Our reference: DFCP 4399
Date: 22nd May 2020

D F Clark Bionomique Ltd

Preliminary Ecological Appraisal Report

of Phase 2 of Abbey Road, North London on behalf of Wates.

Andrews Farm
Burnham Road
Althorne
Essex
CM3 6DS
Tel: 01621 838196
Web: www.dfclark.co.uk

Constructionline CQMS Safety Scheme

Responsibilities:

This document has been prepared for the titled project or named part thereof and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authority of D F Clark Bionomique Ltd being obtained. D F Clark Bionomique Ltd accepts no responsibility or liability for the consequence of this document being used for a purpose other than the purposes for which it was commissioned. Any person using or relying on the document for such other purpose agrees, and will by such use or reliance be taken to confirm his agreement to indemnify D F Clark Bionomique Ltd for all loss or damage resulting therefrom. D F Clark Bionomique Ltd accepts no responsibility or liability for this document to any party other than the person by whom it was commissioned. To the extent that this report is based on information supplied by other parties, D F Clark Bionomique Ltd accepts no liability for any loss or damage suffered by the client, whether contractual or tortious, stemming from any conclusions based on data supplied by parties other than D F Clark Bionomique Ltd and used by D F Clark Bionomique Ltd in preparing this report.

DF Clark Bionomique Ltd does not endorse the content of any of the websites listed and relevant checks should be made to ensure that the products supplied meet the requirements outlined in this document.

Biological Data:

Ownership of biological data gained through the assessment directly associated with the titled project or named part thereof remains in the ownership of the client who commissioned this assessment. However, as part of membership to our professional body we are required to provide our biological results to applicable biological record centres. As such, it is our intention to supply biological data unless directly instructed in writing not to do so by the commissioning client.

Length of Time Report is Valid:

Provided no significant changes are made to the proposal (where provided) or on the proposed site (*e.g.* significant changes to management practices or habitats present) subsequent to the report's issue; this report can be considered valid for 18 months from the date of issue.

Document History

This document has been issued and amended as follows:

Version	Initial Survey Date	Report Issue Date	Description	Author	Job Title	Verified and Approved by	Job Title
1	5th November 2019	19/11/2019	Draft	Maithri Jayasuriya	Assistant Consultant Ecologist	Malcolm Riddler	Senior Ecologist
2	5th November 2019	13/12/2019	Issue – with revised template	Maithri Jayasuriya	Assistant Consultant Ecologist	Malcolm Riddler	Senior Ecologist
3	5th November 2019	13/03/2020	Rev A	Maithri Jayasuriya	Assistant Consultant Ecologist	-	-
4	5th November 2019	01/04/2020	Rev B – Nesting bird clarification	Maithri Jayasuriya	Assistant Consultant Ecologist	-	-
5	5th November 2019	22/05/2020	Rev C - CBRE comments & lighting reference	Maithri Jayasuriya	Assistant Consultant Ecologist	-	

Name and Contact Details of Principal Author

Name	Email Address	Telephone
Maithri Jayasuriya	Maithri.jayasuriya@dfclark.co.uk	07738 705135

Qualifications of Principal Author

Recommendations included within this report are the professional opinion of an experienced ecologist, based on an ecological site survey and the client's proposal for the site.

The report and survey was written and carried out by Maithri Jayasuriya an assistant ecological consultant with a BSc (Hons) in Zoology and an MSc in Ecology and Environmental Management, and has two years of experience as a field surveyor with a year's experience at assistant consultant level. He is also a qualifying member of the Chartered Institute of Ecology and Environmental Management.

Quality Assurance

This report has been produced in accordance with guidelines produced by The Chartered Institute of Ecology and Environmental Management (CIEEM) and British Standards Institute (BSI):

- BSI (2013) *Biodiversity – Code of practice for planning and development*. *BS 42020: 2013* [1].
- CIEEM (2017) *Guidelines on Ecological Report Writing*. Chartered Institute of Ecology and Environmental Management, Winchester.
- CIEEM (2017). *Guidelines for Preliminary Ecological Appraisal 2nd Edition*. Chartered Institute of Ecological and Environmental Management, Winchester [2].
- CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Chartered Institute of Ecology and Environmental Management, Winchester [3].

All Preliminary Ecological Appraisal reports (PEAR) produced by DF Clark Bionomique Ltd are checked, verified, and approved by a second competent ecologist.

Contents

1 Summary

1.1 Purpose of the report

1.1.1 **This report should be read in full to identify potential impacts on protected/notable species and habitats, species and habitats of principal importance, statutory and non-statutory designated sites, and any further actions required.**

1.1.2 A Preliminary Ecological Appraisal (PEA) was carried out for Phase 2 of Abbey Road, London, NW6 4DW (TQ 25791 83938) on the 5th November 2019 under overcast weather conditions. This report aims to provide advice regarding ecological constraints and opportunities arising from the proposed development of the site, and includes if relevant, recommendations for further surveys. Where further surveys are recommended, these will ideally be undertaken in support of the planning application as results shall provide further specifications for mitigation and/or European Protected Species licencing requirements as well as any possibilities for enhancement.

1.1.1 The proposed development site consists of two nineteen-storey tower blocks connected by a walkway bridge, amenity grassland, hardstanding including car parking space, introduced shrub and scattered trees. It also includes a patches of tall ruderal vegetation. There were no areas that qualify as habitats of principle importance under Section 41 of the Natural Environment and Rural Communities Act (NERC) 2006.

1.1.2 The site falls within 2km of three statutory designated sites of local importance. There are 26 non statutory designated sites within 2km.

1.1.3 The scattered trees have the potential to support nesting birds during the nesting season (March to September). One unoccupied birds nest was seen to the south of the site. Dead logs and piles of cuttings were also present on site, potentially providing habitats for reptiles and amphibians, however given the limitations in connectivity to more suitable habitat offsite, reptiles in particular are unlikely to be present.

1.1.4 Care must be taken to prevent pollution from entering the surrounding area from the site during the construction and operational phases of the development.

1.1.5 Green alkanet was recorded on site. This is a non-native invasive species and should be removed carefully. Best practice guidance from the Non-Native Species Secretariat (NNSS) should be followed.

1.2 Conclusions

1.2.1 The development works have the potential to impacts on trees with nesting bird potential during the nesting season (March to September). Nesting bird checks are recommended if removal of trees or large shrubs are to take place during this time. This must be done no earlier than 48 hours prior to the works. The development works do not have the potential to impact bats, reptiles, great crested newts, badgers, dormice, otter, water vole or white-clawed crayfish.

2 Introduction

2.1 Instruction

2.1.1 D.F. Clark Bionomique Ltd were instructed in October 2019 by Wates to conduct a Preliminary Ecological Appraisal on Phase 2 of Abbey Road, London, NW6 4DW (TQ 25791 83938).

2.2 Site description

2.2.1 The proposed development site measures approximately 10,860 sqm. A reference plan showing site redline boundaries can be seen in Appendix 2.

2.2.2 The site comprises of two 20-storey tall tower blocks (Casterbridge and Snowman House) which are separated by an elevated walkway, hardstanding areas with a car-park, amenity grassland, scattered trees, introduced shrubs and tall ruderal areas.

2.2.3 The surrounding area is predominantly urban with residential houses and associated gardens on all sides. The B507/Belsize road runs along the site's south-western and south-eastern border. Train tracks run approximately 54 metres to the south. Patches of broadleaved woodland are located approximately 200 metres (1.64 ha), 290 metres (0.69 ha), 420 metres (1.08 ha) and 530 metres (1.18 ha) to the north. These woodland areas are separated from the site by extensive road networks and residential buildings. There is little terrestrial connectivity by which species can access the survey area.

2.3 Development proposal

2.3.1 The site is Phase 2 of an overall three-phase development. Phase 2 involves the construction of a two-storey building 2,004 sqm in total size with shared facilities. The ground floor will be used as a community centre, with the first floor used as a health centre. The existing tower blocks will remain as will the walkway, however the walkway connecting Snowman House to the extant Phase 3 over the B507 road will be demolished. The new building will be built on the eastern part of the Phase 2 site (see Appendix 4).

2.4 Key Objectives

2.4.1 This survey report aims to:

- Identify key the likely ecological constraints associated with this project;
- Identify any mitigation measures likely to be required, following British Standard Institute's "*Mitigation Heirarchy*"[1].
- Identify any additional surveys that may be required to inform an Ecological Impact Assessment (EcIA); and
- Identify the opportunities offered by a project to deliver ecological enhancement.

3 Planning policy & legislation

3.1 Overview

3.1.1 In surveying and assessing the biodiversity features present on and near the site, regard has been given to relevant biodiversity legislation and the planning context of the development proposal. Reference has been made to established planning principles, all relevant national and local planning policies, local biodiversity objectives and targets, and green infrastructure strategies, along with any relevant supplementary planning documents.

3.1.2 Chapter 15 of the National Planning Policy Framework (NPPF, Feb 2019), *Conserving and* "*Enhancing the Natural Environment*" pertains to the factors decision makers should consider when devising and implementing local policies and applying legislation. The NPPF guidance can be found at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

3.1.3 Policy A3 in Chapter 6 of the Camden Local Plan (2017) seeks to "*protect and enhance sites of nature conservation and biodiversity*." The full plan can be accessed at: https://www.camden.gov.uk/documents/20142/3912524/Local+Plan+Low+Res.pdf/54bd0f8c-c737-b10d-b140-756e8beeae95

3.2 Protected Species Legislation

3.2.1 All wild mammals receive some protection under the Wild Mammals (Protection) Act 1996. This act includes offenses of crushing and asphyxiation of any wild mammal with intent to inflict unnecessary suffering.

3.2.2 The Wildlife and Countryside Act (1981) as amended offers protection for wild birds, their nests and eggs; a range of wild mammals and plants. Different species fall into different schedules with different levels of protection. Actions that would adversely affect these species require a licence. Any such actions conducted without a licence would be a criminal offence and liable to punishment. Species protected under the Wildlife and Countryside Act include great crested newts, nesting birds, reptiles, hazel dormice, otters, water voles and bats.

3.2.3 The Natural Environment and Rural Committees Act (NERC) 2006 places a duty on public authorities including local planning authorities to consider possibilities to conserve biodiversity (Section 40). It also requires the creation and maintenance of a list of species and habitat types of principle importance as defined by Natural England (Section 41). The list of priority habitats and species is informed by the UK Biodiversity Action Plan and should be taken into account during the planning and decision-making process.

3.2.4 Conservation of Habitat and Species Regulations 2017 is designed to transpose the European Council's Habitat Directive (92/43/EEC) on the conservation of natural habitats and of wild flora and fauna. It also covers the designation and protection of European designated sites and European protected species.

3.2.5 The Protection of Badgers Act 1992 protects badgers and their setts. Under this act it is an offence to kill, mistreat, or dig for a badger as well as intentionally or recklessly damage or obstruct a sett, cause a dog to enter a sett or intentionall disturb an occupied sett. Licenses should be obtained for the destruction of badger setts if appropriate mitigation is to be undertaken.

4 Methodology

4.1 Scope of the assessment & Zone of Influence

4.1.1 The survey site included the habitats within the proposed construction zone (site boundary),

4.1.2 '*The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities'* (CIEEM, 2018) [3]. The potential impacts of a development are not always limited to the boundaries of the site concerned, and for there to be an impact upon land that is outside of the site boundaries, there needs to be a source of impact, a pathway and a receptor.

4.1.3 In order to determine the zone of influence of the proposed development on ecological features (receptors), the potential key activities that can generate ecological impacts have been considered for the construction and operational phases of the development.

4.1.4 These impacts have then been considered in the context of pathways available to potential receptors on and off-site. Potential receptors considered will include any relevant statutory or non-statutory nature conservation designations to a distance of 2km for those at a national or local level, and to 5km for those at an international level. Protected species under national and international legislation, as well as Habitats and Species of Principal Importance for conservation under section 41 of the Natural Environment and Rural Communities Act 2006 have also been considered. An assessment of the presence of or the potential presence of invasive plant and animal species was also made during the site visit.

4.1.5 Three Local Nature Reserves (LNR) lie within 2km of the site (Table 1). The proposed development is isolated from both by a network of roads and buildings. There is no pathway by which pollutants may enter these sites, The Zone of Influence (ZoI) is limited to the site boundaries and areas just beyond.

4.1.6 The zone of influence of the project should be reviewed if the project changes to ensure that it is still relevant.

4.2 Field Survey Methodology

4.2.1 The ecological value of the site and potential ecological impacts of the proposed development have been assessed in accordance with industry standard guidelines [1]. Detailed assessments have not been recommended for widespread, unthreatened and resilient features. However, recommendations have still been made to safeguard biodiversity as a whole, as per the European Union Biodiversity Strategy 2020[4].

4.2.2 Where best practice guidelines exist, these were used to assess the likelihood that individual species will be present using habitat suitability ratings, for example *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016)[5]. These have been used as a guide to inform any need for further surveys in respect of species which are present or have the potential to be present on site.

4.3 Desk study

4.3.1 Key ecological features that require consideration during the development process include: statutory/non-statutory designated nature conservation sites, county biodiversity lists, Biodiversity Action Plan lists, red-listed, rare and legally protected species. These categories have been used to assist in making value judgements within the report. Further, geographical context has also been considered, with international/European importance being the highest value for conservation, followed by: national, regional, metropolitan, borough and local importance (as lowest value) [3].

4.3.2 Historic data has only been considered if dated within the last ten years.

4.3.3 The Multi Agency Geographic Information for the Countryside (MAGIC) website managed by Natural England was consulted on the 12th November 2019 to obtain information about:

- Statutory designated sites of European/international importance such as Ramsar Sites, Special Protection Areas (SPA) and Special Areas of Conservation (SAC) to a radius of 5km;
- Statutory designated sites of national importance such as Sites of Special Scientific Interest (SSSI) within a 2km radius of the site;
- The potential for the proposed development site to be present within a SSSI Impact Risk Zone and the effect that this could have on the proposed development;
- European Protected Species Mitigation (EPSM) licences that have been issued to a distance of 2km from the proposed site;
- Ponds within 250 metres of the site.

4.3.4 Aerial imagery (*Google maps*; 23rd July 2019) was used in order to provide an indication of land-use in the surrounding area and the connectivity of habitats on and adjacent to the proposed development site.

4.3.5 The Greenspace Information for Greater London (GIGL) database was consulted to identify Local Wildlife Sites, Sites of Importance for Nature Conservation (SINCs), protected/priority/otherwise notable species recorded within a 2km radius of the application site.

4.4 Desk study limitations

4.4.1 Information regarding aerial photography, European Protected Species Mitigation licences and protected areas is accurate to the date the records were retrieved, and last updated.

4.4.2 Records from biological records centres help understand the species that are or may be present in and around the site boundary within a 2km radius of grid reference TQ 25791 83938. However, survey effort is variable between areas and many records are not submitted to records centres. Therefore, biological records centres cannot confirm absence of a species, and have only been used in this report in conjunction with other techniques to build up a picture of a study area.

4.4.3 Records older than 5 years are less valuable than more recent records, whilst ones older than 10 years were discounted. Records with OS grid references with 6 digits or less are also of limited value.

4.4.4 There were no other known limitations to the desk study.

4.5 Field survey

4.5.1 A single daytime site visit was carried out on 5th November 2019. The weather conditions on the day of the visit were cloudy and overcast.

4.5.2 The survey was conducted following the standard methodology for Phase 1 Habitat Survey [6]. Vegetation communities were assessed through the identification of individual plant species, which were then grouped, classified and mapped based on standardised habitat descriptions.

4.5.3 Habitat suitable for protected/notable species, species of principal importance, or evidence of these species was also recorded and target noted, along with location information.

4.6 Field survey limitations

4.6.1 The survey was undertaken outside the optimum period for PEAR. The recommended field survey season runs from mid-March to mid-October in the south of England [6]. Many plants are dormant/difficult to identify outside this time, so there is an increased risk that botanically protected/notable species, Schedule 9 invasive species may not have been detected. However, due to the site's predominantly urban location, this is not considered to be a significant limitation.

4.6.2 Any saproxylic fauna present may not have been recorded either, as these invertebrates would not typically be found above ground during the winter months.

4.6.3 There were no other known limitations to the survey.

5 Results: Baseline Ecological Conditions

5.1 Assessment Overview

5.1.1 Only the results pertinent to the production of this report in relationship to the proposed scheme have been included below. Full copies of the original field and raw desk-top data are available on request.

5.2 Designated sites

5.2.1 The MAGIC website indicated that there are no sites of European/international significance within a 5km radius of the proposed site.

5.2.2 There are three designated sites of local importance (Table 1) within a 2km radius of the site.

5.2.3 The site does not fall within a SSSI Impact Risk Zone and there are no automatic recommendations for the Local Planning Authority to consult with Natural England regarding the likely risks of the development on nearby statutory designated sites.

Table 1: Results of the UK/local statutory designated sites desk study.

Name	**Designation**	**Distance & Direction (approximate)**	**Size (ha)**	**Grid Ref**	**Reasons for Designation**
Uk/local designations					
"t John's Wood Church Grounds	LNR	1.48km (SE)	1.99	TQ 270 829	Site featuring flower beds, and a wildlife area featuring hedges, a meadow and woodland. Site supports an assemblage of butterflies.
Adelaide	LNR	1.81KM (NW)	0.28	TQ 276 843	Formerly a hay meadow but now a meadow supporting an array of wildflowers including corncockle (*Agrostemma gigatho*); birdsfoot trefoil (*Lotus corniculatus*); bloody cranesbill (*Geranium sanguineum*); lesser periwinkle (*Vinca minor*); marsh marigold (*Caltha palustris*). Trees species including oak (*Quercus sp.*) with signs of gall wasp. A wide assemblages of birds (green woodpecker, blackcap, jay, long-tailed tils) have been recorded as well as insects including lesser stag beetles, lacewings, ladybirds and an array of butterfly species. Foxes and hedgehogs have been

					recorded as well as newts in a pond.
Westbere Copse	LNR	2km (NE)	0.39	TQ 244 853	Small reserve containing woodland, meadows and pond areas. Woodland includes oak (*Quercus robur*); ash (*Fraxinus excelsior*); aspen (*Populus tremula*) and sycamore (*Acer pseudoplatanus*). Site supports 25 species of birds, 150 species of plants as well as frogs, toads and newts.

Table 2: Results of the non-statutory designated sites desk study (10 SINCs out of a total 26).

Name	**Designation**	**Distance & Direction (approximate)**	**Size (ha)**	**Grid Ref**	**Reasons for Designation**
Non-statutory designated sites					
CaBl01 Hampstead Cemetery	SINC	1.95 (NW)	9.34	TQ 248 856	Features, woodland, ruderal, scattered trees present including ash (*Fraxinus excelsior*); silver birch (*Betula pendula*); Norway maple (*Acer platanoides*). Butterfly and bird assemblages also present.
EsL28 Winton Primary School Gardens	SINC	2KM (N)	4.16	TQ 259 860	Blocks of grassland and scattered tree and scrub, shrubs and allotment. Mature trees include horse chestnut and yew. Trees home to diverse bird assemblage including jays, great spotted woodpecker, nuthatch, goldcrest and tawny owl.
Chalk Farm Embankment and Adelaide Local Nature RESERVE	SINC	1.83 km €	0.92	TQ 276 843	Habitats featuring ponds, lake, trees, scrub and woodland. Ground flora features many grassy species including common couch, creeping cinquefoil, Canadian goldenrod and meadowsweet.
CaBl06 West Hampstead Railsides, Medley Orchard and Wesbere Copse Local Nature Reserve	SINC	1km (NW)	7.58	TQ 249 845	Featuring orchard, scattered trees, secondary woodland and semi-improved grassland. Assemblage of wildflowers – including the London notable species common broomrape (*Orobanche minor*) - and birds including blue tits, great tits, wren and dunnock.

CaBI08 Hampstead Parish Churchyard	SINC	1.74 km (NE)	0.91	TQ 262 856	Acid grassland, planted shrubs, stands of mature trees including oak, yews, cherry and sweet chestnut. Also contains grassland and meadowland species.
WeBI03 St Johns Wood Church Grounds	SINC	1.65 (SE)	1.94	TQ 271 830	Contains amenity grassland, planted shrubbery, secondary woodland, semi-improved neutral grassland. Also contains a wildlife area and native hedgerow species. Grey sedge (*Carex divulsa*), locally uncommon, also occurs. Bird assemblage includes blackbird, wren, dunnock, blue tit and robin,
BrBI02 Paddington Old Cemetery	SINC	1.32km (W)	9.99	TQ 245 837	Grassland plants including cat's-ear, bird's foot trefoil alongside woodland plants around graves. Bird and insect assemblages abundant. Common blue butterfly (*Polyommatus Icarus*) also found.
BrBII16 Queen's Park	SINC	1.68km (SW)	12.07	TQ 242 834	Mostly woodland with trees of varying ages, dominated by oak. Also contains horse chestnut, ash, London plane and lime.
CaBII03 Frognal Court Wood	SINC	1km (NE)	0.2	TQ 262 849	Small wood used by local residents, made up of sycamore, lime, ash, poplars. Ground flora dominated by ivy. Birds found include long-tailed tit, wren, greenfinch and song thrush.
CaBII05 Primrose Hill	SINC	1.78km (E)	25.26	TQ 276 838	Mostly mown amenity grassland with scattered trees. Less mown areas feature wildflowers. Parkland trees attract woodpigeon, blue tit, starling and robin.

5.3 Phase 1 Habitats

5.3.1 A plan showing the habitats found on-site can be seen in Appendix 3. Photographs of the site can be found in Appendix 1. The habitats present on site are given below in Table 3 along with their phase 1 codes.

Code	Habitat	Area approx. (ha)	Description	Priority Habitat

J3.6	Buildings	0.1	Two 20-storey tower blocks with walkway bridge, with single storey outbuilding	No
J1.2	Amenity Grassland	0.5	Recreational space, closely mown with little floral diversity.	No
n/a	Hardstanding	0.2	Car park and access spaces to buildings	No
A3.1	Scattered trees	n/a	Broadleaved trees, predominantly lime with some ash. One bird's nest observed in a tree to the south.	No
C3.1	Tall Ruderal	0.05	Patches to north-east and south-east of site featuring nettles, sowthistle with some green alkanet.	No
A2	Introduced Shrub	0.01	Ornamental planting beds to south and north-west	No

Table 3: Summary of phase 1 habitats on site.

J 3.6 - Buildings

5.3.1 Two 20-storey buildings were present on site, Casterbridge (B1; Photo 1) and Snowman House (B2; Photo 2) connected by an elevated walkway bridge (Photo 3). B2 was also connected via a walkway bridge running south over the road (Photo 4). A small single storey outbuilding was located to the west of B2. The buildings and connecting walkway bridge will be retained as per current proposals and will not be affected by the development.

J 1.2 - Amenity Grassland

5.3.2 Much of the site was covered by amenity grassland (Photo 5) which served as recreational and play areas for residents. These areas were dominated by mown annual meadowgrass (*Poa annua*) and also featured mallow (*Malva sp.*) and white clover (*Trifolium repens*).

A 2- Introduced shrubs

5.3.3 Introduced shrubs were present around the southern and north-western borders of the site in planted beds (Photo 6). Species included: cotoneaster (*Cotoneaster sp.*); viburnum (*Viburnum davidii*); *Fatsia japonica*; yucca (*Yucca gloriosa*); privet (*Ligustrum* sp.) and snowberry (*Symphoricarpus albus*). These areas also included some native species such as rose (*Rosa spinosa*); gorse (*Ulex europaeus*); ground ivy (*Glechoma hederacea*); holly (*Ilex sp.*); herb robert (*Geranium robertianum*) and cherry laurel (*Prunus laurocerasus*).

Hardstanding

5.3.4 Harstanding covered much of the southern part of the site, which was taken up by access routes for the buildings as well as a car park. The walkway bridge between the two buildings was made of concrete.

A 3.1 - Scattered Trees

5.3.5 Tree species around the border and the grassland areas included lime (*Tilia cordata*); ash (*Fraxinus excelsior*); maple (*Acer sp.*); pear (*Pyrus communis*), young elder (*Sambucus nigra*) and a mature willow (*Salix sp*.) (Photo 7). A bird's nest was seen on a lime tree on the southern border of the site (TN1; Photo 8).

C 3.1 - Tall Ruderal

5.3.6 The south-eastern corner of the site featured tall ruderal vegetation featuring sowthistle (*Sonchus oleraceus*), bittercress (*Cardimine sp.*) and grasses (Photo 9). The north-eastern section featured nettles (*Urtica dioicea*) (Photo 10) with a small number of green alkanet (Pentaglottis sempervirens) interspersed.

5.4 Species

5.4.1 The below information will include a combination of desk study and field information. Value judgements will be included with regards to the species present or possibly present on site.

Amphibians

5.4.2 MAGIC (*magic.defra.co.uk*; accessed on 14th November 2019) does not show any ponds within 250m of the site.

5.4.3 No European Protected Species Mitigation licences (EPSM) have been issued for great crested newt (*Triturus cristatus*) within 2km of the site in the last 10 years.

5.4.4 The GIGL does not have any records of great crested newts (GCN) within 2km from the last 10 years. There are extensive records of common frog (*Rana temporaria*), with the most recent record being 430 metres away to the north in March 2019. Common toads (*Bufo bufo*) have been found 1.2km to the south-west in 2011 (most recent record), with one palmate newt found 1.8km to the north-west in 2009.

5.4.5 The site featured no ponds or areas of standing water. Much of the site was either buildings, hardstanding or amenity grassland. The areas of perennial vegetation and tall ruderal to the north-east and south-east could potential provide habitats for newts. Piles of cuttings or dead logs (TN2; Photo 11) located around the amenity grassland areas also would provide shelter. However, walls around the border and the road network surrounding it act as significant barriers to any dispersing animals, making it highly unlikely that GCN could access the site

5.4.6 The surrounding area is urban with commercial and residential dwellings, with no suitable habitats for GCN. The site is of negligible potential for this species.

Bats

5.4.7 There are five EPSM licences issued for bats within 2km of the site within the last 10 years. Two of the licences were issued in 2015, with the most recent located approximately 665 metres to the south-east. All five licences were issued for the destruction of resting places for common pipistrelles (*Pipistrellus pipistrellus*) whilst three of the five licences also including soprano pipistrelles (*Pipistrellus pygmaeus*).

5.4.8 A search of the GIGL database revealed extensive records of bats within 2km of the site from the last 10 years, with pipistrelles making up the majority of observations.

- Common pipistrelles recorded 1.4km away to the north-east in 2018 (most recent record).
- Soprano pipistrelles recorded 1.4km away to the north-east in 2018 (most recent record).
- Five Nathusius pipistrelle (*Pipistrellus nathusii*) recorded 1.6km away to the west in 2016 (closest record).
- Twenty records of noctules (*Nyctalus noctula*) recorded 1.9km away to the north (most recent record) in 2017.
- Six Leisler's bats (*Nyctalus leisleri*) were recorded 1.6km away to the north-west in 2019 (closest and most recent records).
- Four serotines (*Eptesicus serotinus*) were recorded approximately 1.6km away to the north-west (closest and most recent records).
- Two unidentified *Myotis* bats were recorded approximately 1.6km away to the north-west (closest and most recent records).

5.4.9 The full exterior of the buildings were not able to be sufficiently viewed from the ground even with binoculars, however there appeared to be no cracks or other features to support potential bat roosting opportunities on either B1 or B2, nor along the walkway. No bats or signs of bats were seen on any structure.

5.4.10 The mature willow tree to the north-east of the site had a superficial crack in the trunk. This however did not lead anywhere and did not provide adequate shelter for bats. None of the other trees showed any signs or potential of bat roosting opportunities.

5.4.11 The scattered trees around the site, and woodland 200 metres, 290 metres, 420 metres and 530 metres to the north offer potential foraging habitats for commuting bats. No bats or evidence of bats were found at the time of the survey.

5.4.12 Overall the buildings and site is of negligible potential for roosting bats.

Hazel Dormice

5.4.13 There are no EPSM licences for hazel dormouse (*Muscardinus avellanarius*) from the last 10 years within 2km of the site. No records of hazel dormice exist within a 2km radius of the site from the last 10 years.

5.4.14 The GIGL database did not have any records of hazel dormouse.

5.4.15 There were no hedgerows or woodland areas on-site that would provide foraging or nesting habitats for dormice, and no connectivity to suitable areas off-site. No evidence of hazel dormice was found on the site during the survey and it is highly unlikely that they will be found.

5.4.16 The site is considered to be of negligible potential for dormice.

Otter and Water Vole

5.4.17 The GIGL database did not have any records for water voles (*Arvicola amphibius*) or otters (*Lutra lutra*) within 2km of the site for the last 10 years.

5.4.18 There are no ditches or running water bodies anywhere on site, and as such is not suitable for these species.

5.4.19 The immediate surrounding area does not feature suitable habitats for this species and there are no pathways with which these species may access the site.

5.4.20 Overall the site is considered to be of negligible potential for otters and water voles.

Invertebrates

5.4.21 The GIGL database has records of invertebrate species such as stag beetles (*Lucanus cervus*), a Schedule 5 species, approximately 179 metres to the north-east in 2015 (closest record) and the jersey tiger moth (*Euplagia quadripunctaria*) approximately 1.4km to the south-east in 2017 (closest record). Most of the recent records of invertebrates are more than 10 years old.

5.4.22 The site has limited potential to support invertebrate species. Any found would be common and widespread to the area. One harlequin ladybird (*Harmonia axyridis*) was seen during the survey on a young elder plant.

Reptiles

5.4.23 Nineteen records of slow worm (*Anguis fragilis*) exist within 2km of the site within the last 10 years. The closest record being approximately 1.6km away in 2016. No other records of any other native reptile species exist on the GIGL database within the search area.

5.4.24 The hardstanding and amenity grassland areas are unsuitable for reptiles however the dead logs and cuttings piles would provide good hibernating, basking and foraging opportunities. The site as a whole is cut off from other more suitable areas by a network of roads, buildings and gardens. It is unlikely that reptiles would be able to access the site.

5.4.25 Overall, the site was of negligible potential for reptiles.

Birds

5.4.26 There are extensive records of bird species recorded within 2km of the site from the last 10 years. These include: little egret (*Egretta garzetta*) 465 metres to the south-west in 2014 (closest record); short-eared owl (*Asio flammeus*) 990 metres to the south in 2014 (closest record); dunnock (*Prunella modularis*) 1.8km to the east in 2017 (most recent record) and brambling (*Fringilla montifringilla*) 465 metres to the south-west in 2011 (closest record). 15 records of peregrine falcons (*Falco peregrinus*) were recorded, with the most recent record being in 2014.

5.4.27 The scattered trees around the site and bordering it provide potential roosting opportunities for nesting birds. An unoccupied bird's nest was seen on a lime tree in the south (TN1; Photo 8).

5.4.28 The roofs of the tower blocks were unable to be inspected however they may offer nesting opportunities for peregrine falcons, a Schedule 1 protected species. This species has been

slowly increasing in numbers in London, with urban nesting pairs preferring tall buildings. The tower blocks though will not be affected by the development and can be scoped out of further surveys.

5.4.29 Any bird species accessing the site from the wider area are likely to be common and widespread. Woodpigeon (*Columba palumbus*), house sparrow (*Passer domestsicus*) and a robin (*Erithacus rubecula*) were seen using the site during the survey.

5.4.30 The site provides good potential for nesting birds during the nesting season (March to September inclusive).

Badgers

5.4.31 The GIGL database has one record of a badger (*Meles meles*) from 2019 (location confidential).

5.4.32 No evidence of badgers (tracks, fur, latrines, setts) were found on-site at the time of the survey. There is some potential for badgers to access the site from the surrounding area but any such instances would be transitional. The amenity grassland areas could provide potential locations for badgers to build their setts, however there is little foraging potential on site.

White-clawed crayfish

5.4.33 The GIGL database has no records of white-clawed crayfish (*Austropotamobius pallipes*). The site is of negligible potential for white-clawed crayfish due to the lack of any running waterbodies.

Invasive plants

5.4.34 Green alkanet was discovered in the tall ruderal vegetation in the north-east of the site. This species is listed in Section 6 of the London Invasive Species Initiative (LSI) and the Non-Native Species Secretariat (NNSS).

Other protected/notable species

5.4.35 Hedgehogs (*Erinaceus europaeus*) were recorded in the surrounding area, with the most recent record being approximately 1.7km away to the west in 2017. There was limited foraging potential for habitats, with hibernating potential reduced to the piles of cuttings. With the walls around the site and the road network, it is unlikely that hedgehogs would be able to access the site.

6 Conclusions and Recommendations

6.1 General

6.1.1 The following section includes information regarding the ecological constraints and opportunities, recommendations for mitigation and any further survey works required.

6.1.2 Opportunities to enhance biodiversity have been noted below, and the '*mitigation hierarchy'* followed (BS 42020:2013) [1]. The *'mitigation hierarchy'* seeks first to avoid impacts, then mitigate unavoidable impacts, as a last resort compensation is recommended for unavoidable residual impacts (BS 42020:2013) [1].

6.1.3 Where further survey work is required, a calendar showing appropriate survey times can be viewed in Appendix 5. The calendar is in line with the BSI Standards Publication: *Biodiversity – Code of practice for planning and development (BS 42020:2013)*[1]*.* However, survey calendars should only be used as a guide. Seasonal windows vary throughout the UK and between years, so timings can be flexible in accordance with the advice from a competentecologist.

6.2 Designated sites

6.2.1 The development is not close to any sites of European or international significance, nor is it within any SSSI risk zones.

6.2.2 Due to the nature of the development, the "t John's Wood Church (1.48km "E), Adelaide (1.81km NW) and Westbere Copse (2km NE) LNRs are unlikely to see an increase in foot traffic. The habitat and species within these areas are unlikely to be affected by the development.

6.3 Habitats

6.3.1 The habitats present are currently of limited value for wildlife *e.g.*hardstanding, amenity grassland, tall ruderal. As far as possible, the habitats on site should continue to link to the habitats off site. This will help retain habitat corridors and landscape connectivity for a variety of species.

6.3.2 Where possible, mature trees should be retained and protected during construction in accordance with the advice of an arboriculturalist, and in line with the British Standards recommendations [7].

6.3.3 The proposed re-development provides an opportunity to enhance the ecological value of the site. It is recommended that locally appropriate, native flowering and fruiting shrubs, trees, and climbers that are beneficial to wildlife are included in the soft landscaping of the development (see Appendix 6).

6.3.4 Planting of climbers can be attached to sections of trellis on external walls of buildings, sections of fence and other walls and structures to increase the space available for wildlife. Climber planting should incorporate at least three species, such as: honeysuckle *Lonicera periclymenum*; ivy *Hedera helix*; common jasmine *Jasminum officinale*, golden hop *Humulus lupulus* 'Aureus' and old man's beard *Clematis vitalba*.

6.3.5 The use of native plant species is preferred within the soft landscaping scheme. If the use of non-native species is unavoidable, these can still be chosen for their wildlife benefit. For example, species such as lavender *Lavandula* sp, *Hebe* (especially late-autumn/winter flowering varieties such as 'Autumn Glory' and 'Great Orme'), and rosemary *Rosemarinus officinalis* provide good wildlife benefits. The 'H" '*Perfect for Pollinators'* label can be used as a useful guide when selecting non-native plants. Wildlife-friendly planting will provide a degree of compensatory habitat for any vegetation removed in addition to an ecological enhancement where high value habitats are included within the design scheme.

6.3.6 Where possible, "Greening the Grey" [8] initiatives should be taken into consideration. This can be achieved through such practices as the installation of green walls and green roofs to attract priority bird species such as black redstart (*Phoenicurus ochruros*).

6.3.7 Prior to planting, more detailed horticultural instructions should be referred to for each plant species selected. This will help to ensure that the planting scheme is suitably located and managed and thus will remain viable post-development.

6.4 Species

Key Recommendations

6.4.1 If protected species presence are identified during any of the below recommended surveys, further survey work and / or appropriate impact avoidance and mitigation measures may need to be incorporated into development scheme. For any European Protected Species (*e.g.* bats, and great crested newt), a licence may need to be obtained from Natural England prior to works being carried out.

Species/Habitats	**Recommendations for Further Survey**	**Timings**
Birds	If the works necessitate the removal of trees and large shrubs during the nesting season, a nesting bird check should be conducted no earlier than 48 hours prior to commencement of works. If any nests are encountered during tree removal, the works should stop and an ecologist contacted for advice.	March to September (inclusive).
	Prior to commencement of work a contractor RAMS must be checked by an ecologist.	Construction Phase
	Recommended Enhancements	**Timings**
Species/Habitats	Where possible, mature trees should be retained and protected during construction in accordance with the advice of an arboriculturalist, and in line	Design/Construction Phase

	with the British Standard: *'BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations* Planting of climbers can be attached to sections of trellis on external walls of buildings, sections of fence and other walls and structures to increase the space available for wildlife. Climber planting should incorporate at least three species, such as: honeysuckle (*Lonicera periclymenum*), ivy (*Hedera helix*), common jasmine (*Jasminum officinale*), golden hop (*Humulus lupulus 'Aureus*') and old man's beard (*Clematis vitalba*). Where non-native species are to be included within the soft landscaping scheme, these can also be chosen for their wildlife benefit. The '*RHS Perfect for Pollinators*' label can be used as a useful guide when selecting non-native plants. Wildlife-friendly plantings will provide a degree of compensatory habitat for any vegetation removed in addition to an ecological enhancement included within the design.	
Soft Landscaping	Two Schwegler 1B nest boxes with 26mm and 32mm entrances holes should be incorporated onto a mature tree. Face the box between north and east. Boxes should be placed facing north or north-west at a height of 4m-7m.	Post-construction
Bats	A Schwegler 2FR (or any similar) bat box is recommended to be added to the newly developed building to provide roosting opportunities for crevice-dwelling bat species. The box should be placed between 3 to 6 metres up, facing in a south or south-easterly direction. Lighting advice given in Appendix 7 should be followed to ensure that it is only directed at intended areas and not to interrupt or impinge on any foraging or commuting bat activity.	Post-construction

Table 4: Summary of recommendations and enhancements for protected species.

Amphibians

6.4.2 There are no ponds or waterbodies on site, or within 250m of the site. The site would not support the terrestrial phases of GCN and as a result no further surveys are necessary. If any

GCN are encountered at any time during the construction phase, the work should stop and an ecologist contacted for advice.

Bats

6.4.3 The exterior of the buildings showed them to be generally well maintained with no visible gaps or cracks on the walls. A willow tree on site showed a superficial crack which would not provide bat roosting potential as there was no access into the interior. No bats or signs of bats were seen at the time of the survey. No further surveys are necessary.

6.4.4 The surrounding area provides some foraging habitats for commuting bats, which could be affected by increased light and noise pollution from construction activities. However this is likely to be localised and temporary (BCT/ILE 2009) [9]. Any lighting on the site associated with the development should be directed downwards to where it is needed, with hoods, cowls, louvres, or shields used to direct the light to the intended area only. Measures to reduce the impacts of lighting need particular consideration with respect to areas where trees have been found to have bat potential or near foraging and commuting areas such as; hedgerows, woodland and boundary flowing drains. Further lighting advice can be found in Appendix7.

6.4.5 Lighting plans proposed by Norman Bromley Partnership LLP[12] show lux levels of between 5 to 10 lux across the majority of the site. However, lux levels of below 3 are anticipated for the trees that border the site. The site contains limited foraging opportunities for bats, and the existing trees bordering it would offer commuting and foraging routes for common bat species. The comparatively low levels of lighting falling on these areas are unlikely to have significantly adverse effects on any commuting or foraging bat activity.

6.4.6 There is potential for enhancement for bats within the new development. It is recommended than an integrated bat box (e.g. Schwegler 2FR (https://www.nhbs.com/2fr-schwegler-bat-tube) should be incorporated into the exterior of the new building to provide roosting opportunities for crevice-dwelling specie such as pipistrelles (*Pipistrellus sp.*) that typically inhabit buildings. The box should be placed between 3 to 6 metres high, facing south or south-east. Integrated bat boxes can be built into the brickwork. Bat boxes added to trees should be placed near vegetation sections, high enough to provide protection from cats and other terrestrial wildlife.

Hazel dormice

6.4.7 There are no suitable foraging or nesting habitats for hazel dormice on-site. There is no connectivity to any suitable areas off-site.

6.4.8 No further surveys for hazel dormice are necessary.

Otters and Water voles

6.4.9 The site does not contain any areas of running water, there are no suitable pathways by which these species may access the site. The site is negligible for otters and water voles; no further surveys are necessary.

Invertebrates

6.4.10 No invertebrates protected by the Conservation of Habitats and Species Regulations 2017, under schedule 5 of the Wildlife and Countryside Act 1981 (as amended), or classified as

Species of Principal Importance in England under section 41 of the Natural Environment and Rural Communities Act 2006 were observed during the site visit.

6.4.11 The habitats on site would indicate common and widespread invertebrates are likely to be present on site. As a result, no detailed invertebrate surveys are necessary.

6.4.12 Including soft landscaping to comprise native or wildlife-friendly planting (as above), e.g. with nectar-rich flowers will be attractive to a range of invertebrate species (e.g. bees and butterflies).

Reptiles

6.4.13 Reptile foraging, sheltering and basking habitats are limited to the cuttings and dead logs around the site (TN2). No reptiles or signs of reptiles were seen at the time of the survey and are unlikely to be able to access the site given the road network surrounding it. The development is focused on the eastern part of the site and as such the areas with the cuttings and logs are to be left undisturbed. If any logs are to be removed, this should be done with care. If any reptiles are found, then work should stop and an ecologist contacted for advice. No further surveys are necessary.

Birds

6.4.14 One nest was observed on a lime tree in the south of the site. However this did not appear to be in use at the time. The site in general had trees which provide potential nesting habitats for birds.

6.4.15 The tree containing the birds nest is not recommended for removal as part of the plans. Should any tree or large shrub require removal or crown reductions during the bird nesting season (March to September inclusive), then a nesting bird check would be required by a suitably experienced ecologist. This should be done at most, 48 hours prior to the commencement of the works. Should the removal of trees take place outside the nesting season (October to February), then no further surveys are necessary. Any active nests found during the construction phase will require the works to stop and an ecologist contacted for advice.

6.4.16 In order to provide ecological enhancement for bird, it is recommended that bird boxes be incorporated into the design either onto the new building or onto a mature tree nearby. Two Schwegler 1B nest boxes (https://www.nhbs.com/1b-schwegler-nest-box)* with 26mm and 32mm holes. The boxes should be placed on the site at a height of approximately 4-7m in a sheltered location facing a north or east-facing direction near vegetation to attack more birds. The higher end of the height range should be chosen in order to keep the box away from cats and other terrestrial predators. The boxes should not be exposed to wind/exposed locations and not placed near street lights. Standalone boxes should be tilted slightly downwards to reduce issues with driving rain.

Badgers

6.4.17 If any badger setts are discovered within 30m of the site, or badgers are found to be using the site regularly for foraging, then there is potential for the proposed scheme to impact upon this species and an impact avoidance/mitigation strategy should be devised. If any active badger setts are found within the footprint for the proposed works and these cannot be retained and protected, it will be necessary to apply to Natural England for a licence to close said sett(s).

6.4.18 There were no large mammal burrows or badger signs such as latrines, track marks or fur found during the walkover. There is a chance that badgers may access the site from the surrounding area but such instances are only likely to be transitional as it does not offer any foraging opportunities.

6.4.19 No further surveys for badgers are necessary.

Invasive plants

6.4.20 Japanese knotweed (*Fallopia japonica*) was recorded approximately 1.9km to the south-east in 2014 in Regents Park (most recent record), whilst giant hogweed (*Heracleum mantegazzianum*) was recorded approximately 1.64km away to the south-east in 2009 (most recent record). Himalayan balsam (*Impatiens glandulifera*) was found 1.24km to the north-west in 2010. These species are listed under Schedule 9 of the Wildlife and countryside Act 1981 (as amended).

6.4.21 Green alkanet, an invasive species as per the LSI and NNSS should be removed as part of vegetation clearance works. This can be done manually by hand, making sure to remove roots and any seedlings and disposed of as controlled waste. The "*Check, Clean, Dry*" method (http://www.nonnativespecies.org//checkcleandry/biosecurity-for-everyone.cfm) as set out by the NNSS pertaining to bio-security and prevention should be followed.

Other legally protected/notable species

6.4.22 European hedgehogs (*Erinaceus europaeus*) are listed under Section 41 of the Natural Environment and Rural Communities Act 2006 (NERC). The UK population has been in decline over recent years. Hedgehogs will commonly be found in urban environments though are unlike to be able to access the site. No further surveys are necessary.

7 References

[1] British Standards Institute (2013). *Biodiversity- code of practice for planning and development*. BS 42020:2013

[2] CIEEM (2017). *Guidelines for Preliminary Ecological Appraisal 2nd Edition*. Chartered Institute of Ecological and Environmental Management, Winchester

[3] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Chartered Institute of Ecology and Environmental Management, Winchester.

[4] European Commission (2011). *Our Life Insurance, Our Natural Capital: an EU Biodiversity Strategy to 2020*. European Commission. COM/2011/0244 final.

[5] Collins, J. (2016) *Bat surveys for Professional Ecologists: Good Practice Guidelines 3rd edition. The* Bat Conservation Trust, London.

[6] Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey - a Technique for Environmental Audit.* Reprinted by JNCC, Peterborough.

[7] British Standards Institute (2012). *Trees in relation to design, demolition and construction – Recommendations*. BS 5837:2012.

[8] Naylor, L.A., Kippen, H., Coombes., M.A., et. al, (2017). *Greening the Grey: a framework for integrated green grey infrastructure (IGGI)*. University of Glasgow report. URL http://eprints.gla.ac.uk/150672/. Accessed on 12th December 2019.

[9] Bat Conservation Trust/Institute of Lighting Engineers (2009) *Bats and Lighting in the UK: Bats and the Built Environment Series*

[10] Gunnell, K., Grant, G., Williams, C. (2012) Landscape and urban design for bats and biodiversity. Bat Conservation Trust.

[11] Norman Bromley Partnership LL. (2020). *Abbey Road Phase 2 Proposed External Lighting*. Rev 1. 18th May 2020.

Websites

Natural England's MAGIC www.magic.defra.gov.uk

Appendix 1: Photographs

Photo 1: B1 (Casterbridge), a 20-storey flat roof brick building

Photo 2: B2 (Snowman House).

Photo 3: Elevated walkway separating B1 (right) and B2 (left).

Photo 4: Walkway between B2 and Phase 3 of developments over B507 road

Photo 5: Amenity grassland

Photo 6: Introduced shrubs on southern border

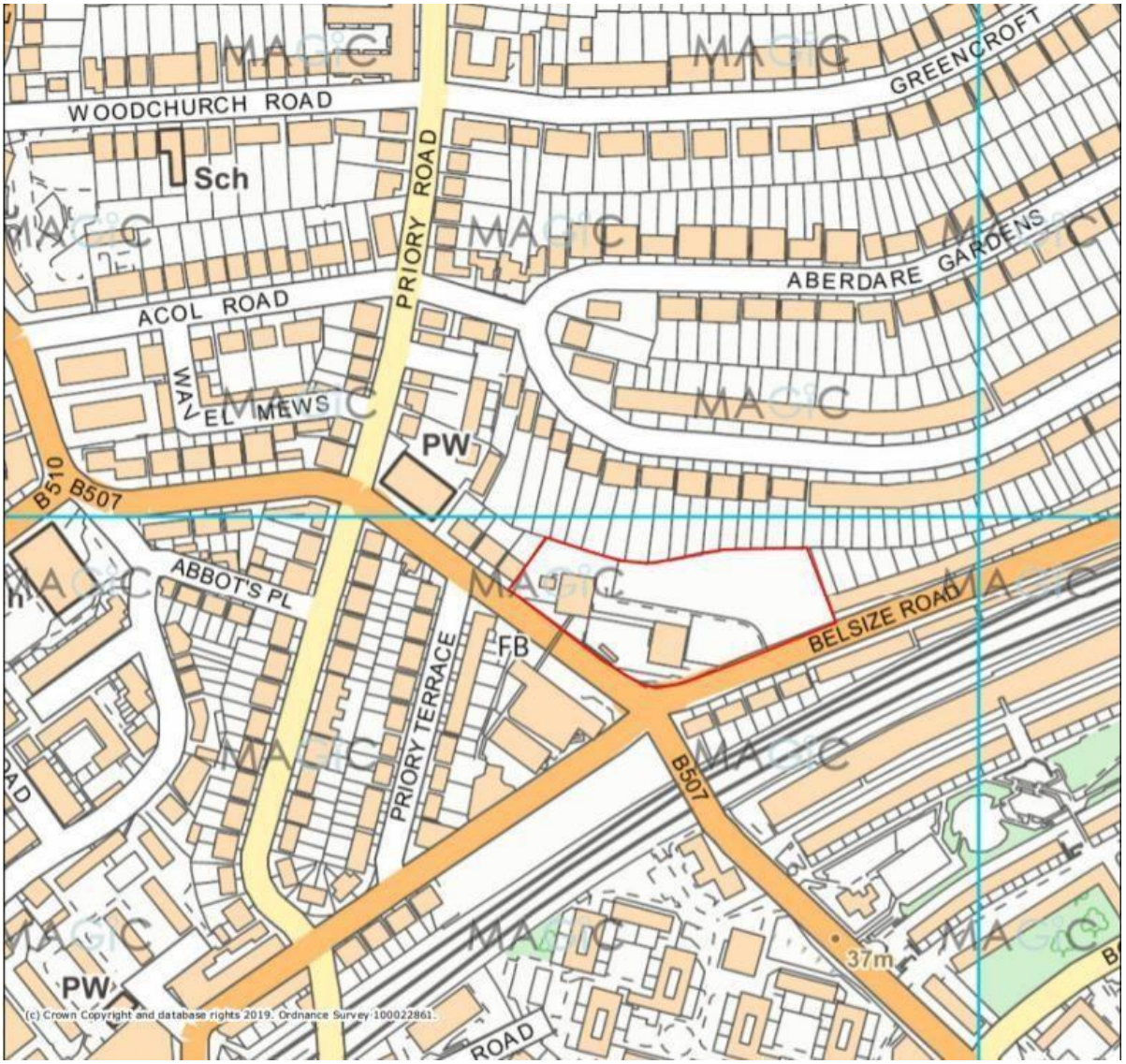
Photo 7: Mature willow tree

Photo 8: Bird's nest in tree (TN1).

Photo 9: Tall ruderal vegetation to south-east

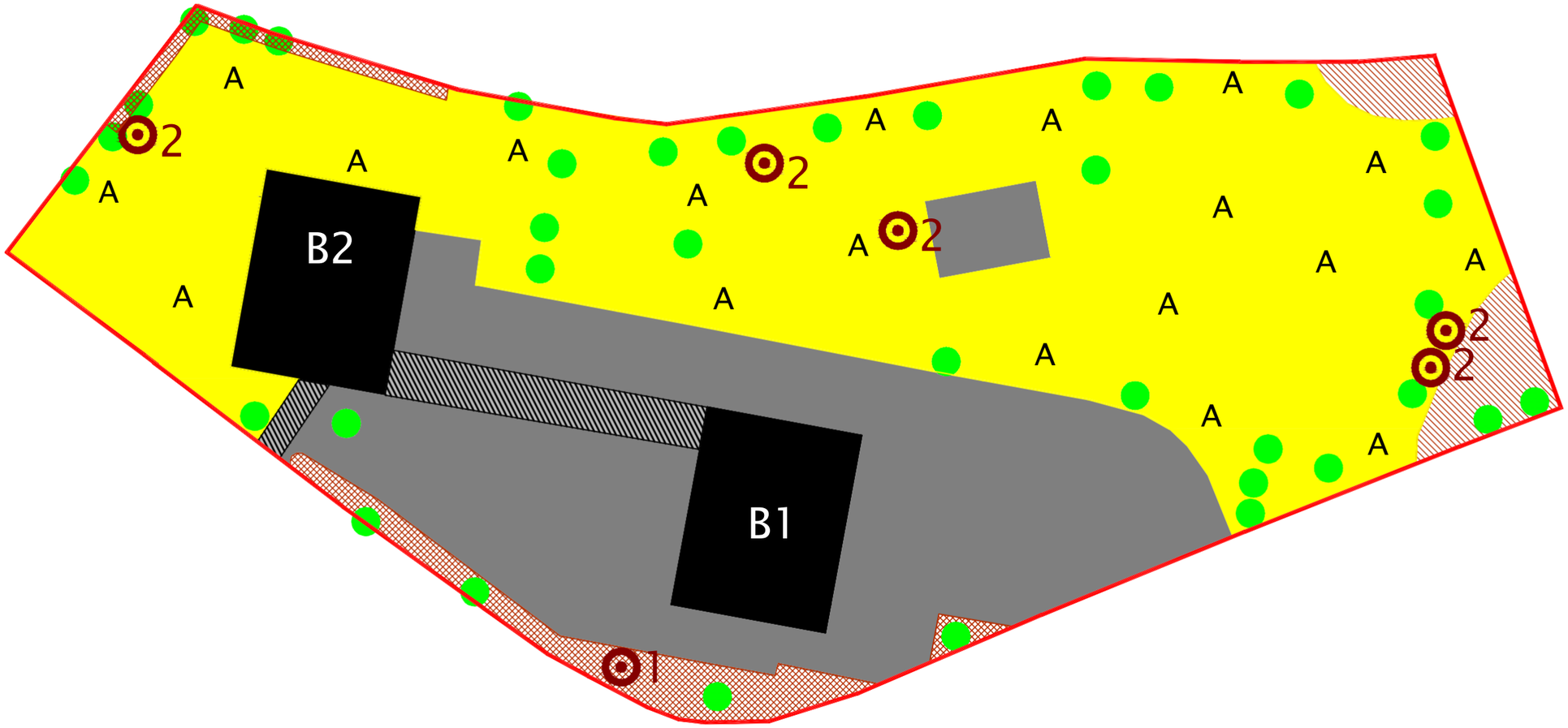
Photo 10: Tall ruderal vegetation to the north-east feturing green alkanet and patches of bare ground.

Appendix 2: Location Plan



(accessed on magic.degra.gov.uk on 15th November 2019)

Appendix 3: Habitat Plan



A Amenity Grassland

Scattered Trees

Tall Ruderal

Introduced Shrub

Walkway

Buildings

Hardstanding

Site Boundary

2 Target Note

D F Clark

Bionomique Ltd

Andrews Farm
Burnham Road
Althorne
Chelmsford
Essex
CM3 6DS
Tel 01621838196
www.dfclark.co.uk

Wates

November 2019
Date

NTS
Scale

Abbey Road Phase 2

DFCP 4399
Drawing number

–
Revision

Phase 1 Habitat Plan

AH
Drawn

MJ
Authorised

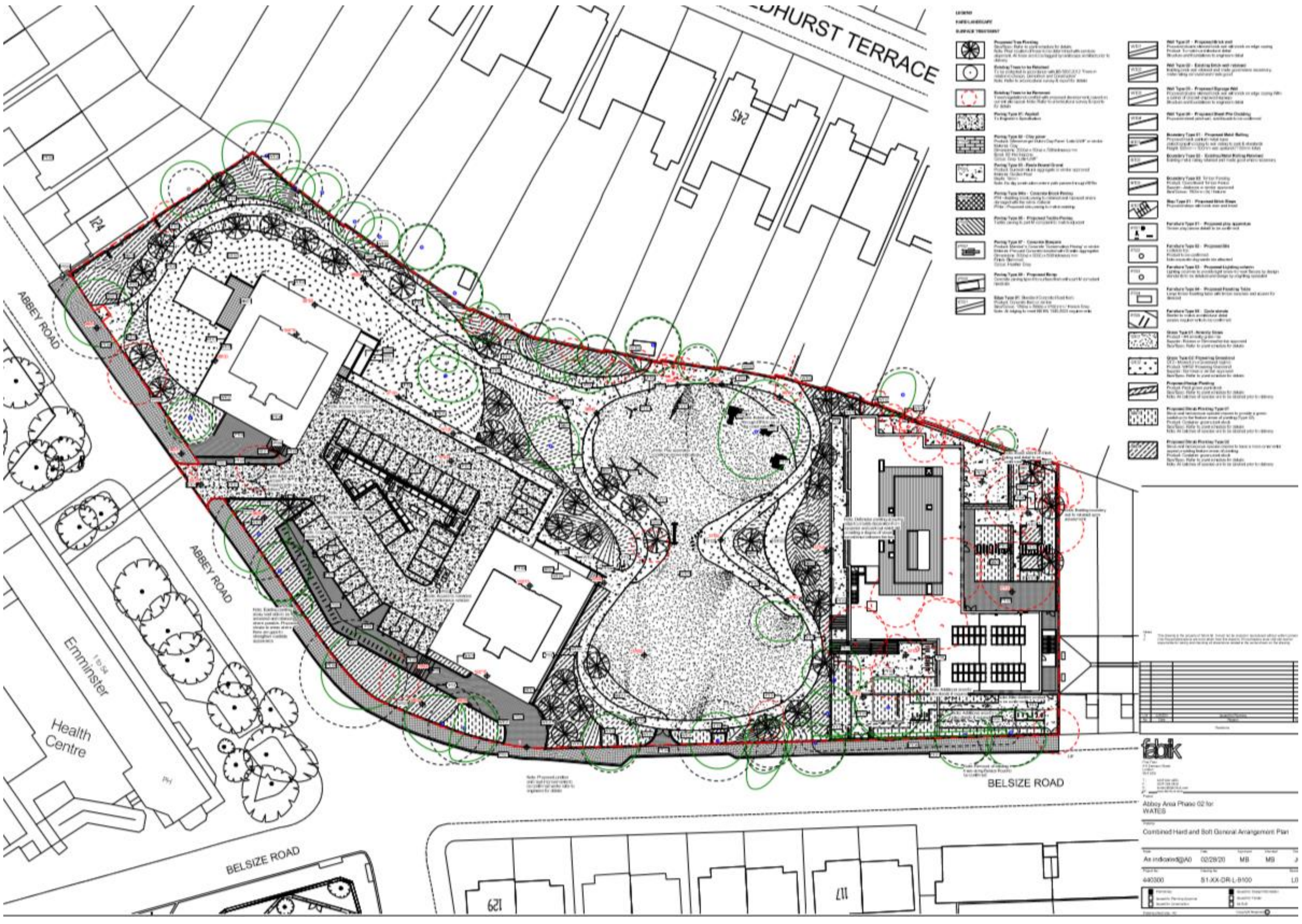
North
Orientation

Information
Drawing status

Notes

1. Do not scale from this drawing
2. Contractors must check all dimensions on site
3. Any discrepancies must be reported to the Landscape Architect before proceeding
4. This drawing is copyright D F Clark Ltd 2015
5. The original of this drawing was produced in colour a monochrome copy should not be relied upon.

Appendix 4: Proposed Development Plan


245
124
ABBEY ROAD
ABBEY ROAD
Emminster
Health Centre
BELSIZE ROAD
BELSIZE ROAD
129
117
LEGEND
HARD LANDSCAPE
SURFACE TREATMENT
fabrik
Abbey Area Phase 02 for
WATES
Combined Hard and Soft General Arrangement Plan
As indicated@A0
02/28/20
MB
MB
4493300
S1-XX-DR-L-B100

Appendix 5: Survey Calendar

Surveys not possible	Limited survey period	Optimal survey period

Habitats/ Vegetation

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Phase I (sub-optimal) No other detailed plant surveys Mosses and lichens only			Detailed habitat assessment surveys National Vegetation Classification Surveys for higher plants and ferns Mosses and lichens in April, May and September only						Phase I (sub-optimal) No other detailed plant surveys Mosses and lichens only		

Badgers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limited sett/bait surveys	Limited Activity			Limited bait marking and sett surveys				Sett surveys			Limited sett/bait surveys

Bats

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inspection of hibernation, tree and building roosts			Limited Activity	Summer roost emergence and activity surveys (Maternity roosts start to form in May, females give birth in June, Mating starts in September)					Limited Activity	Inspection of hibernation, tree and building roosts	

Note: Potential roost and internal inspection surveys are possible all year round. Trees are best surveyed in winter.

Birds

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Winter species		Breeding birds/migrants species		Breeding birds		Low activity		Migrant species		Winter species	

Dorm ice

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gnawed hazelnut search (sub-optimal)		Nest tube / cage trap survey from April to November Nest searches (optimum time September to March)						Gnawed hazelnut search (optimum November to December)			

Great Crested Newts

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Newts hibernating		Pond surveys for adults / Terrestrial surveys / Egg surveys April to mid-June / Larvae surveys from mid-May				Terrestrial habitat and larvae surveys		Terrestrial habitat survey		Newts hibernating	

Freshwater Pear l Mussel

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surveys not possible			Optimal survey period							Surveys not possible	

Fish

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
For coastal, river and stream dwelling species, the timing of the surveys will depend on the migration pattern of the species concerned. Where surveys require information on breeding, the timing of surveys will need to coincide with the breeding period, which may be summer or winter months, depending on the											

Natterjack Toad

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hibernating			Surveys of breeding ponds for adults. Surveys for tadpoles from May onwards Surveys for adults on land.					Surveys for adults on land		Hibernating	

Otters

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limited by vegetation cover and weather conditions rather than seasons											

Pine Martins

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surveys may be conducted all year round weather permitting. Optimum time is spring and summer. Surveys for breeding dens from March to May.											

Red Squirrel

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surveys may be conducted all year round weather permitting. Optimum time is spring and summer. Surveys for breeding females from December to September.											

Reptiles

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Reptiles hibernating		Peak survey months are April and May				Reduced basking time reduces effectiveness of refugia survey		Peak survey month	Limited activity	Reptiles hibernating	

Water Voles

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low activity	Initial habitat survey	Habitat and field signs / activity surveys May be limited by vegetation cover and weather								Initial habitat survey	Low activity

White- clawed Crayfish

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Reduced activity			Searching Torching Trapping	Breeding torchlight survey only (no handling due to females releasing their young)		Substrate search by hand Torchlight and trapping surveys				Reduced activity	

Surveys not possible	Limited survey period	Optimal survey period

Note: This survey calendar should be used as a reference guide only with advice being sought from a qualified ecologist as site and project specific circumstances may alter seasonal windows

Appendix 6: Native Planting Options

Trees and Shrubs

All of the plants recommended below are of recognized benefit to wildlife. This may be via the production of nectar for insects, berries and seeds for birds and mammals, foliage to support a range of insects, early flowering to provide an early source of nectar for insects, or provision of nesting, roosting and overwintering cover for a range of wildlife.

Climbers

Walls and fences provide a surface upon which a variety of plants can thrive, and provide alternative habitat for roosting, nesting and feeding. The species highlighted below are native or recommended by wildlife organizations. Some are evergreen, and will cover an unsightly wall or fence, softening the appearance of a new development.

Wildflowers

Native wildflower mixes (if applicable) can also provide a large number of additional species and can be found for a variety of meadow soils as well as woodland glades, woodland edges, hedgerows and ponds. The species listed in such mixes can also be used separately within any planting scheme. Removing the topsoil in fertile areas or over time regular mowing and removal grass cuttings reduces the vigour of grasses that compete with wildflowers. Always leave an area of grassland unmown preferably one third in a rotational cut to provide for wildlife.

NATIVE TREES	
Acer campestre	Field maple
Alnus glutinosa	Alder
Betula pendula	Silver birch
Betula pubescens	Downy birch
Buxus sempervirens	Box
Calluna vulgaris	Heather
Castanea sativa	Sweet chestnut
Carpinus betulus	Hornbeam
Chaenomeles spp.	Quince
Cornus sanguinea	Dogwood
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Crataegus oxyacantha	Midland hawthorn
Cytisus scoparius	Broom
Erica cinerea	Bell heather
Erica tetralix	Cross leaved heather
Euonymus europaeus	Spindle
Fagus sylvatica	Beech
Frangula alnus	Alder buckthorn
Hypericum androsaemum	Tutsan
Hypericum calycinum	"t John's Wort
Ilex aquifolium	Holly
Juniperus communis	Juniper
Larix decidua	European Larch
Ligustrum vulgare	Privet
Malus domestica	Apple
Pinus sylvestris	Scots pine
Populus alba	White poplar
Populus nigra	Black poplar
Potentilla fruticosa	Shrubby cinquefoil
Prunus avium	Wild cherry
Prunus domestica	Wild plum
Prunus padas	Bird cherry
Prunus spinosa	Blackthorn
Pyrus communis	Pear
Pyrus pyraster	Wild pear
Quercus spp	Oaks
Rosa arvensis	Field rose
Rosa rubiginosa	Sweet briar
Rosa spinosissima	Burnet rose
Rhamnus catharticus	Buckthorn
Rubus idaeus	Raspberry
Salix caprea, S.cinerea, S.fragilis, S.pentandra	Willows
Sambucus nigra	Elder
Sorbus aucuparia	Rowan
Sorbus aria	Whitebeam
Sorbus torminalis	Wild Service Tree
Taxus baccata	Yew
Tilia europaea	Lime
Ulex europaeus	Gorse
Ulmus procera	English Elm
Viburnum opulus	Guelder Rose

NATIVE CLIMBERS	
Hedera helix	Ivy
Lonicera periclymenum	Honeysuckle

Native Wildflowers	
Wet & Damp Areas	
Fritillaria meleagris	Fritillary
Caltha palustris	Marsh marigold
Cardamine pratensis	Lady's smock
Lychnis flos-cuculi	Ragged robin
Lotus pedunculatus	Greater birdsfoot trefoil
Succisa pratensis	Devils bit scabious
Hypericum perforatum	Perforate St John's Wort
Heavy Clay Soils	
Leontodon hispidus	Rough hawkbit
Rumex acetosa	Common sorrel
Geranium pratense	Meadow cranesbill
Centaurea nigra	Common knapweed
Centaurea scabiosa	Greater knapweed
Ononis spinosa	Spiny restharrow
Moist Soils	
Lotus corniculatus	Common birdsfoot trefoil
Ajuga reptans	Bugle
Sanguisorba minor	Salad burnet
Ranunculus acris	Meadow buttercup
Silene latifolia	White campion
Trifolium pratense	Red clover
Primula veris	Cowslip
Leucanthemum vulgare	Oxeye daisy
Medicago lupulina	Black medick
Rhinanthus minor	Yellow rattle
Anthyllis vulneraria	Kidney vetch
Galium verum	Lady's bedstraw
Daucus carota	Wild carrot
Knautia arvensis	Field scabious
Prunella vulgaris	Selfheal
Vicia cracca	Tufted vetch
Lathyrus pratensis	Meadow vetchling
Achillea millefolium	Yarrow
Light Sandy Soils	
Myosotis arvensis	Field forget-me-not
Trifolium dubium	Lesser trefoil
Campanula rotundifolia	Harebell
Hypericum perforatum	Perforate St Johns Wort
	= Early Flowering
	= Late Flowering

Appendix 7: Lighting for Bats

Lighting Recommendations

Most bat species find artificial lighting very disturbing as they are adapted to low light conditions (Gunnell *et al.,* 2012). To avoid increasing predation risk and loss of suitable roosting, foraging and commuting habitats for bats, both on and immediately adjacent to the site, consider the following lighting recommendations [10]

- Reduce light intensity as far as possible. Light levels post-development should be considered in the context of light levels pre-development. Use the minimum amount of lighting for safety and minimise light spill. Eliminate bare bulbs and upward pointing light. It is recommended that artificial lighting does not directly illuminate any features or habitats of value to foraging bats such as hedgerows or treelines, waterbodies etc. Bat roosting sites should not be lit.

- Where appropriate, use lighting design software and professional lighting designers to predict light spill. Post-installation checks ensure the lighting installation is in accordance with the design and predictions were accurate, and mitigations successful.

- Limit the height of lighting columns. Occasionally a higher lighting column may be preferred to reduce horizontal spill or number of columns required.

- Use as steep a downward angle of light as possible and/or use a shield, hood, cowl, louvre that directs the light below the horizontal plane. Avoid lighting above 90° and 100° (*e.g.* with horizontal cut off units) and keep ideally under 70° above the horizontal. Directional accessories can be installed post-installation as a last resort to reduce light spill.

- Planting (e.g. hedgerows/trees) can minimise light spill, or man-made features can block light from certain directions. The effectiveness will depend on pre-development light surveys/modelling to understand the extent and level of light around the site. Use temporary close boarded fencing until vegetation matures to shield sensitive areas from lighting.

- Limit the times lights are on to provide dark periods using modern lighting control methods e.g. during peak bat activity periods (0 to 1.5 hours after sunset and 1.5 hours before sunrise) where this does not conflict with health and safety and security requirements.

- Use narrow spectrum light sources to lower the range of species affected by lighting and light sources should emit minimal ultra-violet (UV) light. Metal halide or mercury light sources emit high UV light. Low pressure sodium lights are a preferred option to high pressure sodium or mercury lamps.

- Avoid white and blue wavelengths. Warm-white wavelength lights are a good alternative (ideally <2700Kelvin). White LED lights do not emit UV but can affect bats. LED lamps allow for directional lighting and most luminaires are full cut-off. Lights should peak at over 550nm or use glass lantern covers to filter UV light. Further, altering the spacing between luminaires can allow for dark areas and reduce the impacts on bats.

- Lighting required for security/safety should use sensor activated lamps of no more than 2000 lumens (150 Watts). Low wattage lamps are preferable (<70W). '*Variable aim'* luminaires can allow the angle of the beam to be altered to reduce impacts. Security lighting should be set on motion sensors and short (1 minute) timers.

- Lighting for pedestrians should be low level, directional and below 3 lux at ground level (preferably below 1 lux).

- Glazing should be restricted or redesigned wherever the ecologist and lighting professional determine there is a likely significant effect upon key bat habitat and features. Where windows and glass facades etc. cannot be avoided, low transmission glazing treatments may be suitable to achieve reduced illuminance targets. Products available include: retrofit window films and factory tinted glazing. '"smart glass' can be set to automatically obscure on a timer during the hours of darkness, and automatic blinds can also be used.

- Use asymmetric beam floodlights, orientated so the glass is parallel to the ground to avoid horizontal spill. See http://www.nationaltrust.org.uk/main/w-bat05_events.pdf for further information.