide shelter and roosting areas for the birds, as evidenced by considerable amounts of droppings.

The RSPB categorise British bird species in terms of conservation importance based on criteria including the level of threat to a species' population status (RSPB, 2009). Feral Pigeon are listed as Green, meaning that the species occurs regularly in the UK and is of low conservation importance. Whilst this species is a common resident species, the removal of the building during the nesting season may have the potential to result in damage or disturbance to nests should they be present, and as such safeguards are recommended in Section 5.

5 RECOMMENDATIONS

5.1 CONSTRUCTION SAFEGUARDS

Trees

The two mature London Plane trees directly adjacent to the site should be accounted for in the project design to prevent their removal or damage – although this is not anticipated based on the current plans. Should they be affected by the works, the London Borough of Camden Tree Team should be consulted. Protection measures such as the adoption of root protection zones should be included in a Construction Environmental Management Plan.

Bats

It is recommended that the works to 150 Holborn proceed with caution, and works to the areas identified as having the potential to support roosting bats be undertaken by hand, for example the stripping of the lead flashing around the top floor of the building. In the unlikely event a bat is found during this process, all works must stop and an ecologist contacted.

Birds

The Feral Pigeons currently using the roof area of the building should be managed in accordance with the Wildlife and Countryside Act 1981, and the Animal Welfare Act 2006. It is recommended that DEFRA Guidance is adhered to in the potential removal of Feral Pigeons, whereby an authorised person should be engaged to install deterrents or scaring devices to preclude the birds from the roof areas. Future access should be prevented prior to the demolition of the building.

5.2 ENHANCEMENT RECOMMENDATIONS

The National Planning Policy Framework sets out that opportunities to incorporate biodiversity in and around developments should be encouraged. Within the London Borough of Camden's Replacement Unitary Development Plan (2006), Strategic Policy 8 concerns the Natural Environment stating that the Council will '*seek to protect and enhance the Borough's open space and conserve and enhance the Borough's biodiversity.*'

However, given the existing urban location and high level of general disturbance at the Site, the opportunities for enhancement are limited. Nevertheless, it is understood that the project will be designed to target BREEAM Excellent rating. As such there is an aim to incorporate features that will result in a net biodiversity gain for the site. The following recommendations are considered to be appropriate to the development.

Bird Boxes

It is recommended, where possible, that enhancements are provided in the form of additional nesting sites for common urban bird species. This can be achieved by providing nesting boxes placed in suitable locations high on the new building walls, particularly on the western boundary of the site due to the proximity of the existing tree line on Grey's Inn Road. Declining urban species such as House Sparrow (*Passer domesticus*) and Swift (*Apus apus*) may be targeted, as well as other species identified in the Camden Biodiversity Action Plan (London Borough of Camden, 2013).

Landscape Planting

It is recommended that the Project design includes new landscape planting, such as living roofs and walls as well as smaller planters within balcony areas. Appropriate planting can benefit the biodiversity value of the site by introducing green spaces where there were previously none, as well as providing supporting habitat for invertebrates and in turn supporting the food chain. Even small areas of planting, such as pots on balconies, can provide living stepping stones for invertebrates in urban areas, providing ecological connectivity across London.

Where living roofs and walls are proposed, it is recommended that provision is made for native habitats and species within these features, ideally of local provenance, as well as providing a diverse planting scheme. The Camden Biodiversity Action Plan includes Advice Notes titled 'Living Roofs and Walls' and 'Landscaping Schemes and Species Features'. These are included in Appendix E for reference, and provide a recommended list of wildflower and grass species as well as other considerations.

6 REFERENCES

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7 APPENDICES

Appendix A:

MAGiC Ecological Data Search

Appendix B:

Excerpt from Camden Biodiversity Action Plan (2013 – 2018): Key Species

Appendix C:

150 Holborn Bat Inspection Report

Appendix D:

150 Holborn Bat Survey Report

Appendix E:

Camden Biodiversity Advice Note: Living Roofs and Walls

Camden Biodiversity Advice Note: Landscaping Schemes and Species Features

Site Check Report Report generated on Wed Nov 18 2015
You selected the location: Centroid Grid Ref: TQ311816
The following features have been found in your search area:

SSSI Impact Risk Zones – to assess planning applications for likely impacts on SSSIs/SACs/SPAs & Ramsar sites (England)

GUIDANCE – How to use the Impact Risk Zones

[/Metadata_for_magic/SSSI IRZ User Guidance v2.3 MAGIC 14Aug2015.pdf](#)

1. DOES PLANNING PROPOSAL FALL INTO ONE OR MORE OF THE CATEGORIES BELOW?

2. IF YES, CHECK THE CORRESPONDING DESCRIPTION(S) BELOW. LPA SHOULD CONSULT NATURAL ENGLAND ON LIKELY RISKS FROM THE FOLLOWING:

All Planning Applications

Airports, helipads and other aviation proposals.

Infrastructure

Wind & Solar Energy

Quarry

Rural Non Residential

Residential

Rural Residential

Air Pollution

Pig & Poultry Units. Any other development/ industrial or commercial process that could cause AIR POLLUTION.

Combustion

General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.

Waste

Composting

Discharges

Water Supply

Ancient Woodland (England)

No Features found

Important Bird Areas (GB)

No Features found

Areas of Outstanding Natural Beauty (England)

No Features found

Limestone Pavement Orders (England)

No Features found

Local Nature Reserves (England) - points

No Features found

Local Nature Reserves (England)

No Features found

Moorland Line (England)

No Features found

National Nature Reserves (England) - points

No Features found

National Nature Reserves (England)

No Features found

National Parks (England)

No Features found

Ramsar Sites (England) - points

No Features found

Ramsar Sites (England)

No Features found

Sites of Special Scientific Interest (England) - points

No Features found

Sites of Special Scientific Interest (England)

No Features found

Special Areas of Conservation (England) - points

No Features found

Special Areas of Conservation (England)

No Features found

Special Areas of Conservation (Scotland) - points

No Features found

Special Areas of Conservation (Scotland)

No Features found

11/18/2015

Special Areas of Conservation (Wales) - points

No Features found

Special Areas of Conservation (Wales)

No Features found

Special Protection Areas (England) - points

No Features found

Special Protection Areas (England)

No Features found

Biosphere Reserves (England) - points

No Features found

Biosphere Reserves (England)

No Features found

Less Favoured Areas (England)

No Features found

Nitrate Vulnerable Zones (England)

No Features found

Community Forests (England)

No Features found

Green Belt (England)

No Features found

National Forest (England)

No Features found

RSPB Reserves (GB) - points

No Features found

RSPB Reserves (GB)

No Features found

Protected and/or Priority Species Records for Camden (as at 2012)

Species Group	Total Records	Protected Species		Number of Records	Protected Status															
		Common name	Scientific name		London BAP	National BAP	WCA 1-1	WCA 1-2	WCA 5-9.1	WCA 5-9.4a	WCA 5-9.4b	WCA 5-9.5a	WCA 5-9.5b	Birds Dir. Anx. 1	Cons RegSch 2	Cons Reg Sch 4	Hab Dir Anx 2	Hab Dir Anx 4		
Birds	13249	Hedge Accentor	<i>Prunella modularis</i>	321	X															
		Song Thrush	<i>Turdus philomelos</i>	267	X															
		Common Starling	<i>Sturnus vulgaris</i>	222	X															
		House Sparrow	<i>Passer domesticus</i>	126	X	X														
		Redwing	<i>Turdus iliacus</i>	117			X													
		Eurasian Hobby	<i>Falco subbuteo</i>	85			X													
		Fieldfare	<i>Turdus pilaris</i>	82			X													
		Herring Gull	<i>Larus argentatus</i>	77	X															
		Common Redpoll	<i>Carduelis flammea</i>	73	X															
		Yellow Wagtail	<i>Motacilla flava</i>	58	X															
		Greylag Goose	<i>Anser anser</i>	56				X												
		Spotted Flycatcher	<i>Muscicapa striata</i>	52	X	X														
		Common Linnet	<i>Carduelis cannabina</i>	50	X															
		Common Kingfisher	<i>Alcedo atthis</i>	49			X								X					
		Brambling	<i>Fringilla montifringilla</i>	48	X															
		Tree Pipit	<i>Anthus trivialis</i>	44	X	X														
		Sky Lark	<i>Alauda arvensis</i>	42	X															
		Northern Lapwing	<i>Vanellus vanellus</i>	40	X	X														
		Sand Martin	<i>Riparia riparia</i>	33	X															
		Common Crossbill	<i>Loxia curvirostra</i>	30			X													

Birds	Reed Bunting	<i>Emberiza schoeniclus</i>	26	X	X															
	Black Redstart	<i>Phoenicurus ochruros</i>	26	X		X														
	Ring Ouzel	<i>Turdus torquatus</i>	24		X															
	Common Tern	<i>Sterna hirundo</i>	24			X														
	Wood Warbler	<i>Phylloscopus sibilatrix</i>	23	X	X															
	Common Cuckoo	<i>Cuculus canorus</i>	17	X	X															
	Yellowhammer	<i>Emberiza citrinella</i>	15	X	X															
	European Turtle Dove	<i>Streptopelia turtur</i>	14	X	X															
	Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>	12	X																
	Peregrine Falcon	<i>Falco peregrinus</i>	12	X																
	Firecrest	<i>Regulus ignicapilla</i>	12			X														
	Lesser Redpoll	<i>Carduelis cabaret</i>	9		X															
	Wood Lark	<i>Lullula arborea</i>	8		X	X													X	
	European Honey-buzzard	<i>Pernis apivorus</i>	7			X													X	
	Larus cachinnans	<i>Larus cachinnans</i>	6	X																
	Green Sandpiper	<i>Tringa ochropus</i>	6			X														
	Eurasian Golden Oriole	<i>Oriolus oriolus</i>	5			X														
	Common Bullfinch	<i>Pyrrhula pyrrhula</i>	4	X																
	Short-eared Owl	<i>Asio flammeus</i>	4																X	
	Hawfinch	<i>Coccothraustes coccothraustes</i>	3	X	X															
	Red-backed Shrike	<i>Lanius collurio</i>	3		X	X													X	
	Arctic Tern	<i>Sterna paradisaea</i>	3																X	
	European Golden Plover	<i>Pluvialis apricaria</i>	3																X	
	Smew	<i>Mergellus albellus</i>	3																X	
	Osprey	<i>Pandion haliaetus</i>	3			X													X	
	Whimbrel	<i>Numenius phaeopus</i>	3			X														
	Grasshopper Warbler	<i>Locustella naevia</i>	2	X	X															

Birds	Eurasian Curlew	<i>Numenius arquata</i>	2		X													
	Little Egret	<i>Egretta garzetta</i>	2											X				
	Little Bittern	<i>Ixobrychus minutus</i>	2			X								X				
	Little Tern	<i>Sternula albifrons</i>	2			X								X				
	Mediterranean Gull	<i>Larus melanocephalus</i>	2			X								X				
	Merlin	<i>Falco columbarius</i>	2			X								X				
	Montagu's Harrier	<i>Circus pygargus</i>	2			X								X				
	Red Kite	<i>Milvus milvus</i>	2			X								X				
	Corn Bunting	<i>Emberiza calandra</i>	1	X														
	Eurasian Tree Sparrow	<i>Passer montanus</i>	1	X	X													
	Arctic Skua	<i>Stercorarius parasiticus</i>	1		X													
	Eurasian Wryneck	<i>Jynx torquilla</i>	1		X	X												
	Barnacle Goose	<i>Branta leucopsis</i>	1												X			
	Ruddy Shelduck	<i>Tadorna ferruginea</i>	1												X			
	Sandwich Tern	<i>Sterna sandvicensis</i>	1												X			
	Dartford Warbler	<i>Sylvia undata</i>	1			X									X			
	Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	1			X									X			
	Barn Owl	<i>Tyto alba</i>	1			X												
	Common Greenshank	<i>Tringa nebularia</i>	1			X												

Flowering Plants	14387	Cornflower	<i>Centaurea cyanus</i>	11		X													
		Chamomile	<i>Chamaemelum nobile</i>	7	X	X													
		Spreading Bellflower	<i>Campanula patula</i>	5		X													
		Marsh Sow-thistle	<i>Sonchus palustris</i>	4	X														
		Triangular Club-rush	<i>Schoenoplectus triqueter</i>	4		X													
		Mistletoe	<i>Viscum album</i>	2	X														
		Populus nigra subsp. betulifolia	<i>Populus nigra subsp. betulifolia</i>	2	X														
		Pennyroyal	<i>Mentha pulegium</i>	2	X	X													
		Creeping Marshwort	<i>Apium repens</i>	2		X	X									X	X	X	
		Caraway	<i>Carum carvi</i>	2		X													
		Corn Buttercup	<i>Ranunculus arvensis</i>	2		X													
		Divided Sedge	<i>Carex divisa</i>	1	X	X													

Insects and Spiders	7236	Stag Beetle	<i>Lucanus cervus</i>	21	X	X							X	X				X	
		White-letter Hairstreak	<i>Satyrrium w-album</i>	11	X	X								X	X				
		Wall	<i>Lasiommata megera</i>	8	X	X													
		Grey Dagger	<i>Acronicta psi</i>	3	X	X													
		White Admiral	<i>Limenitis camilla</i>	3		X													
		Brindled Beauty	<i>Lycia hirtaria</i>	2	X	X													
		Buff Ermine	<i>Spilosoma luteum</i>	2	X	X													
		Centre-barred Sallow	<i>Atethmia centrago</i>	2	X	X													
		Cinnabar	<i>Tyria jacobaeae</i>	2	X	X													
		Dusky Thorn	<i>Ennomos fuscantaria</i>	2	X	X													
		Mouse Moth	<i>Amphipyra tragopoginis</i>	2	X	X													
		Sallow	<i>Xanthia ictertia</i>	2	X	X													
		Small Heath	<i>Coenonympha pamphilus</i>	2	X	X													
		Small Square-spot	<i>Diarsia rubi</i>	2	X	X													
		Beaded Chestnut	<i>Agrochola lychnidis</i>	1	X	X													
		Brown-spot Pinion	<i>Agrochola litura</i>	1	X	X													
		Double Dart	<i>Graphiphora augur</i>	1	X	X													
		Dusky Brocade	<i>Apamea remissa</i>	1	X	X													
		Knot Grass	<i>Acronicta rumicis</i>	1	X	X													
		Lackey	<i>Malacosoma neustria</i>	1	X	X													
		Large Nutmeg	<i>Apamea anceps</i>	1	X	X													
		Mottled Rustic	<i>Caradrina morpheus</i>	1	X	X													
		Mullein Wave	<i>Scopula marginepunctata</i>	1	X	X													
Oak Hook-tip	<i>Watsonalla binaria</i>	1	X	X															
Shaded Broad-bar	<i>Scotopteryx chenopodiata</i>	1	X	X															
Shoulder-striped Wainscot	<i>Mythimna comma</i>	1	X	X															

Insects and spiders		Small Phoenix	<i>Ecliptopera silaceata</i>	1	X	X												
		White Ermine	<i>Spilosoma lubricipeda</i>	1	X	X												
		Bombus (Thoracomus) ruderarius	<i>Bombus (Thoracomus) ruderarius</i>	1		X												
		Narrow-bordered Bee Hawk-moth	<i>Hemaris tityus</i>	1		X												
		Oil Beetle	<i>Meloe proscarabaeus</i>	1		X												

Terrestrial Mammals	812	Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	105	X	X			X	X	X	X	X		X			X	
		Pipistrellus	<i>Pipistrellus</i>	96	X				X	X	X	X	X						X
		Pipistrellus pipistrellus	<i>Pipistrellus pipistrellus</i>	86	X				X	X	X	X	X		X				X
		Daubenton's Bat	<i>Myotis daubentonii</i>	59	X				X	X	X	X	X		X				X
		Noctule Bat	<i>Nyctalus noctula</i>	50	X	X			X	X	X	X	X		X				X
		West European Hedgehog	<i>Erinaceus europaeus</i>	41	X	X													
		Brown Long-eared Bat	<i>Plecotus auritus</i>	41	X	X			X	X	X	X	X		X				X
		Natterer's Bat	<i>Myotis nattereri</i>	16	X				X	X	X	X	X		X				X
		Unidentified Bat	<i>Myotis</i>	12	X				X	X	X	X	X						X
		Vespertilionidae	<i>Vespertilionidae</i>	11	X				X	X	X	X	X		X				
		Lesser Noctule	<i>Nyctalus leisleri</i>	8	X				X	X	X	X	X						X
		Nathusius's Pipistrelle	<i>Pipistrellus nathusii</i>	8	X				X	X	X	X	X		X				X
		Serotine	<i>Eptesicus serotinus</i>	8	X				X	X	X	X	X		X				X
		Nyctalus	<i>Nyctalus</i>	2	X				X	X	X	X	X		X				
		Kuhl's Pipistrelle	<i>Pipistrellus kuhlii</i>	1	X				X	X	X	X	X		X				X

Reptiles and Amphibians	242	Common Frog	<i>Rana temporaria</i>	129								X	X					
		Common Toad	<i>Bufo bufo</i>	55	X	X							X	X				
		Smooth Newt	<i>Lissotriton vulgaris</i>	14									X	X				
		European Pond Terrapin	<i>Emys orbicularis</i>	7													X	X
		Palmate Newt	<i>Lissotriton helveticus</i>	2									X	X				
		Adder	<i>Vipera berus</i>	1	X	X			X				X	X				
		Slow-worm	<i>Anguis fragilis</i>	1	X	X			X				X	X				
Other	3	Common Juniper	<i>Juniperus communis</i> <i>subsp. communis</i>	1	X	X												
		Zoned Rosette	<i>Podoscypha multizonata</i>	1	X	X												
		Fairy Shrimp	<i>Chirocephalus diaphanus</i>	1					X	X	X	X	X					

Glossary of Protected Status definitions

London BAP Priority	A species listed as a priority in the London BAP
National BAP Priority	Listed as a priority species under Section 41 of the NERC Act 2006
WCA 1-1	Wildlife and Countryside Act 1981 (as amended) Schedule 1, Part 1 species
WCA 1-2	Wildlife and Countryside Act 1981 (as amended) Schedule 1, Part 1 species
WCA 5-9.1	Wildlife and Countryside Act 1981 (as amended) Schedule 5, Part 9.1 species
WCA 5-9.4a	Wildlife and Countryside Act 1981 (as amended) Schedule 5, Part 9.4a species
WCA 5-9.4b	Wildlife and Countryside Act 1981 (as amended) Schedule 5, Part 9.4b species
WCA 5-9.5a	Wildlife and Countryside Act 1981 (as amended) Schedule 5, Part 9.5a species
W&C Act Sch 5 Part 9.5b	Wildlife and Countryside Act 1981 (as amended) Schedule 5, Part 9.5b species
Birds Dir Annex 1	Listed as an Annex 1 species under the European Bonn Convention (Directive 2009/147/EC)
Cons Reg Sch 2	Listed as a Schedule 2 species in the Conservation Regulations 1994
Cons Reg Sch 4	Listed as a Schedule 4 species in the Conservation Regulations 1994
Hab Dir Annex 2	Listed under Annex 2 of the European Habitats Directive (92/43/EEC)
Hab Dir Annex 4	Listed under Annex 4 of the European Habitats Directive (92/43/EEC)



150 Holborn, London


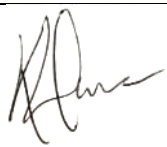
Bat Inspection Report

**Dar Al-Handasah Consultants (Shair and
Partners) UK Ltd.**

August 2015

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Prepared by:	Aven Ecology Ltd 13 Hampden Road London N10 2HP
Project manager:	Anna McDermott
Field team:	Anna McDermott

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Primary author:	Anna McDermott	Signed:	
Reviewed and Approved by:	Kevin Hume	Signed:	

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1.0 Introduction

1.1 Introduction

Aven Ecology Ltd was commissioned by Dar Al-Handasah Consultants (Shair and Partners) UK Ltd. to carry out an inspection survey in respect of bats at 150 Holborn, London, in August 2015. The need for the survey was identified following suspected bat droppings being found within the building in the course of a preliminary inspection by the Dar Group. The purpose of the survey was to search for evidence of bats and to determine the potential of the building to support bats.

1.2 Site Location and Description

150 Holborn, London, hereafter referred to as the 'Site', measures approximately 0.2ha and is situated in Holborn, Camden, London (approximate central OS grid reference: TQ 3116 8165).

The Site comprises a single large seven-storey U-shaped brick building with a three-storey section to the east, and a central hardstanding courtyard. Lead flashing covers the top storey of the building. The building is connected to another building at its north-western end, which is outside the Site boundary. The Site is currently unoccupied with the exception of the ground floor and sections of the basement and first floor, and has been so for several years (*pers. comm* Geoff Kite). Internally the building has been stripped back to the brick and plaster walls, and all furnishings have been removed.

Roads lie immediately adjacent to the eastern, southern and western Site boundaries, and the adjoining building lies to the north of the courtyard. Five London Plane (*Platanus x acerifolia*) trees line Gray's Inn Road, along the western Site boundary. The Site is situated in a very urban location, however a number of small green open spaces are located within 300m, in particular to the north and southwest.

1.3 Development Proposals

The proposed development plans are not yet finalised but are thought to include the renovation of the Site to convert the building into offices.

1.4 Survey Aims and Objectives

The aims of the bat inspection were to:

- identify, where possible, if bats are currently using or have historically used the building as a roost;
- identify if the building has the potential to support roosting bats;
- advise on any further survey work if necessary.

The objectives of the survey included:

- completion of a bat inspection in accordance with best practise guidelines;
- review of legislation relating to bats (see Appendix 1);
- identify potential ecological constraints to works based on survey findings.

1.5 Quality Assurance

All surveys are led by Ecologists who are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) at the appropriate level. By joining the CIEEM staff sign up to a professional code of conduct.

2.0 Methodology

2.1 Introduction

The bat inspection undertaken at 150 Holborn comprised the following:

- 1) Review of the existing bat records within 5km of the Site
- 2) Review of surrounding habitat through aerial photography to identify suitable commuting and foraging habitat within the vicinity of the Site
- 3) Bat inspection of the building within the Site.

2.2 Review of Existing Records and Surrounding Habitat

A desk study was carried out with the aim of informing and supplementing the inspection survey results by collating and reviewing existing ecological information relevant to the Site and the local area.

The publicly accessible online database the National Biodiversity Network (NBN) Gateway was searched for records of bats within 5km of the Site.

Freely available online aerial photography was accessed to search for potential bat foraging habitat within the vicinity of the Site and connected by commuting routes such as treelines and open spaces.

2.3 Bat Internal and External Inspection

The building within the Site was inspected for evidence of and its potential to support bats, where safe to do so and where access permitted. The inspection comprised an external and internal inspection. The exterior and interior walls and roofs of the building were viewed from ground level and features providing potential bat access or roosting places were noted. The internal inspection also comprised a thorough search of the building for evidence indicative of past or present use by roosting bats.

Areas where bat droppings may accumulate, such as on the ground, ledges, window sills and walls, were also inspected. Any features that may potentially be used by bats were identified and any bat roosting features or evidence of bat activity as listed below were noted.

Table 1: External and internal bat roosting or access features or direct evidence of bats

External Inspection Features	Internal Inspection – Features and Direct Evidence
Gaps between roof tiles or ridge tiles	Live bats or bat corpses;
Gaps under the eaves	Droppings
Cracks and crevices in the stonework	Bat sounds
Gaps around the dormer window	Potential access points
Gaps under the lead flashing seals	Potential roosting sites
Potential access points	Clean, cobweb free gaps around potential entrance points

2.4 Survey Dates, Surveyor and Equipment Used

The bat inspection was undertaken by Anna McDermott MCIEEM, holder of Natural England Class Licence WML CL-18, on 17th August 2015.

The following equipment was used or available to use during the survey:

- close focusing binoculars;
- LED P7 Lenser torch;
- endoscope (Seasnake flexible fibre scope); and
- camera.

2.5 Limitations

The floors of the unoccupied parts of the building were concrete covered by dust and small amounts of dirt and debris which may occasionally have obscured the odd scattered bat dropping present, but it is unlikely any clusters of droppings more typically associated with roosting bats would have been missed. Pipework/ventilation systems were open to the remainder of the building, and therefore accessible to bats, and spanned the full height of the building. For health and safety reasons, these areas were not closely inspected.

No access was gained to the plant rooms on the 7th floor and within the basement as the majority of these were locked, however this is not thought to have affected the results of the survey as these rooms appeared sealed.

Any ecological survey represents a snapshot of ecological conditions at the time of survey; ecological conditions may change over time. The details within this report will therefore remain valid for a period of up to 24 months; beyond that date it is advised that a review of ecological conditions is undertaken.

3.0 Results

3.1 Review of Existing Records and Surrounding Habitat

The following records of bat species have been identified within the 10km TQ 38 grid square in which the Site was located:

Eptesicus serotinus – Serotine

Myotis daubentonii – Daubenton's

Myotis myotis – Mouse-eared bat

Nyctalus noctula – Noctule

Pipistrellus pipistrellus – Common pipistrelle

Pipistrellus pygmaeus – Soprano pipistrelle

Plecotus auritus – Brown long-eared bat

Potential bat foraging and commuting habitat was identified within the vicinity of the Site. Gray's Inn Square and South Square Gardens, and Gray's Inn Gardens, both lie less than 200m north-west of the Site, connected by the trees lining Gray's Inn Road. Lincoln's Inn Fields is located less than 250m south-west, however this is not directly connected by a treeline. Small gardens / areas containing trees are also situated within the near vicinity.

3.2 Bat Internal and External Inspection

The indicative locations of the features identified during the external and internal survey are presented in Figure 1, Appendix 3.

3.2.1 External Inspection

No evidence of bats was recorded during the external inspection of the buildings, however the features noted and described in Table 2 below provided potential bat roosting opportunities. Please note the photographs within the table provide only illustrative examples of the features described and are not intended to represent an exhaustive documentation of every such occurrence of those features

3.2.2 Internal Inspection

Each of the seven storeys and the basement were inspected for evidence of bats, with the exception of the ground floor and sections of the basement and 1st floor, which were occupied by tenants at the time of the survey.

With the exception of the basement and the occupied storeys, each floor had a similar layout and all were bare and had been stripped of furnishings. The windows on the 6th floor were mostly open to enable the scaffolding to reach inside, which supported a billboard on the southern side of the building; however the windows were netted to prevent pigeons entering, with the exception of a single window on the 4th floor, which was open but not netted. The greatest number of cracks in the brickwork and holes in the plaster were found on the 6th floor; these features were also present on the on the lower floors albeit in lower numbers.

No evidence of bats was recorded during the internal inspection of the building. Droppings were found at the same location as droppings previously found and reported to be bat droppings; however, the droppings found on the occasion of the current survey were identified as mouse droppings. However features noted and described in Table 3 below provided potential bat roosting opportunities; please note the photographs within the table only provide an example of the feature described.

Table 2: External Building Inspection Results







Description	Photographs of the Feature	Bat Roosting / Access Point
Weep holes in brickwork leaving crevices		Roosting/Access
Lead flashing covered the top storey of the building		Roosting
Gap where lead flashing meets the brick wall on the roof		Roosting
Gaps behind boarding to pipework on roof areas		Roosting

Table 3: Internal Building Inspection Results

Description	Photographs of the Feature	Bat Roosting / Access Point
<p>Pipework running through the floor on each storey provided connectivity between the floors – note the pipes on the floor below visible within the centre of the circular pipe.</p>		<p>Access</p>
<p>Holes/cracks/crevices in the brickwork</p>		<p>Roosting</p>

<p>Holes in the plaster, leading to the gap between the plaster and the brickwork</p>			<p>Roosting</p>
<p>Pipework ran the height of the building, and was accessible on each floor</p>			<p>Roosting and access between floors</p>

<p>Open, albeit mostly netted, windows</p>			<p>Access</p>
<p>A large hole on the 6th floor at the top of a wall inside a cupboard open to the roof and the outside</p>			<p>Access</p>

<p>A small void beneath windows on the 6th floor</p>			<p>Roosting</p>
<p>Mouse droppings were found within cupboards in the same location on the 1st and 3rd floors</p>			<p>N/A</p>

4.0 Discussion and Recommendations

4.1 Discussion

A bat inspection survey was undertaken at 150 Holborn following suspected bat droppings being found within the building. The seven-storey brick building was mostly unoccupied at the time of the survey and had been for a number of years. Internally the building had been stripped and all furnishings removed, meaning it was relatively undisturbed.

The Site was located in a very urban area, however small green open spaces were noted within the vicinity, some connected by a treeline to the Site, which provided commuting routes and foraging areas for bats. Seven bat species have also been recorded within the 10km grid square in which the Site was situated.

No evidence of bats was found within the building during the inspection; droppings were found in the same locations as the previously found suspected bat droppings however these were confirmed as mouse droppings.

Potential bat roosting opportunities were noted during the external and internal inspection, including cracks and crevices in the brickwork and in the plaster. Potential bat access points into the building were provided by open windows and open holes in the walls. In addition, although access points were not present on each floor, open pipework running the height of the building provided connectivity throughout.

Considered together, the presence of potential access points and superficial roosting opportunities, as well as limited commuting routes and foraging areas, the building was categorised in accordance with BCT guidance as having 'Low' (but not 'Negligible') potential to support roosting bats. As the likelihood of small numbers of common/widespread bat species roosting within the building is not negligible, the proposed works to the building may impact upon bats potentially roosting within the building and undetected on the basis of an inspection survey alone (see Limitations section above). Further surveys have therefore been recommended in accordance with best practice guidelines (Hundt, 2012) in order to assess the risk of bats roosting within the building and to inform the safe progress of the proposals with respect to bats (see Recommendations section below)

4.2 Recommendations

In accordance with best practice guidelines (Hundt, 2012), it is recommended that a single dusk bat activity survey is undertaken to assess the level of bat activity within the vicinity of the Site and the risk of bats roosting within the building. In addition, a static bat detector should be deployed on the 6th floor of the building and left in place for 2 weeks to record any bats which may be flying within the building. The survey should be undertaken at a time of year when bats are active, i.e. between May-September. If a high level of bat activity is heard around the Site (particularly around the typical times of bat emergence from their roosts), or bats are recorded flying within the building, further surveys may be required to inform development proposals and provide mitigation, where necessary.

5.0 References

- Defra – <http://magic.defra.gov.uk/website/magic/> [Accessed: 19/08/15]
- HMSO (1981) *The Wildlife and Countryside Act (as amended)*; London
- HMSO (1994) *Biodiversity: The UK Action Plan*; London
- HMSO (2000) *The Countryside and Rights of Way Act*; London
- HMSO (2010) *The Conservation of Habitats and Species Regulations (as amended)*; London
- Hundt, L. (2012) *Bat Surveys: Good Practice Guidelines (2nd edition)*; BCT
- Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*; English Nature, Peterborough
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6.0 Appendices

Appendix 1 – Relevant Legislation

Bats

All species of bat found in the UK are listed under Schedule 5 of *The Wildlife and Countryside Act 1981* (as amended) and are afforded protection under Section 9(4)(b&c) and Section 9(5) of Part 1 of the Act. Under this legislation, a person is guilty of an offence if he intentionally or recklessly:

- Kills or injures any bat;
- Disturbs any bat while it is occupying a structure or place which it uses for shelter or protection; or
- Obstructs access to any structure or place which any bat uses for shelter or protection.

Bats are afforded additional protection through their inclusion on Schedule 2 of *The Conservation of Species and Habitats Regulations 2010* (as amended). Under Part 3 of this legislation, a person is guilty of an offence if he:

- Deliberately captures, injures or kills a bat;
- Deliberately disturbs a bat; or
- Damages or destroys a bat breeding site or resting place.

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, breed or reproduce, rear or nurture their young, migrate or hibernate. It also includes any disturbance likely to affect significantly the local distribution or abundance of the species. Consequently, attention should be given to dealing with the modification or development of an area if aspects of it are deemed important to bats, such as flight corridors and foraging areas.

Appendix 2 – Site Photographs



Photograph 1: Southern elevation of 150 Holborn



Photograph 2: Eastern elevation of 150 Holborn



Photograph 3: Western elevation of 150 Holborn



Photograph 4: Within the central courtyard of 150 Holborn



Photograph 5: Within the Site courtyard



Photograph 6: Roof of eastern arm of the building, taken from inside the western section



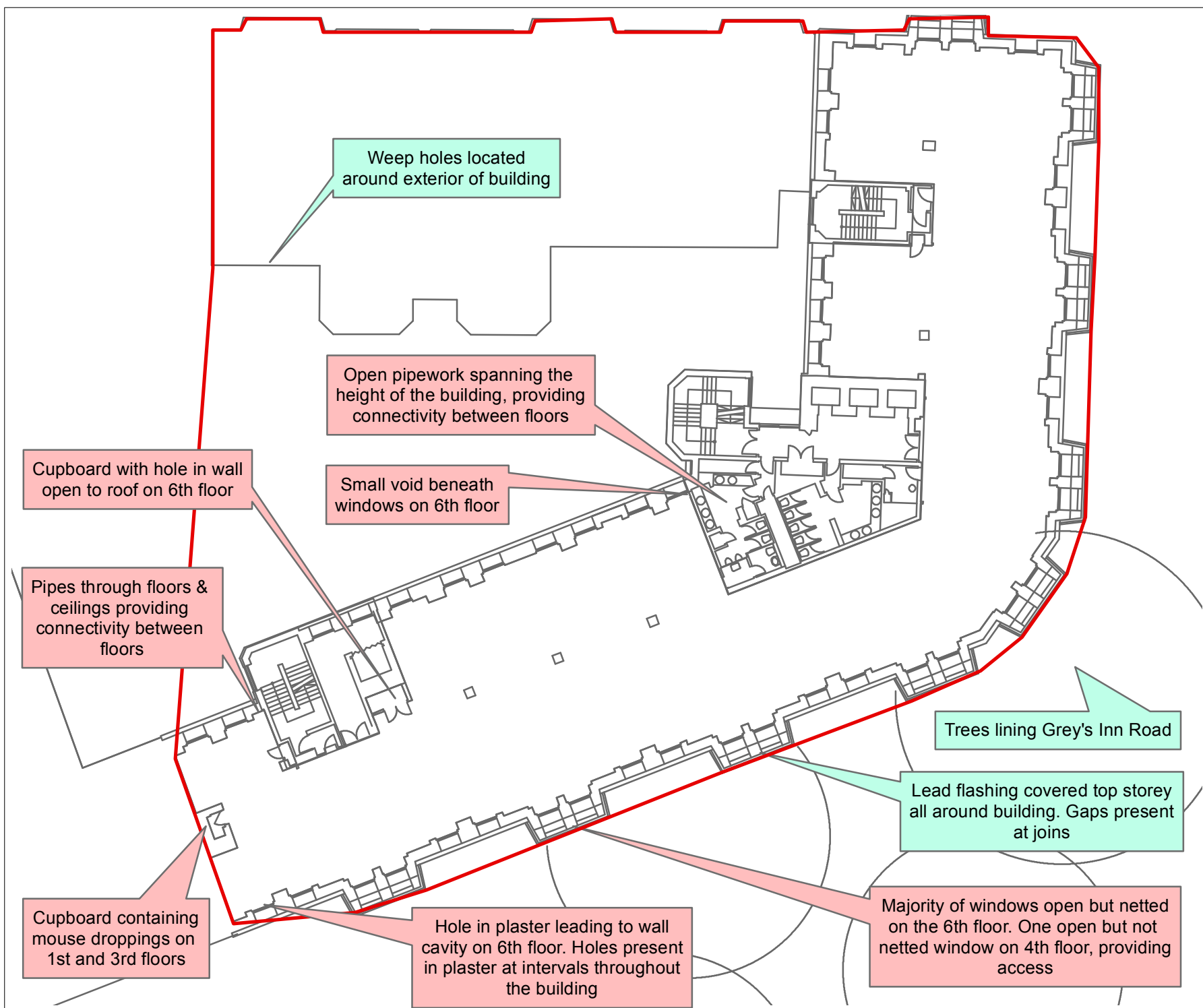
Photograph 7: Inside 150 Holborn



Photograph 8: Inside 150 Holborn

Appendix 3 – Figures

Figure 1: 150 Holborn – Internal and External Inspection Results Plan



Key:

- Internal inspection results
- External inspection results
- Approximate site boundary

N

Scale:	0 2.5 5 meters	
Client:	Dar Group Ltd.	
Project:	150 Holborn	
Title:	Internal and External Inspection Results Plan 17th August 2015	
Date:	20th August 2015	
Figure:	01	Version: 01
Drawn:	HR	Checked: AM





150 Holborn, London


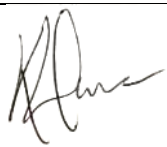
Bat Survey Report

Dar Al-Handasah Consultants (Shair and
Partners) UK Ltd.

September 2015

Document Control

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Project:	150 Holborn, London
Client:	Dar Al-Handasah Consultants (Shair and Partners) UK Ltd.
Job number:	0041
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Prepared by:	Aven Ecology Ltd 13 Hampden Road London N10 2HP
Project manager:	Anna McDermott
Field team:	Anna McDermott

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Reviewed and Approved by:	Kevin Hume	Signed:	

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1.3	Development Proposals	4
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2.3	Static Monitoring Survey	6
2.4	Survey Dates, Surveyors, Weather Conditions and Equipment Used.....	6
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1.0 Introduction

1.1 Introduction

Aven Ecology Ltd was commissioned by Dar Al-Handasah Consultants (Shair and Partners) UK Ltd. to carry out a survey in respect of bats at 150 Holborn, London, in August 2015. The need for the survey was identified following a bat inspection survey undertaken in August 2015 (Aven Ecology, 2015) during which the building was assessed as having low (but not negligible) potential to support roosting bats. The purpose of the survey was to assess the level of bat activity across the Site, in order to inform the development proposals, including any requirement for mitigation.

1.2 Site Location and Description

150 Holborn, London, hereafter referred to as the 'Site', measures approximately 0.2ha and is situated in Holborn, Camden, London (approximate central OS grid reference: TQ 3116 8165).

The Site comprises a single large seven-storey U-shaped brick building with a three-storey section to the east, and a central hardstanding courtyard. The building is connected to another building at its north-western end, which is outside the Site boundary. The Site is currently unoccupied with the exception of the ground floor and sections of the basement and first floor, and has been so for several years (*pers. comm* Geoff Kite).

Roads lie immediately adjacent to the eastern, southern and western Site boundaries, and the adjoining building lies to the north of the courtyard. Five London Plane (*Platanus x acerifolia*) trees line Gray's Inn Road, along the western Site boundary. The Site is situated in a very urban location, however a number of small green open spaces are located within 300m, in particular to the north and southwest.

1.3 Development Proposals

The proposed development plans are not yet finalised but are now thought to include the demolition of the building in order to make way for a new office building.

1.4 Survey Aims and Objectives

The aims of the bat activity survey were to:

- assess the level of bat activity within the Site;
- advise on any further survey work if necessary; and
- assess the potential constraints and implications of the survey findings with regard to the proposed works to the Site.

The objectives of the survey included:

- completion of a bat activity survey, using static automated and mobile transect methodologies;
- identify potential ecological constraints to works based on survey findings.

1.5 Quality Assurance

All surveys are led by Ecologists who are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) at the appropriate level. By joining the CIEEM staff sign up to a professional code of conduct.

2.0 Methodology

2.1 Introduction

The survey undertaken at 150 Holborn comprised an activity survey of and around the building.

2.2 Bat Activity Survey

A dusk bat activity survey was undertaken at 150 Holborn to determine the bat species present and record the level of bat activity on Site. The survey was carried out in accordance with best practice guidelines (Hundt, 2012).

Two surveyors were deployed and were situated within the courtyard of the Site for periods of the survey and also walked a transect around the outside of the Site. The survey was designed to cover the bat access points and roosting opportunities identified during the internal and external inspection as well as assess the level of bat activity across the overall Site. The location of each bat pass, the direction of flight, the species and the behaviour of the bat were recorded on standardised survey forms and field maps. Although not the principal focus of the study, efforts were made to identify potential bat emergence behaviour and thus determine the presence of any roosts.

For the purposes of the survey, a bat pass is defined as “*two or more bat calls in a continuous sequence; each sequence or pass is separated by 1 second or more in which no calls are recorded*” (Hundt, 2012).

The dusk activity survey commenced up to 15 minutes before sunset and continued for approximately 1.5 hours after sunset.

2.3 Static Monitoring Survey

A static bat detector was installed on the 6th floor of the building on 3rd September 2015 and was left in place for 11 nights to record any bat activity within the building, following the discovery of a number of potential bat roosting opportunities during the internal inspection (Aven Ecology, 2015).

2.4 Survey Dates, Surveyors, Weather Conditions and Equipment Used

The bat survey was undertaken by Anna McDermott MCIEEM, holder of Natural England Class Licences WML CL-18, from Aven Ecology and Natalie Andersen from the Dar Group Ltd.

Table 1 below presents the date and the weather conditions during the survey.

Table 1: Survey Date and Weather Conditions

Survey	Date	Sunset	Start/ End	Time	Weather Conditions (Start/end of Survey)				
					Temp. (oC)	Humidity (%)	Wind (Bft)	Cloud (Okt)	Precipitation
Dusk	03.09.15	19:43	Start	19:28	14.5	68.2	0	8	No
			End	21:15	15.2	59.5	0	8	

The equipment used during the survey included:

- Batbox Duet

- Batlogger
- Anabat Express

All bat calls were recorded and later analysed using Analook and BatExplorer sound analysis software.

2.5 Limitations

The intention had been for one surveyor to remain in the courtyard throughout the survey and for the second surveyor to walk a transect around the outside of the Site. For health and safety reasons, it was decided to undertake the survey as a pair due to the presence of 'youths' within the courtyard. As no bats were recorded during the survey, this is not thought to have affected the survey results.

Any ecological survey represents a snapshot of ecological conditions at the time of survey; ecological conditions may change over time. The details within this report will therefore remain valid for a period of up to 24 months; beyond that date it is advised that a review of ecological conditions is undertaken.

3.0 Results

3.1 Bat Activity Survey

A description of the survey is provided below. Figure 1 showing the transect route walked during the survey and is included within Appendix 2.

Dusk Survey - 3rd September 2015

No bats were seen emerging from 150 Holborn and no bats were recorded during the transect survey around the building.

3.2 Static Monitoring Survey

A static detector was installed on the 6th floor of the building on 3rd September and recorded for 11 nights until 14th September. The detector was placed on the 6th floor as the greatest number of potential roosting opportunities had been identified on this floor during the internal inspection and the open windows and connections to the 7th floor roof provided the greatest number of potential bat access points (Aven Ecology, 2015). No bats were recorded flying around the 6th floor of the building during the static monitoring survey.

The location of the static detector for the period of the monitoring survey is shown on Figure 1, Appendix 2.

4.0 Discussion and Recommendations

4.1 Discussion

150 Holborn was assessed as having low potential to support roosting bats during a bat inspection survey undertaken in August 2015 (Aven Ecology, 2015). In accordance with good practice guidelines, a dusk activity survey and a period of static monitoring was recommended; these surveys were carried out in September 2015.

No bats were observed emerging from 150 Holborn and no bats were recorded during the activity survey, indicating the Site has a very low level of bat activity. The static detector installed on the 6th floor also recorded no bats flying around inside the building. It is therefore considered highly unlikely bats are roosting within the building despite the presence of a number of bat roosting opportunities.

4.2 Recommendations

It is recommended that the works to 150 Holborn proceed with caution, and works to the areas identified as having the potential to support roosting bats be undertaken by hand, for example the stripping of the lead flashing around the top floor of the building. In the unlikely event a bat is found during this process, all works must stop and an ecologist contacted.

5.0 References

- HMSO (1981) *The Wildlife and Countryside Act (as amended)*; London
- HMSO (1994) *Biodiversity: The UK Action Plan*; London
- HMSO (2000) *The Countryside and Rights of Way Act*; London
- HMSO (2010) *The Conservation of Habitats and Species Regulations (as amended)*; London
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- Mitchell-Jones, A.J. and McLeish, A.P. (2004) *The Bat Workers' Manual (third edition)*; JNCC, Peterborough
- Aven Ecology (2015) 150 Holborn Bat Inspection Report.

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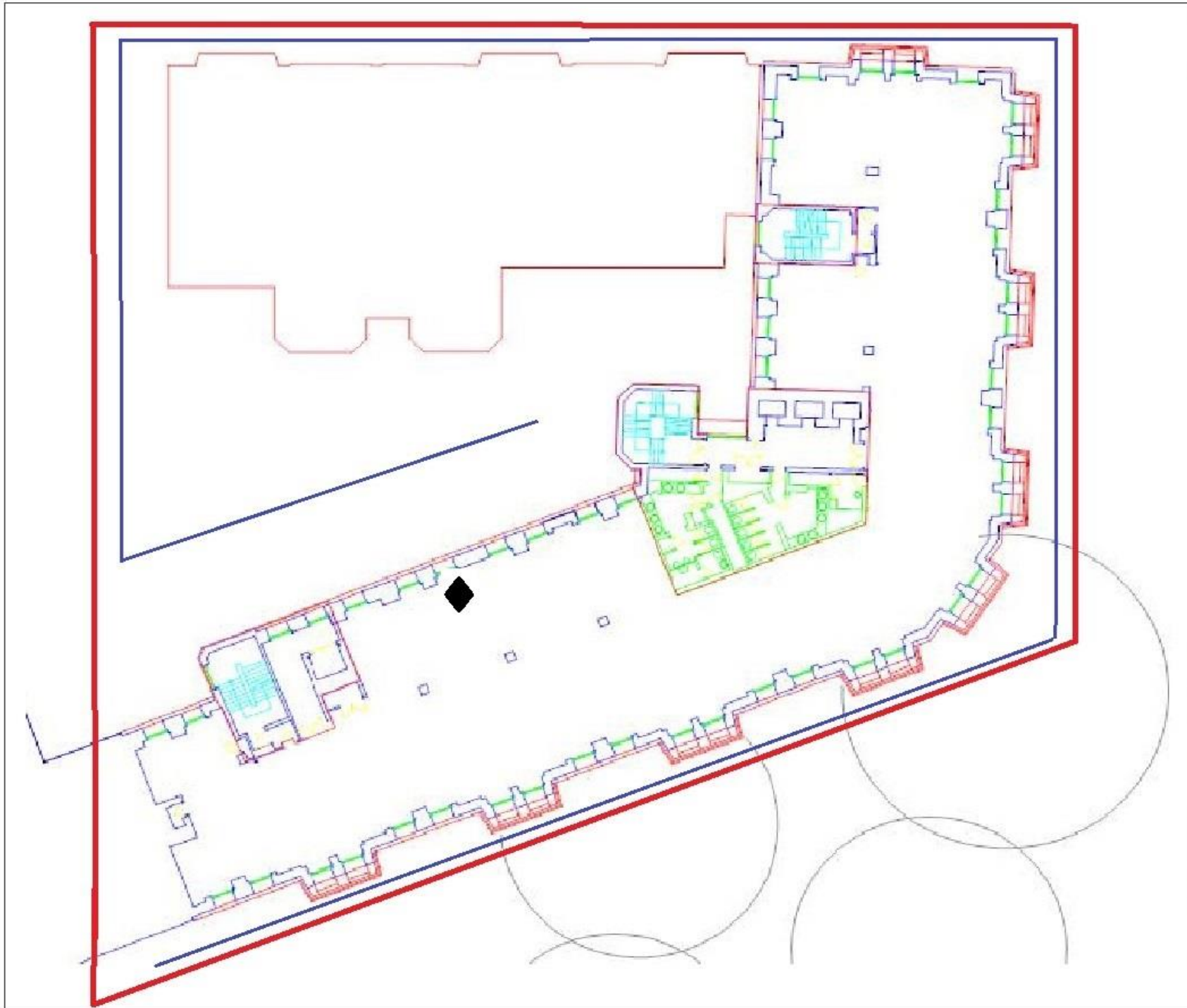
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Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, breed or reproduce, rear or nurture their young, migrate or hibernate. It also includes any disturbance likely to affect significantly the local distribution or abundance of the species. Consequently, attention should be given to dealing with the modification or development of an area if aspects of it are deemed important to bats, such as flight corridors and foraging areas.

Appendix 2 – Figures

Figure 1: 150 Holborn – Bat Activity Survey Transect and Location of Static Detector



Key:

- Approximate redline boundary
- ◆ Location of Static Detector - 6th Floor
- Transect Route

N

Scale:	-	
Client:	Dar Group Ltd	
Project:	150 Holborn	
Title:	Bat Survey Results 3rd September 2015	
Date:	17th September 2015	
Figure:	1	Version:
Drawn:		Checked: AM



Camden Biodiversity Advice Note: Landscaping Schemes and Species Features

The following note provides advice for landscaping schemes and species features as part of new developments and regeneration schemes or in parks and open spaces. Camden expects landscaping schemes to be developed in a way that is sympathetic to biodiversity, alongside their other social, aesthetic and environmental functions. Species features are artificial habitats created to support nesting, roosting or shelter for wildlife such as birds, bats and insects. These features can be valuable in urban areas where there are fewer natural nesting sites available.



Policy Background

National	There is support for the incorporation of biodiversity into developments at the national level in the Natural England White Paper and Biodiversity 2020: A strategy for England's wildlife and ecosystem services. The National Planning Policy Framework under section 11: conserving and enhancing the natural environment also encourages the consideration of biodiversity.
Regional	<p>Biodiversity-sympathetic landscaping is supported by many London policies; principally London Plan policy 7.19 Biodiversity and access to nature. It is also supported by the <i>Mayor's biodiversity strategy 2002 proposal 6: Greening new developments</i>.</p> <p>In addition, biodiversity-sympathetic landscaping is in line with other London policies, such as Policy 5.3 <i>Sustainable design and construction</i> and 5.10 <i>Urban greening</i>. The <i>All London Green Grid</i> highlights the importance of considering surrounding greenspace and the context of London-wide ecological networks.</p> <p>The protection, appropriate care and planting of new trees are also supported by the London Plan policy 7.21 <i>Trees and woodlands</i> and the strategy document <i>Connecting Londoners with Trees and Woodlands: A Tree and woodland framework for London 2005</i>.</p>
Camden	<p>Camden provides advice on biodiversity landscaping and planting within Camden Planning Guidance 3: Sustainability (section 13).</p> <p>The development of wildlife friendly landscaping is also in accordance with Development policy DP22: promoting sustainable design and construction and Core Strategy policy CS15: promoting and improving our parks and open spaces in encouraging biodiversity.</p>

Benefits of biodiverse landscaping

- Habitat provision - wildlife-friendly planting and features will provide habitat for Camden's species.
- Amenity - a large body of research links exposure to nature with positive well-being effects; volunteering in natural space can benefit personal health and community capacity.
- Education - wildlife provides learning and engagement opportunities.
- Climate change adaptation and sustainable urban drainage - reducing hard surfaces will reduce flooding risk and 'urban heat-island' effects; choosing the most appropriate species, e.g. of trees, will reduce planting risks from changed.

Landscaping Features and Considerations

Retaining existing habitats

- Existing habitat should be retained as a refuge for local species, with particular consideration given to habitat networks and whether the site forms part of an ecological green corridor.
- In particular mature trees have many conservation benefits for insects, birds and bats.
- If existing topsoil remains, it may contain a local seed bank and should be retained if possible

New planting

- Wildlife friendly planting will increase food, shelter and breeding site resources for wildlife.
- Native species often have the highest ecological value; however wildlife-friendly non-natives can also be useful. The spatial and functional context of the site will effect what planting is most appropriate. Non-native species that are harmful invasives should be completely avoided (see list below).

Meadows and long grass areas

- Meadows can be restored or created to provide visual amenity and wildlife in appropriate context (e.g. if replacing amenity grass; if an area already has high wildlife value however, creating a meadow may be inappropriate).
- Wildflowers provide an important nectar source for many pollinating insects
- If possible, species should be native and of local provenance.
- A variety of plant species should be included to provide for a range of wildlife.
- Wildflower schemes should have plans and provisions for continuing management.
- A programme of cutting and removal of arisings will maintain floral diversity.
- Mown strips surrounding meadow areas indicate to the public or residents these areas are undergoing management.
- Amenity grass has little biodiversity value. Reducing areas of very short grass and replacing it with longer grass will have a range of wildlife benefits.
 - Longer grass provides shelter and humid conditions for invertebrates.
 - A range of different vegetation structures provide a variety of conditions.
 - Permanent long grass areas provide over-wintering areas for invertebrates.

Tree, shrub and understory planting

- Can provide food, shelter, breeding sites and varied microclimates for many species.
- If possible, a variety of heights should be established including large canopy trees (15-20m high when mature), as these help to regulate urban temperatures
- Native species are often the best to plant although the principle of 'the right tree for the right site' should be used in designing planting schemes
 - 'Right tree, right place' guidance at: <http://www.forestry.gov.uk/ltwf>
- While native shrubs have high value, non-native shrubs with high wildlife value can also be considered (see species list below).
- Hedgerows created with native species are of high ecological value
 - Hedgerows will have to be properly managed to maintain their value (see below for further guidance).

Surfacing

- Permeable "natural" surfaces reduce run-off and encourage insects and so are favourable to hard surfaces.
- Creating some variation in the topography of the soil or the type of substrate (e.g. some bare ground) will create varying microclimates suitable for different species.

Features

- **Deadwood** is important for food, shelter and breeding for some invertebrates, small mammals and birds.
- **Ponds** (both permanent and seasonal) are vital habitats for many amphibians and invertebrates and provide drinking water for birds and mammals. They can also form part of a sustainable drainage strategy.
- **Water courses** should be naturalised where opportunities arise.
- **Bird and bat boxes** integrated into buildings or on trees can provide additional nesting sites. Plans for their maintenance should be considered when they are installed.

Product use

- Peat is a valuable and depleted natural resources and all projects should aim to use peat-free growing mediums.
- Herbicide and insecticide use should be kept to a minimum in order to reduce harm to non-target wildlife species.

Species Suggestions

Most of the species suggested here are native. Some are non-native but they are non-invasive and are valuable to urban wildlife. Non-native species are indicated by (NN). Size of tree species is indicated by: (S) = small (<12m high and 4-8m wide); (M) = medium (>12m high and 4-8m wide); and (L) = large (>12m high and >8m wide).

Meadow plants and grasses

Yarrow (<i>Achillea millefolium</i>)	Ribwort Plantain (<i>Plantago lanceolata</i>)
Agrimony (<i>Agrimonia eupatoria</i>)	Common toadflax (<i>Linaria vulgaris</i>)
Lesser Knapweed (<i>Centaurea nigra</i>)	Cowslip (<i>Primula veris</i>)
Greater knapweed (<i>Centaurea scabiosa</i>)	Red/white/bladder campion (<i>Silene sp.</i>)
Field scabious (<i>Knautia arvensis</i>)	Common sorrel (<i>Rumex acetosa</i>)
Ox-eye daisy (<i>Leucanthemum vulgare</i>)	False Brome (<i>Brachypodium sylvaticum</i>)
Bird's foot trefoil (<i>Lotus corniculatus</i>)	Cocksfoot (<i>Dactylis glomerata</i>)
Yellow rattle (<i>Rhianthus minor</i>)	Sheep's Fescue (<i>Festuca ovina</i>)
Viper's bugloss (<i>Echium vulgare</i>)	Common velvet grass (<i>Holcus lanatus</i>)
Red clover (<i>Trifolium pratense</i>)	Rough bluegrass (<i>Poa trivialis</i>)
Lady's bedstraw (<i>Galium verum</i>)	Crested dog's tail (<i>Cynosurus cristatus</i>)
Common cat's ear (<i>Hypochaeris radicata</i>)	Meadow Cranesbill (<i>Geranium praetense</i>)

Tree species

Field maple (<i>Acer campestre</i>) (M)	Crab apple (<i>Malus sylvestris</i>) (S)
Alder (<i>Alnus glutinosa</i>) (M)	Oaks (<i>Quercus robur</i> and <i>petraea</i>) (L)
Common beech (<i>Fagus sylvatica</i>) (L)	Rowan (<i>Sorbus aucuparis</i>) (M)
Silver birch (<i>Betula pendula</i>) (L)	Lime (<i>Tilia cordata</i>) (L)
Bird cherry (<i>Prunus padus</i>) (M)	Common Holly (<i>Ilex aquifolium</i>) (M)
Wild cherry (<i>Prunus avium</i>) (L)	Whitebeam (<i>Sorbus aria</i>) (L)
Whitebeam (<i>Sorbus aria</i>) (L)	

Annuals and perennials (border plants)

Rooper's Red-hot poker (<i>Kniphofia rooperi</i>) (NN)	Bluebell (native only) (<i>Hyacinthoides non scripta</i>)
Bugle (<i>Ajuga reptans</i>)	Fleabane (<i>Erigeron</i>)
Wood anemone (<i>Anemone nemorosa</i>)	Sea Holly (<i>Eryngium matitimum</i>)
Ox-eye chamomile (<i>Anthemis tinctoria</i>)	Wall Flower (<i>Erysinum cheiri</i>)
Rock cress (<i>Arabis alpine</i>)	Stinking Hellbore (<i>Helleborus foetidus</i>)
Thrift (<i>Armeria maritima</i>)	Foxglove (<i>Digitalis purpurea</i>)
Aubrieta spp. (<i>Aubrieta spp.</i>)	Toadflax (<i>Linaria vulgaris</i>)
Gold dust (<i>Aurinia saxitalis</i>)	Primrose (<i>Primula vulgaris</i>)
Tussock bellflower (<i>Campanula carpatica</i>)	Blessed Mary's Thistle (<i>Silybum marianum</i>)
Red valerian (<i>Centranthus ruber</i>)	Hedge Mustard (<i>Sisymbrium officinale</i>)
Ivy-leaved toad-flax (<i>Cymbalaria muralis</i>)	Wood Betony (<i>Stachys officinalis</i>)
Wild daffodil (<i>Narcissus pseudonarcissus</i>)	Snowdrop (<i>Galanthus nivalis</i>)
Darley Dale Heath (<i>Erica x darleyensis</i>) (NN)	Crocus spp. (<i>Crocus spp.</i>) (NN)
Squill species (<i>Scilla spp.</i>) (some NN)	Winter aconite (<i>Eranthis hyemalis</i>) (NN)
Grape Hyacinth (<i>Muscari neglectum</i>) (NN)	Glory-of-the-snows (<i>Chinodoxa spp.</i>) (NN)

Hedge or shrub species

These species can be used in hedge planting (H) or some can also be wildlife-friendly free-standing shrubs (S).

Hawthorn (<i>Craetaegus montana</i>) (H/S)	Wild pear (<i>Pyrus pyraeaster</i>) (H)
Common Gorse (<i>Ulex europaeus</i>) (H/S)	Common hombeam (<i>Caprinus betulus</i>) (H)
Common Elder (<i>Sambucus nigra</i>) (S)	Wild Privet (<i>Ligustrum vulgare</i>)
Common Hazel (<i>Corylus avellana</i>) (H/S)	Dog rose (<i>Rosa canina</i>) (H)
Common Dogwood (<i>Cornus sanguinea</i>) (H)	Field rose (<i>Rosa arvensis</i>) (H)
Blackthorn (<i>Prunus spinosa</i>) (H)	Spindle (<i>Euonymus europaeus</i>) (H)
Alder buckthorn (<i>Alnus glutinosa</i>) (H/S)	Guelder rose (<i>Viburnum opulus</i>) (H/S)
Purging buckthorn (<i>Rhamnus carthartica</i>) (H/S)	Bay/Crack/Goat/White Willow (<i>Salix sp.</i>) (H/S)
Wayfaring tree (<i>Viburnum lantana</i>) (H)	Crab apple (<i>Malus sylvestris</i>) (H)
Hardy Fuschia (<i>Fuchsia magellanica</i>) (NN) (S)	Ivy (<i>Hedera helix</i>) (Climber)
Orange ball-tree (<i>Buddleia Globosa</i>) (NN) (S)	Silver wattle (<i>Acacia dealbata</i>) (NN) (S)
Witch-hazel (<i>Hammamelis</i>) (NN) (S)	Barberry (<i>Berberis spp.</i>) (NN) (S)
Hedge Veronica (<i>Hebe spp.</i>) (NN) (S)	Firethorn (<i>Pyracantha coccinea</i>) (NN) (S)
Daisy Bush (<i>Olearia spp.</i>) (NN) (S)	Escallonia (<i>Escallonia macrantha</i>) (NN) (S)
Flowering Currant (<i>Ribes sanguinem</i>) (NN) (S)	Wintersweet (<i>Chimonanthus praecox</i>) (NN) (S)
Portuguese laurel (<i>Prunus lustanica</i>) (NN) (S)	

Invasive species (to be avoided)

Butterfly bush (<i>Buddleia davidii</i>)	Holm oak (<i>Quercus ilex</i>)
Cherry laurel (<i>Prunus laurocerasus</i>)	Johnson grass (<i>Sorghum halepense</i>)
Floating pennywort (<i>Hydrocotyle ranunculoides</i>)	Montbretia (<i>Crocsmia x crocosmiiflora</i>)
Giant hogweed (<i>Heracleum mantegazzianum</i>)	Pale Galingale (<i>Cyperus eragrostis</i>)
Himalayan balsam (<i>Impatiens glandulifera</i>)	Perfoliate Alexander (<i>Smyrniun perfoliatum</i>)
Japanese knotweed (<i>Fallopia sachalinensis</i>)	Rhododendron (<i>Rhododendron ponticum</i>)
New Zealand Pigmyweed (<i>Crassula helmsii</i>)	Snowberry (<i>Symphoricarpos albus</i>)
Parrots-feather (<i>Myriophyllum aquaticum</i>)	Turkey Oak (<i>Quercus cerris</i>)
Cotoneaster (<i>Cotoneaster sp.</i>)	Water fern (<i>Azolla sp.</i>)
Few-flowered garlic/leek (<i>Allium paradoxum</i>)	Duck Potato (<i>Sagittaria latifolia</i>)

Key principles for species features

- It is preferable to install species bricks and boxes into the fabric of a building as this provides longevity (i.e. they will last longer) and they are less likely to be disturbed;
- Species will not be attracted to a site unless there are areas for them to feed and cover for them to move around. Appropriate landscaping should be in place for the species being targeted (see Camden Biodiversity Advice Note: Landscaping Schemes).

Locations for species features

The quantity and location of species features will depend on the site conditions, the species being targeted and the availability of commuting/foraging habitat. The following points provide general guidance only.

Bat bricks and boxes

- Should be located at least 5m above ground level;
- Place two or three bricks/boxes facing different directions between south-east and south-west.

Bird bricks and boxes – hole-front

- Should be located 2-4m above ground level;
- Should face between north and east to avoid strong sunlight and winds;
- Make sure birds have a clear flight path to the nest;
- Terraces or multiple boxes can be used for species that live in colonies, such as House sparrow.

Bird bricks and boxes – Swift bricks

- Should be installed at a height of at least 6-7m, preferably under the shelter of the eaves or overhanging roofs;
- Should be sited on a north, north west or west aspect out of the sun and heat which can harm the chicks;
- A 5 metre drop, clear of obstructions provides clear airspace for high speed entry and egress;
- Several boxes together will assist the formation of swift colonies.

Bird bricks and boxes – open-front (Robins and Wrens)

- Position below 2m, well hidden in vegetation.

External boxes

The following should be considered if it is not possible to use 'integrated' species features and it becomes necessary to attach boxes to trees or structures:

- Avoid damaging trees when fixing boxes;
- Use tree ties or strapping (not nails). A rubber strap with buckle should be screwed or bolted to the box with the washer and flat side pointing out. Multiple ties can be tied together to secure the box to the tree around the trunk. It is recommended that tree ties are checked and loosened once every two years to ensure they do not start to restrict the tree or become degraded;
- Ensure the boxes are not placed directly above a path or other area used by the public (in case they fall down);
- Ensure the box is clear of overhanging branches;
- Locate in lines of mature trees or by hedgerows if possible;
- Tilt boxes forward slightly so rain will bounce away.

Further guidance and information

Landscaping

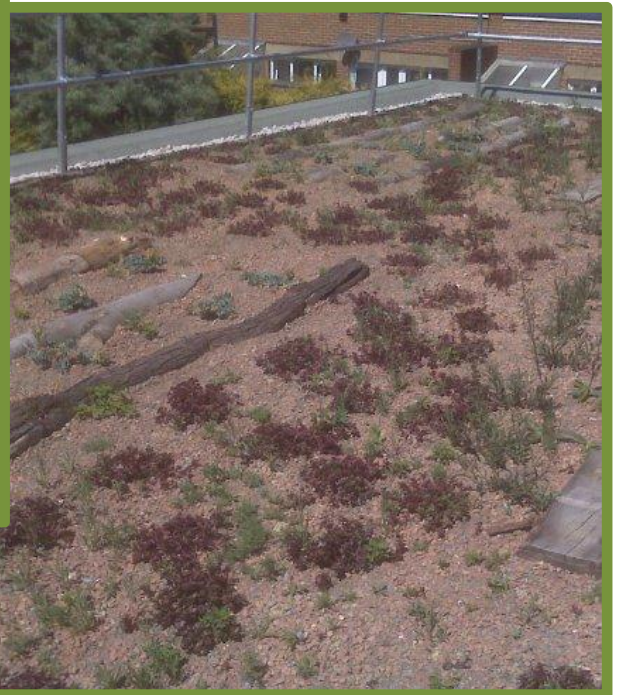
- Species suggestions:
 - www.habitataid.co.uk/
 - www.wildaboutgardens.org.uk/plants.aspx
 - www.plantforwildlife.ccw.gov.uk/
 - www.joyofplants.com/wildlife/home.php
 - <http://apps.rhs.org.uk/advice/search/Search.aspx?oa=true>
- Landscaping:
 - <http://www.tcpa.org.uk/pages/biodiversity-by-design.html>
 - http://www.plantlife.org.uk/publications/landscaping_without_harmful_invasive_plants/
- Right Tree Right Place:
 - www.forestry.gov.uk/ltwf
- Wildlife gardening:
 - www.lbp.org.uk/guidancepubs.html
- Hedgerows:
 - www.hedgeline.org.uk/index.htm

Species features

- Bat Conservation Trust www.bats.org.uk
- Swift Conservation www.swift-conservation.org/
- Blackredstarts.org www.blackredstarts.org.uk
- RSPB www.rspb.org.uk/advice/helpingbirds/nestboxes/

Camden Biodiversity Advice Note: Living Roofs and Walls

The following note provides advice for living roofs and walls as part of new developments, regeneration schemes or retro-fitting projects. Camden expects living roofs to be designed and maintained in a way that is sympathetic to biodiversity, alongside their other environmental functions.



Types of living roof

Living roofs are roof areas with additional waterproofing and substrate material in order to encourage the establishment of plants and wildlife. There are three main categories of living roofs:

1. **Intensive** – Provide accessible amenity space e.g. rooftop gardens and food growing areas, and often require higher levels of design and maintenance.
2. **Semi-intensive** – Can provide different degrees of access and ecological habitat.
3. **Extensive** - Generally demand less maintenance and consist of three sub-types:
 - **Sedum** – type of low-growing plant with shallow roots.
 - **Biodiverse living roofs** – designed to optimize wildlife value. Sparsely sown with wildflowers or re-colonised naturally. Substrate can be brownfield habitat ('Brown roofs') with crushed brick or concrete; or nutrient poor soil ('green roofs') or a mixture of the two substrates.
 - *Brownfield or 'Open mosaic on previously developed land' is a UK BAP Priority*

Biodiverse roofs can consist of a combination of 'brown' and 'green' habitat. Different types of roofs, however, will deliver different levels of each benefit and will be appropriate in different contexts. The Environment Agency state that around **75% of living roofs should be designed for biodiverse green or brown roofs** and 25% should be intensive/semi-intensive.

Benefits of living roofs

Living roofs can deliver many benefits including:

- Sustainable drainage systems (SuDS) appropriate to urban areas
- Climate change mitigation and reducing the urban heat island effect
- Thermal regulation of buildings (heat insulation and cooling)
- Economic benefits such as lifetime extension of a roof and reductions in maintenance costs
- Aesthetic and educational value
- Habitat provision and increasing connectivity
 - *For example, rare black redstarts and endangered stag and streak bombardier beetles can benefit from biodiverse brown and green roofs.*

Policy Background

National	<p>Living roofs are supported by the National Planning Policy Framework, including under <i>Section 11: conserving and enhancing the natural environment</i> and several national strategies, including <i>Climate change – the UK programme, 2006</i> and the government’s sustainable development strategy, <i>Securing the Future 2005</i>.</p> <p>N.B. the Flood and Water Management Act 2010 will require Camden Council to become a Sustainable Drainage Systems (SuDS) Approval Body, eventually approving the drainage of all developments with any drainage implications. Living roofs are recognised as one of the forms of SuDS most suited to urban environments.</p>
Regional	<p>The London Plan has a specific policy relating to living roofs, Sustainable Energy 5.11:</p> <p><i>“The Mayor will and boroughs should expect major developments to incorporate living roofs and walls where feasible and reflect this principle in LDF policies. It is expected that this will include roof and wall planting that delivers as many of these objectives as possible:</i></p> <ul style="list-style-type: none">• <i>Accessible roof space</i>• <i>Adapting to and mitigating climate change</i>• <i>Sustainable urban drainage</i>• <i>Enhancing biodiversity</i>• <i>Improved appearance”</i> <p>Living roofs are also consistent with other policies in the London Plan including those relating to climate change adaptation (5.1, 5.12 and 5.13) and biodiversity (7.19).</p>
Camden	<p>Camden’s Development Policy DP22 states that:</p> <p><i>“Schemes must incorporate green and brown roofs and green walls unless it is demonstrated that this is not possible or appropriate. This includes new and existing buildings. Special consideration will be given to historic buildings to ensure architectural and historic features are preserved”</i></p> <p>This is supported by Camden Planning Guidance 3: Sustainability. The implementation of living roofs also contributes to the aims of Camden Core strategy policy CS15: protecting and improving parks and open spaces and encouraging biodiversity.</p>

Green Roof Design Basics

There are many things to consider when designing and implementing a green roof:

- Whether site is overlooked and any potential privacy infringements;
- Root barriers and waterproofing and drainage capacity (*see below for design specifications*);
- Amount of external heat generated by the building and surface flooding risk;
- Weight and structural considerations;
- Ease of installation and maintenance;
- Aesthetics, access and amenity provision;
- Habitats and biodiversity.

Biodiversity design and considerations

The following outline some key principles for maximising the biodiversity benefit of living roofs. These can be most extensively be applied on green or brown roofs designed for biodiversity; however they can also be incorporated to varying degrees into intensive and semi-intensive green roofs.

Surroundings

- In built-up areas, living roofs and walls can make a significant contribution to an area's greenspace.
- Habitats in the surrounding areas should be considered e.g. if there are important brownfield sites nearby, the strategic provision of brownfield habitat on roofs could increase connectivity between sites.

Substrate

- Substrate depth should be between 80 and 150mm and vary across the roof.
- For brown biodiverse roofs, reclaimed building material can be used but should be screened to ensure that it is not contaminated.
- Areas of bare ground can provide habitat for warmth-loving invertebrates and recreate an open mosaic habitat structure.
- Mounds and ridges can provide varying microclimates suitable for different species and create structurally diverse vegetation.

Planting

- Planting should consider the climate, microclimate, plant attributes and objectives.
- Vegetation can establish either through natural colonisation or planting
 - Colonisation can produce habitat of high value but can also create problems with undesirable species.
- The sowing of annuals or plug planting combined with seeding can be beneficial as it provides a resource for species for the first few years during establishment
- **Sedum** has less biodiversity value but can still deliver drainage benefits etc. and can be combined with other plantings and substrates (on biodiverse roofs should be less than 30%).
- **Wildflowers** provide a habitat for beetles, bees, butterflies and moths. Planting density should be 15-20 species/m². In addition to constituting the main planting for biodiverse green roofs, they can be incorporated into extensive brown roofs and sedum roofs. Mosses, succulents and grasses can provide additional variation.
- **Shrubs and cover** can be provided depending on structural considerations and substrate depth and can provide cover for wildlife, perches and winter food for birds, and windbreaks.

Other Biodiversity Features

- *Over-wintering* vegetation allows many invertebrates to complete their lifecycle;
- *Log piles and deadwood* can provide habitat and perches for invertebrates and birds;
- *Bee banks* are mounds of sand and provide valuable nesting sites;
- *Stones and mounds of cleaned bricks* can provide insect and spider habitat;
- *Ponds and wet areas* can provide a valuable resource for many species;
- *Bug hotels and habitat walls* for nesting and overwintering invertebrates.

Maintenance

- Maintenance will vary between roofs and it is important to understand the maintenance requirements before the roof is installed;
- Most extensive green roofs do not require extensive irrigation and fertiliser;
- Initial watering will usually be required during establishment (for around 6 weeks);
- Monitoring and removal of undesirable species may be required;
- Habitat management e.g. re-creating bare-ground areas may be required.

Photovoltaic (PV) Panels

PV can be installed in combination with green roofs. In fact, green roofs can regulate the temperature and improve the efficiency of PV panels, which in turn can provide shaded areas and enhance the biodiversity value of a roof.

(image © Dusty Gedge)



Species Suggestions

Chosen species must be appropriate for the location (ideally local provenance), persistent in harsh conditions (e.g. drought and high winds) and able to form resilient low-growing cover.

Suggested wildflowers

Achillea millefolium / Yarrow (BL)
Agrimonia eupatoria / Agrimony
Anthyllis vulneraria / Kidney vetch
Centaurea nigra / Common knapweed
Echium vulgare / Viper's-bugloss
Galium verum / Lady's bedstraw
Hypericum perforatum / Perforate St. Johnswort
Knautia arvensis / Field scabious
Lamium album / White dead nettle (BL)
Leontodon autumnalis / Autumn hawkbit
Leontodon hispidus / Rough hawkbit
Leucanthemum vulgare / Oxeye daisy
Linaria vulgaris / Common toadflax
Lotus corniculatus / Bird's-foot trefoil
Malva moschata / Musk mallow

Origanum vulgare / Wild marjoram
Plantago media / Hoary plantain
Primula veris / Cowslip
Prunella vulgaris / Selfheal
Ranunculus acris / Meadow buttercup
Ranunculus bulbosus / Bulbous buttercup
Reseda lutea / Wild mignonette
Sanguisorba minor / Salad burnet
Silene latifolia / White Campion
Silene noctiflora / Night flowering catch-fly
Silene uniflora / Sea campion (GRG)
Silene vulgaris / Bladder campion
Thymus ducii / Wild Thyme (GRG)
Trifolium Pratense / Red clover (BL)

Suggested grasses

Briza media / Quaking-grass
Festuca ovina / Sheeps fescue

Other *festuca* spp.
Koeleria macrantha / Crested hair-grass

Living walls

Living walls are walls that have vegetation growing on them. Living walls can provide many of the benefits of living roofs, including pollution alleviation, aesthetics and insulation. They can also provide well-being benefits through urban greening at the street level.

They can be grouped into three types:

1. **Self-clinging climbers** –plants that climb directly up wall surfaces e.g. Ivy (*Hedera sp.*)
2. **Supported climbers** – plants that climb up a grid or trellis e.g. Jasmine (*Jasminum sp.*)
3. **Vertical systems** –wall panels with plants grown directly within them. Watering systems and nutrient supply are incorporated within these and as such, require intensive management.

When implementing a living wall important considerations are:

- The number of species included and their biodiversity value e.g. for pollinators, birds etc.;
- Building features and structure, especially in relation to the weight of the wall;
- Any threat to the structural fabric and material of the building;
- The maintenance and sustainability of the wall (especially irrigation and fertilisation);
- Position and amenity provision e.g. especially in built-up areas with a lack of greenspace.

Further Guidance and information

More information on biodiversity and other elements of living roof and wall design can be found at:

- Environment Agency: Green roof toolkit
www.environment-agency.gov.uk/business/sectors/91967.aspx
- GLA: Living roofs and walls technical report
http://legacy.london.gov.uk/mayor/strategies/sds/tech_rpts.jsp
- GRO Code <http://www.greenroofcode.co.uk/>
- Green roof guide <http://www.greenroofguide.co.uk/>
- FLL European standards <http://www.fill.de/shop/english-publications.html>
- Green roof centre of excellence <http://www.thegreenroofcentre.co.uk/>
- Livingroofs.org <http://livingroofs.org/>
- Design for Biodiversity resource www.d4b.org.uk
- Creating Green Roofs for Invertebrates: Best Practice Guidance
<http://www.buglife.org.uk/AboutBuglife/publications>