

Preliminary Ecological Appraisal

for

Orchard Hill College, West Drayton

August 2017

Quality management		
Project:	Orchard Hill College, West Drayton	
Project No:	E17865	
Report title:	Preliminary Ecological Appraisal	
Report author:		Name: Nick Trull Title: Assistant Ecologist
Approved by:		Name: Dr Jo Parmenter Title: Director
Status:	Draft: 1	
Date of last revision:	16 August 2017	

Client Details	
Client:	Mace
Client Address:	155 Moorgate London EC2M 6XB United Kingdom

Contact Details
The Landscape Partnership Ltd Jonathan Scott Hall Thorpe Road Norwich CB8 9DE Tel: 01603 230777 The Landscape Partnership Ltd is a practice of Chartered Landscape Architects, Chartered Ecologists and Chartered Environmentalists, registered with the Landscape Institute and a member of the Institute of Environmental Management & Assessment & the Arboricultural Association. Registered Office: Greenwood House 15a St Cuthberts Street Bedford MK40 3JG. Registered in England No 2709001

Quality standards
This report is certified BS 42020 compliant and has been prepared in accordance with The Chartered Institute of Ecology and Environmental Management's (CIEEM) Technical Guidance Series '<i>Ecological Report Writing</i>' and Code of Professional Conduct. The copyright of this document rests with The Landscape Partnership. All rights reserved.

Contents

Non-technical summary

1	Introduction	1
1.1	Commission	1
1.2	Legislation and policy background	1
1.3	Reporting standards	1
1.4	Site location and context	1
1.5	Acknowledgements	1
1.6	Description of the project	2
1.7	Objectives of this appraisal	2
1.8	Previous ecological studies	2
1.9	Duration of appraisal validity	2
2	Methodology	3
2.1	Desk study methodology	3
2.2	Phase 1 habitat survey methodology	3
2.3	Assessment methodology	3
2.4	Mitigation hierarchy	5
3	Results	6
3.1	Desk study results	6
3.2	Phase 1 habitat survey results	9
4	Evaluation of conservation status and impact assessment	12
4.1	Assessment rationale	12
4.2	Evaluation of conservation status and assessment of designated sites	12
4.3	Evaluation of conservation status and assessment of habitats and green infrastructure	12
4.4	Evaluation of conservation status and assessment of species	13
4.5	Cumulative impacts	14
5	Mitigation and avoidance measures	15
5.1	Avoidance measures	15
5.2	Proposed mitigation for known impacts	15
5.3	Compensation for ecological impacts	16
5.4	Species licensing	16
6	Enhancement options	17
6.1	Ecological enhancement	17
6.2	Habitat enhancement options	17
6.3	Small-scale species enhancement options	17
7	Recommendations	18
7.1	Recommendations for further survey	18
7.2	Other recommendations	18
8	Conclusions	19
8.1	Overall assessment of value and impact	19
8.2	Duration of validity of report	19
8.3	Further survey requirements	19
9	References	20

Figures

1. Phase 1 Habitat Survey

Appendices

1. Summary of relevant legislation
2. Impact and assessment methodology
3. Designated sites (information provided by Greenspace Information for Greater London (GiGL))
4. Bats and lighting

Non-technical summary

The Landscape Partnership was commissioned by Mace to undertake a Preliminary Ecological Appraisal comprising a desk study and, Phase 1 Habitat Survey and an assessment of the potential of site features to support bats, together with an assessment of impacts at Orchard Hill College, West Drayton.

The objectives of the appraisal were to identify the habitats and species present or potentially present and evaluate their importance, assess the impact of the development proposal and describe any measures necessary to avoid impacts, reduce impacts or compensate for impacts so that there is no net harm to ecological features.

The survey involved classifying and recording habitat types and features of ecological interest, and identified the potential for protected species to be present by assessing habitat suitability for those species. The survey was undertaken by appropriately qualified and experienced personnel.

The site comprises a number of grassland areas, including a large playing field at its northern end. There are several areas of ornamental planting and some standard trees occur in the vicinity of the school buildings which are located within the southern half of the site. The southern and eastern boundaries are marked by a mixture of hedgerows and trees. Collectively the habitats within the proposed development site are assessed as being of value at up to the **Parish** level.

Based on the habitat types present, it is considered that the site has potential to support the following protected species or groups of species: breeding birds and bats (foraging and commuting).

The proposed development constitutes the construction of a new-build secondary school for c160 special-needs students. Planning is at an early stage and no detailed site layout plans have been formalised.

In the absence of mitigation, the proposed development would give rise to the loss of boundary habitat, including hedgerows and trees, as well as trees in internal areas of the site. This would give rise to a **Minor Adverse** impact upon breeding birds and bat foraging and commuting. Mitigation has been proposed, including, but not limited to, a minimum 5m working offset from retained habitats, the requirement that ornamental planting constitutes at least 50% by area of native species or species of known value to wildlife, such as fruiting species and species known to provide a good nectar source and, to compensate for a reduction on nesting opportunities as a result of vegetation removal, the provision of five bird boxes. This mitigation would reduce the impacts of the development proposals upon the habitats and species present, to give rise to an overall **Neutral** impact.

The assessment of the site determined no requirement for further survey.

A number of **ecological enhancements** have been proposed, which would improve the quality of the site for native flora and fauna, including, but not limited to, a new wildlife pond in a secluded corner of the site, habitat piles, bat boxes, bird boxes and native planting. Delivery of these enhancements would lead to an overall **Minor Beneficial** impact.

1 Introduction

1.1 Commission

- 1.1.1 The Landscape Partnership was commissioned by Mace to carry out a Preliminary Ecological Appraisal (PEA), comprising a desk study and, Phase 1 Habitat Survey and an assessment of the potential of site features to support bats, together with an assessment of impacts at Orchard Hill College, West Drayton.

1.2 Legislation and policy background

- 1.2.1 There is a range of protection given to sites and species. Sites may be designated for local, national, European or global importance for nature conservation. Species may be protected by European-scale legislation or varying levels of national regulation.
- 1.2.2 The Local Planning Authority has a policy to protect features of nature conservation value within its Local Plan. Other regulators have policies relating to the consents issued by them.
- 1.2.3 Further information is given in Appendix 1.

1.3 Reporting standards

- 1.3.1 This report was written in compliance with British Standard 42020:2013 'Biodiversity — Code of practice for planning and development' and the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct.
- 1.3.2 This report was prepared in accordance with the CIEEM 'Guidelines for Ecological Report Writing' as updated December 2015.
- 1.3.3 The report was prepared by Nick Trull. The report was reviewed by Dr Jo Parmenter, Director of The Landscape Partnership.
- 1.3.4 Assessment was undertaken against current legislation and planning policy, and in accordance with standard guidance. Further information is given in Section 2 and Appendix 2.

1.4 Site location and context

- 1.4.1 The site is located in a distinctly urban setting at the north-west of West Drayton, west London, approximately 4.1km east of Slough, in the Parish of St. Matthew, Yiewsley. Access is from Falling Lane to the south. Historic aerial imagery from google Earth Pro indicates that the site has been used as a school and has been managed in the same way for at least the last 18 years. Grassland areas including the playing field at the north of the site are mown variably regularly, but all at least several times a year. Boundary hedgerows are cut at least once a year.
- 1.4.2 Other than hedgerows, boundary habitat also includes some tree cover which is restricted to the eastern and southern boundaries of the southern half the site, where the school buildings are situated. There are several small areas of ornamental planting in the vicinity of the school buildings.
- 1.4.3 The Ordnance Survey Grid Reference for the approximate centre of the proposed development site is TQ 0613 8100. A plan showing the site is provided at Figure 01.

1.5 Acknowledgements

Permissions to gain access to land

- 1.5.1 Permission to gain access to the land for survey is gratefully acknowledged.

Surveyor Competencies

Survey(s)	Surveyor(s)	Experience (years)	Licences
Phase 1 habitat survey	Nick Trull GradCIEEM	1	

Other contributors

1.5.2 We acknowledge the input of:

- Greenspace Information for Greater London (GiGL) for provision of data as reproduced in Appendix 3;

1.6 Description of the project

1.6.1 The proposal is at an early stage and no site layout plans have yet been developed, but consists of the construction of a new special-needs secondary school for circa 160 students.

1.7 Objectives of this appraisal

1.7.1 The aim of this appraisal is to inform a planning application for the proposed development, as described above. Detailed objectives are to:

- identify the habitats and species present or potentially present and evaluate their importance;
- identify any ecological constraints to development;
- assess the impact of the development proposal;
- identify any opportunities available for integrating ecological features within the development;
- describe any measures necessary to avoid impacts, reduce impacts or compensate for impacts so that there is no net harm to ecological features;
- propose ecological enhancements.

1.8 Previous ecological studies

1.8.1 There are no known previous ecological studies of the site.

1.9 Duration of appraisal validity

1.9.1 The assessment, conclusions and recommendations in this appraisal are based on the studies undertaken, as set out in this report, and the stated limitations. This appraisal is based on the project as described and any changes to the project would need the appraisal to be reviewed. Unless otherwise stated, the assessment, conclusions and recommendations given assume that the site habitats will continue to be used for their current purpose without significant changes until development takes place. However, changes in use or management may occur between the time of the survey and proposals being implemented. Ecological features may change naturally at any time; for example, species may be lost from existing sites or colonise new areas. Our knowledge of the ecology of the site enables us to provide an estimate of the duration of the validity of the surveys carried out and hence the applicability of this appraisal, so that any future need for review and update of this appraisal, or the surveys described within it, and the date by which such updates would become necessary, can be identified.

1.9.2 The table below sets out the duration of validity of each element of each information source. If the proposed development is delayed beyond the stated timescale, update surveys or further investigations would be required.

Duration of validity of information source

Information source	Date undertaken	Duration of validity from date undertaken	Notes
Desk study	8th August 2017	1 – 2 years	Further data may become available.
Phase 1 habitat survey	4th August 2017	2 years	The habitats on site may change especially if management changes.

2 Methodology

2.1 Desk study methodology

- 2.1.1 Greenspace Information for Greater London (GiGL) was requested to provide records of protected, rare and/or priority species and details of statutory and non-statutory designated sites on 8th August 2017, within a 1km radius of the centre of the site at TQ 0613 8100.
- 2.1.2 The Magic website (www.magic.gov.uk) was used to identify European sites within a 5km radius and national sites within a 2km radius. The Magic website was accessed on 8th August 2017.
- 2.1.3 Water bodies within 250m of the site were identified from the relevant 1:25,000 Ordnance Survey map sheet, to establish the need for protected species scoping surveys, such as great crested newt Habitat Suitability Index surveys. Consideration was also given to the green infrastructure of the local area.
- 2.1.4 The potential for protected, rare and/or priority species to be present on site has been considered in this assessment, taking into account the nature of the site and the habitat requirements of the species in question. Absence of records does not constitute absence of a species. Habitats on the site may be suitable for supporting other protected species that have not previously been recorded within the search area. Conversely, presence of a protected species in the search area does not imply its presence on-site. Records of alien species, non-localised records (e.g. tetrad records) and records dated before 1995 have not been described in detail, but are taken into account when considering likely species presence or absence.

Limitations to desk study methodology

- 2.1.5 There were no significant limitations to the desktop study.
- 2.1.6 In accordance with BS42020 and advice from most Local Biological Record Centres, species lists are not appended to this report but are available to the Local Planning Authority on request.
- 2.1.7 The data supplied by the Records Centre was considered in the assessment of potential impacts below.

2.2 Phase 1 habitat survey methodology

- 2.2.1 The standard Phase 1 (baseline) habitat survey methodology¹ was followed. Phase 1 habitat survey is a standardised system for surveying, classifying and mapping wildlife habitats, including urban areas. All habitats present and areas or features of ecological interest within such habitats were recorded and mapped. The survey methodology facilitates a rapid assessment of habitats and it is not necessary to identify every species on site.
- 2.2.2 The survey visit was also used to identify potential for protected, rare and/or priority species, for example bats, mammals, amphibians and reptiles, to occur on, or in the vicinity of, the proposed development site. Although the survey methodology is not intended for species survey, any protected, rare and/or priority species which were seen during the survey were noted.
- 2.2.3 The survey was undertaken on 4th August 2017 and the weather conditions were sunny with some cloud cover but dry.

Limitations to Phase 1 habitat survey

- 2.2.4 There were no significant limitations to the Phase 1 habitat survey.

2.3 Assessment methodology

- 2.3.1 The assessment was undertaken in accordance with the Chartered Institute of Ecology and Environmental Management's Professional Guidance Series².
- 2.3.2 More details of the assessment methodology are provided in Appendix 2, but, in summary, the impact assessment process involves:

¹ JNCC (2010) *Handbook for Phase 1 Habitat Survey - a Technique for Environmental Audit*. Reprinted by JNCC, Peterborough.

² CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*, Second Edition.

- identifying and characterising impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects; and
- identifying opportunities for ecological enhancement.

2.3.3 The hierarchical process of avoiding, mitigating and compensating for ecological impacts is explained further below.

2.3.4 In Ecological Impact Assessment (EcIA) it is only essential to assess and report significant *residual* effects (i.e. those that remain after mitigation measures have been taken into account). However, it is considered good practice for the EcIA to make clear both the potential significant effects without mitigation and the residual significant effects following mitigation, particularly where the mitigation proposed is experimental, unproven or controversial. Alternatively, it should demonstrate the importance of securing the measures proposed through planning conditions or obligations.

2.3.5 Assessment of the potential impacts of the proposed development takes into account both on-site impacts and those that may occur to adjacent and more distant ecological features. Impacts can be positive or negative. Negative impacts can include:

- direct loss of wildlife habitats;
- fragmentation and isolation of habitats through loss of connectivity;
- disturbance to species from noise, light or other visual stimuli;
- changes to key habitat features; and
- changes to the local hydrology, water quality, nutrient status and/or air quality.

2.3.6 Negative and positive impacts on ecological features are characterised based on predicted changes as a result of the proposed activities. In order to characterise the impacts on each feature, the following parameters are considered:

- the magnitude of the impact;
- the spatial extent over which the impact would occur;
- the temporal duration of the impact and whether it relates to the construction or operational phase of the development;
- the timing and frequency of the impact; and
- whether the impact is reversible and over what time frame.

2.3.7 Both short-term (i.e. impacts occurring during the site clearance and construction phases) and long-term impacts are considered.

Conservation status

2.3.8 The extent to which the proposed development may have an effect upon ecological features should be determined in the light of its expected influence on the integrity of the site or ecosystem. The integrity of protected sites is considered specifically in the light of the site's conservation objectives. Beyond the boundaries of designated sites with specific nature conservation designations and clear conservation objectives, the concept of 'conservation status' is used. Conservation status should be evaluated for a study area at a defined level of ecological value. The extent of the area used in the assessment relates to the geographical level at which the feature is considered important.

2.3.9 For habitats, conservation status is determined by the sum of the influences acting on the habitats and their typical species that may affect their long-term distribution, structure and functions, as well as the long-term survival of its typical species within a given geographical area. For species, conservation status is determined by the sum of influences acting on the species concerned and inter-relationships that may affect the long-term distribution and abundance of its populations within a given geographical area.

Confidence in predictions

2.3.10 It is important to consider the likelihood that a change or activity will occur as predicted and also the degree of confidence in the assessment of the impact on ecological structure and function.

- **Certain** probability estimated at above 95%
- **Probable** probability estimated above 50% but below 95%
- **Possible** probability estimated above 5% but below 50%
- **Unlikely** probability estimated as less than 5%

Cumulative impacts

- 2.3.11 Consideration is also given to the potential for the development proposal to give rise to significant negative impact in combination with other proposed developments in the local area.

Overall assessment

- 2.3.12 An overall assessment of value and impact is provided. This is based upon the highest level or value of any of the features or species present, or likely to be present on the site. Similarly, the overall assessment of impact is the impact of greatest significance.

2.4 Mitigation hierarchy

- 2.4.1 The following principles underpin EcIA and have been followed, where applicable, in this assessment.

- **Avoidance** Seek options that avoid harm to ecological features (for example, by locating the proposed development on an alternative site or safeguarding on-site features within the site layout design).
- **Mitigation** Adverse effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
- **Compensation** Where there are significant residual adverse ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- **Enhancement** Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

3 Results

3.1 Desk study results

Sites of European importance

3.1.1 There were no sites of European importance in the search area.

Sites of national importance

3.1.2 There were no sites of national importance in the search area.

Sites of local importance

3.1.3 Greenspace Information Greater London provided its data subject to terms and conditions. The data provided must not be distributed or published for an external or public audience, for example within the appendix of a report. Local Planning Authorities may request a copy of the data from GiGL either through their Service Level Agreement or as a data search. Consequently, site details are not presented here, although the data was considered in the assessment of potential impacts below.

3.1.4 The following sites of local importance (Site of Importance for Nature Conservation) were identified within the search area.

Sites of local importance

Site	Distance from development site (approx.)	Direction	Key habitat/ features of interest
London's Canals (SINC)	420m	W (nearest point)	London's canals support a wide range of aquatic flora, amongst which are found a number of locally uncommon species. These include narrow-leaved water plantain <i>Alisma lanceolatum</i> , rigid hornwort <i>Ceratophyllum demersum</i> and shining pondweed <i>Potamogeton lucens</i> , all species of clean, clear waters. Many waterside plants, including several London rarities, also grow on the brickwork and banks of the canal. The canals also support an important invertebrate fauna (including several species of dragon/damselflies), a diverse fish community, and breeding waterfowl. London's network of canals fulfil an important function in allowing nature into heavily built-up environments.
Little Britain (SINC)	420m	W (nearest point)	This area of the Colne valley has a remarkable variety of habitats including lakes, rivers, scrub, areas of wasteland, woodland and neutral grassland. The Colne and Frays rivers are clean, fast flowing and support an interesting range of marginal habitats, including valuable areas of wet woodland. Unbranched bur-reed <i>Sparganium emersum</i> and water dock <i>Rumex hydrolapathum</i> both occur in the Frays. Of particular importance are the areas of unimproved floodplain grassland, which support a lush flora

			including the nationally scarce tasteless water-pepper (<i>Polygonum mitis</i>) and London rarities marsh arrowgrass <i>Triglochin palustre</i> , marsh speedwell <i>Veronica scutellata</i> and sharp-flowered rush <i>Juncus acutiflorus</i> , as well as abundant ragged-robin <i>Lychnis flos-cuculi</i> .
Lower Colne (SINC)	890m	SW	One of the finest river systems in London, including sections of the rivers Colne, Wraysbury and Frays. These originate as chalk streams and collectively support a diverse aquatic and marginal flora, including several plants with a restricted London distribution. Among these are the nationally declining river water-dropwort <i>Oenanthe fluviatilis</i> , unbranched bur-reed <i>Sparganium emersum</i> , great yellow-cress <i>Rorippa amphibia</i> , bladder-sedge <i>Carex vesicaria</i> , arrowhead <i>Sagittaria sagittifolia</i> , narrow-leaved water-plantain <i>Alisma lanceolatum</i> and common water-crowfoot <i>Ranunculus aquatilis</i> . Associated wet meadows, flooded gravel pits, ponds, alder-willow woodland and an old orchard are included within the site at several points, and support further botanical interest including London's only native population of the nationally rare and specially-protected pennyroyal <i>Mentha pulegium</i> . The breeding avifauna includes kingfisher and grey wagtail. The invertebrate fauna is also likely to be important; the banded demoiselle damselfly <i>Calopteryx splendens</i> is abundant here. The rivers also support a diversity of fish, including dace, chub and the uncommon barbel. The specially-protected water vole is also present.
River Pinn and Manor Farm Pastures (SINC)	Adjacent	N	This stretch of the River Pinn is bordered on both sides by open grassland, much of which comprises rank grasses and tall herbs with scattered scrub, although some of it is managed as sports fields. The river is generally lined by trees and shrubs such as alder <i>Alnus glutinosa</i> , crack willow <i>Salix x fragilis</i> , ash <i>Fraxinus excelsior</i> , hawthorn <i>Crataegus monogyna</i> and blackthorn <i>Prunus spinosa</i> but open areas of the banks are smothered in bramble <i>Rubus</i>

			<i>fruticosus</i> agg. and nettle <i>Urtica dioica</i> . The heavy shade and competition has led to a dearth of aquatic and wetland plants except for the introduced species.
Stockley Park Country Park (SINC)	800m	E	This large, hilly country park contains extensive grassland and other habitats including tall herbs, scrub, trees and hedgerows, much of which has been planted. The grasslands include perennial rye-grass <i>Lolium perenne</i> , barren brome <i>Anisantha sterilis</i> , couch <i>Elytrigia repens</i> , creeping bent <i>Agrostis stolonifera</i> and Yorkshire fog <i>Holcus lanatus</i> . A large variety of flowers occur within a number of sown wildflower meadows including ox-eye daisy <i>Leucanthemum vulgare</i> , meadow vetchling <i>Lathyrus pratensis</i> , wild carrot <i>Daucus carota</i> , musk mallow <i>Malva moschata</i> and hairy tare <i>Vicia hirsuta</i> . A small pond supports a dense stand of common reed <i>Phragmites australis</i> , reed sweet-grass <i>Glyceria maxima</i> , common club-rush <i>Schoenoplectus lacustris</i> and flowering rush <i>Butomus umbellatus</i> . Reed warblers nest in the reed bed. Copses of planted silver birch <i>Betula pendula</i> , wild cherry <i>Prunus avium</i> , lime <i>Tilia</i> sp.) and white willow <i>Salix alba</i> are present with other woody species as hedges including hazel <i>Corylus avellana</i> , dogwood <i>Cornus sanguinea</i> and blackthorn <i>Prunus spinosa</i> with scattered London plane <i>Platanus x hispanica</i> and horse chestnut <i>Aesculus hippocastanum</i> .

- 3.1.5 Further information as well as site locations relative to the proposed development site are provided in Appendix 3.

Protected, rare and/or priority species

- 3.1.6 A number of species records were returned for the search area. Records for protected, rare and/or priority species from within the search area are summarised below. In accordance with BS42020 and advice from most Local Biological Record Centres, species lists are not appended but are available to the Local Planning Authority on request.

Veteran trees

- 3.1.7 No veteran tree records were returned.

Plants

- 3.1.8 A small number of plant records were returned including, but not limited to, galingale *Cyperus longus*, stinking hellebore *Helleborus foetidus*, fringed water-lily *Nymphoides peltata* and common meadow-rue *Thalictrum flavum*.

Invertebrates

- 3.1.9 A relatively small number of records for invertebrates were returned including Odonata, Orthoptera, Coleoptera and Lepidoptera. Species included, but were not limited to, red-eyed damselfly *Erythromma najas*, long-winged cone-head *Conocephalus fuscus*, one record for stag beetle *Lucanus cervus*, brown argus *Aricia agestis* and buttoned snout *Hyperbaena rostralis*.

Amphibians including great crested newts

- 3.1.10 One record for common frog *Rana temporaria* was returned.

Reptiles

- 3.1.11 One record for grass snake *Natrix natrix* was returned.

Birds

- 3.1.12 A small number of records for birds were returned. Species included, but were not limited to, kingfisher *Alcedo atthis*, house martin *Delichon urbicum*, reed bunting *Emberiza schoeniclus* and red kite *Milvus milvus*.

Dormouse

- 3.1.13 No dormouse *Muscardinus avellanarius* records were returned.

Terrestrial Mammals including badgers

- 3.1.14 One record of hedgehog *Erinaceus europaeus* was returned.

Aquatic Mammals including water voles and otters

- 3.1.15 One record of water vole *Arvicola amphibius* was returned.

Bats

- 3.1.16 One record of an unidentified bat *Pipistrellus* sp. was returned.

3.2 Phase 1 habitat survey results

- 3.2.1 Eleven Phase 1 habitat categories were identified during the Phase 1 habitat survey and are shown on Figure 01.

Management, setting and green infrastructure

- 3.2.2 The habitat comprises a regularly mown large playing field at its north and several smaller areas of managed grassland and ornamental shrub planting at the southern end where the main school building and associated outhouses are situated. Maintained hedgerows mark the southern and eastern boundaries, as well as the eastern and northern boundaries of the playing field where the off-site and adjacent hedgerows protrude the site's fence line perimeter. Some tree cover occurs at boundaries at the southern half of the site.

- 3.2.3 The site lies in an urban setting with dense residential development to the immediate south and east. Adjacent and north of the site, however, the River Pinn and Manor Farm Pastures (SINC) occurs. The off-site and adjacent hedgerow constitutes boundary vegetation of this SINC. Hedgerows and trees along the eastern boundary of the site connect to boundary habitats of this SINC which comprise copses, scrub and hedgerows at the margins of open grassland and the River Pinn where wetter riparian habitats occur.

- 3.2.4 Figure 01 shows the habitats present. Each habitat is described below.

A3.1 Scattered broadleaved trees

- 3.2.5 A number of broadleaved trees (some ivy-clad) occurred at the south of the site, with the majority located at the boundary to the south-east. Most of these trees were of a young age and comprised ash *Fraxinus excelsior*, hornbeam *Carpinus betulus*, hazel *Corylus avellana*, sycamore *Acer pseudoplatanus* with understorey species including lilac *Syringa vulgaris*, cherry laurel *Prunus laurocerasus* and ivy *Hedera helix*. Two semi-mature ash trees were identified within the site, one toward the east boundary in the vicinity of the main school building, and the other located at the southern corner adjacent to the site boundary. At this southern corner, a cherry *Prunus* sp. and weeping willow *Salix x sepulcralis* were also present.

A3.2 Scattered coniferous trees

- 3.2.6 A small number of conifer trees *Cupressus* sp. occurred at similar locations to those described above for broadleaved species.

B4 Improved grassland

- 3.2.7 Improved grassland occurred in the southern half of the site, in the vicinity of the school buildings, at the east and west boundaries and as a strip associated with a raised mound located directly north of the main school building which forms the southern margin of the playing field at the north of the site.

J1.2 Amenity grassland

- 3.2.8 Several small areas of close-mown grassland in the vicinity of the school buildings at the southern of the site, and the playing field to the north were dominated by perennial ryegrass *Lolium perenne*. Associated forbs included nettle *Urtica dioica*, ivy, wood avens *Geum urbanum*, cat's-ear *Hypochaeris radicata*, chickweed *Stellaria media*, white clover *Trifolium repens*, dove's-foot crane's-bill *Geranium molle*, yarrow *Achillea millefolium*, smooth sow-thistle *Sonchus oleraceus*, dandelion *Taraxacum* agg., Canadian fleabane *Conyza canadensis*, ribwort plantain *Plantago lanceolata*, daisy *Bellis perennis* and common ragwort *Senecio jacobaea*.

J1.4 Introduced shrub

- 3.2.9 There were several areas of introduced shrub within the site, generally occurring adjacent to the main school building, although two ornamental shrubs were present along the west boundary of the playing field at the north of the site. West of the main school building abutting some outbuildings, species present included wall cotoneaster *Cotoneaster horizontalis*, *Hydrangea* sp., cherry laurel, hawthorn *Crataegus monogyna*, field maple *Acer campestre*, holly *Ilex aquifolium*, elder *Sambucus nigra*, hazel, holm oak *Quercus ilex*, ash and dogwood *Cornus sanguinea* with climbers including ivy and bittersweet *Solanum dulcamara*. East of the main school building, in a fenced area, there was a small herb garden with rosemary *Rosmarinus officinalis*, among other common garden herbs.

J2.1.1 Species-rich hedge, intact

- 3.2.10 A species-rich hedge marked a section of the eastern boundary towards its northern end. This continued off-site along the northern-most section of the eastern boundary and along the northern boundary, but protruded the site's perimeter fence-line. Structural species within the hedge included hawthorn, plum *Prunus* sp., blackthorn, cherry *Prunus avium*, Norway maple *Acer platanoides*, elder and oak *Quercus robur*. Established, dense ivy also formed significant sections of the hedge along the east boundary. Climbers and scramblers included white bryony *Bryonia dioica* and bramble *Rubus fruticosus* agg. Hedge base flora comprised common mallow *Malva sylvestris*.

J2.1.2 Species-poor hedge, intact

- 3.2.11 A hedgerow marking the east boundary, adjacent to the entrance driveway, comprised yew *Taxus baccata*, holly, cherry laurel, elder and ivy. A small section of hedge at the very southern end of the west boundary comprised cherry laurel, butterfly-bush *Buddleja davidii* and elder.

J2.3.1 Species-rich hedge with trees

- 3.2.12 A hedge with coniferous and broadleaved trees marked the south boundary, including the west boundary adjacent to the entrance driveway. Tree species included cypress, ash and hornbeam. Structurally, the hedge comprised hawthorn, buckthorn *Rhamnus cathartica*, blackthorn, Oregon grape *Mahonia aquifolium*, butterfly bush, dogwood, snowberry *Symphoricarpos albus*, cherry laurel, ash, hornbeam, hazel as well as ornamental shrubs. Climbers and scramblers included bramble, ivy, bittersweet

J2.4 Fence

- 3.2.13 The entire boundary of the site was marked by fencing of a variety of fencing types. Internally fenced areas were restricted to the southern half of the grounds, where the school buildings are situated.

J3.6 Buildings

- 3.2.14 The main school building and associated external classrooms and outhouses are situated in the southern half of the site (the northern half comprising only the playing field).

J4 Hardstanding and bare ground

- 3.2.15 The southern half of the site was dominated by hardstanding with some bare ground, including carparking area, walkways and a basketball court. There was also a small area of hardstanding adjacent to the east boundary within the playing field at the north of the site.

4 Evaluation of conservation status and impact assessment

4.1 Assessment rationale

- 4.1.1 The assessment is based on the ecological data presented within this report. Future changes in the wildlife present on site are beyond the scope of this report, unless specifically stated.

4.2 Evaluation of conservation status and assessment of designated sites

- 4.2.1 The ecological value of the site is considered below and evaluated using the methodology set out in Appendix 2 and in accordance with species legislation and planning policy, as outlined in Appendix 1.

Sites of European importance

- 4.2.2 There are no sites of European importance within the search area. The impact of the proposed development upon European designated sites is therefore assessed as **Neutral**.

Sites of national importance

- 4.2.3 There are no sites of national importance in the search area. The impact of the proposed development upon nationally designated sites is therefore assessed as **Neutral**.

Sites of local importance

- 4.2.4 A total of 5 sites lie within the 1km search radius of the proposed development site. These sites are assessed as being of **Medium** importance for wildlife at the **County** scale.

- 4.2.5 Due to the fact that the site is surrounded by urban development, including the A408 to the south and west, construction on-site would not impact four of the five nearby designated sites. However, as it is located adjacent to the site, the River Pinn and Manor Farm Pastures (SINC) could be impacted by minor increases in noise and air pollution during the construction phase of the proposal, particularly if the development is concentrated toward the site's northern end. Off-site vegetation at the northern boundary, however, would buffer such impacts. As a precautionary measure, to protect this SINC during construction activities, a Construction Environmental Management Plan (CEMP) should be implemented which would set out construction best-practice measures. A shallow catch ditch could also be excavated along the northern boundary to avoid silt-laden run-off into the northern and adjacent ditch (which is within the boundary of the River Pinn and Manor Farm Pastures (SINC)). These measures would ensure that the impact of the proposed development upon locally designated sites is **Neutral**. Visual impacts would furthermore be limited by vegetation adjacent to the northern boundary. Impacts on this SINC westwards would be buffered by the presence of Rabbsfarm Primary School to the immediate west.

4.3 Evaluation of conservation status and assessment of habitats and green infrastructure

Habitats

- 4.3.1 Habitats of higher ecological value include those at the boundaries, including along the southern and eastern boundaries. It is recommended that these are retained and incorporated into the development as part of the site's green infrastructure. Habitats of lower value include the amenity grassland areas and ornamental shrubs. It is recommended that these are retained where possible and ecological enhancements considered. These habitats are assessed as being of **Lower** value at the **Parish** scale.

- 4.3.2 Impacts of any development upon the site habitats are provisionally considered to be **Minor Adverse**. Mitigation (as outlined below), however, would ensure impacts of development at the site are **Neutral**.

Green infrastructure

- 4.3.3 The site provides some minor habitat linkage with garden habitats to the south and east. Hedgerows off-site but adjacent to it along the north boundary and the northern section of the east boundary connect to the River Pinn and Manor Farm Pastures (SINC) to the north.

4.4 Evaluation of conservation status and assessment of species

Veteran trees

- 4.4.1 There are no veteran trees present on the site. The value of the proposed development site for these is therefore **Negligible**. The impact of the proposed development upon this group is **Neutral**.

Plants

- 4.4.2 Given the nature of the habitats recorded at the site, it is not considered that the site has potential to support protected, rare and/or priority plants. The value of the proposed development site for this group is **Negligible** and the impact of the proposed development is **Neutral**.

Invertebrates

- 4.4.3 Given the nature of the habitats recorded on the site and, it is not considered that the site has potential to support protected, rare and/or priority invertebrates. The value of the proposed development site for this group is **Negligible** and the impact of the proposed development is **Neutral**.

Amphibians including great crested newts

- 4.4.4 There are no ponds within 250m of the site. Great crested newt would therefore not be likely to be present on-site and the impact of the proposal is **Neutral**.

Reptiles

- 4.4.5 Given the fact that the majority of grassland areas within the site are frequently mown, there is very limited potential for reptiles to occur on-site. The value of the proposed development site for this group is **Negligible** and the impact of the proposed development is **Neutral**.

Birds

Breeding birds

- 4.4.6 Small numbers of common species may use the boundary habitats for nesting and foraging. The site is considered to be of **Lower** value at the **Parish** scale. If boundary habitats are retained and with mitigation outlined below, the impact of the proposal would be **Neutral**.

Wintering birds

- 4.4.7 There are no habitats present on site which might support significant populations of wintering birds. The site is considered to be of **Negligible** value for this group.

Dormice

- 4.4.8 There were no dormouse records returned for the site, and the habitats present offer no resource for this species. The site is therefore considered to be of **Negligible** value for this species and the impact of the proposed development is **Neutral**.

Aquatic mammals including water voles and otters

- 4.4.9 Should members of this group use the River Pinn, approximately 160m north-west, they would be very unlikely to use the site as less disturbed, better quality habitat occurs closer to the river. The value of the proposed development site for this group is **Negligible** and the impact of the proposed development is **Neutral**.

Terrestrial mammals including badgers

- 4.4.10 There were no badger records returned for the local area, and the habitats present on site are of very limited suitability for sett construction and offer a limited foraging resource. The site is therefore considered to be of **Negligible** value for this species and the impact of the proposed development is **Neutral**.

Bats

Roosting potential

- 4.4.11 The site habitats offer very limited potential for bat roosting. Trees on-site or adjacent to it lack suitable features for bat roosting such as decay holes, crevices in the bark, etc.

- 4.4.12 Site buildings have very little potential to support bat roosts as they are located beyond 200m of water and woodland, were built post-1960, and were constructed in a fashion unsympathetic to bat roosting suitability; lacking features such as exposed wooden beams, hanging tiles, weather boarding etc. Further survey of these building would not therefore be recommended.

Foraging/commuting potential

- 4.4.13 Vegetation along the eastern and off-site northern and north-eastern boundaries of the site are likely to be used as foraging and commuting habitat. Off-site vegetation along the northern boundary is particularly suitable habitat in this regard as it also constitutes boundary habitat of the River Pinn and Manor Farm Pastures (SINC) which contains a range of suitable habitat types for bat foraging and commuting. The site is considered to be of **Lower** value at the **Parish** scale for foraging/commuting. Retention of the site's boundary habitats and with mitigation, including restrictions to external lighting (as outlined below), would ensure the impact of the proposal upon bat foraging and commuting is **Neutral**.

4.5 Cumulative impacts

- 4.5.1 There are no known cumulative impacts.

5 Mitigation and avoidance measures

5.1 Avoidance measures

5.1.1 The following impact avoidance measures have been identified and will be delivered.

- All site boundary features, including scrub and trees at the periphery of the site, are to be protected in the built scheme.
- Where possible, trees in interior areas of the site will be retained in-situ.
- Implementation of a catch ditch along the northern boundary to avoid run-off into an adjacent and parallel ditch which occurs at the boundary of the River Pinn and Manor Farm Pastures (SINC).

5.2 Proposed mitigation for known impacts

5.2.1 The following mitigation is required to reduce the impacts of the scheme to within acceptable limits.

Habitats

- Ensure that no works come closer than 5m (as a minimum) from retained habitats.
- To mitigate for loss of vegetation, semi-natural planting should include berry-bearing native trees and shrubs to enhance food availability for wildlife. The proposed planting should be structurally diverse, with tree, shrub and ground layers, and areas of dense scrub as well as more open areas.
- Ornamental planting should constitute at least 50% by area of native species or species of known value to wildlife, such as fruiting species and species known to provide a good nectar source. All ornamental planting should be structurally diverse, with tree, shrub and ground layers, and areas of dense planting as well as more open areas.
- Linear habitat should be retained along the site's eastern boundary to maintain a north-south green corridor.
- A minimum 5m buffer between the existing site boundaries, i.e. fences, and newly installed security fencing will allow for hedgerow strengthening after construction and prevent damage to marginal habitat.

Rare plants

- No mitigation required.

Stag beetle

- No mitigation required.

Great Crested Newt

- No mitigation required.

Reptiles

- No mitigation required.

Breeding birds

- The reduction in nesting opportunities as a consequence of vegetation removal can be offset by the provision of five bird boxes, which could be erected on retained standard trees elsewhere on site.
- Vegetation removal required for the construction phase should take place outside of the bird breeding season of March to August inclusive, to prevent disturbance to birds, or if removed in that period, only after a survey has shown that no active nests are present.

Dormouse

- No mitigation required.

Water Vole

- No mitigation required.

Otter

- No mitigation required.

Badger

- No mitigation required.

Bats

- Areas of scrub and trees, and linear features such as hedgerows, should be retained wherever possible throughout the site to allow foraging activity to continue.
- Boundary habitats should not be illuminated, either directly or via light spill from adjacent buildings. If lighting is required for the site boundaries, e.g. for security, it should be reduced to a minimum, and designed in accordance with guidelines from the Bat Conservation Trust (see Appendix 4).

5.3 Compensation for ecological impacts

- 5.3.1 No compensatory habitat creation or management is proposed.

5.4 Species licensing

- 5.4.1 No species licence is necessary.

6 Enhancement options

6.1 Ecological enhancement

6.1.1 Ecological enhancement aims to improve the quality of the site and the immediate vicinity for native flora and fauna. Such enhancements can also provide aesthetic appeal and can add value to the proposed development.

6.1.2 Possible enhancement opportunities specific to the development proposals for this site are provided below. It is not anticipated that all of these options would be utilised. The options are listed in order of priority, with habitat enhancements having most benefit to wildlife. Small-scale enhancements targeted at individual species, whilst valuable, are generally of less overall benefit than habitat enhancement measures.

6.2 Habitat enhancement options

6.2.1 Wherever possible, planting should use native species, which support biodiversity significantly better than non-native plants. This is due to the numbers of flowers, fruits, seeds and berries that are produced by our native species and their different flowering and fruiting times throughout the year.

6.2.2 Potential habitat enhancements include the following.

- A new wildlife pond should be created in a secluded corner of the site.
- The boundary vegetation should be strengthened by further planting, including berry-bearing species to provide for bird foraging, and native species to attract insects. A structurally diverse range of plants should be used, including shrubs large enough to support nesting birds.
- Permanent wildflower grassland and native scrub habitat should be created along the site boundaries and within areas of open space.
- Structural native trees and shrubs should be planted to provide corridors across the site and a foraging resource for a variety of species.
- Planting on the site should be designed so as to link in to, or add to, surrounding areas of open space.
- Supplementary planting should be used to 'gap up' existing hedgerows and infill any gaps in tree and hedge lines to improve connectivity with the surrounding area. Areas highlighted for planting are the eastern and western site boundaries. Native hedging plants local to the area and suitable for this purpose include Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, dogwood *Cornus sanguinea*, spindle *Euonymus europaeus*, Field Maple *Acer campestre* and Hazel *Corylus avellana*.
- Sustainable Drainage System (SuDS) features should be enhanced using native wetland plants, and trees, shrubs, etc.
- Good practice in hedgerow maintenance should be employed, including cutting alternate sides of hedges on alternate years, which will benefit hedgerow species such as breeding birds, small mammals and bats.

6.2.3 These enhancements would benefit common invertebrates, breeding birds and bat foraging.

6.3 Small-scale species enhancement options

6.3.1 Potential small-scale enhancements to benefit individual species/species groups would include the following.

- Three bat boxes (e.g. Schwegler), suitable for a range of bat species, should be erected on retained standard trees or buildings in unlit parts of the site.
- Five bird boxes (e.g. Schwegler), suitable for a range of bird species, should be erected on retained standard trees or buildings in undisturbed parts of the site.
- Three swift boxes should be erected on proposed buildings.
- Up to three habitat piles should be created, using woody cut material (brash) from vegetation clearance. These should be stacked in a quiet, sheltered corner of the site to form piles measuring approximately 5m x 1m x 1m.

7 Recommendations

7.1 Recommendations for further survey

- 7.1.1 It is recommended that the following survey work be undertaken in order to establish whether protected habitats or species are present at the site. The seasons in which species may reliably be surveyed are given in the table below.

Recommended further survey work

Survey type	Season for survey	Survey required?
Phase III (detailed) NVC habitat survey	May to September	X
Hedgerow survey	May to October	X
Rare plant survey	April to September (depending upon species)	X
Invertebrate survey	April to September (depending upon species)	X
Great crested newt survey	March to June	X
Reptile survey	April to June and September to October	X
Breeding bird survey	April to June	X
Wintering bird survey	December to February	X
Dormouse survey	April to November	X
Badger survey	Year round (Spring/Autumn are optimal)	X
Water vole survey	April to October	X
Otter survey	Year round (Spring is optimal)	X
Bat activity survey	April to October	X
Bat emergence/re-entry survey	May to August	X

7.2 Other recommendations

Ecological mitigation method statement

- 7.2.1 There is no requirement for an ecological mitigation statement.

Landscape and ecological management plan

- 7.2.2 A Construction Environmental Management Plan (CEMP) is advised as a precautionary measure to avoid impacts to the adjacent and north River Pinn and Manor Farm Pastures (SINC) which are considered likely to include increased air and noise pollution. In combination with the implementation of a shallow ditch along the northern boundary to avoid silt-laden run-off in to the SINC, a **Neutral** impact can be achieved.

8 Conclusions

8.1 Overall assessment of value and impact

8.1.1 The overall value of the site to wildlife is considered to be **Lower** at the **Parish** scale.

8.1.2 A summary of assessments of value and the impact of the proposed development without mitigation, and the residual significant effects following mitigation, is provided in the table below.

Summary of assessment of value and impact

Feature	Level of value	Scale	Unmitigated impact	Confidence level	Mitigated impact
Sites of European importance	-	-	-	-	-
Sites of national importance	-	-	-	-	-
Sites of local importance	Medium	County	Minor Adverse	Probable	Neutral
Habitats	Lower	Parish	Minor Adverse	Probable	Neutral
Veteran trees	Negligible	-	-	-	-
Plants	Negligible	-	-	-	-
Invertebrates	Negligible	-	-	-	-
Amphibians including great crested newts	Negligible	-	-	-	-
Reptiles	Negligible	-	-	-	-
Breeding birds	Lower	Parish	Minor Adverse	Probable	Neutral
Wintering birds	Negligible	-	-	-	-
Dormice	Negligible	-	-	-	-
Aquatic mammals including water voles and otters	Negligible	-	-	-	-
Terrestrial mammals including badgers	Negligible	-	-	-	-
Bats - foraging	Lower	Parish	Minor Adverse	Probable	Neutral
Bats - roosting	Negligible	-	-	-	-

8.1.3 The overall impact of the proposals is considered to be **Minor Adverse** in the absence of mitigation. The mitigated impact is considered to be **Neutral**.

8.1.4 The adoption of all or most of the enhancement measures detailed in Section 6 above would give rise to a **Neutral-Minor Beneficial** impact.

8.2 Duration of validity of report

8.2.1 Should there be a significant period of time (most local planning authorities consider this period to be two years or greater) between the date of this Ecological Appraisal and the commencement of the Development, an update assessment may be required to determine whether the use of the Site with regard to those habitats and species present has significantly changed. Refer to Section 1.9 for details of the duration of validity of specific survey elements.

8.3 Further survey requirements

8.3.1 There is no requirement for further survey at the site.

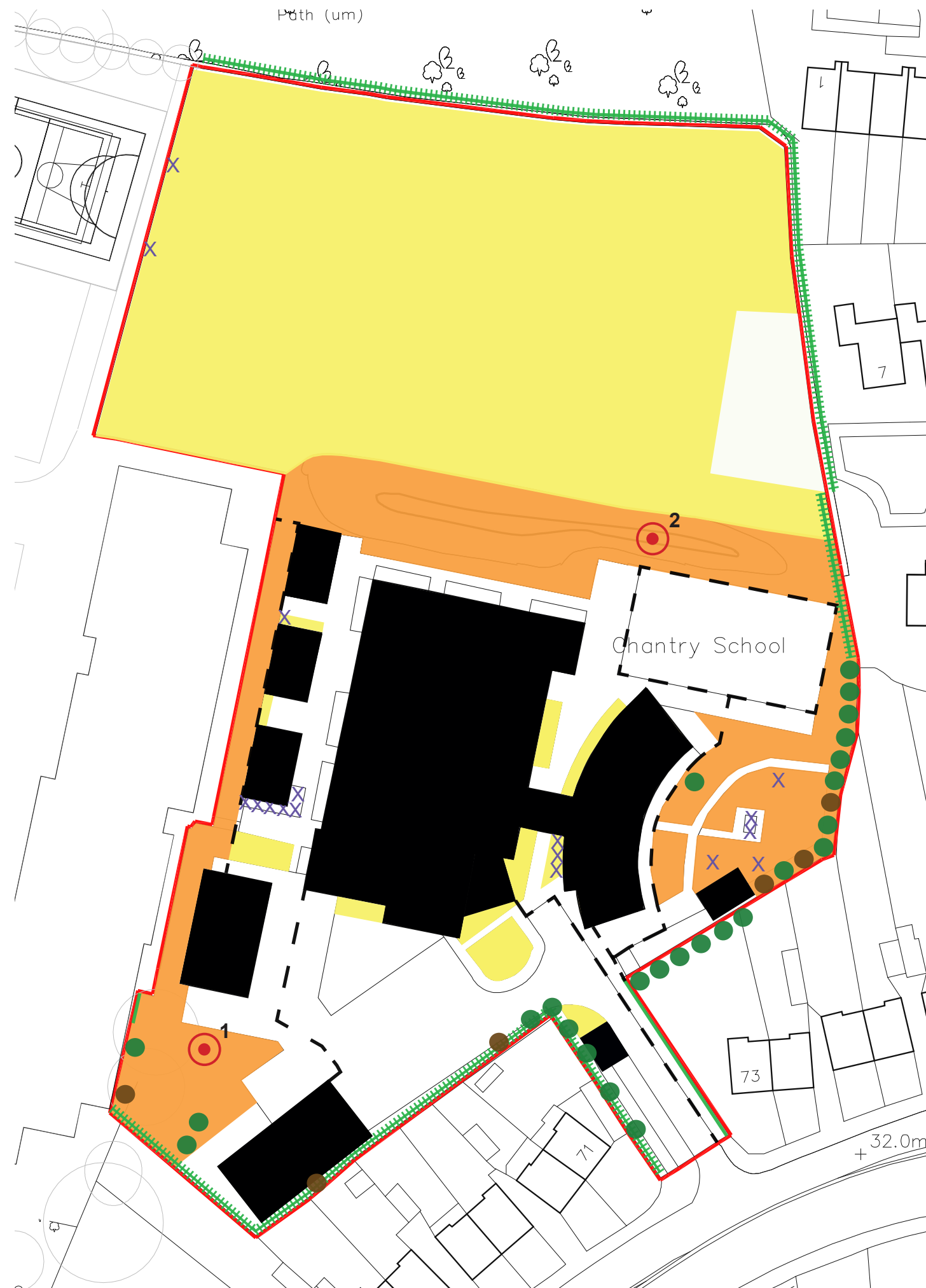
9 References

CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*, Second Edition.

DEFRA *Magic Map Application*. Available from: <http://magic.defra.gov.uk/MagicMap.aspx>

JNCC (2010) *Handbook for Phase 1 Habitat Survey - a Technique for Environmental Audit*. Reprinted by JNCC, Peterborough.

Figures



Key

- Fenced site boundary
- A3.1 Scattered broadleaved trees
- A3.2 Scattered coniferous trees
- B4 Improved grassland
- J1.2 Amenity grassland
- J1.4 Introduced shrub
- J2.1.1 Species-rich hedge, intact
- J2.1.2 Species-poor hedge, intact
- J2.3.1 Species-rich hedge with trees
- J2.4 Fence
- J3.6 Buildings
- J4 Hardstanding/bare ground

¹ Target notes

1 Former cultivated area with relict tomatoe and wheat plants

2 Playground amenties (including swinging tyres etc.)

E17865 Orchard Hill College, West Drayton

Phase 1 Habitat Survey

Figure 01

Scale NTRS

August 2017

Appendix 1

Legislative and policy context

There is a number of pieces of legislation, regulations and policies specific to ecology which underpin this assessment. These may be applicable at a European, National or Local level. References to legislation are given as a summary for information and should not be construed as legal advice.

Birds Directive

The European Community Council Directive on the Conservation of Wild Birds (79/409/EEC), normally known as the Birds Directive, sets out general rules for the conservation of all naturally occurring wild birds, their nests, eggs and habitats. It was superseded by the 'new' Birds Directive (2009/147/EC) which generally updated the previous directive.

These requirements are interpreted into English law by the Wildlife and Countryside Act 1981 (as amended) with regard to protection of birds, and the Conservation of Habitats and Species Regulations 2010 with regard to the registration and regulation of Special Protection Areas.

Habitats Directive

The European Community Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC), normally known as the Habitats Directive, aims to protect the European Union's biodiversity. It requires member states to provide strict protection for specified flora and fauna (i.e. European Protected Species) and the registration and regulation of Special Areas of Conservation.

These requirements are interpreted into English law by the Conservation of Habitats and Species Regulations 2010 with regard to European Protected Species and the registration and regulation of Special Areas of Conservation.

Conservation of Habitats and Species Regulations 2010

The Conservation of Habitats and Species Regulations 2010 interpret the Birds Directive and Habitats Directive into English and Welsh law. For clarity, the following paragraphs consider the case in England only, with Natural England given as the appropriate nature conservation body. In Wales, the Countryside Council for Wales is the appropriate nature conservation body.

Special Protection Areas and Special Areas of Conservation are defined in the regulations as 'European sites'. The Regulations regulate the management of land within European sites, requiring land managers to have the consent of Natural England before carrying out management. Byelaws may also be made to prevent damaging activities and if necessary land can be compulsorily purchased to achieve satisfactory management.

The Regulations define competent authorities as public bodies or statutory undertakers. Competent authorities are required to make an appropriate assessment of any plan or project they intend to permit or carry out, if the plan or project is likely to have a significant effect upon a European site. The permission may only be given if the plan or project is ascertained to have no adverse effect upon the integrity of the European site. If the competent authority wishes to permit a plan or project despite a negative assessment, imperative reasons of over-riding public interest must be demonstrated, and there should be no alternative to the scheme. The permissions process would involve the Secretary of State and the option of consulting the European Commission. In practice, there will be very few cases where a plan or project is permitted despite a negative assessment. This means that a planning application has to be assessed by the Local Planning Authority, based on information provided by the applicant, and the assessment must either decide that it is likely to have no significant effect on a European site or ascertain that there is no adverse effect upon the integrity of the European site.

Government policy is for Ramsar sites (wetlands of global importance) to be treated as if they were European sites within the planning process.

Appropriate Assessment

Appropriate Assessment is required in certain instances under the Conservation of Habitats and Species Regulations 2010. Regulation 61 says that:

61.—(1) A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which-

(a) is likely to have a significant effect on a European site or a European offshore marine site

(either alone or in combination with other plans or projects), and
(b) is not directly connected with or necessary to the management of the site,
must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.

(2) A person applying for any such consent, permission or other authorisation shall provide such information as the competent authority may reasonably require for the purposes of the assessment or to enable them to determine whether an appropriate assessment is required.

(3) The competent authority shall for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority may specify.

(4) They must also, if they consider it appropriate, take the opinion of the general public, and if they do so, they must take such steps for that purpose as they consider appropriate.

(5) In the light of the conclusions of the assessment, and subject to regulation 62 (considerations of overriding public interest), the competent authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

(6) In considering whether a plan or project will adversely affect the integrity of the site, the authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given.

The competent authority is typically the local planning authority. The appropriate assessment contains the information the council requires for the purposes of its assessment under the Habitat Regulations.

The Habitat Regulations also are applicable to local authority land use plans and policies. If a policy or plan is likely to have a significant effect upon a European site, the permission may only be given if the policy or plan is ascertained to have no adverse effect upon the integrity of the European site. This approach gives rise to a hierarchy of plans each with related appropriate assessments. For example, the appropriate assessment of a Regional Spatial Strategy will affect policies within a Core Strategy, which will then need its own appropriate assessment, and so on.

European Protected Species

European Protected Species of animals are given protection from deliberate capture, injury, killing, disturbance or egg taking/capture. Their breeding sites or resting places are also protected from damage or destruction, which does not have to be deliberate. A number of species are listed as European Protected Species, with those most likely to be considered in planning applications being bats, dormouse, great crested newt and otter. Natural England may give a licence for actions that are otherwise illegal, subject to them being satisfied on the three tests of no alternative, over-riding public interest, and maintenance of the species in favourable condition.

European Protected Species of plant are also listed and given protection. These species are generally very rare and unlikely to be present in proposed development sites.

Wildlife and Countryside Act 1981

The Wildlife and Countryside Act 1981 has been amended many times, including by the Countryside and Rights of Way Act 2000. It contains provisions for the notification and regulation of Sites of Special Scientific Interest, and for protected species.

The Regulations regulate the management of land within Sites of Special Scientific Interest, requiring land managers to have the consent of Natural England before carrying out management.

All public bodies are defined as 'S28G' bodies, which have a duty to further the nature conservation of Sites of Special Scientific Interest in the undertaking of their functions. In practice, this prevents planning applications being permitted if they would harm Sites of Special Scientific Interest, as it would be a breach of that duty.

The Act makes it an offence intentionally to kill, injure, or take any wild bird, take, damage or destroy the nest of any wild bird, while that nest is in use or being built, or take or destroy an egg of any wild bird. Special penalties are available for offences related to birds listed on Schedule 1, for which there are additional offences of disturbing these birds at their nests, or their dependent young.

The Act makes it an offence intentionally to kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places. Some species have lesser protection under this Act, for example white-clawed crayfish, common frog and toads are only protected from sale, and reptile species, other than smooth snake and sand lizard, are protected from intentional killing or injury, but they are not protected from disturbance and their habitat is not protected. It is also an offence intentionally to pick, uproot or destroy any wild plant listed in Schedule 8.

National Planning Policy Framework

The National Planning Policy Framework dated March 2012 (NPPF) replaces previous Government Policy in relation to nature conservation and planning, which was set out in Planning Policy Statement 9. Paragraph 109 of the NPPF says that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible.

Paragraph 113 describes policy for designated sites, where Local Planning Authorities should set criteria-based policies, against which proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. Further policy is within paragraph 118, where Local Planning Authorities should aim to conserve and enhance biodiversity when determining planning applications by applying the following principles.

- If significant harm resulting from a development cannot be avoided (through locating it on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused,
- Opportunities to incorporate biodiversity in and around developments should be encouraged.
- Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss.
- Paragraph 115 adds protection to biodiversity within areas designated for their landscape value. It says that great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.

Government circular 'Biodiversity and Geological Conservation – Statutory Obligations and their Impact Within the Planning System' referenced ODPM 06/2005 and Defra 01/2005 has not been replaced and remains valid. It sets out the legislation regarding designated and undesignated sites and protected species, and describes how the planning system should take account of that legislation. It does however pre-date the NERC Act 2006 (see below), which includes a level of protection for a further list of habitats and species regardless of whether they are on designated sites or elsewhere.

Natural Environment and Rural Communities (NERC) Act 2006

This Act includes a list of habitats and species of principal importance in England. Local Authorities are required to consider the needs of these habitats and species when making decisions, such as on planning application.

Local Planning Authority's planning policy

The Local Planning Authority will have policies relating to biodiversity conservation.

Species Legislation

The following table provides an overview of legislation with regard to species.

Protected Species	Legislation			
	Wildlife & Countryside Act, 1981	The Conservation of Habitats and Species Regulations, 2010	Natural Environment & Rural Communities (NERC) Act, 2006	Protection of Badgers Act, 1992
Plants (certain 'rare' species)	✓	✓ ³	✓	
Invertebrates (certain 'rare' species)	✓	✓ ⁴	✓	
White-clawed crayfish	✓		✓	
Great crested newt, natterjack toad, pool frog	✓	✓	✓	
Other amphibians	✓ ⁵		✓	
Sand lizard, smooth snake	✓	✓ ⁶	✓	
Other reptiles	✓ ⁷		✓	
Breeding birds	✓	✓	✓	
Wintering birds (certain 'rare' species)	✓	✓	✓	
Bats	✓	✓	✓	
Dormouse	✓	✓	✓	
Water vole	✓		✓	
Otter	✓	✓	✓	
Badger				✓

³ Nine species present in the UK, with very specialised habitat requirements, are European Protected Species.

⁴ Fisher's estuarine moth, large blue butterfly and lesser whirlpool ram's-horn snail are European Protected Species.

⁵ The four other native amphibian species (smooth and palmate newts, common frog and common toad) are only protected against trade under this act.

⁶ Smooth snake and sand lizard are European Protected Species.

⁷ The four other native reptile species (common lizard, slow worm, grass snake and adder) are protected against intentional killing, injury and trade under this act.

Appendix 2

Assessment Methodology: Valuing Ecological Features and Impact Assessment

The three-stage assessment method for determining ecological value is based upon assessment matrices published in the Handbook of Biodiversity Methods⁸. It has been updated to comply with recent changes to planning policy and legislation. The three-stage process allows the value of ecological sites, habitats and populations, and the magnitude of the impact, to be cross-tabulated to identify impact significance.

Valuing ecological sites, habitats and populations: scale and level of value

Scale	Level of value	Sites, habitats and populations
European	Very High	Statutory sites designated under international conventions or related national legislation, for example: - Wetlands of International Importance (Ramsar sites), - Special Areas of Conservation, - Special Protection Areas.
National	High	Statutory sites designated under national legislation, for example: - Sites of Special Scientific Interest (England, Wales, Scotland), - National Nature Reserves (UK). Significant viable areas of habitats, or populations or assemblages of species of principal importance for the conservation of biodiversity in England and Wales (Section 41 species and habitats)⁹ of such size and quality as might qualify for SSSI designation. Populations or assemblages of red-listed, rare or legally protected species, as might qualify for SSSI designation, for example: - species of conservation concern, - Red Data Book (RDB) species, - birds of conservation concern (Red List species), - nationally rare and nationally scarce species, - legally protected species.
County	Medium	Statutory sites of lower conservation value designated under national legislation, for example Local Nature Reserves (UK). Non-statutory sites designated under local legislation, for example: - County Wildlife Sites, - Local Wildlife Sites, - Roadside Nature Reserves (protected road verges). Viable areas of habitat or populations of species of principal importance for the conservation of biodiversity in England and Wales (Section 41 species and habitats)¹⁰ of such size and quality as might qualify for designation at the county level. Other non-designated sites which meet the criteria for designation at this level.

⁸ Hill, D., Fasham, M., Tucker, G., Shewry, M., Shaw, P. (eds.) (2005) *Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring*, Cambridge University Press.

⁹ Listed under S41 of the Natural Environment and Rural Communities Act 2006 <http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx>.

¹⁰ Listed under S41 of the Natural Environment and Rural Communities Act 2006 <http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx>.

District/ Borough¹¹	Lower	Sites meeting criteria for metropolitan designations. Undesignated sites or features not meeting criteria for county designation, but that are considered to enrich appreciably the habitat resource within the local district or borough, for example: • ancient woodland, • diverse, ecological valuable and cohesive hedgerow networks, • significant clusters or groups of ponds, • veteran or ancient trees. Viable areas of habitat or populations of species of principal importance for the conservation of biodiversity in England and Wales (Section 41 species and habitats)¹² not qualifying for designation at the county level.
Parish	Lower	Areas of habitat considered to enrich appreciably the ecological resource within the context of the local parish. Small areas of habitat or populations of species of principal importance for the conservation of biodiversity in England and Wales (Section 41 species and habitats)¹³.
Site only	Negligible	Ecological feature or resource not meeting any of the above criteria.

Note: there is much overlap in designations and lists of important species, and many sites, habitats and species appear on several. Where a site, habitat or species has multiple designations or levels of protection, normally the highest level would be the level at which impacts are assessed.

¹¹ Including metropolitan boroughs.

¹² Listed under S41 of the Natural Environment and Rural Communities Act 2006 <http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx>.

¹³ Listed under S41 of the Natural Environment and Rural Communities Act 2006 <http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx>.

Definitions of impact magnitude

Magnitude(negative or positive)	Definition/trigger
Severe	Loss or severe degradation affecting over 75% of a site feature, habitat or population. Adverse change to, or reduced condition of, over 90% of a site feature, habitat or population, for example through disturbance or trampling.
Major	Loss or severe degradation affecting over 25% of a site feature, habitat or population. Adverse change to, or reduced condition of, over 50% of a site feature, habitat or population, for example through disturbance or trampling. For benefits, an impact equivalent in nature conservation terms to a gain of over 50% in a site feature, habitat or population.
Moderate	Loss or severe degradation affecting over 5% of a site feature, habitat or population. Adverse change to, or reduced condition of, over 10% of a site feature, habitat or population, for example through disturbance or trampling. For benefits, an impact equivalent in nature conservation terms to a gain of 10-50% in a site feature, habitat or population
Minor	Loss or severe degradation affecting up to 5% of a site feature, habitat or population. Adverse change to, or reduced condition of, 1-10% of a site feature, habitat or population, for example through disturbance or trampling. For benefits, an impact equivalent in nature conservation terms to a gain of up to 10% in a site feature, habitat or population.
Insignificant	No loss of or severe degradation to a site feature, habitat or population. Adverse change to, or reduced condition of, less than 1% of a site feature, habitat or population. No benefit to a site feature, habitat or population.

Impact significance

Value of site, habitat or population	Magnitude of impact							
	<i>Severe Negative</i>	<i>Major Negative</i>	<i>Moderate Negative</i>	<i>Minor Negative</i>	<i>Insignificant</i>	<i>Minor Positive</i>	<i>Medium Positive</i>	<i>Major Positive</i>
<i>European (Very High)</i>	Severe Adverse	Severe Adverse	Major Adverse	Major Adverse	Neutral*	Major Beneficial	Major Beneficial	Major Beneficial
<i>National (High)</i>	Severe Adverse	Major Adverse	Major Adverse	Moderate Adverse	Neutral*	Moderate Beneficial	Major Beneficial	Major Beneficial
<i>County/Metropolitan (Medium)</i>	Major Adverse	Major Adverse	Moderate Adverse	Moderate Adverse	Neutral	Minor Beneficial	Moderate Beneficial	Major Beneficial
<i>District/Borough (Lower)</i>	Major Adverse	Moderate Adverse	Moderate Adverse	Minor Adverse	Neutral	Minor Beneficial	Moderate Beneficial	Moderate Beneficial
<i>Parish (Lower)</i>	Moderate Adverse	Moderate Adverse	Minor Adverse	Minor Adverse	Neutral	Minor Beneficial	Minor Beneficial	Moderate Beneficial
<i>Minimal/negligible</i>	Neutral	Neutral	Neutral	Neutral	Neutral	Minor Beneficial	Minor Beneficial	Moderate Beneficial

Where the impact significance falls below Minor Adverse, the term 'Neutral' is used.

*In some circumstances, some 'insignificant' impacts might fail legislative or policy tests and the impact would be greater than Neutral.

Appendix 3

Metropolitan

Site Reference:	M006
Site Name:	London's Canals
Summary:	London's canals provide a home for many fish and aquatic plants, and are a great way to enjoy the natural world in some of the city's most built-up areas.
Grid ref:	TQ 202 833
Area (ha):	188.52
Borough(s):	Brent, Camden, Ealing, Hackney, Hammersmith and Fulham, Hillingdon, Hounslow, Islington, Kensington and Chelsea, Tower Hamlets, Westminster
Habitat(s):	Bare ground, Canal, Ruderal, Scattered trees, Scrub, Secondary woodland, Semi-improved neutral grassland, Tall herbs, Vegetated wall/tombstones, Wet woodland/carr
Access:	Free public access (all/most of site)
Ownership:	Canal & River Trust

Site Description:

London's canals support a wide range of aquatic flora, amongst which are found a number of locally uncommon species. These include narrow-leaved water plantain (*Alisma lanceolatum*), rigid hornwort (*Ceratophyllum demersum*) and shining pondweed (*Potamogeton lucens*), all species of clean, clear waters. Many waterside plants, including several London rarities, also grow on the brickwork and banks of the canal. The canals also support an important invertebrate fauna (including several species of dragon/damselflies), a diverse fish community, and breeding waterfowl. London's network of canals fulfill an important function in allowing nature into heavily built-up environments. The towpath and associated areas of waste ground, especially in East London, support a number of uncommon species of disturbed ground. The whole of the Grand Union Canal system in London, including the Regent's and Hertford Union Canals, is included in this single Metropolitan site.

Site first notified:	01/04/1986	Boundary last changed:	30/11/2005
Citation last edited:	01/12/2005	Mayor Agreed:	25/11/2002
Defunct:	N		
Last Updated:	21/03/2007		

Metropolitan

Site Reference:	M043
Site Name:	Little Britain
Summary:	A section of the Colne Valley with a remarkable variety of wildlife habitats, including lakes, rivers, scrub, areas of wasteland, woodland and grassland.
Grid ref:	TQ 047 827
Area (ha):	87.46
Borough(s):	Hillingdon
Habitat(s):	Marsh/swamp, Pond/lake, Ruderal, Running water, Scrub, Secondary woodland, Wet ditches, Wet grassland
Access:	Free public access (part of site)
Ownership:	London Borough of Hillingdon and Private

Site Description:

This area of the Colne valley has a remarkable variety of habitats including lakes, rivers, scrub, areas of wasteland, woodland and neutral grassland. The Colne and Frays rivers are clean, fast flowing and support an interesting range of marginal habitats, including valuable areas of wet woodland. Unbranched bur-reed (*Sparganium emersum*) and water dock (*Rumex hydrolapathum*) both occur in the Frays. Of particular importance are the areas of unimproved floodplain grassland, which support a lush flora including the nationally scarce tasteless water-pepper (*Polygonum mitis*) and London rarities marsh arrowgrass (*Triglochin palustre*), marsh speedwell (*Veronica scutellata*) and sharp-flowered rush (*Juncus acutiflorus*), as well as abundant ragged-robin (*Lychnis flos-cuculi*). The lakes were originally gravel pits which now attract various breeding and wintering birds, despite the heavy angling presence. Other former pits have been landfilled and capped, and now support early successional communities, scrub and young woodland. The site supports specially-protected water voles and there are also recent reports of otters in the vicinity. The area is also of importance for bats, with noctule, Daubenton's bat and soprano pipistrelle all present in good numbers.

Site first notified:	19/09/1988	Boundary last changed:	30/11/2005
Citation last edited:	01/12/2005	Mayor Agreed:	25/11/2002
Defunct:	N		
Last Updated:	17/01/2007		

Metropolitan

Site Reference:	M059
Site Name:	Lower Colne
Summary:	One of the finest river systems in London, connecting gravel pits and areas of wet woodland and supporting a remarkable range of wetland plants and animals.
Grid ref:	TQ 047 780
Area (ha):	140.27
Borough(s):	Hillingdon
Habitat(s):	Marsh/swamp, Orchard, Pond/lake, Running water, Wet ditches, Wet grassland, Wet woodland/carr
Access:	Free public access (part of site)
Ownership:	London Borough of Hillingdon and Private

Site Description:

One of the finest river systems in London, including sections of the rivers Colne, Wraysbury and Frays. These originate as chalk streams and collectively support a diverse aquatic and marginal flora, including several plants with a restricted London distribution. Among these are the nationally declining river water-dropwort (*Oenanthe fluviatilis*), unbranched bur-reed (*Sparganium emersum*), great yellow-cress (*Rorippa amphibia*), bladder-sedge (*Carex vesicaria*), arrowhead (*Sagittaria sagittifolia*), narrow-leaved water-plantain (*Alisma lanceolatum*) and common water-crowfoot (*Ranunculus aquatilis*). Associated wet meadows, flooded gravel pits, ponds, alder-willow woodland and an old orchard are included within the site at several points, and support further botanical interest including London's only native population of the nationally rare and specially-protected pennyroyal (*Mentha pulegium*). The breeding avifauna includes kingfisher and grey wagtail. The invertebrate fauna is also likely to be important; the banded demoiselle damselfly (*Calopteryx splendens*) is abundant here. The rivers also support a diversity of fish, including dace, chub and the uncommon barbel. The specially-protected water vole is also present. Widespread public access via footpaths, and Harmondsworth Moor is also freely accessible.

Site first notified:	19/09/1988	Boundary last changed:	30/11/2005
Citation last edited:	01/12/2005	Mayor Agreed:	25/11/2002
Defunct:	N		
Last Updated:	06/04/2006		

Borough Grade II

Site Reference:	HiBII07
Site Name:	River Pinn and Manor Farm Pastures
Summary:	Stretch of the river bordered by open grassland and a patchwork of other habitats.
Grid ref:	TQ 061 814
Area (ha):	33.32
Borough(s):	Hillingdon
Habitat(s):	Bare ground, Hedge, Ruderal, Running water, Scattered trees, Scrub, Secondary woodland, Semi-improved neutral grassland, Tall herbs
Access:	Free public access (all/most of site)
Ownership:	London Borough of Hillingdon and Private

Site Description:

This stretch of the River Pinn is bordered on both sides by open grassland, much of which comprises rank grasses and tall herbs with scattered scrub, although some of it is managed as sports fields. The river is generally lined by trees and shrubs such as alder (*Alnus glutinosa*), crack willow (*Salix fragilis*), ash (*Fraxinus excelsior*), hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) but open areas of the banks are smothered in bramble (*Rubus fruticosus* agg.) and nettle (*Urtica dioica*). The heavy shade and competition has led to a dearth of aquatic and wetland plants except for the introduced species, Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*) and Indian balsam (*Impatiens glandulifera*).

Two of the fields to the west of the Pinn are grazed by horses and contain false oat-grass (*Arrhenatherum elatius*), bent (*Agrostis* sp.) and yarrow (*Achillea millefolium*). The rest are either mown infrequently or have been left unmanaged for a year or so. These tend to be dominated by false oat-grass, perennial rye-grass (*Lolium perenne*), creeping bent (*Agrostis stolonifera*) and red fescue (*Festuca rubra*), with a good range of wild flowers including teasel (*Dipsacus fullonum*), tufted and common vetches (*Vicia cracca* and *V. sativa*), autumn hawkbit (*Leontodon autumnalis*), meadow buttercup (*Ranunculus acris*) and horse-radish (*Armoracia rusticana*). The area between Church Road and Nursery Lane comprises rough horse-grazed pasture with scrub to the west and roughland to the east, separated by the River Pinn, along with native hedges and scattered trees. Pedunculate oak (*Quercus robur*), hornbeam (*Carpinus betulus*) and ash are present along with bramble, false oat-grass, couch (*Elytrigia repens*) and yarrow. There is no public access to this area.

To the north, the former Field Heath Nursery comprises a number of horse-grazed paddocks on both sides of the river. There is a well-structured patchwork of grassland, tall herbs, ruderals and hedgerow remnants with trees. Winter flocks of chaffinch and greenfinch occur here. To the north margin is a broad naturalised track divided from the paddocks by a fragmented and outgrown historically-laid hornbeam/elder (*Carpinus betulus*/*Sambucus nigra*) hedgerow with the occasional pedunculate oak standard. There is public access, generally restricted to footpaths, across most of the site, except for the fenced former nursery to the north.

Site first notified:	01/01/1988	Boundary last changed:	08/09/2005
Citation last edited:	29/12/2005	Mayor Agreed:	
Defunct:	N		
Last Updated:	27/03/2006		

Borough Grade II

Site Reference:	HiBII12
Site Name:	Stockley Park Country Park
Summary:	A large hilly country park with grassland and other habitats.
Grid ref:	TQ 072 808
Area (ha):	17.73
Borough(s):	Hillingdon
Habitat(s):	Amenity grassland, Hedge, Planted shrubbery, Pond/lake, Scrub, Secondary woodland, Semi-improved neutral grassland, Tall herbs
Access:	Free public access (all/most of site)
Ownership:	London Borough of Hillingdon

Site Description:

This large, hilly country park contains extensive grassland and other habitats including tall herbs, scrub, trees and hedgerows, much of which has been planted.

The grasslands include perennial rye-grass (*Lolium perenne*), barren brome (*Anisantha sterilis*), couch (*Elytrigia repens*), creeping bent (*Agrostis stolonifera*) and Yorkshire fog (*Holcus lanatus*). A large variety of flowers occur within a number of sown wildflower meadows including ox-eye daisy (*Leucanthemum vulgare*), meadow vetchling (*Lathyrus pratensis*), wild carrot (*Daucus carota*), musk mallow (*Malva moschata*) and hairy tare (*Vicia hirsuta*).

A small pond supports a dense stand of common reed (*Phragmites australis*), reed sweet-grass (*Glyceria maxima*), common club-rush (*Schoenoplectus lacustris*) and flowering rush (*Butomus umbellatus*). Reed warblers nest in the reed bed.

Copses of planted silver birch (*Betula pendula*), wild cherry (*Prunus avium*), lime (*Tilia* sp.) and white willow (*Salix alba*) are present with other woody species as hedges including hazel (*Corylus avellana*), dogwood (*Cornus sanguinea*) and blackthorn (*Prunus spinosa*) with scattered London plane (*Platanus x hispanica*) and horse chestnut (*Aesculus hippocastanum*).

The site is good for invertebrates including the localised species Roesel's bush-cricket (*Metrioptera roeselii*).

Other species include the butterflies, meadow brown, gatekeeper and holly blue plus a number of Odonata such as emperor dragonfly (*Anax imperator*), brown hawker (*Aeshna grandis*) and the common blue damselfly (*Enallagma cyathigerum*). In spite of its artificial beginnings, the site is important for its number of birds and invertebrates, probably due to the variety of plant species present.

Site first notified:	01/01/1988	Boundary last changed:	08/09/2005
Citation last edited:	15/12/2005	Mayor Agreed:	
Defunct:	N		
Last Updated:	12/05/2006		

Sites of Importance for Nature Conservation

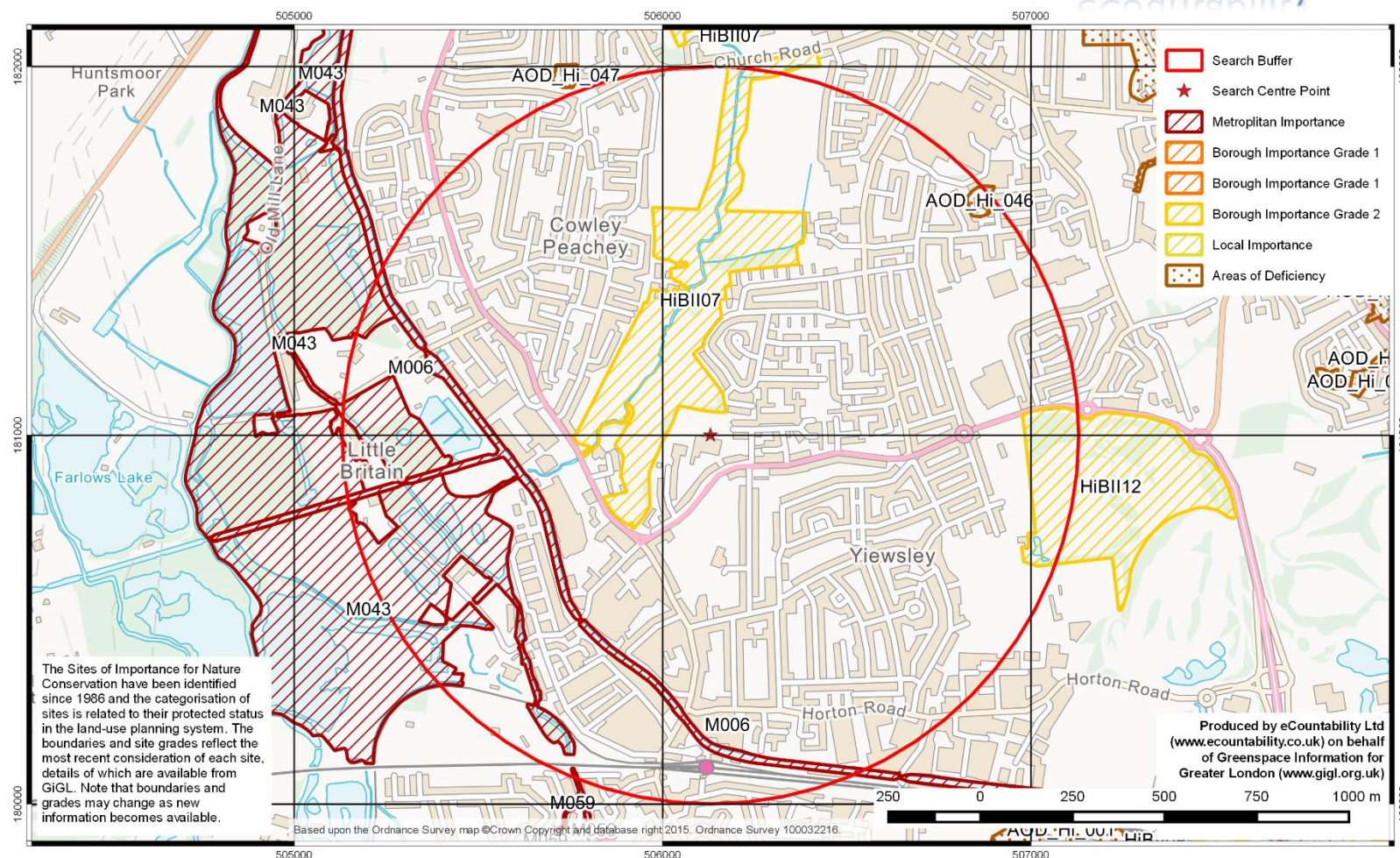
Ecological Data Search for The Landscape Partnership

Orchard Hill College, West Drayton, 09 August 2017



GiGL
Greenspace Information for Greater London CIC
the capital's environmental records centre

eCountability



Appendix 4



Artificial lighting and wildlife

Interim Guidance: Recommendations to help minimise the impact artificial lighting

Wherever human habitation spreads, so does artificial lighting. This increase in lighting has been shown to have an adverse effect on our native wildlife, particularly on those species that have evolved to be active during the hours of darkness. Consequently, development needs to carefully consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. When the impacts on different species groups are reviewed, the solutions proposed have commonalities that form the basis of good practice. These are outlined in the following document.

Overview of impacts

Invertebrates

Artificial light significantly disrupts natural patterns of light and dark, disturbing invertebrate feeding, breeding and movement, which may reduce and fragment populations. Some invertebrates, such as moths, are attracted to artificial lights at night. It is estimated that as many as a third of flying insects that are attracted to external lights will die as a result of their encounter.¹ Insects can become disoriented and exhausted making them more susceptible to predation. In addition, the polarisation of light by shiny surfaces attracts insects, particularly egg laying females away from water. Reflected light has the potential to attract pollinators and impact on their populations, predators and pollination rates. Many invertebrates natural rhythms depend upon day-night and seasonal and lunar changes which can be adversely affected by artificial lighting levels.

It is not always easy to disentangle the effects of lighting on moths from other impacts of urbanisation. However, it is known that UV and green and blue light, which have short wavelengths and high frequencies, are seen by most insects and are highly attractive to them. Where a light source has a UV component, male moths in particular will be drawn to it. Most light-induced changes in physiology and behaviour are likely to be detrimental. They discern it to be 'light', so they do not fly to feed or mate.²

Birds

There are several aspects of changes to bird behaviour to take into account. The phenomenon of robins and other birds singing by the light of a street light or other external lighting installations is well known, and research has shown that singing did not have a significant effect on the bird's body mass regulation. However, it was felt that the continual lack of sleep was likely to be detrimental to the birds' survival and could disrupt the long-term circadian rhythm that dictates the onset of the breeding season³. Many species of bird migrate at night and there are well-documented cases of the mass mortality of nocturnal migrating birds as they strike tall lit buildings. Other UK bird species that are particularly sensitive to artificial lighting are long-eared owls, black-tailed godwit and stone curlew.⁴

¹ Bruce-White C and Shardlow M (2011) A Review of the Impact of Artificial Light on Invertebrates - See more at: <http://www.buglife.org.uk/advice-and-publications/publications/campaigns-and-reports/review-impact-artificial-light#sthash.s7GPA1vL.dpuf>

² As above

³ Pollard A. (2009) Visual constraints on bird behaviour. University of Cardiff

⁴ Rodriguez A., Garcia A.M., Cervera F. and Palacios V. (2006) Landscape and anti-predation determinants of nest site selection, nest distribution and productivity in Mediterranean population of Long-eared Owls, *Asio otus*. *Ibis*, 148(1), pp. 133-145

Mammals

A number of our British mammals are nocturnal and have adapted their lifestyle so that they are active in the dark in order to avoid predators. Artificial illumination of the areas in which these mammals are active and foraging is likely to be disturbing to their normal activities and their foraging areas could be lost in this way. It is thought that the most pronounced effect is likely to be on small mammals due to their need to avoid predators. However, this in itself has a knock-on effect on those predators.

The detrimental effect of artificial lighting is most clearly seen in bats. Our resident bat species have all suffered dramatic reductions in their numbers in the past century. Light falling on a bat roost exit point, regardless of species, will at least delay bats from emerging, which shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. At worst, the bats may feel compelled to abandon the roost. Bats are faithful to their roosts over many years and disturbance of this sort can have a significant effect on the future of the colony. It is likely to be deemed a breach of the national and European legislation that protects British bats and their roosts.

In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats and their use of commuting routes. There are two aspects to this: one is the attraction that short wave length light (UV and blue light) has to a range of insects; the other is the presence of lit conditions.

As mentioned, many night-flying species of insect are attracted to lamps that emit short wavelength component. Studies have shown that, although noctules, serotines, pipistrelle and Leisler's bats, take advantage of the concentration of insects around white street lights as a source of prey, this behaviour is not true for all bat species. The slower flying, broad-winged species, such as long-eared bats, barbastelle, greater and lesser horseshoe bats and the *Myotis* species (which include Brandt's, whiskered, Daubenton's, Natterer's and Bechstein's bats) generally avoid external lights.

Lighting can be particularly harmful if it illuminates important foraging habitats such as river corridors, woodland edges and hedgerows used by bats. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross⁵. It is also known that insects are attracted to lit areas from further afield. This could result in adjacent habitats supporting reduced numbers of insects, causing a further impact on the ability of light-avoiding bats to feed.

These are just a few examples of the effects of artificial lighting on British wildlife, with migratory fish, amphibians, some flowering plants, a number of bird species, glow worms and a range of other invertebrates all exhibiting changes in their behaviour as a result of this unnatural lighting.

Recommendations

Survey and Planning

The potential impacts of obtrusive light on wildlife should be a routine consideration in the Environmental Impact Assessment (EIA) process⁶. Risks should be eliminated or minimised wherever possible. Some locations are particularly sensitive to obtrusive light and lighting schemes in these areas should be carefully planned.

In August 2013, Planning Minister Nick Boles launched the new National Online Planning Guidance Resource aimed at providing clearer protection for our natural and historic environment. The guidance looks at when lighting pollution concerns should be considered and is covered within one of the on line planning practice

⁵ Stone E. L., Jones G and Harriss (2009) Street lighting disturbs commuting bats. *Current Biology*, 19, pp 1-5

⁶ See also: Institution of Lighting Professionals – Professional Lighting Guide (PLG 04) Guidance on undertaking lighting environmental impact assessments)

guides⁷. The guide provides an overview for planners with links to documents that aim to give planners an overview of the subject through the following discussion points:

1. When is obtrusive light / light pollution relevant to planning?
2. What factors should be considered when assessing whether a development proposal might have implications for obtrusive lighting / light pollution?
3. What factors are relevant when considering where light shines?
4. What factors are relevant when considering how much the light shines?
5. What factors are relevant when considering possible ecological impact?

This can help planners reach the right design through the setting of appropriate conditions relating to performance and mitigation measures at the planning stage.

The Institution of Lighting Professionals (ILP) recommends that Local Planning Authorities specify internationally recognised environmental zones for exterior lighting control within their Development Plans⁸. In instances lacking classification, it may be necessary to request a Baseline Lighting Assessment/Survey conducted by a Lighting Professional in order to inform the classification of areas, particularly for large-scale schemes and major infrastructure projects.

When assessing or commissioning projects that include the installation of lighting schemes, particularly those subject the EIA process, the following should be considered and relayed to applicants:

- ***Ecological consultants should confirm the presence of any sensitive fauna and flora***, advising the lighting designers of bat routes and roosts and other areas of importance in order to ensure that reports correspond with each other.
- ***Ecological consultants should consider the need for quantitative lighting measurements***. In some instances it may be necessary for further lighting measurements to be taken. For example, outside an important bat roost. These should follow best practice guidance from the ILP and would ideally be conducted by a Lighting Professional.
- ***Where appropriate, professional lighting designers should be consulted*** to design and model appropriate installations that achieve the task but mitigate the impacts. This should be done at the earliest opportunity. Early decisions can play a key role in mitigating the impact from lighting.
- ***Reports submitted should outline the impacts of lighting in relation to ecology***, making clear reference to the ecological findings, highlighting any sensitive areas and detail proposed mitigation. Consideration should also be given to internal lighting where appropriate.
- ***Post –installation checks and sign off upon commissioning should be carried out*** by the lighting designer to ensure that the lighting installation has been installed in accordance with the design, that predictions were accurate and mitigation methods have been successful.

Principles and design considerations

Do not

- ***provide excessive lighting***. Use only the minimum amount of light needed for the task.
- ***directly illuminate bat roosts*** or important areas for nesting birds

Avoid

- ***installing lighting in ecologically sensitive areas*** such as: near ponds, lakes, rivers, areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. glow worms, rare moths, slow-flying bats) and habitat used by protected species.
- ***using reflective surfaces under lights***.

⁷<http://planningguidance.planningportal.gov.uk/blog/guidance/light-pollution/when-is-light-pollution-relevant-to-planning/>

⁸ Institution of Lighting Professionals (2011) Guidance Notes for the Reduction of Obtrusive Light GN01:2011.

Do

- **consider employing a competent lighting designer** who will apply the principals of providing the right light, in the right place, at the right time and controlled by the right system.
- **minimise the spread of light** to at, or near horizontal and ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required.
- **consider the height of lighting columns.** It should be noted that a lower mounting height is not always better. A lower mounting height can create more light spill or require more columns. Column height should be carefully considered to balance task and mitigation measures.
- **consider no lighting solutions where possible** such as white lining, good signage and LED cats eyes. These options can also be effective. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times.
- **use temporary close-boarded fencing until vegetation matures,** to shield sensitive areas from lighting.
- **limit the times that lights are on to provide some dark periods.** The task being lit often varies, for example roads are less used after 23.00hrs and car parks are empty. A lighting designer can vary the lighting levels as the use of the area changes reducing lighting levels or perhaps even switching installations off after certain times. This use of adaptive lighting can tailor the installation to suit human health and safety as well as wildlife needs.

Technological specifications

Research from the Netherlands has shown that spectral composition does impact biodiversity.

- **Use narrow spectrum light sources** to lower the range of species affected by lighting.
- **Use light sources that emit minimal ultra-violet light**
- **Lights should peak higher than 550 nm**
- **Avoid white and blue wavelengths of the light spectrum** to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin.

Further guidance on the spectral composition of artificial lighting will be made available following the publication of research from the Netherlands.

Further reading:

- A review of the impact of artificial light on invertebrates. Buglife. 2011
- Royal Commission on Environmental Pollution. 2009. Artificial light in the environment. London, HMSO
- The Ecological Consequences of Artificial Night Lighting" edited by Longcore and Rich
- Shedding Light: A survey of local authority approaches to lighting in England. CPRE 2014

For more information on lighting and wildlife see:

- Bat Conservation Trust (BCT) — www.bats.org.uk
- Campaign for Dark Skies (CfDS) — www.britastro.org/dark-skies
- Bats and Lighting Research project — www.batsandlighting.co.uk/index.html.
- Institution of Lighting Professionals (ILP) — www.theilp.org.uk
- Lichtopnatuur - Impact of artificial light on flora and fauna in The Netherlands - <http://www.lichtopnatuur.org/>