

**Dame Alice Owen's School, Potters
Bar**

Ecological Appraisal

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Issuing office

Worton Park | Worton | Oxfordshire | OX29 4SX
 T: 01865 883833 | W: www.bsg-ecology.com | E: info@bsg-ecology.com

Client	Dame Alice Owen's School
Job	Dame Alice Owen's School, Potters Bar
Report title	Ecological Appraisal
Draft version/final	FINAL
File reference	6140_R_sf_sm_23 04 12.docx

	Name	Position	Date
Originated	Stephen Foot	Senior Ecologist	19 April 2012
Reviewed	Sian Mitchell	Principal Ecologist	20 April 2012
Approved for issue to client	Sian Mitchell	Principal Ecologist	23 April 2012
Issued to client	Stephen Foot	Senior Ecologist	23 April 2012

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1 Summary

- 1.1 Dame Alice Owen's School is in the process of applying for planning consent to demolish a single storey science building followed by its replacement with a new two-storey science building. This new science building is to be constructed on an area of amenity grassland to the south of an ornamental lake and woodland (hereafter referred to as "the site"). The site is located to the south of Potter's Bar and covers an area of approximately 1.45ha which is bordered to the south, east and north by amenity grassland playing fields and the west by the remainder of the school complex and Dugdale Hill Lane.
- 1.2 Existing ecological information for the site and its surrounding area was searched for using on-line resources (Natural England's Nature on the Map, the MAGIC website and the NBN Gateway website) and the Hertsmere Borough Council Supplementary Planning Document – Biodiversity Trees and Landscape (December, 2010). This search identified one statutory designated site (a Local Nature Reserve) to be present 1.6km to the north-west of the site. This Local Nature Reserve (Furze field Wood and Lower Half Penny Bottom LNR) is designated for its woodland and meadow habitats. In addition to this, 20 non-statutory designated "Wildlife Sites" (WS) were also found to be present within 2km of the site boundary. The NBN Gateway website and the SPD document also highlighted a range of protected species and species of principal importance, including birds, badgers dormice, otters, water voles, bats, great crested newts, reptiles and invertebrates as having the potential to be present in the borough and given the habitats present, potentially on site.
- 1.3 An extended Phase 1 habitat survey revealed the site to comprise amenity grassland, semi-natural broadleaved woodland, scattered broadleaved trees, standing water (an ornamental lake) and species-poor hedgerows. A number of mature oak trees were identified that had the potential to support roosting bats and a number of common widespread bird species were recorded during the field survey.
- 1.4 An external inspection of building B1 to be demolished revealed that this building has negligible potential to support roosting bats due to a lack of suitable roosting features.
- 1.5 A habitat suitability index (HSI) assessment of water-bodies on site and within a 500m radius of the site (where access was possible) classified the site as having negligible potential to support great crested newts given the presence of a large population of common carp within the ornamental lake on site.
- 1.6 The survey confirmed that the site has the potential to support foraging and nesting habitat for common species of birds, foraging habitat for badgers, roosting and foraging habitat for bats and foraging and sheltering habitat for reptiles (the ornamental lake and woodland). Habitat for stag beetle *Lucanus cervus* which is a UK and local BAP species as well as a Species of Principal Importance (SPI's) was also identified.
- 1.7 The impacts of a proposed development on nearby designated sites and woodland, standing water and hedgerow habitats found on site is predicted to be negligible given that the development is to be contained completely within the site boundary on an area of closely mown amenity grassland. Proposals for the enhancement of woodland and grassland habitats present on site are put forward including increasing the ecological value of these areas through new species planting and adopting an appropriate mowing regime for the amenity grassland in order to increase its intrinsic ecological value. Recommendations to prevent impacts to nesting birds, and badgers, bats and reptiles foraging and sheltering on site are also included. If any trees require removal an inspection must first be undertaken by a licenced bat worker in order to assess the potential of the tree(s) to support roosting bats. In accordance with national planning policy (NPPF) and local planning policy (The Hertsmere Borough Council Local Plan and the Revised Core Strategy), biodiversity enhancement measures have also been proposed to benefit breeding birds, badgers, bats, reptiles and invertebrates.

2 Introduction

Site Description

- 2.1 Dame Alice Owen's School is located within Metropolitan Green Belt in the north-east of the Borough of Hertsmere, off Dugdale Hill Lane, to the south of the urban centre of Potter's Bar, Hertfordshire. The site that is the focus of this study is 1.45ha in extent and located to the south-east of the school complex at grid reference TL 241 004 (see **Figure 1**). It comprises amenity grassland adjacent to an area of semi-natural broadleaved woodland and an ornamental lake. . The site is bordered by the remaining school buildings to the west and by amenity grassland playing fields and species-poor hedgerows to the north, east and south.

Description of Project

- 2.2 Dame Alice Owen's School is in the process of seeking planning consent to demolish a single storey science block located in the centre of the school site followed by its replacement with the construction of a new 2000m², two-storey science block to be located on the south-eastern side of the school complex on an area of greenfield land.

3 Scope of Study

3.1 BSG Ecology was commissioned to undertake an ecological survey of the site comprising a desk study, an extended Phase 1 habitat survey and external and internal building inspection to determine its use by roosting bats. .

Aims of Study

3.2 The study aims to determine the habitats present within the site, make an assessment of its potential to support protected species and to present the results in a report which: :

1. Confirms the outcome of the review of biological information obtained during the desk study;
2. Describes the habitats present within the site;
3. Details the results of the external and internal building inspection for bats;
4. Assesses the potential for the site to support protected or notable species (including bats);
5. Sets out the legislative and/or policy protection afforded to any habitats present or any species potentially associated with the site;
6. Presents a preliminary assessment of any potential ecological impacts of the proposal based on our findings and current plans;
7. Provides recommendations for any further surveys if considered necessary; and
8. Provides initial recommendations on potential mitigation, compensation and/or enhancement measures.

4 Methods

Desk Study

- 4.1 Existing ecological information for the site and its surrounding area was searched for using on-line resources including the National Biodiversity Network (NBN Gateway), the Multi Agency Geographic Information for the Countryside website (MAGIC, www.magic.gov.uk), Natural England's Nature on the Map website, the Hertsmere Borough Council Supplementary Planning Document – Biodiversity Trees and Landscape (December, 2010) and aerial photography of the area. The Hertsmere Borough Council SPD contains information regarding the distribution of protected species and species of principal importance within the borough which is useful when assessing the species' potential to be present on site.
- 4.2 Information on both statutory and non-statutory designated sites was searched for covering the site and land up to 2km from the site boundary. Records for protected species and species of conservation interest were also searched for within the same radius. In this case, species of conservation concern were defined as priority species in the UK Biodiversity Action Plan (UK BAP), species in the local BAP, species listed in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act.

Field Survey

- 4.3 The site visit was undertaken by Stephen Foot MIEEM (a licenced bat worker, Licence No. 20113782) on 3rd April 2012, when the weather conditions were dry and mild (9°C) with hazy sunshine and a slight easterly breeze (Beaufort Scale 1). Cloud cover was 3/8 throughout the survey visit. Habitats within the site boundary were identified and described following standard JNCC Phase 1 habitat survey methodology as detailed in the Phase 1 Habitat Survey Handbook (JNCC, 2010). This uses a system of codes to describe different habitat types based on the dominant vegetation present. The survey was extended to give particular consideration to the potential of the habitats present to support protected species or species of conservation interest, as detailed in Section 4.2. .

External and Internal Building Inspection Survey for Bats

- 4.4 The external and internal building inspection survey was undertaken following standard guidance (BCT, 2012). The exterior of building B1, which is to be demolished during the proposed works, was searched from the ground using a high powered torch and close-focussing binoculars (where necessary) for:
1. Features which could provide bats with access into roosting spaces or provide roosting spaces (such as gaps under roofing tiles, gaps in ridge tiles, gaps in soffit boxes, gaps under lead flashing, and cracks and crevices in the stonework).
 2. Evidence of the presence of bats such as bat droppings on windows, windowsills, walls and the ground, or scratch marks or staining from bat's fur around possible roost access/egress points.
- 4.5 All accessible interiors of the building (where present) were inspected using a high-powered torch for evidence of the presence of bats such as: piles of bat droppings, scratch marks or characteristic oil staining around potential roosting features, urine staining, and live or dead bats.
- 4.6 Following this inspection building B1 was assigned a category in accordance with Table 1 defining its potential to support roosting bats.

Table 1: Categories of Bat Potential of Buildings

Level of Bat Potential	Rationale
Negligible	Building with no or very limited roosting opportunities for bats and no evidence of use by bats and where the feature is isolated from foraging habitat.
Low	Building with a limited number of roosting opportunities and no evidence of current use by bats. With poor connectivity to foraging habitat.
Medium	Building with some roosting opportunities with no evidence of current use by bats. With connectivity to moderate – high quality foraging habitat.
High	Building with multiple roosting opportunities for one or more species of bat. With good connectivity to high quality foraging habitat.
Confirmed Roost	Presence of bats or evidence of recent use by bats.

Habitat Suitability Index (HSI) Assessment for Great Crested Newts

4.7 During the field survey a HSI assessment of all ponds within a 500m radius of the site identified from aerial photography and Ordnance survey data available on-line, (where access was possible), was undertaken. Information on the physical features and characteristics of each water-body were collected in order to allow a great crested newt Habitat Suitability Index (HSI) score to be derived for each (see Oldham et al, 2000). A modification of evaluating terrestrial habitat based on Oldham's original methodology (as proposed by Lee Brady, 2008) is recognised as a valuable method for determining HSI value by the Herpetological Conservation Trust (HCT) and was subsequently used in this assessment. Ten suitability indices (SI) were scored in the field and from maps; these include features such as size, quality of surrounding habitat and presence of fish. These scores were then used to calculate the overall HSI for each water-body as a number between 0 and 1, with 0 being the least suitable and 1 being the most suitable. The HSI score allows each water-body to be placed in one of five pre-defined categories defining its suitability for great crested newts as follows:

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

Limitation to Methods

4.8 Due to constraints in project timing it was not possible to obtain records from the Hertfordshire Biological Records Centre. However, a comprehensive search of records detailed upon the NBN Gateway website and within the Hertsmere Borough Council Supplementary Planning Document (Dec, 2010) provided a general account of protected species and species of principal importance (SPI's) present within the borough that may have been supported by the habitats present on site. Therefore, it is considered that this assessment has not been compromised by limited access to records.

5 Results and Interpretation

5.1 This section presents the results of the desk study, field survey, external and internal building inspection survey for bats and habitat suitability index (HSI) assessment for great crested newts. The implications of these results are then considered and an evaluation of the potential for the site to support bats, great crested newts and other protected species or species of conservation interest is made.

Desk Study - Designated Sites

5.2 There is one designated site within a 2km radius of the site. This is Furzefield Wood and Lower Half Penny Bottom Local Nature Reserve (LNR) which is located approximately 1.6km to the north. In addition to this, 20 non-statutory designated sites, Wildlife Sites (WS) were found to be present within 2km of the site boundary. The closest of these is Dugdale Hill Road Meadows (WS) located approximately 250m to the north-west of the site.

5.3 This statutory and these non-statutory designated sites are listed within Table 2 which provides a grid reference, bearing and distance from the site derived from the information provided within the Hertsmere Borough Council SPD and the MAGIC website. Where available a description of the site has also been included.

Table 2: Statutory and Non-Statutory Designated Sites within 2km of the Site Boundary

Site Name	Area (ha)	Grid Reference	Distance (km), Bearing and Site Description
Furzefield Wood and Lower Half Penny Bottom (LNR)	7.39ha	TL 242 023	This local nature reserve is located approximately 1.6km to the north of the site. This site consists of a traditionally managed woodland and meadow comprising large stands of oak with a coppiced hazel understorey. The meadow comprises a number of species including lady's bedstraw <i>Galium verum</i> and meadow sweet <i>Filipendula ulmaria</i> .
Dugdale Hill Road Meadows (WS)	3.3	TL 239 008	0.25km NW; no description present
Bridgefoot House area (WS)	Unknown	TL 234 090	0.75km W; no description present
Kimptons Mead Allotments (WS)	Unknown	TL 237 012	0.8km NW; no description present
Five Bells Farm Pond (WS)	0.08	TL 232 007	0.9km West; no description present
Elm Farm Pasture area (WS)	Unknown	TQ 249 999	0.9km SE; no description present
Wash Lane (WS)	3.62	TL 231 003	1km West; no description present
Wroxham Fields Ponds (WS)	Unknown	TL 234 012	1km NW; no description present
Wash Lane Common (WS)	1.89	TQ 234 995	1.1km SW; no description present
Bentley Heath Pond (WS)	0.15	TQ 249 995	1.2km SE; no description present

Site Name	Area (ha)	Grid Reference	Distance (km), Bearing and Site Description
Pond by Bentley Heath Church (WS)	Unknown	TQ 249 995	1.2km SE; no description present
Meadow by St. Albans Road (WS)	1.25	TL 226 009	1.5km West; no description present
Meadows by Windmore Hall (WS)	8.18	TL 232 017	1.5km NW; no description present
Furzefield Wood (WS)	5.74	TL 241 022	1.6km N; no description present
Half Penny Bottom Field (WS)	1.56	TL 240 023	1.7km N; no description present
Ganwick Corner Pond (WS)	Unknown	TQ 254 994	1.7km SE; no description present
Mimmshall Brook Pasture (WS)	2.46	TL 230 019	1.7km NW; no description present
Mimmshall Brook by Mimms Hall (WS)	0.46	TL 231 021	1.8km NW; no description present
Grassland W. of Greyhound Lane (WS)	1.66	TL 223 007	1.8km W; no description present
Footpath N. of Cranborne Road (WS)	0.05	TL 243 025	1.9km N; no description present
Parkfield (WS)	Unknown	TL 259 015	2km NE; no description present

Desk Study – Protected Species and Species of Conservation Interest

- 5.4 The Hertsmere Borough Council Supplementary Planning Document – *Biodiversity, Trees and Landscape* (December, 2010) provides information on the approximate distributions of protected species and species of conservation interest within the borough. The document contains information relating to the distribution of badgers, bats, reptiles, great crested newts, water voles, purple emperor butterflies and the black necked grebe. This information was supported by records provided by the NBN Gateway website (where records were present) and is summarised below.

Badgers

- 5.5 No records of badgers were found to be present from within a 2km radius on the NBN Gateway website. The SPD document states that “*Badgers are thinly scattered across the northern half of the borough but largely absent from the southern half, which is dominated by London Clay. There may be an association with the free draining chalkier soils, as there appears to be an aggregation of setts in the north-west of the borough where most chalk is at or close to the surface*”.

Bats

- 5.6 The closest bat record on the NBN Gateway website was a record of a common pipistrelle *Pipistrellus pipistrellus* roost which was found to be present in 2004 approximately 3km to the north-east of the site. The SPD states that, “*bat records are quite common across the entire borough, and seven species have been recorded*” (whiskered *Myotis mystacinus*, natterer's *Myotis natterei*, Daubenton's *Myotis daubentonii*, serotine *Eptesicus serotinus*, noctule *Nyctalus noctula*, pipistrelle *Pipistrellus* sp. and brown long-eared *Plecotus auritus*).

Reptiles

- 5.7 No records of reptiles were found to be present within a 2km radius of the site on the NBN Gateway website. According to the SPD, only two species of reptiles have been recorded within the borough including the slow worm *Anguis fragilis* and grass snake *Natrix natrix*. The majority of slow worm records are from allotments in and around Potter's Bar.

Great crested newts

- 5.8 A single record of a great crested newt *Triturus cristatus* was recorded in a survey undertaken in 1986 approximately 1.2km to the south-east of the site (NBN Gateway). The SPD confirms that this species is present throughout the borough with small populations known to be present to the south-west of Potters Bar, north of Borehamwood and north of Hillfield and Aldenham Reservoirs.

Water voles

- 5.9 No records of water voles were found to be present within a 2km search radius following a search of the NBN Gateway website. The information contained within the SPD states that water voles are rare in Hertsmere. However, they have been recorded along the River Colne, around the Hillfield and Aldenham Reservoirs (9km south-west of the site) and on the Mimms Hall Brook on the eastern edge of the borough.

Purple Emperor butterflies

- 5.10 No records of the purple emperor butterfly *Apatura iris* were found to be present within a 2km radius of the site on the NBN Gateway website. Sightings of this species have occurred within large areas of established woodland within the Tyttenhanger area in Hertsmere (approximately 7km to the north-west of the site).

Black-necked grebe

- 5.11 No records of black-necked grebe *Podiceps nigricollis* were found to be present within a 2km radius of the site on the NBN Gateway website. Information provided by the SPD shows that this species has bred regularly at Hillfield Park Reservoir since 1998 (approximately 9km to the south-west of the site).

Other Species of Note

- 5.12 A number of species are also listed on Hertfordshire's Local Biodiversity Action Plan. No records of these species were found to be present within a 2km search radius of the site on the NBN Gateway website. However, the following species will be considered within this study owing to the presence of potentially suitable habitat on site;
- The hazel dormouse *Muscardinus avenallarius* (woodland and hedgerows);
 - The otter *Lutra lutra*; (the ornamental lake);
 - The stag beetle *Lucanus cervus* (woodland);
 - The grizzled skipper *Pyrgus malvae* (woodland, hedgerows and grassland);
 - The bittern *Botaurus stellaris* (the ornamental lake and reed-bed); and
 - The tree sparrow *Passer montanus* (woodland and hedgerows).

Field Survey – Habitats

- 5.13 The following Phase 1 habitat types were recorded on site during the survey:
- Amenity grassland
 - Species-poor hedgerow
 - Semi-natural broadleaved woodland
 - Scattered broadleaved trees
 - Standing water
 - Marginal vegetation
- 5.14 The distribution of these habitats is shown on Figure 1 with summary descriptions given below. Photographs are provided in Figure 3; target notes (TNs) referred to in the text below and on Figure 1 are provided in Appendix 1.
- 5.15 The site is located in the south-east of the Dame Alice Owen's School grounds. The proposed siting of the new science block is on an area of closely mown, species-poor amenity grassland covering a total area of approximately 0.32ha (see Target Note 1 in Appendix 1 and Photograph 4 on Figure 3). This habitat parcel is dominated by perennial rye-grass *Lolium perenne* with daisy *Bellis perennis* frequently recorded along with occasional white clover *Trifolium repens*, greater plantain *Plantago major* and dandelion *Taraxacum* agg.
- 5.16 A species-poor hedgerow lines the south-eastern boundary of the site (see Target Note 3 in Appendix 1 and Photograph 6 in Figure 3). This hedgerow is well managed and closely cropped and averages 1.5m in height and approximately 45m in length. Hawthorn *Crataegus monogyna* is the main component of this hedgerow with occasional blackthorn *Prunus spinos*. Ivy *Hedera helix* was frequently recorded amongst the ground flora with occasional cleavers *Galium aparine* and lord's and ladies *Arum maculatum*. A further length of species-poor hedgerow is present perpendicular to the northern extent of this hedgerow running from west to east outside of the site boundary (see Target Note 4 in Appendix 1). The species composition of this hedgerow is similar, however, this hedgerow appears to have undergone less frequent management. A number of mature broadleaved trees are present on the periphery of the site including a mature pedunculate oak *Quercus robur* located in the south-eastern corner of the site adjacent to the species-poor hedgerow (see Target Note 2 in Appendix 1 and Photograph 5 in Figure 3).
- 5.17 The centre of the site comprises semi-natural broadleaved woodland, covering an area of approximately 0.41ha (see Target Note 6 in Appendix 1 and Photograph 8 in Figure 3). There are a number of mature pedunculate oak trees on the periphery of this woodland stand with the remainder of the canopy layer comprising semi-mature oak with occasional ash *Fraxinus excelsior* and Norway maple *Acer platanoides*. The shrub layer consists of frequent hawthorn with occasional blackthorn with the ground flora comprising bare soil with locally frequent ivy and occasional lord's and ladies and common dog violet *Viola riviniana*.
- 5.18 An ornamental lake occupies 0.5ha of the northern portion of the site (see Target Note 9 in Appendix 1 and Photograph 9 in Figure 3). This water-body covers an area of approximately 0.5ha. The margins of this ornamental lake support emergent aquatic macrophytes including common reed *Phragmites australis*, bulrush *Typha latifolia* and water mint *Mentha aquatica*. This lake was encircled by an extension of the woodland in the centre of the site and had a similar species composition to the area of woodland described previously (see Target Note 10 in Appendix 1). The north of the water-body had undergone succession and had become dominated by a reed bed comprising common reed *Phragmites australis* with occasional common nettle *Urtica dioica* (see Target Note 11 in Appendix 1 and Photograph 10 in Figure 3).
- 5.19 The area where the new science building is proposed comprises closely mown amenity grassland with negligible intrinsic ecological value. However, the native species-poor hedgerows on the eastern boundary of the site and the woodland in the centre of the site are classified as both UK and local BAP habitats and Habitats of Principal Importance (HPI) and the large water-body in the centre of the site also possesses some intrinsic ecological value. The mature oak trees on the periphery of the site have value ecologically in addition to their potential of supporting nesting birds and in some cases roosting bats.

Field Survey – Protected Species and Species of Conservation Interest

- 5.20 This section presents any evidence of protected species or species of conservation interest identified during the survey and evaluates the potential for the site to support these species given the habitat types recorded. Bats and great crested newts are considered separately in Sections 5.36 and Section 5.40 respectively).

Breeding Birds

- 5.21 A total of 7 species of bird were incidentally recorded during the site visit (see Table 3 for a list of these species).

Table 3: Birds Recorded on site during Extended Phase 1 Habitat Survey

Common Name	Scientific Name
Carrion crow	<i>Corvus corone corone</i>
Heron	<i>Ardea cinerea</i>
Magpie	<i>Pica pica</i>
Mallard	<i>Anas platyrhynchos</i>
Mistle thrush	<i>Columba livia</i>
Moorhen	<i>Gallinula chloropus</i>
Wood pigeon	<i>Columba palumbus</i>

- 5.22 Building B1 provides some limited nesting potential for breeding birds such as robins *Erithacus rubecula* and blue tits *Cyanistes caeruleus*, and nesting material was identified within a soffit box on the southern aspect of the building (see Photograph 3 in Figure 3).
- 5.23 The semi-natural broadleaved woodland, scattered mature trees and species-poor hedgerows also provide nesting habitat for common species birds including robins, black birds *Turdus merula*, blue tits, great tits *Parus major* and a number of birds of conservation concern (on the amber and red list) and SPI's including green woodpecker *Picus viridis*, dunnock *Prunella modularis*, starling *Sturnus vulgaris* and tree sparrow (see below).
- 5.24 The SPD document highlighted the presence of the black-necked grebe within reservoirs located approximately 9km to the south-west of the site. The black-necked grebe is a scarce winter visitor to the UK where it is predominantly found within sheltered coasts (Brown & Grice, 2005). When utilising freshwater habitats this species tends to prefer large open areas of water (reservoirs and large lakes). In addition, this species very rarely breeds in England (Brown & Grice, 2005). The water-body present on site is not characteristic of the freshwater habitats that this species tends to frequent, as it is too small in size, with open water in the lake covering an area of less than 0.5ha. The water-body on site is there considered to provide negligible breeding and over-wintering habitat for this species and therefore black-necked grebes will not be considered further within this study.
- 5.25 Tree sparrows are a local BAP species for Hertfordshire. This species tends to inhabit more rural habitats than those present on site, characteristically nesting colonially in holes in trees (Brown & Grice, 2005). Given the suburban nature of the site it is unlikely that this species uses the habitats present. However, this species is occasionally recorded in parkland habitats and is known to roost in oak trees (Brown and Grice, 2005) and therefore its presence cannot be completely ruled out.
- 5.26 The Bittern (also a UK and local BAP species) is one of England's rarest breeding birds (Brown & Grice, 2005). This species tends to nest and forage upon water-bodies with extensive areas of reed bed. The reed bed on site is very limited in size and is subject to continual human disturbance due to the close proximity of the school. In addition to this there are no records of bittern within a 2km radius of the site following a search of the NBN website. For these reasons it is highly unlikely that bitterns utilise the habitats present on site and this species will therefore not be considered further within this study.

Water voles and Otters

- 5.27 A search on NBN Gateway revealed no records of either of these species to be present within a 2km radius of the site. No water vole burrows, water vole latrines or characteristic feeding signs were observed during the field survey of the lake. However, numerous brown rats *Rattus norvegicus* were noted. The SPD document shows that the closest recorded water voles within the borough were historically present on the Mimms Hall Brook approximately 4km to the north-east of the site. Water voles are not historically known to be present within the local area. This fact coupled with the large distance separating the lake on site from other potentially suitable water-courses means that it is highly unlikely that water voles are present. Water voles will therefore not be considered further within this study.
- 5.28 No records of otter were found to be present within a 2km radius of the site following a search of the NBN Gateway website in addition, no signs of otters were identified during the field survey. The common carp *Cyprinus carpio* (see Photograph 12 on Figure 3) present within the lake could potentially provide a food source for otters. However, given the lack of connectivity of this water-body to other watercourses and given the high levels of human disturbance present on site it is highly unlikely that this species uses the site. Otters are therefore not considered any further within this study.

Badgers

- 5.29 No records of badgers were found to be present within a 2km radius of the site. The SPD states that badgers are more likely to use the chalkier soils in the north-west of the borough for sett building. However, the sloping woodland in the centre of the site does provide relatively good habitat for badgers when constructing their setts. Despite this, no signs of badgers or their setts were found to be present within the site during the field survey. The badger's preferred food source is the earthworm *Lumbricus terrestris* and the amenity grassland and surrounding playing fields adjacent to the site could provide potential foraging habitat for badgers in the local area (Neal & Cheesman, 1995). It is therefore possible that badgers may sporadically forage on site or travel across the site when moving through their territory.

Dormice

- 5.30 No records of dormice were identified on site or within a 2km radius of the site boundary on the NBN Gateway website. The Dormouse Conservation Handbook states that "*this species tends to be found in extensive ancient semi-natural woodland, where there has been time for shrub species diversity to develop, and where coppicing of hazel is carried out on a long rotation. This appears to constitute the species' core habitat, especially where shrubs flourish in clearings and around woodland edges*" (English Nature, 2006). This arboreal species also rarely descend to the ground and is reluctant to cross open spaces, in order to avoid predation.
- 5.31 The woodland on site is very small with a relatively dense canopy and does not support a variety of the preferred food plants of this species. The site is also poorly connected to larger areas of more established woodland in the wider landscape being completely enclosed by roads (Dugdale Hill Lane and Sawyers Lane) which dormice are reluctant to cross. For these reasons it is highly unlikely that dormice are present on site and therefore they will not be considered further within this study.

Reptiles

- 5.32 No reptiles were found to be present within a 2km radius of the site, however, both slow worms and grass snakes are known to be present within the borough. All species of British reptile prefer a mosaic of habitats with a varied vegetation structure providing both sheltering and foraging habitat (Edgar et al, 2010). The amenity grassland on which the new science building is proposed, comprises entirely of close cropped amenity grassland offering no sheltering or foraging habitat for slow worms or other species of reptile. However, the water-body in the north of the site is likely to offer foraging habitat for grass snakes. This species feeds on small fish, frogs and other amphibians some of which are likely to be present on site. In addition to this the woodland is likely to offer some over-wintering habitat for this species. Grass snakes are known to range great distances (Vaughan, 2007) in search of prey and therefore their presence on site cannot be discounted.

Invertebrates

- 5.33 The grizzled skipper is primarily found in woodland and areas of unimproved grassland where the adults forage on the nectar of bird's-foot trefoil *Lotus corniculatus*, bugle *Ajuga reptans*, buttercups *Ranunculus* sp. and ragged robin *Lychnis flos-cuculi*. This species lays its eggs upon agrimony *Agrimonia eupatoria*, creeping cinquefoil *Potentilla reptans*, wild strawberry *Fragaria vesca*, bramble *Rubus fruticosus*, dog rose *Rosa canina*, tormentil *Potentilla erecta*, salad burnet *Sanguisorba minor* and wood avens *Geum urbanum* which are the primary food plants of the larvae of this species (UK Butterflies, 2012). Of the plant species listed above the site only supports very small patches of wood avens within the periphery of the woodland. Given the lack of available food plants for both adult grizzled skipper butterflies and their larvae, their presence on site is considered to be unlikely.
- 5.34 The purple emperor butterfly spends the majority of its time foraging high in the woodland canopy where it feeds on aphid honeydew. This species only rarely descends from the canopy to feed on sap runs or in some cases animal droppings or carrion (UK Butterflies, 2012). This butterfly tends to inhabit large expanses of deciduous woodland, usually those containing oaks, but less-frequently beech *Fagus sylvatica* and other species. The primary larval food plant of the purple emperor butterfly is goat willow *Salix caprea*, however, crack-willow *Salix fragilis* and grey willow *Salix cinerea* are also used (UK Butterflies, 2012). The woodland on site is considered to be too small to constitute suitable habitat for purple emperor butterflies and therefore this species is unlikely to be present on site despite the presence of potential larval food plants (crack willow) on the margins of the ornamental lake.
- 5.35 Stag beetles are known to be present within the borough. This species of invertebrate lays its eggs in soft soil near to rotting wood. The larvae then hatch and feed on this dead and decaying wood (PTES, undated). The woodland in the centre of the site has the potential to support stag beetles.

Bats

- 5.36 The results of the external and internal inspection survey of building B1 is detailed below along with an assessment of the site as a whole to support roosting and foraging bats.
- 5.37 Building B1 is a science building constructed approximately 40-50 years ago. This single storey building has a metal framed, prefabricated plastic and glass construction and has a flat roof with no internal roof void (see Photographs 1 and 2 on Figure 3). The dimensions of this building are approximately 50m in length by 30m in width by 5m in height. This building is extremely well sealed with no opportunities to support roosting bats. A small soffit box is present on the southern aspect of this building which is partially open with the rest covered in wooden boarding. This opening is completely blocked by bird nesting material preventing access to roosting bats (see Photograph 3 on Figure 3). Given this lack of suitable features to support roosting bats it is therefore considered that building B1 is considered to have negligible potential to support a bat roost.
- 5.38 The SPD stated that bats are quite common throughout the borough. During the field survey a number of trees on the woodland edge (see Target Notes 2, 5, 7 and 8 in Appendix 1 and Photographs 5 and 7 on Figure 3) and within the species-poor hedgerow were found to have features (rot holes, cracks in the bark and cavities in the trunk) with the potential to support roosting bats. In addition to this the woodland, hedgerows and the ornamental lake (see Target Notes 6, 3 and 9 in Appendix 1) are also likely to provide high quality foraging and commuting habitat for a number of common bat species.

Habitat Suitability Index (HSI) Assessment for Great Crested Newts

- 5.39 An examination of on-line aerial photography prior to the site visit identified a total of thirteen ponds to be present within a 500m radius of the boundary of the site. Access was not permitted to seven of these ponds (Ponds 6-9 and 11-13) and five of these ponds were dry at the time of survey (Ponds 2, 3, 4, 5 and 10). The result of the HSI assessment for the remaining water-body (including the overall suitability class) is given in full within Table 6 in Appendix 2. The locations of the ponds and the HSI score attributed to Pond 1 are shown on Figure 2.

Pond 1

- 5.40 As described within Section 5.18, the ornamental lake covers an area of approximately 0.5ha with the margins supporting emergent aquatic macrophytes including common reed, bulrush and water mint. This water-body supports a number of water fowl principally mallards *Anas platyrhynchos*, moorhens *Gallinula chloropus* and a heron *Ardea cinerea* (a predator of great crested newts). In addition to this a large population of common carp is also present within this lake (see Photograph 12 in Figure 3). The lake is surrounded by a narrow strip of woodland and scattered trees to the east and west and the woodland to the south. Close cropped amenity grassland playing fields form the main component of the wider landscape.
- 5.41 The assessment undertaken for this pond provided an HSI of 0.34. This HSI value is considered to be poor in terms of suitability to support a population of great crested newts.

Interpretation of HSI Assessment in Context of the Desk Study Results and Site Conditions

- 5.42 A single record of a great crested newt was noted in a survey undertaken in 1986 approximately 1.2km to the south-east of the site (NBN Gateway). Pond 1 (the ornamental lake) in the north of the site was classified as having poor suitability to support great crested newts owing to the existence of high populations of both fish (common carp) and predatory waterfowl (herons). The presence of these species means that it is unlikely that the lake supports a population of great crested newts. The field survey was undertaken during the breeding season for great crested newts. Great crested newts lay their eggs upon leaves of submerged vegetation which are characteristically folded by the female newt to protect the egg from predation (Froglife, 2001). The leaves of the water-mint were searched during the survey and no great crested newt eggs or eggs of other newt species were identified.
- 5.43 The closest ponds to the proposed new science building, within the woodland in the centre of the site were all dry at the time of survey as were Ponds 5 and 10 located approximately 70m to the east and 225m to the south-east respectively. It was not possible to access Ponds 6-9 during the survey. However, these water-bodies are surrounded by woodland (high quality terrestrial habitat) and therefore if great crested newts are present they would be unlikely to travel significant distances in search of similar quality habitat.
- 5.44 Ponds 11 and 12 are located 150m and 360m respectively from the west of the site. These water-bodies are also situated within high quality terrestrial habitat and the school buildings and associated hard-standing are likely to act as a barrier to great crested newt migration. This is particularly the case with Pond 12 where newts would also have to cross Sawyers Lane to gain access to the school grounds.
- 5.45 Pond 13 is located approximately 480m to the south-west of the site. Following an examination of on-line aerial photography, it appears that this pond is fed by a small brook, increasing the likelihood of fish to be present. If however, great crested newts are present within this water-body they are likely to remain within the woodland surrounding the pond rather than cross over 400m of close-cropped amenity grassland which offers extremely limited shelter for this species.
- 5.46 In summary, no great crested newt eggs were found within the marginal vegetation of the lake during the field survey. In addition, the ornamental lake supports a large population of waterfowl and common carp which are likely to predate upon any newts or newt larvae that may be present and for this reason this water-body is extremely unlikely to support great crested newts.
- 5.47 The new science building is to be constructed upon an area of intensively managed amenity grassland. Closely mown amenity grassland constitutes poor terrestrial habitat for this species offering extremely limited opportunities for shelter. The woodland to the south of the ornamental lake is considered to represent moderate quality terrestrial habitat for great crested newts. However, given the lack of suitability of the lake and the presence of similar and superior quality habitat surrounding nearby ponds their presence on site is extremely unlikely.
- 5.48 Given that the nearest known population of great crested newts is over 1km from the boundary of the site and that the lake in the centre of the site offers poor aquatic habitat for this species, it is considered highly unlikely that this species is present. For these reasons great crested newts will not be considered further within this study.

6 Potential Impacts and Recommendations

- 6.1 This section highlights the potential impacts of a proposed development on ecological receptors identified during the desk study and field surveys. It then goes on to describe recommended mitigation and compensation measures to overcome the identified potential impacts and recommendations for further survey and potential ecological enhancement, where necessary in-line with legislation and current government and local planning policy.

Designated Sites

- 6.2 The closest designated site; Furzefield Wood and Lower Half Penny Bottom (LNR) is in excess of 1.6km from the boundary of the site. The closest non-statutory designated site is Dugdale Hill Road Meadows (WS) located approximately 250m to the north-west and is separated from the site by the other school buildings and Dugdale Hill Lane. The demolition of the existing science building and the proposed construction of the new science building will be contained entirely within the boundary of the site. Given the small scale of this development and the distance between the development and nearby designated sites, direct or indirect impacts on statutory and non-statutory designated sites are predicted to be negligible. Therefore the proposed development will be compliant with Policy E2 of the Hertsmere Borough Council Local Plan (2003), which seeks to protect designated sites from the adverse effects of development (see Appendix 3).

Habitats

- 6.3 A proportion of the amenity grassland present on site is to be lost as a result of the proposed development. This habitat is common and widespread with limited intrinsic ecological value and as a result its loss is not considered to have an adverse impact to the overall ecological value of the site.
- 6.4 The woodland in the centre of the site and the native species-poor hedgerows in the south-east of the site are classified as UKBAP and local BAP habitats and habitats of principal importance (HPI's). As detailed within Appendix 3, planning authorities have a duty under Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 to ensure that habitats of principal importance are protected from the adverse effects of development. As current plans show, the woodland and hedgerows are to be retained and protected during the construction of the new science building.
- 6.5 Construction works in the vicinity of the woodland, scattered broadleaved trees or hedgerows should adhere to British Standard: 5837:2005 "*Trees in Relation to Construction*" which prescribes the need for the following protection measures:
- Erection of stout fencing around each tree or hedgerow in advance of site clearance, enclosing the Root Protection Area;
 - Prohibition of construction activities, material storage, use of vehicles, fires, etc within the fenced area to prevent damage to tree roots and compaction of the soil; and
 - Maintenance of an adequate water supply to the trees and hedgerows both during and after construction.
- 6.6 In the unlikely event that any hedgerows, sections of hedgerows or trees need to be removed during the construction phase of the development they should be replanted using species of local provenance. The species-richness of hedgerows could also be enhanced through additional species planting. New sections/lengths of hedgerow or supplementary individual species should comprise a mixture of at least five native species per 30m (BRIG, 2008), with emphasis on hawthorn *Crataegus monogyna*. Additional species could include a selection of the following; field maple *Acer campestre*, beech *Fagus sylvatica*, hazel, *Corylus avellana* hornbeam *Carpinus betulus*, blackthorn *Prunus spinosa*, holly *Ilex aquifolium*, dogwood *Cornus sanguinea* or dog rose *Rosa canina*.
- 6.7 The protection of the woodland, individual trees and hedgerows during the construction phase of the development and the planting of additional trees, lengths of hedgerow or improving the

species-richness of hedgerows will ensure compliance with national planning policy (NPPF) and Policies E4, E6, E7 and E8 of the Hertsmere Borough Council Local Plan (2003) and Policy CS12 of the Revised Core Strategy (2011), (see Appendix 3 for details of these planning policies).

- 6.8 The ornamental lake in the centre of the site should be retained and protected throughout the proposed development works. Direct effects on this lake are predicted to be negligible as the new science building is to be constructed approximately 40-50m to the south.
- 6.9 Indirect impacts on this water-body could arise during construction as a result of inappropriate use of plant or storage of materials, potentially resulting in contaminated run-off or dust contamination (in the absence of mitigation). To avoid any indirect adverse impacts on the lake, appropriate standard working measures should be adopted to ensure that dust is kept a minimum and contamination of the ground and surface water is avoided. Undertaking these measures will ensure compliance with local planning policy including Policy E4 of the Hertsmere Borough Council and Policy CS12 of the Revised Core Strategy (see Appendix 3).
- 6.10 The National Planning Policy Framework (NPPF) aims to “*minimise impacts on biodiversity and providing net gains in biodiversity where possible*”. In order to achieve a net gain in biodiversity in-line with national planning policy (see Appendix 3) the following enhancements could be made to the existing habitats present on site. The value of the grassland on site could be improved by leaving areas uncut and by adopting an appropriate mowing regime (cutting in September/October and in February) followed by the removal of any arisings. Plug planting the grassland with a variety of forb species would also improve species diversity. Suitable species could include a selection of those listed in Table 4 below.

Table 4: Grassland species that could be plug planted into existing grassland

Common Name	Scientific Name
Greater knapweed	<i>Centaurea scabiosa</i>
Wild carrot	<i>Daucus carota</i>
Hedge bedstraw	<i>Galium mollugo</i>
Lady's bedstraw	<i>Galium verum</i>
Field scabious	<i>Knautia arvensis</i>
Rough hawkbit	<i>Leontodon hispidus</i>
Oxeye daisy	<i>Leucanthemum vulgare</i>
Bird's-foot trefoil	<i>Lotus corniculatus</i>
Cowslip	<i>Primula veris</i>
Meadow buttercup	<i>Ranunculus acris</i>
Yellow rattle	<i>Rhinanthus minor</i>
Red campion	<i>Silene dioica</i>

- 6.11 The woodland could also be enhanced through planting of shrubs and woodland ground flora within the woodland under-storey. Suitable species that could be planted include a selection of those listed in Table 5 below.

Table 5: Shrubs and ground flora that could be planted within the existing woodland

Common Name	Scientific Name
<i>Shrubs</i>	
Cherry	<i>Prunus avium</i>
Field maple	<i>Acer campestre</i>

Common Name	Scientific Name
Hazel	<i>Corylus avellana</i>
Hawthorn	<i>Crataegus monogyna</i>
Elder	<i>Sambucus nigra</i>
Dogwood	<i>Cornus sanguinea</i>
Spindle	<i>Euonymus europaeus</i>
Woodland ground flora	
Garlic mustard	<i>Alliaria petiolata</i>
Ramsons	<i>Allium ursinum</i>
Betony	<i>Stachys officinalis</i>
Nettle leaved bellflower	<i>Campanula trachelium</i>
Foxglove	<i>Digitalis purpurea</i>
Hedge bedstraw	<i>Galium mollugo</i>
Wood avens	<i>Geum urbanum</i>
Bluebell	<i>Hyacinthoides non-scripta</i>
Primrose	<i>Primula vulgaris</i>

- 6.12 Suitable seed mixes for the grassland and woodland ground flora can be purchased from suitable reputable suppliers.

Protected Species and Species of Conservation Concern

Breeding Birds

- 6.13 The Wildlife and Countryside Act (WCA) 1981 (as amended) prohibits the killing and injury of all wild bird species, the taking, damage or destruction of their active nests and the taking or destruction of their eggs (as detailed in Appendix 3).
- 6.14 The building (B1), scattered broadleaved trees, species-poor hedgerow, woodland and reed-bed provide nesting habitat for a variety of species of breeding birds.
- 6.15 Current plans show that the trees, woodland, hedgerows and reed-bed are to be retained and protected throughout the proposed development. The impact on breeding birds as a result of the proposed development is therefore predicted to be negligible. However, as birds are known to have nested within building B1 in the past or if plans change and the removal of trees or hedgerows is required the following approach should be adhered to.
- 6.16 Adult birds will easily able to escape from harm during building demolition or any necessary clearance of vegetation. However, to avoid damage or destruction of nests and eggs, or killing or injury of young birds in nests, the demolition and any necessary site clearance within suitable habitat should be timed to avoid the breeding season of common bird species. In practice, this means that the demolition of building B1 should be undertaken within the period from 1st September until the 28th February, as a guide. If this timing is not possible, the soffit box and any vegetation to be cleared should first be checked by an ecologist or other suitably qualified individual for active nests. This would involve watching the areas for signs of bird activity and undertaking a search to look for active nest sites. In the event that nesting activity was identified the clearance works would need to cease until the bird had finished nesting. Appropriately timing these works will also ensure compliance with Policy E3 of the Hertsmere Local Plan (2003), see Appendix 3.
- 6.17 In order for the development to achieve a net gain in biodiversity in line with the new National Planning Policy Framework (NPPF, See Appendix 3) the site could be enhanced for other species of nesting birds through the provision of additional nesting opportunities on retained mature trees in the woodland or on the newly constructed science building. A number of designs of bird boxes are

commercially available. It is recommended that a variety of types are chosen to encourage a range of species. Suitable bird box designs could include:

- Smaller wood or woodcrete boxes with a small hole entrance (around 25 to 32mm in diameter) suitable for smaller bird species such as blue tits;
- Larger wood or woodcrete boxes with a larger hole entrance (around 45mm in diameter) suitable for starlings; and
- Wood or woodcrete open-fronted boxes suitable for robins, blackbirds and wagtails.

6.18 Specific provisions are particularly recommended for tree sparrows as this species is in severe decline in the UK and is classified as a UK and Local Priority BAP species and Species of Principal Importance (SPI). Installing the smaller woodcrete boxes on a number of neighbouring trees (providing that the entrance hole on the box is 32mm or more), may help to encourage this colonial species to use the habitats present on site.

6.19 As this is a school site, the installation of bird boxes would also potentially provide a good teaching resource for the students and projects involving the annual monitoring and maintenance of the bird boxes could be undertaken.

Badgers

6.20 The habitats on site (woodland, amenity grassland and hedgerows) are likely to provide foraging habitat for badgers. Whilst the site is unlikely to be a core part of a badger clans territory given the absence of any setts or recent signs of activity within the site, it is possible that badgers occasionally use the site for foraging, and the proposed construction works in the amenity grassland area could result in the loss of some badger foraging habitat. In addition to this, there is the potential for badgers to be killed or injured during the construction process.

6.21 In order to prevent harm to badgers using the site during the construction phase the following precautions should be followed:

- Any trenches within the working area of the site will either be covered over-night, or planks of wood will be secured within the trench to allow badgers to escape via a ramp should they fall in; and
- Any temporarily exposed open pipe system will be capped in such a way as to prevent badgers from gaining access.

6.22 Foraging opportunities for badgers can also be improved on the site by incorporating fruit or mast-bearing shrubs and trees into the woodland under-storey, including species described in Section 6.11 above.

6.23 Badgers are highly mobile animals and patterns of activity can change over time. Therefore, if more than one year elapses before the commencement of works, in order to establish the current usage of the site by badgers and to ensure that the potential for committing an offence under the Badger Act 1992 (see Appendix 3) is avoided, it is recommended that the site is re-surveyed for any new evidence of badger activity, and particularly for the presence of setts. It is recommended that this survey is undertaken in April/May or October/November when badger activity is high and vegetation is low. However, such a survey can be undertaken all year round.

Bats

6.24 Building B1 to be demolished has been classified as having negligible potential to support roosting bats due to a lack of suitable roosting opportunities. It is therefore not predicted that there will be an impact on roosting bats as a result of the building demolition.

6.25 Despite the presence of high quality roosting (mature oaks on the periphery of the woodland) and foraging habitats (the woodland and ornamental lake) present on site, the impact of the construction of the new science building to the south of the woodland is predicted to be negligible. The majority of the mature trees assessed as having medium to high potential to support roosting bats are a significant distance from the proposed building footprint so will not be affected by

shading from the building. External lighting on the building should be avoided or kept to a minimum. However, given the presence of a large floodlit sports pitch on the southern boundary of the site the effect of any new external lighting is not anticipated to have a negative impact on foraging and commuting bats.

- 6.26 The SPD document has stated that bats are common throughout the wider area and therefore, in line with national planning policy (NPPF), enhancements to benefit bats using the site could be incorporated into the new development. The inclusion of additional roosting opportunities within the site is one such enhancement. A good range of bat boxes are offered by Schwegler. These boxes are made from woodcrete and so are highly durable. The following box types offered would be good for the bat species likely to be present on site:
- 2F (double-fronted option) – good for pipistrelle species, Daubenton's bats *Myotis daubentonii* and Natterer's bats *Myotis natterei*;
 - 1FF and 2FN – also good for pipistrelle bats and good for noctule bats *Nyctalus noctula*. These boxes can be fitted onto the sides of buildings or attached to suitable mature trees; and
 - Bat tubes (1FR or 2FR) good for pipistrelles could also be incorporated into the walls of the new science building.
- 6.27 Bat boxes are best installed in positions where they are out of reach of people from the ground (so as to limit interference) and high enough to deter cats and other predators. It is best not to place them too high as this makes maintenance more difficult and can leave the boxes exposed to weather, particularly strong winds. In practice, placing them between 3 and 4.5 metres from the ground on trees or buildings is optimal. It is useful to place different boxes in a range of locations at slightly different heights and facing in slightly different directions to give a choice of roost site options. It is preferable to position boxes facing in a southerly direction (i.e. south-west through south to south-east) where they will receive a good degree of sunlight.
- 6.28 Where any tree removal or necessary pruning of dead limbs is required an inspection should be undertaken by a suitably qualified ecologist/ bat worker in order to assess the likelihood of the tree/limb to support roosting bats. Further survey in the form of dusk emergence/dawn return to roost surveys may also be required following this inspection.

Reptiles

- 6.29 The ornamental lake is likely to provide foraging habitat for grass snakes. In addition, the woodland in the centre of the site could also provide sheltering and over-wintering habitat for this species. The new science building is proposed entirely within an area of close cropped amenity grassland in the south of the site. This habitat does not provide any sheltering or foraging habitat for grass snakes. Therefore, the proposed development is unlikely to result in a contravention of the legislation protecting reptiles from killing and injury as detailed in Appendix 3.
- 6.30 The construction of small log piles within and on the periphery of the woodland and leaving a border or area of the amenity grassland un-cut on the woodland edge and at the bases of the hedgerows would provide a varied vegetation structure that will provide additional foraging and sheltering habitat for grass snakes using the site. Incorporating these enhancements for reptiles will help to ensure compliance with national and local planning policy. The creation of log piles will also provide habitat for a range of other species including small mammals, amphibians and invertebrates.

Invertebrates

- 6.31 The planting of forb species within the existing grassland and the planting of woodland shrubs and ground flora is likely to provide foraging habitat for the larvae of the grizzled skipper butterfly potentially present within 2km of the site.
- 6.32 The woodland is to be retained and protected throughout the proposed development. Therefore the impact on stag beetles is predicted to be negligible. It is recommended that a number of log piles are included within or on the periphery of the woodland. The inclusion of log piles will provide foraging habitat for the larvae of stag beetles that may be present on site.

7 Conclusions

- 7.1 The results of this desk study, extended Phase 1 habitat survey, external and internal building in section for bats and habitat suitability index (HSI) assessment have identified a number of potential ecological constraints and opportunities for enhancement to be present within the Dame Alice Owen's School site.
- 7.2 Providing that the recommendations relating to appropriate methods of working during the demolition of building B1 and construction of the new science building are adhered to, the development should be compliant with the national and local planning policy relating to the protection of designated sites.
- 7.3 Semi-natural broadleaved woodland and species-poor hedgerows (UK and local BAP priority habitats and Habitats of Principal Importance) were recorded to be present on site. In addition, the school site is considered to provide suitable habitat for a range of protected species and species of conservation concern including; breeding birds, roosting and foraging bats, badgers, reptiles, and a number of UKBAP Priority species, Species of Principal Importance (SPI's).
- 7.4 Providing that the recommendations made within this report relating to the protection of these habitats and mitigation for the loss of hedgerows and trees (should this be necessary) and providing that enhancements for nesting birds, badgers, bats, reptiles and invertebrates be incorporated into the scheme, the development should be compliant with the relevant legislation and planning policies relating to these habitats and species.

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- Natural England's Nature on the Map: www.natureonthemap.naturalengland.org.uk
- The National Biodiversity Network: www.nbn.org.uk
- UK Butterflies website: www.ukbutterflies.co.uk

9 Appendix 1: Target Notes

Target Note 1

- 9.1 An area of closely mown amenity grassland located in the south of the site. The vegetative composition of this grassland is limited being dominated by perennial rye-grass *Lolium perenne* with forb species recorded including frequent daisy *Bellis perennis* and occasional greater plantain *Plantago major*, white clover *Trifolium repens* and dandelion *Taraxacum* agg.

Target Note 2

- 9.2 A mature pedunculate oak tree *Quercus robur* located in the south eastern corner of the site. This tree has splits in the trunk and rot holes giving the tree moderate to high potential to support roosting bats.

Target Note 3

- 9.3 A well-managed, species-poor hedgerow lines the south-eastern boundary of the site. This hedgerow principally comprises hawthorn *Crataegus monogyna* with occasional blackthorn *Prunus spinosa* and rare instances of elder *Sambucus nigra*. The ground flora associated with the hedgerow comprises frequent ivy *Hedera helix* and cleavers *Galium aparine* with occasional bramble *Rubus fruticosus* agg. and lord's and ladies *Arum maculatum*. Mahonia *Mahonia* sp. (a non-native species) was also present within this hedgerow.

Target Note 4

- 9.4 A length of species-poor hedgerow on the east of the site (running from east to west). The vegetative composition of this hedgerow is identical to that described within TN3. However, this hedgerow contains more mature specimens and has been subjected to management less recently.

Target Note 5

- 9.5 A mature pedunculate oak on the eastern corner of a block of semi-natural broadleaved woodland. This oak has splits in the trunk and rot holes giving this tree moderate to high bat roosting potential.

Target Note 6

- 9.6 A semi-natural broadleaved woodland covering approximately 0.41ha, running from east to west in the centre of the site. The majority of trees within this woodland are young –semi-mature in age with a few mature trees present on the periphery. The canopy layer of this habitat parcel comprises occasional pedunculate oak, ash *Fraxinus excelsior* and Norway maple *Acer platanoides*. The shrub layer includes frequent hawthorn with occasional blackthorn and the ground flora comprises locally abundant lords and ladies, frequent ivy with occasional common dog violet *Viola riviana*.

Target Note 7

- 9.7 A mature pedunculate oak on the south western edge of the woodland. This tree has moderate bat potential due to the presence of splits and rot holes in the trunk and main branches.

Target Note 8

- 9.8 A very mature possibly veteran pedunculate oak with rot holes conferring moderate potential to support roosting bats.

Target Note 9

- 9.9 An ornamental lake covering approximately 0.5ha that is a minimum of 1m in depth. Common reed *Phragmites australis* and bulrush *Typha latifolia* are present in the margins with occasional water mint *Menthe-aquatica*. A number of water fowl including mallards *Anas platyrhynchos* and moorhens *Gallinula chloropus* were present in and around the pond and a large population of

common carp *Cyprinus carpio* was also observed. Brown rats *Rattus norvegicus* were noted foraging in the margins of this waterbody.

Target Note 10

- 9.10 A shelter belt of woodland extends around the perimeter of the pond. The composition of this habitat parcel is similar to the woodland in TN6 but also supports crack willow *Salix fragilis*, grey willow *Salix cinerea* and rare silver birch *Betula pendula*.

Target Note 11

- 9.11 The northern extent of this waterbody has become overrun with common reed with vegetation having been completely succeeded over.

Target Note 12

- 9.12 The south-western corner of the waterbody is also inundated with common reed and bulrush.

10 Appendix 2: Habitat Suitability Index (HSI) Assessment Results

Table 6: Results of Great Crested Newt HSI Assessment

ID	SI Scores (Oldham <i>et al</i> , 2000)											Suitability Class
	Location	Area	Permanence	Water Quality	Shading	Water fowl	Fish	Density	Terrestrial Habitat	Macrophyte Cover	HSI Score	
1	1	0.55	0.9	0.67	1	0.01	0.01	1	1	0.6	0.34	Poor
2	Dry											
3	Dry											
4	Dry											
5	Dry											
6	No access											
7	No access											
8	No access											
9	No access											
10	Dry											
11	No access											
12	No access											
13	No access											

11 Appendix 3: Summaries of Relevant Legislation, Policy and Other Instruments

11.1 This section briefly summarises the relevant legislation, policy and related issues that are mentioned in the main text of the report. The following text does not constitute legal advice.

National Planning Policy Framework

11.1 The government published the National Planning Policy Framework (NPPF) on 27th March 2012. The NPPF states that, "*the planning system should contribute to and enhance the natural and local environment by:*

- a. *Protecting and enhancing valued landscapes, geological conservation interests and soils;*
- b. *Recognising the wider benefits of ecosystem services;*
- c. *Minimising impacts on biodiversity and providing net gains in biodiversity, where possible contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- d. *Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and*
- e. *Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."*

Planning – land allocation and policies

11.2 The NPPF indicates that '*in preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the least environmental or amenity value, where consistent with other policies in this Framework.*'

11.3 In paragraph 111, the NPPF refers to brownfield land as follows: '*planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value.*'

11.4 Local planning authorities are advised in paragraph 113 to '*set criteria-based policies against which proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks.*'

11.5 Local planning authorities are advised further to '*set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure...*'

11.6 In paragraph 115 the NPPF states that for National Parks, the Broads and Areas of Outstanding Natural 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.*' The accompanying Paragraph 116 sets out the assessment requirements should planning applications be considered in these areas although the default is that '*planning permission should be refused for major developments in these designated areas except in exceptional circumstances and where it can be demonstrated they are in the public interest.*'

11.7 The NPPF also states that, "*to minimise impacts on biodiversity and geodiversity, planning policies should:*

- a. *Plan for biodiversity at a landscape-scale across local authority boundaries;*

- b. *Identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;*
- c. *Promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets; and identify suitable indicators for monitoring biodiversity in the plan;*
- d. *Aim to prevent harm to geological conservation interests; and*
- e. *Where Nature Improvement Areas are identified in Local Plans, consider specifying the types of development that may be appropriate in these Areas.”*

Planning applications and biodiversity

- 11.8 “When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:
- a. *If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
 - b. *Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site’s notified special interest features is likely, an exception should only be made where the benefits of the development, at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;*
 - c. *Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;*
 - d. *Opportunities to incorporate biodiversity in and around developments should be encouraged;*
 - e. *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; and*
 - f. *The following wildlife sites should be given the same protection as European sites:*
 - i. *potential Special Protection Areas and possible Special Areas of Conservation*
 - ii. *listed or proposed Ramsar sites; and*
 - iii. *sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.”*
- 11.9 “*The presumption in favour of sustainable development (paragraph 14 [of NPPF]) does not apply where development requiring appropriate assessment under the Birds and Habitats Directives is being considered, planned or determined.”*
- 11.10 In paragraph 125 the NPPF stipulates that ‘*by encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*’

The Hertsmere Local Plan (through to 2011) – Adopted 2003

- 11.11 The Hertsmere Local Plan contains the following saved policies that relate to ecological constraints and opportunities associated with the site.

Policy E2: Nature Conservation Sites – Protection

- 11.12 *Development which could have an adverse effect on a Local Nature Reserve, a Wildlife Site or a Regionally Important Geological / Geomorphological Site, as identified on the Proposals Map or as identified by any future studies and published as non-statutory guidance, will not be permitted*

unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to safeguard the nature conservation or geological value of the site. Where proposed development could have an adverse impact on such a site the submission of an environmental statement will be required with the application. Where such development is permitted the Council will seek to ensure that any necessary measures are taken to mitigate and compensate for any damage caused. Such measures must be within the control of the developer and subsequent site owner(s) or operator(s).

Policy E3: Species Protection

- 11.13 *Planning permission will not be granted for development which could have an adverse impact on badgers or species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981, as amended, unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to maintain the unaltered and undisturbed habitat of the affected species. Where proposed development could have an adverse impact on such species the submission of an environmental statement will be required with the application. Where such development is permitted the Council will seek to ensure that any necessary measures are taken to:*
- a. *facilitate the survival of the species; and*
 - b. *minimise disturbance; and*
 - c. *provide adequate alternative habitat(s) to sustain at least the current levels of population.*
- 11.14 *Such measures must be within the control of the developer and subsequent site owner(s) or operator(s).*

Policy E4: Features of Major Importance for Nature Conservation

- 11.15 *Developments which are likely to adversely affect any features listed below which are of major importance for wild flora and fauna will only be permitted if it can be shown that the reasons for the development outweigh the need to retain the feature(s). In such instances either suitable mitigation, reinstatement or replacement of the feature(s) will be sought and the ability or otherwise to do this will be considered as part of the planning decision. Such measures must be within the control of the developer and subsequent site owner(s) or operator(s). In appropriate instances the submission of an environmental statement will be required to accompany such an application.*
- 11.16 *List of Features: Hedgerows, linear tree belts, plantations and woods, green lanes, river corridors (including banks), ponds (excluding private garden ponds) and lakes, urban wildlife corridors / green links or chains.*

Policy E5: Nature Conservation Sites - Management , Enhancement and Access

- 11.17 *The Council recognises the educational and wider community benefits associated with nature conservation and will seek to realise opportunities for habitat creation, retention and sensitive management, particularly within urban areas. Where possible appropriate forms and levels of access to nature conservation sites will be encouraged. Where appropriate sites will be designated as Local Nature Reserves, Wildlife Sites, RIGS, or green links / chains. In particular, sites connecting any areas of wildlife importance will similarly be identified, provided with interpretative material, managed and enhanced. Within nature conservation sites which are considered to be at risk the Council will, in appropriate cases, seek to enter into appropriate management agreements with the owner or operator and / or another appropriate body.*

Policy E6: Nature Conservation Sites - Opportunities Arising from Development

- 11.18 *Where landscaping schemes are sought in connection with a development proposal the incorporation of measures to promote habitat creation or enhancement will be encouraged. Where possible and appropriate, native species of plants, shrubs and trees should be used to foster wildlife interest. Ideally such planting should be of local provenance where this is possible.*

Policy E7: Trees and Hedgerows - Protection and Retention

- 11.19 *Tree Preservation Orders will be made to ensure that existing trees, or groups of trees, which are healthy and contribute to the amenity of the area, are retained and protected. When permission is given to remove existing trees subject to Tree Preservation Orders replacement planting will be*

required. The Council will also use its powers under the Hedgerow Regulations 1997 (and any successive legislation) to protect hedgerows. Planning permission will be refused for development which would result in the loss, or likely loss, of any healthy trees and/or hedgerows which make a valuable contribution to the amenity of the area in which they are located unless the benefits of the proposed development outweigh the amenity value of the tree and/or hedgerow. If development is approved which would result in the removal of trees and/or hedgerows, equivalent and appropriate replacement planting will be required.

Policy E8: Trees , Hedgerows and Development

- 11.20 On development sites where existing trees and/or hedgerows are to be retained and/or new planting provided it will be a requirement that:-
- the proposals provide sufficient space between trees and/or hedgerows and buildings, roads/footpaths and parking areas to enable the implementation of the development to take place without affecting the existing and proposed landscape features and ensure that their health is not endangered by water deprivation;
 - existing trees, which are removed to enable the development to take place, are replaced by two trees for every one removed within the landscape scheme for the site. Adequate attention shall be given to the species and the spaces required for these trees to mature within the overall layout of the development. Appropriate replacement planting will also be required for any hedgerows which are removed to enable the development to take place;
 - the location of all site works including storage of materials and the location of services (i.e. gas, electricity, water, drainage, communications cables) shall not directly or indirectly damage or destroy any trees or hedges to be retained; and
 - adequate protection shall be provided throughout the period of construction to protect trunks, root systems and limbs from damage. Where appropriate, details of fencing or other protection measures will be required for approval before any works commence on site.
- 11.21 Development proposals should ensure that sufficient land is provided for additional planting and landscaping. Existing wildlife habitats, ecological, topographical and landscape features; including trees, hedges, shrubs, water features and walls; should be retained and utilised in the new scheme.

Hertsmere Borough Council – Revised Core Strategy 2011

- 11.22 In addition to the policies detailed within the local plan highlighted above, a revised core strategy was approved by the Council in November 2011. One of the principal aims of this strategy relates to biodiversity and ecology and aims to “To protect and enhance local biodiversity” (LDF Core Strategy Objective 13). One policy within the Core Strategy relates to biodiversity and is detailed below.

Policy CS12 Green Belt protection and enhancement of the natural environment

- 11.23 This policy states that, “All development proposals must conserve and enhance the natural environment of the Borough, including biodiversity, protected trees, landscape character, and sites of ecological and geological value, in order to maintain and improve environmental quality. Proposals should provide opportunities for habitat creation and enhancement throughout the life of a development”.

Hertsmere Borough Council – Supplementary Planning Document (SPD)

- 11.24 Hertsmere Borough Council has produced an SPD (Biodiversity, Trees and Landscape). This SPD details the local wildlife sites, habitats and species of principal importance within the Borough and provides details with regard to habitat creation and maintenance and the protection of trees throughout the development process. This SPD was adopted on 8th December 2010 for use in planning applications registered on or after 20th December.

Species and Habitats of Principal Importance

- 11.25 The NPPF (paragraph 117) indicates that local authorities should take measures to “promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection

and recovery of priority species" linking to national and local targets through local planning policies. Priority species are those species shown on the England Biodiversity List published by the Secretary of State under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Planning authorities have a duty under Section 40 of the NERC Act to have regard to priority species and habitats in exercising their functions including development control and planning.

UK Biodiversity Action Plan

- 11.26 The Government has drawn up a national strategy to conserve our threatened native species and habitats - the UK Biodiversity Action Plan (BAP)^[1]. The UK BAP includes detailed Action Plans for priority habitats and species. The list of priority habitats and species included within the UK BAP is closely related to the list of habitats and species of principal importance.

Local Biodiversity Action Plans

- 11.27 The UK BAP is supported by a series of Local Biodiversity Action Plans (LBAPs), usually set up on a local authority administrative boundary basis. Each LBAP identifies those habitats and species considered to be most important in that area (usually referred to as priority habitats and species). Commonly, an LBAP will identify a number of habitats and species for which "action plans" have been prepared.

- 11.28 The Hertfordshire Local BAP has prepared action plans for the following habitats:

- Woodland
- Wetland
- Heathland and acid grassland
- Neutral grassland
- Chalk grassland
- Farmland
- Urban

- 11.29 Action plans have also been prepared for the following species: water vole, tree sparrows, grizzled skipper, common dormouse, bittern, stag beetle, Natterer's Bats, stone-curlew *Rhinus oedicephalus*, white-clawed crayfish *Austropotamobius pallipes*, otter, great crested newt, great pignut *Bunium persicum*, black necked grebe, chalkhill blue *Polyommatus coridon*, cornflower *Centaurea cyanus*, river water-dropwort *Oenanthe fluviatilis* and pasque flower *Pulsatilla* sp.

European and National Legislation

European protected species

- 11.30 The Conservation of Habitats and Species Regulations 2010 consolidates the various amendments that have been made to the Regulations. The original (1994) Regulations transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.
- 11.31 "European protected species" (EPS) are those which are present on Schedule 2 of the Conservation of Habitats and Species Regulations 2010. They are subject to the provisions of Regulation 41 of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these pieces of legislation make it an offence to:
- a. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species
 - b. Possess or control any live or dead specimens or any part of, or anything derived from a these species

^[1] <http://jncc.defra.gov.uk/page-5155> (The UK Biodiversity Action Plan) – 14 June 2011

- c. deliberately disturb wild animals of any such species
 - d. deliberately take or destroy the eggs of such an animal, or
 - e. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place
- 11.32 For the purposes of paragraph (c), disturbance of animals includes in particular any disturbance which is likely—
- a. to impair their ability—
 - i. to survive, to breed or reproduce, or to rear or nurture their young, or
 - ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - b. to affect significantly the local distribution or abundance of the species to which they belong.
- 11.33 Although the law provides strict protection to these species, it also allows this protection to be set aside (derogation) through the issuing of licences. The licences in England are currently determined by Natural England (NE) for development works. In accordance with the requirements of the Regulations (2010), a licence can only be issued where the following requirements are satisfied:
- a. The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'
 - b. 'There is no satisfactory alternative'
 - c. The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.'

Breeding birds

- 11.34 All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs.

Badgers

- 11.35 Badgers are protected under the Protection of Badgers Act 1992. This makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A licence can be granted by Natural England to permit works that would otherwise result in an offence (e.g. to allow sett closure where activities close by may otherwise result in disturbance or damage to the sett).

Common Reptiles

- 11.36 The common, widespread species of reptile (slow worm, grass snake, adder and common lizard) are protected through Sections 9(1) and 9(5) of the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000, making it an offence to:
- Intentionally or recklessly kill or injure any reptile;
 - Sell, offer for sale, possess or transport for the purchase of sale or publish advertisements to buy or sell any reptile.
- 11.37 Reptiles across the UK have undergone significant declines in recent years and all species of reptile within the UK are now included on the list of species of principal importance prepared in response to Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006. This legislation placed a duty on the Secretary of State to publish, review and revise lists of living organisms in England that are of principal importance for the purpose of conserving biodiversity. The NERC Act also required the Secretary of State to take, and promote the taking of, steps to further the conservation of the listed organisms.

12 Appendix 4: Figures



LEGEND

- Broadleaved woodland
- Trees
- A Amenity grassland
- Standing water
- Inundation vegetation/swamp
- Bare ground
- B1 Building with negligible bat potential
- Specie-poor intact hedge
- Site boundary
- 1 Target note reference

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OFFICE: Oxford
T: 01865 883833

JOB REF: 6140

PROJECT TITLE
DAME ALICE OWEN'S SCHOOL, POTTER'S BAR

DRAWING TITLE
Figure 1:
Extended Phase 1 Habitat Survey Results

DATE: 18.04.2012 CHECKED: SF SCALE: NTS
DRAWN: RSC APPROVED: SM STATUS: FINAL

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No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

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Sources: Bing maps

L:\Contracts\Live Contracts\6101-62006140 Dame Alice Owen's School, Pottery Bar\Drawings and Plans\BSG Drawings and Plans\BSG Drawings and Plans\Illustrator and InDesign\Ponds



LEGEND

-  Site boundary
 -  Dry
 -  No access
 -  Pond reference number
- Habitat Suitability Index (HSI) Scores
-  Poor (>0.5)
 -  Below average (0.5-0.59)
 -  Average (0.6-0.69)
 -  Good (0.7-0.79)
 -  Excellent (>0.8)



Photograph 1: The science building B1 to be demolished as part of the development.



Photograph 2: This single –storey building is tightly sealed with negligible potential to support roosting bats.



Photograph 3: An open section of soffit box located on the southern aspect of the building. This is completely blocked by bird nesting material accumulated over a number of years which would prevent access to bats.



Photograph 4: The amenity grassland (TN1) in the south of the site. This is the area upon which the new science building is proposed. This closely mown grassland is species poor and has very limited intrinsic ecological value.



Photograph 5: The mature oak tree (TN2) in the south-east of the site. This tree has rot holes and split bark that have the potential to be used by roosting bats.



Photograph 6: The species-poor hedgerow (TN3) located along the south-eastern boundary of the site. This hedgerow is well managed and is dominated by hawthorn *Crataegus monogyna*.

OFFICE: Oxford
T: 01865 883833

PROJECT TITLE
DAME ALICE OWEN'S SCHOOL

PHOTO PANEL TITLE
Photo Panel 1

DATE: 18.04.2012 CHECKED: SF JOB REF: 6140
PRODUCED: SW APPROVED: SF STATUS: FINAL

File reference location



Photograph 7: A mature pedunculate oak on the eastern corner of a block of semi-natural broadleaved woodland (TN5). This oak has splits in the trunk and rot holes giving this tree moderate to high bat roosting potential.



Photograph 8: The semi-natural broadleaved woodland in the centre of the site (TN6). The canopy layer of this habitat parcel comprises occasional pedunculate oak, ash *Fraxinus excelsior* and Norway maple *Acer platanoides*.



Photograph 9: The ornamental lake (TN9) in the north of the site. A number of waterfowl including a heron was observed on this water-body during the survey.



Photograph 10: The north and south-west of this water-body has become dominated by common reed *Phragmites australis*.



Photograph 11: The south-western corner of the lake with bulrush *Typha latifolia* and common reed present.



Photograph 12: A common carp *Cyprinus carpio* identified during the survey. The presence of large numbers of carp decreases the likelihood of great crested newts to be present.

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PROJECT TITLE
DAME ALICE OWEN'S SCHOOL

PHOTO PANEL TITLE
Photo Panel 2

DATE: 18.04.2012 CHECKED: SF JOB REF: 6140
PRODUCED: SW APPROVED: SF STATUS: FINAL