

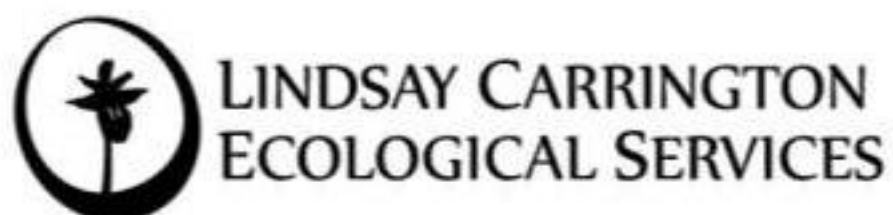


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ECOLOGICAL SERVICES

ECOLOGICAL APPRAISAL AND PHASE 2 SURVEYS
TOWNPARK
BEREWOOD
WATERLOOVILLE
HAMPSHIRE
PO7 7PS

OCTOBER 2018
UPDATED NOVEMBER 2018

ON BEHALF OF GRAINGER PLC



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SUMMARY

1. Lindsay Carrington Ecological Services Limited were commissioned by Grainger Plc to conduct an ecological appraisal of the Town Park land at Berewood, Waterloooville, PO7 7PS (Grid Ref: SU 6748 0889).
2. Berewood (Havant Borough Council planning ref: APP/10/00828/ Winchester City Council planning ref: 10/02862/OUT) is a large multi-phased development. This report presents current information for the works associated with construction of the Town Park. A site location plan for this phase of the development is provided in appendix I.
3. An ecological appraisal is essentially a multi-disciplinary walk-over survey and was conducted with the objective of identifying any ecological constraints associated with the proposals such as the site's potential to support any legally protected species or habitats of high nature conservation value.
4. The site comprises areas of semi-improved grassland, scrub, tall ruderal, a pond and stream. There are a number of species-rich native hedgerows with dry ditches which mark the field boundaries.
5. There are species-rich native hedgerows on site within the application boundary. They may qualify as 'Important' under the Hedgerow Regulations 1997 and therefore further recommendations have been provided in section 5.1.
6. Badger setts were recorded within the dense scrub on the site with latrines recorded along the western boundary. The site provides potential foraging habitat and further recommendations are provided in section 5.2.
7. Activity transects across the site recorded the site as being of local importance for bats with areas along the southern boundary and around the woodland being of particular importance. Further recommendations are provided in section 5.2.
8. Suitable terrestrial habitat for great crested newts is present on site and great crested newts have been recorded in the area with all confirmed great crested newt ponds over 500 metres from the site. The pond on site was eDNA tested for great crested newt presence with results showing this species is absent. No further action is required.
9. The scrub, hedgerows and semi-improved grassland on site provided potential nesting habitat for birds. The fields provide limited potential habitat for overwintering birds. Further recommendations are provided in section 5.3.
10. The scrub on site provides suitable habitat for dormice. As scrub is likely to require clearance a non-licensed method statement has been put in place which has been agreed with Natural England. Further details are provided in section 5.4.

11. The semi-improved grassland, scrub, hedgerows and ditches on site all provided suitable areas of habitat for common reptile species such as slow worm, grass snake and common lizard which have been recorded on the wider site previously. Update surveys of the site recorded a good population of slow worm on the site. Further recommendations are provided in section 5.5.
12. Recommendations to enhance the ecological value of the site are outlined in section 5.6.

1.0 INTRODUCTION

Lindsay Carrington Ecological Services Limited were commissioned by Grainger Plc to conduct an ecological appraisal of the Town Park land at Berewood, Waterloooville, PO7 7PS (Grid Ref: SU 6748 0889).

Berewood, Waterloooville (Havant Borough Council planning ref: APP/10/00828/ Winchester City Council planning ref: 10/02862/OUT) is a large multi-phased development. This report presents current information for the works associated with construction of the Town Park. A site location plan for this phase of the development is provided in appendix I. This area of the site is currently partially under construction and therefore the site has changed significantly during the course of the survey work.

An ecological appraisal is essentially a multi-disciplinary walk-over survey and was conducted with the objective of identifying any ecological constraints associated with the proposals such as the site's potential to support any legally protected species or habitats of high nature conservation value.

Section 2 of the report provides some background information on legislative requirements and relevant policy. Section 3 details the methodologies adopted for the ecological surveys that were conducted and section 4 provides an account of the survey results. Section 5 provides information on the relevance of the results to the proposed development and makes recommendations for measures to mitigate and compensate for the effects on a particular habitat or species.

2.0 LEGISLATION AND POLICY

2.1 Legislation

The following legislation may be of relevance to the proposed works. Full details of statutory obligations with respect to biodiversity and the planning system can be found in DCLG Circular 06/2005.

- **The Conservation of Habitats and Species Regulations 2017:**
This transposes the EU Habitats Directive (Council Directive 92/43/EEC) into domestic law. The Regulations provide protection for a number of species including:
 - All species of bat;
 - Dormouse;
 - Otter; and
 - Great crested newt.

This legislation makes it an offence to deliberately capture, kill or injure individuals of these species listed on Schedule 2 and damage or destroy their breeding site or place of shelter. It is also illegal to deliberately disturb these species in such a way as to be likely to significantly affect: (i) the ability of any significant group of the species to survive, breed or rear or nurture their young; or (ii) the local distribution or abundance of the species¹;

This legal protection means that where development has the potential to impact on bats, or other European protected species, the results of a protected species survey must be submitted with a planning application.

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are also protected under this legislation. These are a network of sites designated for supporting habitats or species of high nature conservation importance in the European context. Any activity that has a detrimental effect on these European sites is made an offence under the Regulations. Where a development is likely to have a significant impact on a European site, the Regulations require a rigorous assessment of the impacts, known as an Appropriate Assessment.

¹ The *Conservation of Habitats and Species Regulations 2017* consolidates the numerous amendments that were made to the *Conservation (Natural Habitats, &c.) Regulations 1994*. Of particular relevance are amendments made in August 2007 and January 2009 which increased the threshold of illegal levels of disturbance to European Protected Species (EPS). An offence is only committed if the deliberate disturbance would result in significant impacts to the EPS population. However, it should be noted that activities that cause low levels of disturbance to these species continue to constitute an offence under *Section 9 of the Wildlife and Countryside Act (1981)*.

- **The Wildlife and Countryside Act 1981 (and amendments):** Protected fauna and flora are listed under Schedules 1, 5 & 8 of the Act. Species likely to be of relevance include:
 - All species of **bat**. It is an offence to intentionally or recklessly disturb any bat whilst it is occupying a roost or to intentionally or recklessly obstruct access to a bat roost;
 - All species of British **reptile** (in particular grass snake, common lizard, adder and slow-worm). It is illegal to kill or injure these species; and
 - **Great crested newt**. It is illegal to obstruct access to any structure or place which great crested newts use for shelter or protection or to disturb any great crested newt while it is using such a place.
 - **Water vole**. It is an offence to intentionally kill, injure or take water vole, intentionally or recklessly damage, destroy, obstruct access to water vole burrows or disturb them whilst in a burrow.

This Act also makes it an offence to intentionally kill, injure or take any wild bird or to take, damage or destroy their eggs and nests (whilst in use or being built). In addition, it is an offence to disturb any nesting bird listed on Schedule 1 or their young.

Schedule 9 of the Act lists those species for which it is an offence to cause their spread. Schedule 9 species that are most likely to be encountered are Japanese knotweed (*Fallopia japonica*) and New Zealand pigmyweed (*Crassula helmsii*).

Sites of Special Scientific Interest (SSSIs) are also protected under the Wildlife and Countryside Act 1981. These are a network of sites identified as being of national nature conservation importance and hence afforded legal protection.

- **The Countryside and Rights of Way Act 2000:** This Act strengthens nature conservation and wildlife protection. It places a duty on Government Ministers and Departments to conserve biological diversity, provides police with stronger powers relating to wildlife crimes, and improves protection and management of SSSIs.
- **The Protection of Badgers Act 1992:** This Act makes it an offence to wilfully take, injure or kill a badger (*Meles meles*); cruelly mistreat a badger; interfere with badger setts. A licence is required for work which may damage or disturb a sett.
- **Wild Mammals (Protection) Act 1996:** This Act provides protection for all wild animals from intentional acts of cruelty.
- **Hedgerow Regulations 1997:** These Regulations establish a set of criteria for assessing the importance of hedgerows. Where a hedgerow is deemed to be

‘important’ its removal is prohibited without consent from the local Planning Authority

2.2 Policy

The following policy is of relevance to the proposed works:

- **National Planning Policy Framework (NPPF):** This sets out the Government’s vision for biodiversity in England with the broad aim that planning, construction, development and regeneration should maintain and enhance, restore or add to biodiversity and geological conservation interests. NPPF includes information on legally protected species and sites in section 15(2) (see section 2.1).
- **Local Sites (including Sites of Nature Conservation Interest (SNCIs), Local Nature Reserves (LNR), and Biological Notification Sites (BNSs)/County Wildlife Sites (CWSs):** These are a network of sites designated for their nature conservation importance in a local context. Although they are not afforded legal protection they contribute towards local and national biodiversity. Where such development is permitted, the local planning authority will use conditions and/or planning obligations to minimise the damage and to provide compensatory and site management measures where appropriate.
- **Biodiversity Action Plans (BAPs):** BAPs set out policy for protecting and restoring priority species and habitats as part of the UK’s response as signatories to the Convention on Biological Diversity. BAPs operate at both a national and local level with priority species and habitats identified at a national level and a series of Local BAPs that identify ecological features of particular importance to a particular area of the country. The requirement to consider and contribute towards BAP targets was strengthened through the Countryside and Rights of Way Act 2000. Habitat and Species Action Plans that are likely to be of relevance include:
 - Reptiles (UK BAP)
 - Brown long-eared bat (*Plecotus auritus*) (UK BAP)
 - Soprano pipistrelle (*Pipistrellus pygmaeus*) (UK BAP)
 - Dormice (*Muscardinus avellanarius*) (UKBAP)

3.0 METHODOLOGY

3.1 Desk study

Hampshire Biological Information Centre (HBIC) provided protected species records within two kilometres of the site and details of any non-statutory designated sites. The Multi-Agency Geographical Information for the Countryside (MAGIC) website was used to provide information on any statutory designated sites within five kilometres of the proposed development.

3.2 Field study

3.2.1 Vegetation

The standard phase 1 habitat survey methodology (JNCC, 2010) was adopted whereby habitats are mapped using colour codes (appendix I). A detailed walkover survey of the site was undertaken on 27th April 2018 by Andrew Heideman, directly searching for legally protected and invasive species of flora and fauna, and categorising any habitats of ecological value that were encountered. A general description of the vegetation on site was also recorded, listing species encountered and scoring their abundance using the DAFOR scale:

D	Dominant;
A	Abundant;
F	Frequent;
O	Occasional;
R	Rare;
L	Local (used as a prefix to any of the above).

3.2.2 Protected species assessment

Badgers

A direct search was undertaken for signs of badger. Signs of badger may include setts, dung pits, latrines, paths or hairs on fences and vegetation. Any setts encountered were classified according to the number of entrances and the extent of their use.

Where setts were recorded these were classified into four main categories, defined by the number of holes present:

- Main sett: A large well used and well established sett used for breeding. There is usually only one main sett within each clan of badgers.

- Annex sett: These are additional setts often located close to the main sett connected by well worn paths.
- Subsidiary sett: These are additional setts often some 150m from the main sett which are sometimes used for breeding but do not have obvious paths linking to other setts and are not always active.
- Outlier sett: These setts are usually smaller in size than the other setts, intermittently used and located some distance from the main sett.

Setts recorded were then examined to establish their level of usage. Each hole was classified under one of the following categories:

- Well used: An entrance free of leaf litter and showing recent signs of excavation.
- Partially used: An entrance with some leaf litter and debris around the hole but also showing some signs of recent digging.
- Disused: An entrance with debris and leaf litter partially obscuring the hole with no recent signs of digging, or a hole that exhibits the characteristics of a badger hole with a large D-shaped entrance and old spoil piles at the entrance, but shows no other signs of badger activity.

Bats

Trees

All bats use trees as they provide a foraging area, and connectivity between different habitats, however the most significant use is as a roost. Bats often roost in trees. Features such as old woodpecker holes, splits, cavities and rot holes, loose or flaking bark will be exploited by bats to roost. Any trees present on site were therefore assessed for their potential to support roosting bats by searching for such features. The presence of roosting bats can be spotted through signs such as accumulations of moth or butterfly wings, staining, bat droppings, or bats themselves. The absence of these cannot, however, be treated as conclusive evidence that bats are not present, and therefore an assessment was made of the potential of the trees to support bats based on the scale presented below in Table 1, adapted from the *Good Practice Guidelines* (Collins, 2016):

Table 1: Criteria for assessing bat roosting potential of trees

High Roosting Potential	Trees with multiple, highly suitable features capable of supporting larger roosts or with evidence of bat occupation found
Moderate Roosting Potential	Trees with definite bat potential, supporting fewer suitable features than high roosting potential trees or with potential for use by single bats

Low or Negligible Roosting Potential	Trees with no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features which may have limited potential to support bats or trees with no potential to support bats
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Foraging/commuting habitat

The site was assessed for its suitability to support foraging/commuting bats. Bats will forage on sites that support linear landscape features (e.g. hedgerows, tree lines and rivers) with good habitat connectivity and within proximity to suitable roosting sites. Sites that support a range of semi-natural habitats with varied vegetation structure are considered to provide more suitable foraging habitat for bats as they support an abundance and diversity of insect prey.

Activity transects

A suite of bat activity surveys were undertaken on site in accordance with the guidelines established by the BCT (Collins, 2016).

Bats are generally most active between the months of March and September with the optimal months for undertaking transects being June to August. Activity transects were undertaken on during April, May 2018, June 2018, July 2018, August 2018 and September 2018. The dusk transect surveys began at or just before sunset and continued for approximately two hours afterwards in order to record any bats commuting from roost sites to foraging grounds as well as general foraging activity. The dawn transect surveys commenced two hours before sunrise and continued until sunrise.

Bat transect surveys involve walking pre-defined route which incorporate key areas of habitat that are likely to be important for foraging and/or commuting bats. Such areas include scrub and grassland and linear features such as hedgerows and woodland/scrub edge. In regards to the development site, a predetermined transect route was walked by a pair of surveyors during each survey visit. The route was walked up to twice during any one survey at a steady speed and a number of listening station stops were also incorporated along the route. The surveyors paused at each listening stop for a duration of five minutes. The site transect route is illustrated on the plan included as appendix V.

Static Monitoring

Static monitoring devices were left on site for a period of five nights April, May, June, July, August and September 2018 following the updated guidelines by the BCT (Collins, 2016). The recording devices consisted of SM2, SM4 and Anabat expresses. The recording devices were set up at the same strategically selected locations around the site on each occasion. All analysis of the static recording device was conducted using Analook software.

For all months, the statics were deployed at the following locations:

- Static monitor 1 (SU 67421 08913): Positioned under a mature hedgerow on a large oak tree.
- Static Monitor 2 (SU 67166 08728): Positioned on an immature hawthorn in the edge of the treeline to woodland.

Table 2 below identifies the number of nights that recorded bat activity for each monitor per month.

Table 2: Static Monitoring days

	April	May	June	July	August	September
Static 1	3	7	6	0	6	4
Static 2	4	0	6	7	7	4

Assessment of foraging and commuting habitat importance

A methodology for the ecological impact assessment of bats has been developed by Wray et al (2010). This uses a number of factors such as the species and number of bats involved, presence of roosts nearby and characteristics for foraging and commuting habitat to produce a score indicating level of importance. This scoring system has been applied to the foraging area and commuting routes for the site to assess their level of importance. The value of the habitat can be assessed for each of the bat species recorded during the survey, but the highest score (normally obtained for the rarest species) is used when defining the value of the habitat. The scores relate to the following levels of importance:

- 0–10 = not valuable
- 11–20 = locally important
- 21–30 = important at county level
- 31–40 = important at regional level
- 41–50 = nationally important

Limitation and constraints

The site was initially assessed as holding moderate suitability to support commuting and foraging bats and as such monthly surveys were undertaken with a view to surveying once a month between April and October in accordance with the BCT's guidelines (Collins, 2016). Due to the project deadline and the proposal to submit a planning application the surveys were concluded in September. The reduced survey effort is not

considered to have had a significant impact on the results of the survey as only low numbers of bats were recorded during the surveys.

On a number of months there were technical faults and recordings were not made for the full five nights, however recordings from the transects and static monitoring across the survey season were considered sufficient to gauge local bat activity levels.

Dormice

The habitat on the site was assessed for the potential to support dormice (*Muscardinus avellanarius*), which are found in habitats such as woodlands, scrub and hedgerows with good connectivity and suitable food plants. A visual inspection for their distinctive nests was undertaken. Where fruiting hazel (*Corylus avellana*) is present nuts are checked for dormice distinctive opening holes. Satellite images were used to assess the connectivity of any suitable habitat present on the site to other areas of woodland and hedgerow networks.

Great crested newts

Suitable breeding ponds are essential to support populations of great crested newt (*Triturus cristatus*) although they actually only spend a relatively short period of the year in the ponds during the spring for breeding. The remainder of the year is spent in suitable 'foraging' terrestrial habitat such as tall grassland and woodland. During the winter the great crested newt hibernates, often amongst the roots of trees and scrub or in other places such as rubble piles, amongst the foundations of buildings or under fallen trees and logs.

Great crested newts are known to forage up to at least five hundred metres from their breeding pond and suitable habitats that fall within two hundred and fifty metres must be considered even in situations where the breeding pond itself will not be affected. The site and surrounding area were assessed during the phase 1 habitat survey for the presence of ponds that may provide suitable breeding habitat for great crested newts. Suitable terrestrial habitat was also assessed.

eDNA

A technique for surveying great crested newts known as environmental DNA testing (eDNA) was undertaken on 20th April 2018 by Louisa Jones (Natural England Class Licence number: 2015-19216-CLS-CLS) and Aimee Cokayne. This involved taking water samples from the pond for DNA analysis which can confirm presence or absence of great crested newt. Water samples were sent to SureScreen Scientific for analysis.

Reptiles

Common reptile species such as slow-worm (*Anguis fragilis*) and grass snake (*Natrix natrix*) are widespread in habitats that provide both cover, in the form of scrub or tall vegetation, and basking areas such as hard standing or short grassland communities. Piles of debris or rubble also provide excellent refuge and hibernation sites for reptiles. They do also have an affinity for hiding under debris exposed or partially exposed to the sun. This trait is exploited by adopting a methodology based upon placing artificial refuges around the survey site thus encouraging any reptiles present to use them.

Targeted reptile surveys were undertaken between during May and June 2018. This involved distributing artificial refugia within the site on the 19th April 2018, in this case 0.25m² pieces of roofing felt were used. These were left to settle for fifteen days, after which seven survey visits were undertaken. The 'reptile mats' were checked between 0900 and 1100 hours or between 1600 and 1900 hours and/or during suitable weather conditions, when it was cloudy and/or with sunny breaks with temperatures between ten and eighteen degrees centigrade, when the refuges provide greater heat than the open ground.

Water voles

Water voles (*Arvicola amphibius*) occur mainly along well vegetated banks of slow flowing rivers, ditches, dykes and lakes with little shading. Water voles excavate extensive burrow systems into the banks of waterways. They forage on grasses, reeds, rushes and bark, and steep earth banks are preferred for burrowing. Suitable waterbodies within 5 metres of the site are visually assessed for suitability to support water voles. Any field signs such as burrows, latrines and feeding stations are noted. Further specialist surveys will be recommended where appropriate.

Otters

Otters (*Lutra lutra*) are secretive and generally confined to watercourses, wetlands and coastal areas. They can have territories extending up to 20km and will use a variety of habitats such as cavities in tree root systems, dense bramble patches and reedbeds for the establishment of holts (breeding sites) and resting areas. They forage on fish, crayfish, birds and amphibians. Further specialist surveys will be recommended for proposals that are considered likely to lead to disturbance of otters or damage to an otter's place of shelter.

4.0 RESULTS

4.1 Desk study

Designated sites

Table 3 below lists sites designated for nature conservation located within five kilometres of the development site.

Table 3: Statutory designated sites within a five kilometre radius and non-statutory sites within a two kilometre radius of the land at Berewood, Waterloooville.

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
Solent Maritime	SAC ²	3.7 south	165300	The Solent encompasses a major estuarine system on the south coast of England. Designated for its estuary, salt meadow, coastal lagoons, mudflats. Qualifying species includes Desmoulin's whorl snail (<i>Vertigo moulinsiana</i>)
Chichester and Langstone Harbours	SPA ³	3.7 south	5,810	The SPA qualifies under Article 4.1 for breeding little tern (<i>Sterna albifrons</i>) and sandwich tern (<i>Sterna sandvicensis</i>), little egret (<i>Egretta garzetta</i>) and overwintering bar-tailed godwit (<i>Limosa lapponica</i>) and little egret. This site also qualifies under Article 4.2 for passage ringed plover (<i>Charadrius hiaticula</i>), overwintering black-tailed godwit (<i>Limosa limosa islandica</i>), dark-bellied brent goose (<i>Branta bernicla bernicla</i>), dunlin (<i>Calidris</i>

² SAC: Special Area of Conservation

³ SPA: Special Protection Area

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				<i>alpina alpina</i>), grey plover (<i>Pluvialis squatarola</i>), redshank (<i>Tringa totanus</i>), and assemblage of international importance.
	Ramsar ⁴	3.7 south	5,810	Chichester Harbour comprises extensive mud and sandflats that are exposed at low tide. The site is designated as a wetland of international importance and is of particular significance for wintering wildfowl and waders as well as breeding birds both within the Harbour and in the surrounding permanent pasture fields and woodlands.
Lye Heath Marsh	SSSI ⁵	2.0 west	4.4	Lye Heath Marsh supports the following habitats including a mixture of basic flushes, unimproved grassland, alder woodland and dense hedgerows, which combine to form a now rare association of individually restricted habitats.
Portsdown	SSSI	2.4 south west	69.15	Portsdown is notified for its geological importance.
Hook Heath Meadows	SSSI	2.4 south-west	5.9	Hook Heath Meadows comprise an intimate mixture of woodland and agriculturally unimproved acid pasture lying within a shallow river valley over London Clays. Many of the habitats present are now rare in lowland Britain through agricultural intensification.

⁴ Ramsar: Internationally important wetland site

⁵ SSSI: Site of Special Scientific Interest

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				Their close juxtaposition here is of particular value as an invertebrate habitat.
Langstone Harbour	SSSI	3.7 south	2,069	A tidal basin with extensive mudflats, marshland and reedbeds supporting internationally important numbers of overwintering waders.
Hazelton Common	LNR ⁶	3.5 north-east	17.45	A large area of heathland, mixed scrub and wooded dells with ponds and wetland area, supporting many species of reptile, dragonfly and other invertebrates. Bracken has spread in some areas, a few patches of heather survive, mostly mixed with extensive areas of gorse where there is a good breeding population of stonechats (<i>Saxicola torquata</i>).
Farlington Marshes	LNR	3.7 south-east	119.68	Farlington Marshes comprise grazed wildflower rich-marshes. The site is internationally important for bird populations, and is a popular location for observing butterflies.
Yeoll's Copse	LNR	4.2 north-east	5.48	A precious fragment of Ancient Woodland with a small wetland area on the north side and now surrounded on three sides by housing development. Unusual plants include common cow wheat (<i>Melampyrum pratense</i>) and butcher's broom (<i>Ruscus aculeatus</i>).

⁶ LNR: Local Nature Reserve

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
Dell Piece West	LNR	4.3 north east	4.06	Well-wooded borders, unimproved grassland, damp marshy ground and a large shallow pond provides habitat for a rich variety of wildlife that includes various butterflies, dragonflies and reptiles.
Marrelsmoor Row	SINC ⁷	0.6 south	0.7	Ancient semi-natural woodlands.
Marrelsmoor Coppice	SINC	0.6 south	3.05	Ancient semi-natural woodlands. A site that supports dormouse populations.
Alsfordmoor Coppice	SINC	0.7 south	5.66	Woodland where there is a significant element of ancient semi-natural woodland surviving. They comprise important community types of restricted distribution in the County, such as yew (<i>Taxus baccata</i>) woods and alder (<i>Alnus glutinosa</i>) swamp woods. A site that supports dormouse populations.
Newlands Farm Meadow	SINC	0.7 south east	3.75	Semi improved grassland which retain a significant element of unimproved grassland.
Newlands Row and Plant Row	SINC	0.8 east	5.35	Ancient semi-natural woodlands. A site that supports dormouse (<i>Muscardinus avellanarius</i>) populations.
Purbrook Heath	SINC	0.8 south	3.4	Agriculturally unimproved grasslands. A site that supports dormouse populations.
Pound Coppice Remnant	SINC	0.8 west	1.23	Woodland where there is a

⁷ SINC: Site of Importance for Nature Conservation

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				significant element of ancient semi-natural woodland surviving. A site that supports dormouse populations.
Sheepwash/Tattle/Dunslan Coppices	SINC	0.8 west	20.06	Ancient semi-natural woodlands. A site that supports dormouse populations.
Drivetts Complex	SINC	0.8 west	63.70	Ancient semi-natural woodlands.
Halls Cottage Woodland	SINC	0.8 west	2.85	Woodland where there is a significant element of ancient semi-natural woodland surviving.
Stakes Coppice Remnant 1	SINC	0.9 east	0.47	Woodland where there is a significant element of ancient semi-natural woodland surviving. Site of nature conservation interest which occur in areas otherwise deficient in such interest, and/or are known to be of particularly high value to local communities e.g. community wildlife sites.
Newlease Copse, Havant	SINC	1.2 south east	1.74	Ancient semi-natural woodlands.
Broomground Coppice/Potwell Coppice	SINC	1.2 south west	19.95	Ancient semi-natural woodlands. Woodland where there is a significant element of ancient semi-natural woodland surviving. They comprise important community types of restricted distribution in the County, such as yew woods and alder swamp woods.
Piper's Hill Wood	SINC	1.4 north west	1.96	Ancient semi-natural woodlands.
Aldermoor Meadow Part	SINC	1.4 south	1.93	Fens, flushes, seepages, springs, inundation

Site name	Conservation status	Distance and direction from site (km)	Size (Ha)	Habitat description
				grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.
London Road Fen	SINC	1.5 south	1.91	They comprise important community types of restricted distribution in the County, such as yew woods and alder swamp woods. Fens, flushes, seepages, springs, inundation grasslands etc. that support a flora and fauna characteristic of unimproved and waterlogged (seasonal or permanent) conditions.
Park Wood, Havant	SINC	1.6 north east	2.60	Ancient semi-natural woodlands.
The Queen's Inclosure	SINC	1.6 north east	40.27	Ancient semi-natural woodlands.
Widley Walk Meadow	SINC	2.0 south west	1.56	Agriculturally unimproved grasslands.
Sandy and Aldermoor Coppices	SINC	2.0 south west	6.18	Ancient semi-natural woodlands.

Chichester and Langstone Harbours SPA and Ramsar lie 3.7 kilometres to the south of the site, the Solent Maritime SAC lies 3.7 kilometre to the south, and the nearest statutory site is Lye Heath Marsh which is situated 2.0 kilometres to the west of the site. There are not anticipated to be any impacts to these sites from this element of the scheme. Issues relating to the wider housing development are detailed within the Ecology Chapter for the development (Biodiversity by Design 2010b). No further action is required.

Protected species records

Table 4 below lists records of protected species within two kilometres of the site provided by HBIC.

Table 4: Protected and notable species within two kilometres of land at Berewood, Waterloooville

Common Name	Scientific name	Status	Dates
<i>Amphibians and Reptiles</i>			
Slow-worm	<i>Anguis fragilis</i>	Schedule 5 WCA ⁸ , UKBAP ⁹	2 records dated 2011.
Great crested newt	<i>Triturus cristatus</i>	Habs Regs ¹⁰ Annex II, Schedule 5 WCA, UK BAP	38 records dated between 2007 and 2015.
<i>Birds</i>			
Lesser redpoll	<i>Acanthis cabaret</i>	Red List BoCC ¹¹ , UK BAP	2 records dated between 2010 and 2015.
Skylark	<i>Alauda arvensis</i>	Red List BoCC, UK BAP	6 records dated between 2008 and 2015.
Kingfisher	<i>Alcedo atthis</i>	Schedule 1 WCA, Annex 1 ¹² , Amber List BoCC	7 records between 2007 and 2015.
Gadwall	<i>Anas strepera</i>	Amber List BoCC	1 record dated 2013.
Short-eared owl	<i>Asio flammeus</i>	Annex 1, Amber List BoCC	2 records dated 2003.
Brent goose	<i>Branta bernicla</i>	Amber List BoCC, UK BAP	12 records dated between 2005 and 2015.
Dunlin	<i>Calidris alpina</i>	Amber List BoCC	1 record dated 2015.
Nightjar	<i>Caprimulgus europaeus</i>	Annex 1	16 records dated between 1994 and 2010.
Cetti's warbler	<i>Cettia cetti</i>	Schedule 1 WCA	1 record dated 2015.
Black-headed gull	<i>Chroicocephalus ridibundus</i>	Amber List BoCC	21 records dated between 2006 and 2015.
Little egret	<i>Egretta garzetta</i>	Annex 1	47 records dated between 2002 and 2015.
Yellowhammer	<i>Emberiza citrinella</i>	Red List BoCC	1 record dated 2011.
Reed bunting	<i>Emberiza schoeniclus</i>	Amber List BoCC, UK BAP	2 records dated 2015.
Peregrine	<i>Falco peregrinus</i>	Schedule 1 WCA, Annex 1, Red List BoCC	37 records dated between 2001 and 2015.
Hobby	<i>Falco subbuteo</i>	Schedule 1 WCA	65 records dated between 1993 and 2015.
Pied flycatcher	<i>Ficedula hypoleuca</i>	Red List BoCC	1 record dated 2015.

⁸ WCA: The Wildlife and Countryside Act 1981 (as amended)

⁹ UKBAP: UK Biodiversity Action Plan

¹⁰ Habs Regs: Conservation of Habitats and Species Regulations 2010

¹¹ BoCC: Birds of Conservation Concern

¹² Annex 1 of the Birds Directive

Common Name	Scientific name	Status	Dates
Brambling	<i>Fringilla montifringilla</i>	Schedule 1 WCA	1 record dated 2008.
Oystercatcher	<i>Haematopus ostralegus</i>	Amber List BoCC	1 record dated 2015.
Herring gull	<i>Larus argentatus</i>	Red List BoCC, UK BAP	7 records dated between 2010 and 2015.
Lesser black-backed gull	<i>Larus fuscus</i>	Amber List BoCC	22 records dated between 2012 and 2015.
Great black-backed gull	<i>Larus marinus</i>	Amber List BoCC	8 records dated between 2006 and 2013.
Mediterranean gull	<i>Larus melanocephalus</i>	Schedule 1 WCA, Annex 1, Amber List BoCC	Over 150 records dated between 2004 and 2015.
Black-tailed godwit	<i>Limosa limosa</i>	Schedule 1 WCA, Red List BoCC, UK BAP	1 record dated 2015.
Linnet	<i>Linaria cannabina</i>	Red List BoCC, UK BAP	8 records dated between 2007 and 2015.
Common crossbill	<i>Loxia curvirostra</i>	Schedule 1 WCA	11 records dated between 2008 and 2015.
Woodlark	<i>Lullula arborea</i>	Schedule 1 WCA, Annex 1, UK BAP	3 records dated between 2010 to 2015.
Nightingale	<i>Luscinia megarhynchos</i>	Red List BoCC	1 record dated 2011.
Red kite	<i>Milvus milvus</i>	Schedule 1 WCA, Annex 1	20 records dated between 2008 and 2015.
Grey wagtail	<i>Motacilla cinerea</i>	Red List BoCC	100 records dated between 1994 and 2015.
Yellow wagtail	<i>Motacilla flava</i>	Red List BoCC, UK BAP	3 records dated between 2010 and 2012.
Spotted flycatcher	<i>Muscicapa striata</i>	Red List BoCC, UK BAP	3 records dated between 2006 and 2015.
Curlew	<i>Numenius arquata</i>	Red List BoCC, UK BAP	27 records dated between 1994 and 2007.
Whimbrel	<i>Numenius phaeopus</i>	Schedule 1 WCA, Red List BoCC	1 record dated 2003.
Osprey	<i>Pandion haliaetus</i>	Schedule 1 WCA, Annex 1, Amber List BoCC	2 records dated between 2005 and 2013.
House sparrow	<i>Passer domesticus</i>	Red List BoCC, UK BAP	51 records dated between 2007 and 2015.
Black redstart	<i>Phoenicurus ochruros</i>	Schedule 1 WCA, Red List BoCC	1 record dated 2015.
Redstart	<i>Phoenicurus phoenicurus</i>	Amber List BoCC	1 record dated 2011.
Wood warbler	<i>Phylloscopus sibilatrix</i>	Red List BoCC	2 records dated between 2010 and 2011.

Common Name	Scientific name	Status	Dates
Marsh tit	<i>Poecile palustris</i>	Red List BoCC, UK BAP	11 records dated 2006 and 2014.
Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber List BoCC, UK BAP	45 records dated between 2002 and 2015.
Firecrest	<i>Regulus ignicapillus</i>	Schedule 1 WCA,	4 records dated between 2010 and 2014.
Whinchat	<i>Saxicola rubetra</i>	Red List BoCC	1 record dated 2008.
Woodcock	<i>Scolopax rusticola</i>	Red List BoCC	7 records dated between 1994 and 2012.
Turtle dove	<i>Streptopelia turtur</i>	Red List BoCC, UK BAP	2 records dated between 2006 and 2009.
Starling	<i>Sturnus vulgaris</i>	Red List BoCC, UK BAP	43 records dated between 2006 and 2015.
Greenshank	<i>Tringa nebularia</i>	Schedule 1 WCA, Amber List BoCC	1 record dated 2015.
Green sandpiper	<i>Tringa ochropus</i>	Schedule 1 WCA, Amber List BoCC	1 record dated 2015.
Redwing	<i>Turdus iliacus</i>	Schedule 1 WCA, Red List BoCC	38 records dated between 1993 and 2015.
Song thrush	<i>Turdus philomelos</i>	Red List BoCC, UK BAP	10 records dated between 2010 and 2013.
Fieldfare	<i>Turdus pilaris</i>	Schedule 1 WCA, Red List BoCC	1 record dated 2011.
Mistle thrush	<i>Turdus viscivorus</i>	Red List BoCC	1 record dated 2013.
Barn owl	<i>Tyto alba</i>	Schedule 1 WCA	4 records dated 2009 and 2013.
Lapwing	<i>Vanellus vanellus</i>	Red List BoCC, UK BAP	3 records dated 2006 and 2015.
Invertebrates - Coleoptera			
Stag beetle	<i>Lucanus cervus</i>	Annex II ⁵ (non-priority)	2 records dated between 2007 and 2012.
Invertebrates - Lepidoptera			
Purple emperor	<i>Apatura iris</i>	IUCN GB 2001 NT	1 record dated 2003.
Silver-washed fritillary	<i>Argynnis paphia</i>	HBAP, CI	4 records dated between 2006 and 2011.
White admiral	<i>Limenitis camilla</i>	IUCN GB 2001 VU	9 records dated between 1992 and 2011.
Grizzled skipper	<i>Pyrgus malvae</i>	IUCN GB 2001 VU	1 record dated 2007.
Mammals – bats			
Serotine	<i>Eptesicus serotinus</i>	Schedule 2 Habs Regs, Schedule 5 WCA	3 records dated between 1986 and 2012.
Daubenton's bat	<i>Myotis daubentonii</i>	Schedule 2 Habs Regs, Schedule 5 WCA	8 records dated between 2006 and 2009.
Whiskered bat	<i>Myotis mystacinus</i>	Schedule 2 Habs Regs, Schedule 5 WCA	1 record dated 2005.
Whiskered/Brandt's bat	<i>Myotis mystacinus/brandtii</i>	Schedule 2 Habs Regs, Schedule 5 WCA	1 record dated 2005.

Common Name	Scientific name	Status	Dates
Noctule	<i>Nyctalus noctula</i>	Schedule 2 Habs Regs, Schedule 5 WCA, UK BAP	8 records dated from 1982 to 2013.
Pipistrelle species	<i>Pipistrellus sp.</i>	Schedule 2 Habs Regs, Schedule 5 WCA	17 records dated between 1985 and 2011.
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	Schedule 2 Habs Regs, Schedule 5 WCA	14 records dated between 1982 and 2015.
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	Schedule 2 Habs Regs, Schedule 5 WCA, UK BAP	9 records dated between 2009 and 2015.
Brown long-eared	<i>Plecotus auritus</i>	Schedule 2 Habs Regs, Schedule 5 WCA	26 records dated between 1982 and 2014.
Mammals – Terrestrial (non-bats)			
West European hedgehog	<i>Erinaceus europaeus</i>	UK BAP	4 records dated 2007.
Eurasian badger	<i>Meles meles</i>	PBA ¹³	3 records dated between 2002 and 2008.
Hazel dormouse	<i>Muscardinus avellanarius</i>	UK BAP, Schedule 5 WCA	27 records dated between 2006 and 2012.
Invasive plants			
Montbretia	<i>Crocsmia x crocsmifolia</i>	Schedule 9 WCA	1 record dated 2014.
Nuttall's waterweed	<i>Elodea nuttallii</i>	Schedule 9 WCA	2 records dated 2004 and 2014.
Japanese knotweed	<i>Fallopia japonica</i>	Schedule 9 WCA	6 records dated between 2007 and 2014.
Indian balsam (Himalayan balsam)	<i>Impatiens glandulifera</i>	Schedule 9 WCA	4 records dated between 2007 and 2011.
Yellow variegated archangel	<i>Lamiastrum galeodolon argentatum</i>	Schedule 9 WCA	2 records dated 1998 and 2010.
Virginia-creeper	<i>Parthenocissus quinquefolia</i>	Schedule 9 WCA	1 record dated 2013.
Rhododendron	<i>Rhododendron ponticum</i>	Schedule 9 WCA	3 records dated between 1991 and 2001.

These records of protected, notable and invasive species in the vicinity of the site increase the likelihood of them being present where suitable habitat is identified in the field survey.

⁵Annex II of the Habitats Directive

⁶See IUCN (2001) guidelines, covering Great Britain

⁷ PBA: Protection of Badgers Act

4.2 Field survey

4.2.1 Vegetation

The accompanying phase 1 habitat map provided as appendix II depicts the habitats encountered and highlights areas of particular interest with target notes.

The site comprises arable land, amenity grassland, semi-improved grassland, tall ruderal vegetation, hardstanding, bare ground, hedgerows, scrub, native broad-leaved woodland, plantation woodland, scattered trees, dry ditches, wet ditches, a stream and a pond.

Descriptions of the habitats encountered during the survey are provided below:

Arable (Target note 1)

There is an area of arable land which is currently being used for growing wheat (*Triticum sp*) in the west of the site.

The arable land on site is currently used for intensive production of wheat and lacks floristic diversity, it is considered to be of negligible ecological value. The arable land could potentially support ground nesting bird species, these species are discussed further in section 4.2.2.

Amenity grassland (Target note 2 & 3)

Regularly managed amenity grassland (T2)

There are small sections of regularly managed amenity grassland adjacent to the southern boundary of the site. This amenity grassland comprises a regularly mown, species-poor sward c. 3-4 centimetres in height. Species recorded include common bent (*Agrostis capillaris*), Yorkshire-fog (*Holcus lanatus*), daisy (*Bellis perennis*), dandelion (*Taraxacum* agg.), white clover (*Trifolium repens*), common bird's-foot trefoil (*Lotus corniculatus*), greater plantain (*Plantago major*), sticky mouse-ear (*Cerastium glomeratum*), red fescue (*Festuca rubra*) and cat's-ear (*Hypochaeris radicata*).

Rough amenity grassland (T3)

At the east and south-east of the site there is a considerable area of rough amenity grassland which comprises a frequently managed and mostly species-poor sward c. 10-12 centimetres in average height. Dominant and abundant species recorded within the sward include Yorkshire-fog, perennial rye-grass (*Lolium perenne*), false oat-grass (*Arrhenatherum elatius*) and creeping bent (*Agrostis stolonifera*). A full species list is provided in table 4 below.

Table 4: Species recorded within the rough amenity grassland

Common name	Latin name	Abundance	Status
<i>Grasses, sedges and rushes</i>			
Creeping bent	<i>Agrostis stolonifera</i>	D-A	Common & widespread
False oat-grass	<i>Arrhenatherum elatius</i>	A	Common & widespread
Soft brome	<i>Bromus hordeaceus</i>	F-O	Common & widespread
Red fescue	<i>Festuca rubra</i>	F-O	Common/widespread in many grassland habitats
Yorkshire-fog	<i>Holcus lanatus</i>	D	Common & widespread
Perennial rye-grass	<i>Lolium perenne</i>	A	Common & widespread
Annual meadow-grass	<i>Poa annua</i>	O	Common & widespread
Rough-stalked meadow-grass	<i>Poa trivialis</i>	F	Common & widespread
<i>Herbaceous plants</i>			
Creeping thistle	<i>Cirsium vulgare</i>	O-R	Common & widespread
Wild teasel	<i>Dipsacus fullonum</i>	R	Common & widespread
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	O-R	Common & widespread
Common bird's-foot trefoil	<i>Lotus corniculatus</i>	R	Typically occurs in unimproved and semi-improved grasslands
Bristly ox-tongue	<i>Picris echioides</i>	O	Common & widespread
Ribwort plantain	<i>Plantago lanceolata</i>	O-R	Common & widespread
Curled dock	<i>Rumex crispus</i>	O	Common & widespread
Broad-leaved dock	<i>Rumex obtusifolius</i>	O	Common & widespread
Dandelion	<i>Taraxacum agg.</i>	O	Common & widespread
Lesser trefoil	<i>Trifolium dubium</i>	O	Common & widespread
White clover	<i>Trifolium repens</i>	O-LA	Common & widespread
Common ragwort	<i>Senecio jacobaea</i>	O	Common & widespread
Common vetch	<i>Vicia sativa</i>	O	Common & widespread

Species present within the areas of regularly managed and rough amenity grassland are common/widespread and these habitats are considered to be of negligible ecological value. The regularly managed amenity grassland is considered unsuitable to support any protected or notable species and therefore no further action is required. The rough amenity grassland could potentially support badgers, ground nesting birds, common reptile species and great crested newt, and these species are discussed further in section 4.2.2.

Semi-improved grassland (Target notes 4, 5 & 6)

There are considerable areas of semi-improved grassland within the site with some variety in sward structure noted. Areas of semi-improved grassland recorded on site include a species-poor, grass-dominated sward, a rough, regenerating sward with abundant ruderals and scattered scrub, and a short, moderately species-rich sward.

Species-poor semi-improved grassland (T4)

There are areas of species-poor, semi-improved grassland in the north of the site which comprise a mostly grass-dominated sward, c. 8 centimetres in average height, with few common/widespread forbs in limited abundance. Dominant and abundant species recorded within the sward include Yorkshire-fog, creeping bent, common bent (*Agrostis capillaris*), cock's-foot (*Dactylis glomerata*), white clover and creeping buttercup (*Ranunculus repens*). Other species recorded include red fescue, cut-leaved crane's-bill (*Geranium dissectum*), cat's-ear, ribwort plantain (*Plantago lanceolata*), broad-leaved dock (*Rumex obtusifolius*), dandelion (*Taraxacum* agg.), red clover (*Trifolium pratense*) and common ragwort (*Senecio jacobaea*).

Rough, regenerating semi-improved grassland (T5)

There is a significant area of semi-improved grassland within the central area of the site which comprises a rough, regenerating sward, c. 6 centimetres in average height, with abundant ruderals and scattered goat willow (*Salix caprea*) and bramble (*Rubus fruticosus* agg.) scrub. It is considered that this grassland has regenerated on land that was formerly used for arable farming. Dominant, abundant and frequent species within the sward include creeping bent, Yorkshire-fog, ribwort plantain, bristly oxtongue (*Picris echioides*), Canadian fleabane (*Conyza canadensis*) and willowherb (*Epilobium* sp). A full species list is provided in table 5 below.

Table 5: Species recorded within the rough/regenerating semi-improved grassland

Common name	Latin name	Abundance	Status
<i>Grasses, sedges and rushes</i>			
Common bent	<i>Agrostis capillaris</i>	A	Common/widespread in most grassland habitats
Creeping bent	<i>Agrostis stolonifera</i>	D	Common & widespread
Cock's-foot	<i>Dactylis glomerata</i>	O	Common & widespread
Yorkshire-fog	<i>Holcus lanatus</i>	A	Common & widespread
<i>Herbaceous plants</i>			
Common mouse-ear	<i>Cerastium fontanum</i>	O	Common & widespread
Creeping thistle	<i>Cirsium arvense</i>	O	Common & widespread
Spear thistle	<i>Cirsium vulgare</i>	R-O	Common & widespread
Canadian fleabane	<i>Conyza canadensis</i>	F	Common & widespread
Willowherb	<i>Epilobium</i> sp	F	Common & widespread
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	R	Common & widespread
Hogweed	<i>Heracleum sphondylium</i>	O-R	Common & widespread
Bristly oxtongue	<i>Picris echioides</i>	F	Common & widespread
Ribwort plantain	<i>Plantago lanceolata</i>	F	Common & widespread
Greater plantain	<i>Plantago major</i>	R-O	Common & widespread

Common name	Latin name	Abundance	Status
Creeping buttercup	<i>Ranunculus repens</i>	O	Common & widespread
Broad-leaved dock	<i>Rumex obtusifolius</i>	O-R	Common & widespread
Common ragwort	<i>Senecio jacobaea</i>	O	Common & widespread
Dandelion	<i>Taraxacum</i> agg.	O	Common & widespread
White clover	<i>Trifolium repens</i>	A	Common & widespread
Common nettle	<i>Urtica dioica</i>	O	Common & widespread

Moderately species-rich semi-improved grassland (T6)

There are small sections of moderately species-rich semi-improved grassland within the central area of the site adjacent to stands of scrub and hedgerows. The sward is generally short, approximately 5-7 centimetres in average height and appears to be grazed by rabbits (*Oryctolagus cuniculus*). The sward comprises a variety of common grasses and forbs such as Yorkshire-fog, creeping bent, ribwort plantain, ox-eye daisy (*Leucanthemum vulgare*), common vetch (*Vicia sativa*) and creeping cinquefoil (*Potentilla reptans*). A full species list is provided in table 6 below.

Table 6: Species recorded within the moderately species-rich semi-improved grassland

Common name	Latin name	Abundance	Status
<i>Grasses, sedges and rushes</i>			
Common bent	<i>Agrostis capillaris</i>	F	Common/widespread in most grassland habitats
Creeping bent	<i>Agrostis stolonifera</i>	A	Common & widespread
Cock's-foot	<i>Dactylis glomerata</i>	O	Common & widespread
Yorkshire fog	<i>Holcus lanatus</i>	F	Common & widespread
<i>Herbaceous plants</i>			
Mugwort	<i>Artemisia vulgaris</i>	R	Common & widespread
Common mouse-ear	<i>Cerastium fontanum</i>	O	Common & widespread
Spear thistle	<i>Cirsium vulgare</i>	R	Common & widespread
Wild teasel	<i>Dipsacus fullonum</i>	O-R	Common & widespread
Willowherb	<i>Epilobium</i> sp	O	Common & widespread
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	O-R	Common & widespread
Ground ivy	<i>Glechoma hederacea</i>	LF-O	Common & widespread
Meadow vetchling	<i>Lathyrus pratensis</i>	R	Common & widespread
Ox-eye daisy	<i>Leucanthemum vulgare</i>	O-R	Common & widespread
Ribwort plantain	<i>Plantago lanceolata</i>	O	Common & widespread
Creeping cinquefoil	<i>Potentilla reptans</i>	O	Common & widespread
Cowslip	<i>Primula veris</i>	R	Typically occurs in unimproved grasslands
Meadow buttercup	<i>Ranunculus repens</i>	F-O	Common & widespread
Curled dock	<i>Rumex crispus</i>	O	Common & widespread
Broad-leaved dock	<i>Rumex obtusifolius</i>	O-R	Common & widespread

Common name	Latin name	Abundance	Status
Hoary ragwort	<i>Senecio erucifolius</i>	O-R	Common & widespread
Dandelion	<i>Taraxacum</i> agg.	O-R	Common & widespread
Red clover	<i>Trifolium pratense</i>	O	Common & widespread
White clover	<i>Trifolium repens</i>	A	Common & widespread
Common nettle	<i>Urtica dioica</i>	O-R	Common & widespread
Common vetch	<i>Vicia sativa</i>	O-R	Common & widespread

Species recorded within the areas of semi-improved grassland are common and / or widespread and this habitat is considered to be of limited ecological value, nevertheless it could potentially support badgers, ground nesting birds, common reptile species and great crested newt, these species are discussed further in section 4.2.2.

Tall ruderal vegetation (Target note 7)

There are numerous stands of tall ruderal vegetation scattered around the central area of the site, mostly adjoining hedgerows and scrub. Species recorded within the stands of tall ruderal include common nettle (*Urtica dioica*), cleavers (*Gallium aparine*), hogweed (*Heracleum sphondylium*), cock's-foot (*Dactylis glomerata*), willowherb, creeping buttercup (*Ranunculus repens*), false oat-grass, wild teasel (*Dipsacus fullonum*) and colt's-foot (*Tussilago farfara*).

The stands of tall ruderal on site comprise common/widespread species and are considered to be of limited ecological value, nevertheless they could potentially support badgers, ground nesting birds, common reptile species and great crested newt, these species are discussed further in section 4.2.2.

Hardstanding and bare ground (Target notes 8 & 9)

Areas of hardstanding and bare ground within the site include tarmac access roads, gravel trackways and pedestrian footpaths (T8), construction site compounds (T9), and area of bare earth used for storing construction materials.

The areas of hardstanding and bare ground on site are considered to be of negligible ecological value and unsuitable to support any protected or notable species. No further action is required.

Native hedgerows (Target notes 10 & 11, H1 – H6)

A total of five established, species-rich native hedgerows (T10) and one recently planted native hedgerow (T11) were recorded on site. The established native hedgerows on site comprise a good variety of woody species and a relatively diverse field layer which includes ancient woodland indicator species such as dog's mercury (*Mercurialis perennis*) and wood false-brome (*Brachypodium sylvaticum*). The established hedgerows range from approximately 2.5 to 5.5 metres in height and include mature standard trees

and adjoining drainage ditches. There is one recently planted (but well established) native hedgerow on site (H6) which comprises a mixture of native shrub planting, with some tree guards still in place, that ranges between 2 and 3.5 metres in height, the field layer of this hedgerow is mostly species poor. Species present are presented in table 7 overleaf.

Table 7: Native hedgerows recorded on site

Key (see Phase 1 map)	Woody species	Ground flora	BAP status (80% native woody species)	General description
H1	Hazel (<i>Corylus avellana</i>) Hawthorn (<i>Crataegus monogyna</i>) Ash (<i>Fraxinus excelsior</i>) Holly (<i>Ilex aquifolium</i>) Blackthorn (<i>Prunus spinosa</i>) Pedunculate oak (<i>Quercus robur</i>) Rose (<i>Rosa</i> sp) Grey willow (<i>Salix cinerea</i>)	Lords and ladies (<i>Arum maculatum</i>) Wood false-brome (<i>Brachypodium sylvaticum</i>) Rough chervil (<i>Chaerophyllum temulum</i>) Cleavers (<i>Galium aparine</i>) Wood avens (<i>Geum urbanum</i>) Ivy (<i>Hedera helix</i>) Dog's mercury (<i>Mercurialis perennis</i>) Bramble (<i>Rubus fruticosus</i> agg.) Wood dock (<i>Rumex sanguineus</i>)	Yes	Intact, species-rich hedgerow with mature standard oak and ash trees and a wet ditch along part of its length. Some gaps in hedgerow.
H2	Hawthorn Ash Blackthorn Rose	Lords and ladies Wood false-brome Hedge bedstraw (<i>Galium mollugo</i>) Ground ivy (<i>Glechoma hederacea</i>) Ivy White dead-nettle (<i>Lamium album</i>) Dog's mercury Bramble Wood dock Hedge woundwort (<i>Stachys sylvatica</i>) Greater stitchwort (<i>Stellaria holostea</i>) Nipplewort (<i>Tamus communis</i>) Common nettle	Yes	Intact, species-rich hedgerow with a mature standard ash tree.
H3	Field maple Sycamore Hazel Hawthorn Ash Holly	Ground elder (<i>Aegopodium podagraria</i>) Lords and ladies Cleavers Ivy White dead-nettle Dog's mercury	Yes	Species-rich hedgerow with mature standard ash trees.

Key (see Phase 1 map)	Woody species	Ground flora	BAP status (80% native woody species)	General description
	Blackthorn Goat willow (<i>Salix caprea</i>)	Bramble Common nettle		
H4	Field maple (<i>Acer campestre</i>) Sycamore (<i>Acer pseudoplatanus</i>) Hazel Hawthorn Ash Blackthorn Holly Rose (<i>Rosa sp</i>) Goat willow (<i>Salix caprea</i>) Yew (<i>Taxus baccata</i>)	Lords and ladies Lesser celandine (<i>Ficaria verna</i>) Cleavers Ivy Honeysuckle (<i>Lonicera periclymenum</i>) Bramble Common nettle	Yes	Intact, species-rich hedgerow with mature standard trees (including a veteran specimen of pedunculate oak) and a wet ditch. Some gaps in hedgerow.
H5	Dogwood Hawthorn Ash Blackthorn Rose (<i>Rosa sp</i>)	Lords and ladies Wood false-brome Red fescue Cleavers Hedge bedstraw Ivy Yorkshire fog Des Etangs' St John's wort (<i>Hypericum desetangsii</i>) Dog's mercury Primrose (<i>Primula vulgaris</i>) Wood dock Greater stitchwort	Yes	Intact, species-rich hedgerow with mature standard ash trees.
H6	Dogwood (<i>Cornus sanguinea</i>) Hazel (<i>Corylus avellana</i>) Hawthorn Holly (<i>Ilex aquifolium</i>)	Yarrow (<i>Achillea millefolium</i>) Cow parsley (<i>Anthriscus sylvestris</i>) Cock's-foot (<i>Dactylis glomerata</i>) Red fescue (<i>Festuca rubra</i>)	Yes	Recently planted, intact, moderately species-rich hedgerow c. 10 – 20 years in age.

Key (see Phase 1 map)	Woody species	Ground flora	BAP status (80% native woody species)	General description
	Blackthorn Elder (<i>Sambucus nigra</i>) Guelder rose (<i>Viburnum opulus</i>)	Cleavers Wood avens Ivy Hogweed (<i>Heracleum sphondylium</i>) Yorkshire fog (<i>Holcus lanatus</i>) Ox-eye daisy (<i>Luecanthemum vulgare</i>) Creeping buttercup (<i>Ranunculus repens</i>) Hedge woundwort Common nettle Speedwell (<i>Veronica sp</i>)		

All of the native hedgerows on site comprise 80% or more cover of at least one woody UK native species which qualifies them as UK BAP Hedgerow habitat. A number of the native hedgerows on site could also potentially qualify as 'Important' under the Hedgerow Regulations 1997. Further recommendations are provided in section 5.1. The hedgerows on site could potentially support badgers, nesting birds, foraging/commuting/roosting bats, dormice, great crested newt, and reptiles. These species are discussed further in section 4.2.2.

Scrub (Target note 12)

There are stands of scattered and dense scrub in various parts of the site. There are considerable stands of dense and mature scrub within the north-eastern and central areas of the site. Scrub species recorded on site include bramble, goat willow, willows (*Salix spp*), elder (*Sambucus nigra*), wild plum (*Prunus domestica*), Wilson's honeysuckle (*Lonicera nitida*), cherry (*Prunus sp*), hazel (*Corylus avellana*), blackthorn (*Prunus spinosa*), rose (*Rosa sp*), butterfly-bush (*Buddleja davidii*), pedunculate oak (*Quercus robur*), holly (*Ilex aquifolium*), sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*) and honeysuckle (*Lonicera periclymenum*).

The scrub on site comprises common/widespread species and is considered to be of limited ecological value, nevertheless it could potentially support badgers nesting birds, foraging/commuting bats, dormice, great crested newt, and reptiles, these species are discussed further in section 4.2.2.

Native broad-leaved woodland (Target note 13)

There is a small section of native, broad-leaved woodland at the south-western boundary of the site which is floristically diverse and includes a number of ancient woodland indicator species within the ground flora, such as dog's mercury, wood anemone (*Anemone nemorosa*) and bluebell (*Hyacinthoides non-scripta*). This area of broad-leaved woodland is summarised in table 8 below.

Table 8: Plant species recorded within the native broad-leaved woodland

Common name	Latin name	Abundance	Status
Canopy species			
Pedunculate oak	<i>Quercus robur</i>	R	Common & widespread
Goat willow	<i>Salix caprea</i>	F-O	Common & widespread
Understorey species			
Hazel	<i>Corylus avellana</i>	O	Common & widespread
Blackthorn	<i>Prunus spinosa</i>	O	Common & widespread
Rose	<i>Rosa sp</i>	R	Common & widespread
Elder	<i>Sambucus nigra</i>	O-R	Common & widespread
Field layer			
Grasses, sedges, ferns and mosses			
Remote sedge	<i>Carex remota</i>	O-R	Common in damp and shaded habitats
Herbaceous plants			
Lord's-and-ladies	<i>Arum maculatum</i>	R	Common & widespread in woodlands and hedgerows
Enchanter's nightshade	<i>Circaea lutetiana</i>	O	Typically found in ancient woodland sites
Cleavers	<i>Galium aparine</i>	O	Common & widespread
Herb-Robert	<i>Geranium robertianum</i>	O	Common & widespread in woodlands
Ivy	<i>Hedera helix</i>	D-A	Common/widespread
Bluebell	<i>Hyacinthoides non-scripta</i>	O	Typically found in ancient woodland sites and old hedgerows

Common name	Latin name	Abundance	Status
Dog's mercury	<i>Mercurialis perennis</i>	A	Typically found in ancient woodland sites and old hedgerows
Soft shield-fern	<i>Polystichum setiferum</i>	O-R	Typically found in ancient woodland sites
Bracken	<i>Pteridium aquilinum</i>	LO	Common & widespread
Bramble	<i>Rubus fruticosus</i> agg.	O	Common & widespread
Wood dock	<i>Rumex sanguineus</i>	O	Common & widespread
Common figwort	<i>Scrophularia nodosa</i>	R	Typically found in ancient woodland sites
Common nettle	<i>Urtica dioica</i>	D-A	Common & widespread

The area of native broad-leaved woodland is considered to be a habitat of ecological value and it could potentially qualify as the UKBAP Priority habitat 'Lowland Mixed Deciduous Woodland'. This area of woodland lies on the boundary of the site and will not be impacted by this phase of development. The area of native broad-leaved woodland could potentially support badgers nesting birds, foraging/commuting bats, dormice, great crested newt, and reptiles, these species are discussed further in section 4.2.2.

Plantation woodland (Target note 14)

There is a small section of plantation woodland at the south-western boundary of the site, adjacent to the native broad-leaved woodland. This comprises a fenced-off area which contains numerous recently planted native tree and shrub saplings with tree guards in place. Species recorded within this area include dogwood (*Cornus sanguinea*), hazel, blackthorn, guelder rose (*Viburnum opulus*), hawthorn, field maple (*Acer campestre*), rose and cherry (*Prunus* sp).

The area of plantation woodland comprises young saplings of common and / or widespread tree and shrub species and is therefore considered to be of limited ecological value. However, this area is part of the buffer planting around plant Row and linked to the dormouse master plan. This habitat could potentially support badgers, nesting birds, foraging/commuting bats, dormice, great crested newt, and reptiles, these species are discussed further in section 4.2.2.

Scattered trees (Target note 15)

There are a number of scattered trees within the site which include mature specimens of pedunculate oak, sycamore, ash, field maple, yew (*Taxus baccata*) and Leyland cypress (*Cupressus × leylandii*).

The mature specimens of pedunculate oak, ash and yew are considered to be of ecological and aesthetic value. The other recorded trees species are considered to be of negligible ecological value. The scattered trees on site could potentially support foraging/commuting/roosting bats and nesting birds, these species are discussed further in section 4.2.2.

Dry ditches (Target note 16)

There is one dry ditch which runs along the southern boundary of the site. This ditch comprises a recently excavated small earth channel c. 0.5 metres in depth and width. It is vegetated with the surrounding regularly managed amenity grassland vegetation, as described in the relevant section above.

The dry ditch on site comprises a small earth channel that is vegetated with a regularly managed and species-poor grassland vegetation, it is considered to be of negligible ecological value. The dry ditch on site is considered unsuitable to support any protected or notable species. No further action is required.

Wet ditches (Target note 17, D1 – D5)

There are a total of five wet drainage ditches on site, all of which are approximately 0.5 to 0.75 metres in depth and 0.5 to 0.75 metres in width. They are mostly situated in heavily shaded conditions alongside hedgerows, underneath dense scrub and under broad-leaved woodland, with the exception of ditch D5 and part of ditch D3 which are situated within open fields. No macrophytic vegetation was noted within the ditches on site, instead they are vegetated with the local surrounding flora. Ditch D5 contains some common grasses and ruderals, such as Yorkshire-fog, red fescue, rough-stalked meadow-grass (*Poa trivialis*), willowherb (*Epilobium sp*) and dock (*Rumex sp*), however it is considered that this ditch is likely to be dry at most times of the year. The wet drainage ditches comprise earth channels and banks, water quality varies from good/clear to very poor/turbid and stagnant with some algal growth also noted. The wet ditches on site are summarised in table 9 below.

Table 9: Wet ditches recorded on site

Key (see Phase 1 map)	General description	Macrophytic/other vegetation and abundance scores
D1	Heavily shaded wet drainage ditch situated underneath dense bramble (<i>Rubus fruticosus</i> agg.) scrub and part of hedgerow H1.	Some hedgerow ground flora on banks of ditch as described for hedgerow H1.
D2	Shaded drainage ditch situated within a stand of ecologically-diverse native broad-leaved woodland.	Woodland vegetation, as summarised in the relevant section above, surrounding the ditch and established on ditch banks.
D3	Heavily shaded wet drainage ditch situated underneath dense scrub and within an open area of rough semi-improved grassland.	Scrub and rough semi-improved grassland vegetation.
D4	Heavily shaded wet drainage which runs along most of the length of hedgerow H4.	Some hedgerow ground flora on banks of ditch as described for hedgerow H4.
D5	Recently installed, unshaded wet drainage ditch situated in a field next to a public footpath. Numerous tadpoles	Willowherb (<i>Epilobium sp</i>) Red fescue (<i>Festuca rubra</i>) (O) Yorkshire fog (<i>Holcus lanatus</i>) (A-O)

Key (see Phase 1 map)	General description	Macrophytic/other vegetation and abundance scores
	noted within the water.	Rough-stalked meadow-grass (<i>Poa trivialis</i>) (O) Dock (<i>Rumex sp</i>) (O-R) Red clover (<i>Trifolium pratense</i>) (O-R)

The wet ditches on site are considered to be of ecological value as they provide an ecological resource and a source of drinking water for a range of fauna, including invertebrates, amphibians, birds and mammals. The wet ditches on site could potentially support great crested newt, otter and water vole, these species are discussed further in section 4.2.2.

Stream (Target note 18)

There is a stream situated within the north-eastern area of the site which stretches between the pond (T19) and the northern boundary of the site. The stream is mostly enclosed by mature and dense scrub, and it has a shallow channel, c. 0.25 metres in depth, which varies in width from 0.25 to 1.5 metres. In one section the stream channel opens out into a wide muddy flush with some common and / or widespread macrophytic vegetation including hemlock water-dropwort (*Oenanthe crocata*), yellow iris (*Iris pseudacorus*), great willowherb (*Epilobium hirsutum*) and water figwort (*Scrophularia auriculata*). The substrate of the stream channel is mostly comprised of earth though it becomes stonier where it nears the northern boundary of the site.

The stream is considered to be a habitat of ecological value that will likely support a range of invertebrates as well as providing a source of drinking water for birds and mammals. The stream could potentially support otter and water vole, these species are discussed further in section 4.2.2.

Pond (Target note 19)

There is a single pond within the north-eastern area of the site which is approximately 150 square metres in size and is enclosed by dense/mature willow (*Salix spp*) scrub. Water quality varies between average and poor, it is quite turbid and silty in places with some algal growth also noted. Macrophytic vegetation is very limited with only a small amount of yellow iris and hemlock water-dropwort recorded.

*The pond is considered to be a habitat of ecological value that may potentially support a range of invertebrates and amphibians as well as providing a source of drinking water for birds and mammals. The pond could potentially support grass snake (*Natrix natrix*) and great crested newt, these species are discussed further in section 4.2.2.*

4.2.2 Protected species assessment

Badgers

Evidence of badgers was recorded on the site in the form of latrines and setts, the locations of which are shown in appendix III. A total of seven of latrines were recorded along the western boundary of the site. This indicates this may be a boundary between clans on the site. Two setts were recorded in the central dense area of scrub. Due to the density of scrub this area was difficult to access however one of the entrances had a fresh area of spoil present and is considered to be active while a second in close proximity appeared partially used with a clear entrance. These setts are considered to be outlier setts with the main sett located away from this phase of the development in the western half of the Berewood development, over one kilometre. The surrounding semi-improved grassland and scrub also provides foraging habitat for badgers with the pond providing a drinking resource.

Further recommendations regarding impacts on badgers have been provided in section 5.2.

Bats

Trees

A number of mature trees were present in the site which have features suitable for use by bats. These include seven trees with low potential to support bats and three trees with moderate potential. The locations of the trees are shown in appendix IV and features are described in table 10 below.

Table 10: Potential of trees within the site

Tree number	Species	Grid reference	Roost feature	Potential
1	Oak	SU67187 09048	Knot hole and flaking bark on east side approximately 8 metres high	Low
2	Oak	SU67223 08783	Split limb and knot hole on south side approximately 6 metres high	Moderate
3	Ash	SU67287 09044	Two woodpecker holes on south side 8 metres high	Moderate
4	Pine	SU67385 09036	Cavity behind a tear out on west side 10 metres high	Low
5	Oak	SU67421 08815	Dead limb and lifted bark on west side approximately 6 metres high	Low
6 - 9	Oaks	SU67482 09238	Dead and split limbs on trees, difficult to access	Low
10	Oak	SU67421 09086	Dead limbs present	Moderate

Plans currently retain all these trees within the site and no further action is required. If plans change then an ecologist should be consulted.

Foraging habitat

The hedgerows, scattered trees, scrub, woodland and semi-improved grassland on the site has been assessed as moderate value foraging/commuting habitat for bats. Collectively, these habitats are likely to support a diverse assemblage of invertebrate prey and they are also well connected with further suitable habitat in the surrounding area including hedgerows, woodland and lowland farmland. Within the wider surrounding area there are native hedgerows, woodland, arable and pasture fields, water courses, residential housing with associated gardens, and allotment gardens, all of which could provide suitable foraging and commuting habitat for bats.

Activity surveys

A series of monthly bat transect surveys commenced in April 2018 alongside static monitoring devices. A map showing the transect route is located in appendix V. A summary of the results is provided below while detailed results are provided in appendix VI.

Low numbers of common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle, serotine (*Eptesicus serotinus*), Myotis species (*Myotis sp.*), long-eared (*Plecotus sp.*) and noctule bats (*Nyctalus noctula*) were recorded during the activity surveys. The bats were recorded mainly commuting along the hedgerows along the western boundary of the survey area.

April dusk survey on 30th April 2018

- Low levels of bat activity were recorded during the survey, with the most abundant species being common pipistrelle bats commuting and foraging across the site between 21:07 and 21:43. The bats were mostly foraging around the trees in the centre of the transect and along the south eastern hedgerow that runs parallel to the main London Road.
- A long-eared bat species was recorded commuting along the northern most boundary of the transect route at 21:55.

May dusk survey on 21st May 2018

- Low levels of bat activity were recorded during the survey, with the most abundant bat being common pipistrelle bats commuting and foraging across the site between 21:37 and 22:33. The bats were mostly foraging along the hedgerows and woodland edges across the site, with most activity being recorded along the south eastern hedgerow that runs parallel to London Road.
- A soprano pipistrelle bat was recorded commuting along a field margin that forms the western boundary of the transect at 22:38.

June dusk survey on 11th June 2018

- Low levels of bat activity were recorded during the survey, with the most abundant bat being common pipistrelle bats commuting and foraging across the site between 22:06 and 22:56. The bats were mostly foraging along the hedgerows and woodland edges across the site, with most activity being recorded along the south eastern hedgerow.

- Noctule bats were twice recorded commuting in the southern part of the site at 22:18 and 22:34.

July dusk survey on 11th July 2018

- Low levels of bat activity were recorded during the survey, with the most abundant bat being common pipistrelle bats commuting and foraging across the site between 22:06 and 22:56. The bats were mostly foraging along the hedgerows and woodland edges across the site.
- Noctule bats were twice recorded commuting in the southern part of the site at 22:18 and 22:34.

August dusk survey on 06th August 2018

- Low levels of bat activity were recorded during the survey, with the most abundant bat being common pipistrelle bats commuting and foraging across the site between 21:10 and 22:38. The bats were mostly foraging along the hedgerows and woodland edges across the site.
- Serotine bats were recorded intermittently at stopping points E, D, B and H respectively between 21:34 and 22:32

August dawn survey on 07th August 2018

- Very low levels of bat activity were recorded during the survey. The most abundant calls were recorded at intermittent points along the western boundary.
- Noctule, serotine, soprano pipistrelle and common pipistrelle calls were all recorded in low numbers on this survey
- Peak activity was recorded at 04:41 between stopping points G and H where a soprano and a common pipistrelle were heard but not seen on the southwest boundary of the site

September dusk survey on 13th September 2018

- Low levels of bat activity were recorded during the survey, with the only species of bat to be recorded was common pipistrelle. Common pipistrelle calls were recorded intermittently across site between 19:54 and 21:24.
- Two common pipistrelle bats were observed commuting along the hedgerow between stopping points D and E at 19:55

Static monitoring

A plan showing the location of the static detectors is located in appendix V and results provided in table 11. A summary of the findings has been provided below:

- A total of seven species and genus of bat were recorded during the static monitoring survey including Leisler's (*Nyctalus leisleri*), common pipistrelle, soprano pipistrelle,

Nathusius' pipistrelle (*Pipistrellus nathusii*), noctule, serotine, long-eared and indeterminate *Myotis* species.

- The most common species recorded was common pipistrelle which was consistently recorded during every month of the static monitoring. Peaks of activity were recorded during April with an average pass of 540 at static 2 and 129 at static 1.
- Nathusius' pipistrelle was only recorded in May at static 1 and September at static 2 during the static surveys. This indicates this are likely records of bats passing through the area and the site does not provide foraging for a nearby roost. This is considered to be a "rarer" bat species.
- Leisler's bats were recorded at low activity levels during all months with the majority of activity recorded at static 2 which is near an area of woodland. The low average number of passes indicate the site is not important for this species. Leisler's are considered to be "rarer" bats with a population between 10,000 and 100,000 nationally.
- All other bats were recorded with very low levels of activity throughout the site with the area around static monitor 2 appearing to be of the most important.

Table 11: Average passes recorded during the static monitoring

Static 1						
Average passes	April	May	June	July	August	September
C.pip ¹⁴	129.00	102.43	58.33	0.00	0.00	27.75
Leisler's	0.00	2.29	0.33	0.00	0.00	0.00
Myotis sp.	0.00	0.14	0.00	0.00	0.00	0.00
N.pip ¹⁵	0.00	0.43	0.00	0.00	0.00	0.00
Noctule	0.00	0.43	0.00	0.00	0.00	0.00
S.pip ¹⁶	0.33	0.86	0.00	0.00	0.00	1.25
Serotine	0.00	0.00	0.17	0.00	0.00	0.00
Static 2						
Average passes	April	May	June	July	August	September
C.pip	540.00	0.00	49.50	25.67	26.00	77.75
Leisler's	1.00	0.00	0.83	3.33	3.00	0.25
Long-eared	0.00	0.00	0.00	0.00	0.00	0.25
Myotis sp.	0.75	0.00	0.00	0.00	0.00	0.25
N.pip	0.00	0.00	0.00	0.00	0.00	0.75
Noctule	0.00	0.00	0.00	1.50	1.83	0.75
S.pip	1.50	0.00	1.00	0.00	0.00	6.75

¹⁴ C.pip: Common pipistrelle

¹⁵ N.pip: Nathusius pipistrelle

¹⁶ S.pip: Soprano pipistrelle

Serotine	0.00	0.00	0.33	0.00	0.00	1.25
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Value of the habitat for foraging and commuting bats

The value of the habitat for foraging and commuting bats was assessed. The scores in table 12 and 13 assume a small population of Leisler's and Nathusius bat, the rarest species recorded. As this species was not consistently recorded at the same monitor, in similar numbers or over successive months, it is concluded there is no roost located near the site.

Table 12: Scores for Berewood foraging habitat (bold indicates the relevant criteria)

Species	Number of bats	Roosts/potential roosts nearby	Foraging habitat characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
-	-	Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches, less intensive arable and/or small towns and villages (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)
5	10	1	3
Total score			19

Table 13: Score for Berewood commuting habitat (bold indicates relevant criteria)

Species	Number of bats	Roosts/potential roosts nearby	Commuting habitat characteristics
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
-	-	Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Walls, gappy or flailed hedgerows, isolated well-grown hedgerows, and moderate field sizes (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Well-grown and well-connected hedgerows, small field sizes (4)

Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and river/streams (5)
5	10	1	4
Total score			20

Using the scoring system above, the foraging and commuting routes across the site are considered to be locally important for bats. This is reflected in the survey data by the low number of passes recorded on the majority of the survey nights.

The site is locally important for bats and therefore further recommendations regarding foraging/commuting bats have been provided in section 5. 3.

Birds

Breeding birds

Previous breeding bird surveys were carried out across the wider site by FCPR in 2003 and 2005 in relation to the Plant Farm development. Species recorded as breeding or probable breeding included the following: lesser whitethroat (*Sylvia curruca*), blue tit (*Cyanistes caeruleus*), skylark (*Alauda arvensis*), wren (*Troglodytes aedon*), whitethroat (*Sylvia communis*), dunnoek (*Prunella modularis*), blackcap (*Sylvia atricapilla*), robin (*Erithacus rubecula*), wood pigeon (*Columba palumbus*), pheasant (*Phasianus colchicus*) and chaffinch (*Fringilla coelebs*). Species recorded as possible breeding included starling (*Sturnus vulgaris*). Skylark, dunnoek and starling are UK BAP Priority bird species and BoCC red list species, the other recorded birds are common and widespread species which are not of conservation concern.

The hedgerows, ditches, scrub, and semi-improved grassland within the site provides suitable habitat for nesting birds.

Wintering birds

The arable fields may provide suitable habitat for wintering birds. However, the site is considered to be of low suitability for brent geese due to the current levels of construction in the surrounding area which has increased disturbance levels on the site. The area is also frequently used by pedestrians and dog walkers along the footpath.

There are ten sets of records for brent goose (*Branta bernicla*) within two kilometres of the site dating from between 2005 and 2015. The site falls within the Wader and Brent Geese Strategy (King, 2010) survey area WO6H and H00B which was surveyed for the 2010 strategy for waders and brent geese without positive results.

The Environmental Statement details mitigation for wintering birds (Biodiversity by Design Ltd, 2010a). Further details have been given in section 5.4.

Dormice

The scrub and woodland within the application boundary provides suitable habitat for dormice, with good structure and availability of suitable food plants. These areas however are very isolated from suitable habitat across the site. The wider site is also well connected with further suitable habitat in the immediate surrounding area, including native hedgerows, scrub and semi-natural broad-leaved woodland.

Sixteen records of dormice were returned by HBIC for the vicinity of the site dated 2006 to 2012. A previous dormouse survey carried out on site and in the adjacent surrounding land by Biodiversity by Design Ltd between 2007 and 2009 (Biodiversity by Design Ltd, 2010a), found that dormice are present within the immediate surrounding area.

Dormice mitigation licences with an associated Berewood wide masterplan has been approved by Natural England for the clearance of small amounts of scrub, hedgerows and woodland across the site. The areas of scrub on the site are considered poor habitat for dormice due to the isolation from suitable habitat. These areas of scrub have now been enclosed by areas of development.

Dormice are present across the Berewood development site and works have been agreed with Natural England. A non-licensed method statement has been agreed with Natural England for clearance works of scrub habitat and hedgerow within this phase of the development. Further recommendations have been made in section 5.5.

Great crested newts

The semi-improved grassland, scrub and tall ruderal habitats on the site provide potential habitat for great crested newts. Great crested newts are present within the wider Berewood development with the main breeding pond located over 500 metres to the west of the site. The breeding pond is also separated from this phase of the development by a herptile fence.

There is a pond within the site and as part of the monitoring programme currently being carried out for the populations of great crested newts on the site this pond was tested for eDNA. The results came back negative for great crested newts and they are therefore not considered present in this phase of the development.

Great crested newts are considered to be currently absent from the Town Park development site. No further action will be required.

Reptiles

The semi-improved grassland, hedgerows and tall ruderal within the application site are considered to hold potential to support common reptile species such as slow-worm, common lizard (*Zootoca vivipara*) and grass snake. These habitats are also well connected to further suitable habitat in the surrounding area including lowland farmland, hedgerows, woodland and small water courses. The desk study returned records of slow-worm within two kilometres of the development site. A previous reptile survey of the site and wider development zone carried out by Biodiversity by Design Ltd (Biodiversity by Design Ltd,

2010a) recorded the presence of grass snake, slow-worm and common lizard in relatively low numbers dispersed across the area.

The current proposals indicate that areas of suitable reptile habitat on site including semi-improved grassland will be removed. The results of the 2018 reptile surveys have been provided in table 14 below. A good population of slow worms were recorded on the site during the surveys (Froglife 1999).

Table 14: Results of reptile surveys

Date	Time	Weather	Temp (°c)	Species found
03/05/18	09:00	Wind 2/12, cloud 2/8	13	2 adult slow worms
11/05/18	09:10	Wind 2/12, cloud 2/8	13	2 adult slow worms
17/05/18	10:15	Wind 2/12, cloud 0/8	13	3 juvenile slow worms
24/05/18	9:45	Wind 2/12, cloud 7/8	15	1 male slow worm 1 female slow worm
07/06/18	12:00	Wind 1/12, cloud 8/8	18	3 male slow worm 2 female slow worm 6 juvenile slow worm
14/06/18	10:00	Wind 2/12, cloud 8/8	14	2 adult slow worm 2 juvenile slow worm
27/06/18	07:00	Wind 2/12, cloud 0/8	14	1 juvenile slow worm

A good population of slow worm was recorded across the site, further recommendations have been provided in section 5.6.

Otter and water vole

The stream running through to the pond and ditches may support populations of water vole and commuting otters in the area. The stream is heavily overgrown with scrub and lacks species favoured by foraging water vole. The ditches also lack any suitable foraging species for water voles. Surveys carried out for the wider Berewood development have not recorded water vole on the wider development area. They are therefore considered absent from this section of the site. The stream is also isolated from any other suitable watercourses which may be used by otters and is now surrounded by development. It is therefore considered highly unlikely that otter would be present within this section of stream.

Otters and water vole are not considered present within any of the watercourses within the site. No further action is required.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The Town Park at Berewood is considered to be of moderate ecological value with the main constraints relating to the presence of hedgerows, badgers, bats, and reptiles. The development may have the following impacts:

- Loss of the native hedgerow which is considered to be a UKBAP habitat.
- The killing/injury of badgers during the clearance of the site.
- Disturbance to bats foraging in the local area through the use of lighting.
- The killing/injury of nesting birds during the clearance of the site.
- The killing/injury of reptiles during the clearance of the site.

Mitigation strategies have been provided below to prevent and minimise these impacts.

5.1 Hedgerow

5.1.1 Summary of findings

The native hedgerows running along the boundaries of the site are considered to be UKBAP hedgerows due to comprising 80% native species. These hedgerows should therefore be retained in any development plans where possible. Previous surveys of the hedgerows, carried out by Biodiversity by Design Ltd in 2009, recorded hedgerows 3 and 5 as “Important” under the Hedgerow Regulations 1997. Mitigation is provided below in the event that sections of the hedgerows require removal for the works.

5.1.2 Mitigation

It is recommended that the hedgerows on site are retained alongside the development as far as reasonably possible. If the proposals require the removal of sections of hedgerow 3 and 5 then written permission from the local council will need to be obtained before this work can proceed prior to the reserve matters approval. If the design requires the removal of the hedgerows then further action will be required. The mitigation outlined below will be required.

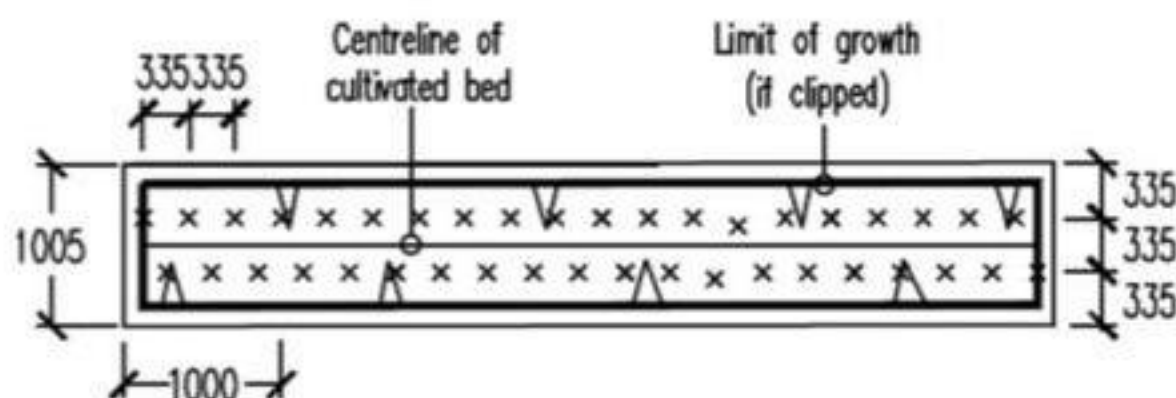
- Retain and protect the hedgerows in accordance with the British Standards Institute (2012) *Trees in Relation to Design, Demolition and Construction – Recommendations BS5837:2012* by installing Heras fencing along the root protection zones before works.
- Mitigate any hedgerow loss using native tree planting that is equivalent to the length of habitat lost. This would provide suitable mitigation for the hedgerow loss resulting from the proposals as well as an additional habitat feature suitable for a range of fauna including birds, invertebrates, reptiles and amphibians. New hedgerow planting would also enhance the aesthetic appeal of the site and provide natural screening of the development.

- An example of the species that could be used within new hedgerow planting on site are outlined in table 15 below and following the planting pattern illustrated in diagram 1.

Table 15: Species to be included in hedgerow/shrub planting

Species	Proportion within hedgerow
Spindle (<i>Euonymous europaea</i>)	10%
Hawthorn (<i>Crataegus monogyna</i>)	15%
Blackthorn (<i>Prunus spinosa</i>)	15%
Field maple (<i>Acer campestre</i>)	15%
Dog rose (<i>Rosa canina</i>)	5%
Hazel (<i>Corylus avellana</i>)	20%
Elder (<i>Sambucus nigra</i>)	10%
Crab apple (<i>Malus sylvestris</i>)	5%
Guelder-rose (<i>Viburnum opulus</i>)	5%
Pedunculate oak (<i>Quercus robur</i>) will be used for standard tree planting within the hedgerow.	

Diagram 1: Planting Pattern



5.2 Badgers

5.2.1 Summary of findings

Badger setts were recorded within the area of dense scrub on the site with a potential clan boundary present on the western boundary of the site. It is currently not clear what the impacts will be to the area of the site where the setts are located. Therefore, construction mitigation is proposed in line with the standard guidelines and the mitigation proposed in the Ecology Chapter, as per condition 6.

5.2.2 Mitigation

Natural England's guidelines on disturbance levels from developments and licensing requirements are stated below.

- Foraging areas should be maintained or new foraging areas should be created.

- Access between setts and foraging / watering areas should be maintained or new ones provided.
- Development that isolates a badger territory by surrounding it with roads or housing results in problems such as increased road traffic collisions, and badger damage to gardens and houses. The design of the development should seek to avoid this.
- Natural setts are usually favoured over artificial setts, so unnecessary closure of natural setts should be avoided.
- Badger tunnels can extend to 20 metres from the entrance holes and are located between 0.2 and several metres deep, depending on the soil and topography. Excavation work and heavy machinery should be kept well away from where it could result in damage to the sett or disturbance to any badger occupying the sett.
- Fires and chemicals should not be used within 20 metres of a sett.
- Trees should be felled so that they fall away from active setts and badger paths should be cleared of felled timber and scrub wherever possible.
- Disturbances, such as loud noise or vibrations, that might agitate badgers occupying a sett should be avoided or limited to areas well away from the sett.

If works take place within 20 metres of an active badger sett then a licence from Natural England may be required and the following mitigation may also be required:

Exclusion exercise

If the setts are directly impacted by the development the following procedure will be required:

- Exclusion will be conducted under licence using one-way gates between July and November.
- Once the gates have been installed they will be visited once every 3 days, by a suitably qualified ecologist, for a period of 21 days to ensure badgers have not dug their way back in.
- The gates will be left in situ for the duration of the exclusion exercise, and once the badgers are deemed to have left the sett they will then be dug up under the supervision of a suitably qualified ecologist.

The following construction mitigation measures are also recommended due to the proximity of the working area to active setts:

- Install fencing in areas where it is important to exclude badgers for safety reasons e.g. fuel storage areas.
- Locate any topsoil / material piles well away from identified badger activity and check on a daily basis for badger activity.
- Temporarily fence any piles of material that are to be on site for a significant period of time to prevent badgers from accessing the fresh soil.
- Minimise night-working to avoid disturbance to badgers, and cease works in proximity to active setts at least two hours before sunset.

- Where possible excavations should not be left open overnight. However, if excavations are left open at night, then an earth / wooden ramps must be installed to allow any animals that fall in to escape. Work areas would be checked daily to ensure no animals are trapped.
- Cap any pipes over-night on site to avoid animals becoming trapped.

The development of the Town Park area can provide enhanced foraging for the badgers across the wider Berewood development site. Sowing the open space with a wildflower grassland mix will provide enhanced foraging opportunities and the use of native fruiting species within the landscape design can provide additional foraging opportunities. The scheme should include ponds to provide additional drinking resources for the local badger population.

5.3 Bats

5.3.1 Summary of findings

The mixture of scrub and semi-improved grassland provides good foraging habitat for bats. A total of eight species and genus of bat were recorded during the static monitoring and activity surveys.

The Bat Conservation Trust considers bats such as Leisler's and Nathusius' pipistrelle to be uncommon (BCT, 2016). Other species recorded on site are considered to be common and widespread. It is considered that whilst the assemblage recorded is good and that low numbers of Leisler's bats (with a population between 10,000 and 100,000 nationally) were recorded, that in the context of the bat populations in the wider area the site is considered to be locally important. However, given the low numbers of bats observed during the transect and the generally low number of passes recorded by the static monitors, it is not considered that the site contains an important commuting route or foraging area associated with a nearby roost of high importance.

Development of the site could have a significant negative effect on bats using the area in terms of loss of foraging habitat, reduced landscape connectivity and disturbance from light pollution. This negative effect will be most detrimental to bats commuting and foraging along hedgerows along the southern edge of the site and woodland areas. This is reflected by the increase activity recorded in these areas by the static monitors and the activity surveys. Mitigation is therefore provided below.

5.3.2 Mitigation

Foraging and commuting habitat

The overall masterplan for the wider development maintains the connectivity across and around the site so that foraging or commuting bats are able to cross the site. Connectivity to retained woodland habitat will be maintained and where possible enhanced through planting additional hedgerows. The Town Park development can provide additional foraging opportunities with the inclusion of wildflower grasslands and the use of native species within the landscape design.

Lighting

The scheme is anticipated to have minimal lighting requirements. Where lighting is required the following measures will be put in place:

- Directing lighting to only where it is needed away from the hedgerows and trees.
- Through the design of the luminaire by using accessories such as cowls or hoods.
- Light sources should emit minimal ultra-violet light, peak higher than 550nm and be of a warm/neutral colour <4,200 kelvin.
- Using low pressure sodium lighting with light levels kept as low as practically possible (between 1 and 3 lux).
- Restricting the height of the lighting columns to three metres or less.

5.4 Birds

5.4.1 Summary of findings

Breeding birds

The hedgerows, woodland, ditches, and semi-improved grassland on site provided potential nesting habitat for birds.

Wintering birds

Whilst no wintering birds have been recorded previously on the site and the habitat is not considered suitable the Ecology Chapter outlined brent goose compensation measures, these are detailed below.

5.4.2 Mitigation

Breeding birds

The following precautions should negate the risk of harming nesting birds during both the infrastructure and housing development:

- The clearance of any scrub, hedgerows and semi-improved grassland should where possible be undertaken outside of the bird nesting season, which is considered to extend from the 1st March to the 31st August, or if this is not possible, clearance must be done under the supervision of an ecologist to ensure that nesting birds are not harmed. Where nesting birds are encountered, clearance and/or demolition must be postponed until the nestlings have fledged.
- Ecological enhancement measures suggested in section 5.7 will provide foraging and nesting opportunities for many species of bird.

Wintering birds

A substantial area of farmland 13.5 ha of 'Brent Goose Compensation Land' has been set aside on the north-western corner of the development. This will be managed to provide suitable habitat for brent geese. The measures are outlined within the Ecology Chapter (Biodiversity by Design 2010).

5.5 Dormice

5.5.1 Summary of findings

Dormice are present within the woodlands across the wider Berewood development site. The scrub and hedgerows present on the Town Park site provide suitable habitat for dormice but lack the connectivity to the wider woodland network which supports them. Dormice are therefore considered unlikely to be present in the habitats on site. A non-licensed method statement has been agreed with Natural England for clearance works which is detailed below.

5.5.2 Mitigation

Dormice are more active at night therefore all works should be undertaken within daylight hours. No vegetation clearance will be carried out between June and early September when adult dormice have dependent young. Supervised clearance will be carried out in either of the following two ways depending on the time of year works take place (active season or inactive season).

Active season (May or September/October)

- Clearance will be carried out in May or September/October when dormice are active and all young are independent. Clearance at this time of year can be carried out in a single stage clearance with all vegetation and stumps removed at the same time.
- Prior to clearance the area of vegetation will be inspected by a licenced ecologist to record any dormouse nests in the area.
- If no dormice are recorded then clearance will then take place with the use of hand trimmers in one direction towards the retained habitat.
- The noise of the machinery and contractors will cause any dormice in the area to move out of the working area.
- Any stumps in the area can then be removed.
- A completion statement will be produced following the works detailing the findings and actions taken during the clearance.

Inactive season (November to April)

- Clearance carried out between November and April will be carried out in a two stage clearance.
- Prior to clearance the area of vegetation will be inspected by a licenced ecologist to record any dormouse nests in the area.

- Clearance of above ground vegetation will be carried out with hand tools with vegetation cleared to no lower than 10cm from the ground. The stumps will remain in place over the winter to avoid the risk of encountering any hibernating dormice.
- No sections larger than 50 metre ² will be cleared in this manner to ensure that any dormice emerging from hibernation are not isolated from suitable habitat.
- The stumps can then be removed in May once dormice are active. The stump will be inspected by a licenced ecologist prior to removal.
- A completion statement will be produced following the works detailing the findings and actions taken during the clearance.

If dormice are encountered, then the works will cease immediately and Natural England will be contacted for further advice and this may result in a European Protected Species licence application being obtained.

5.6 Reptiles

5.6.1 Summary of findings

The semi-improved grassland, hedgerows, scrub and woodland on site, all provided suitable areas of habitat for common reptile species such as slow-worm, grass snake and common lizard. The reptile surveys recorded a good population of slow worm on the site.

5.6.2 Mitigation

The mitigation strategy will include a strim and push mitigation methodology due to the low numbers of reptiles recorded and the level of habitat that is to be lost. A full translocation exercise is therefore not considered necessary. Details of the mitigation measures are provided below.

- Clearance works should be carried out in the spring and the habitat within the works area will be made unsuitable by strimming the habitat. This will be carried out in temperatures above 10°C when reptiles are more mobile. The cutting of the habitat will be carried out in a two strim cycle where vegetation exceeds 15cm. The first cut will be made to 15cm. If vegetation is below 15cm or after the first strim cycle the next strim cycle will be to ground level. This cutting will take place in one direction towards the suitable habitat that is being retained in order to give any reptiles a chance to leave the area.
- All arisings from the cutting and clearance will be immediately removed from the works area to prevent any reptiles sheltering within it.
- The habitat within the works area will then be maintained at a short sward height to discourage reptiles from entering the works area.
- Any spoil piles, log piles or tree root systems that need to be removed should be dismantled or excavated carefully during weather greater than 10°C during the time

when reptiles are active, March to October, to avoid disturbing any hibernating reptiles.

- Materials and any arisings, such as rubble from demolition, will be kept off the ground through the use of skips or pallets.

Habitat enhancement

The Town Park phase of the development can be enhanced for reptiles with the inclusion of wildflower grassland areas which can be oversown with an EM10 wildflower mix and maintained to provide a scrub:grassland mosaic favoured by slow worms. The construction of hibernacula within these areas can further enhance the habitat for slow worms.

Ecological enhancement measures that could potentially benefit reptiles on site are provided in section 5.7.

5.7 Ecological enhancement

A few suggestions for ecological enhancements across the development site are outlined below.

- Provision of log and brushwood piles alongside any retained hedgerows and within any new habitat creation areas will provide refugia and hibernacula for reptiles and other fauna such as hedgehog (*Erinaceus europaeus*) and deadwood invertebrates.
- Flowering grassland seed mixes from a supplier of seeds of local provenance can be used to seed new lawns and areas of amenity grassland within the layout of the development (such as Emorsgate EL1). Such grassland provides better nectar sources for invertebrates and hence is of greater value for foraging birds, reptiles and amphibians.
- The inclusion of wildlife ponds within the design of any proposals would enhance the area for local amphibians and invertebrate populations. The pond should be kept free of fish and planted with native British plant species such as water-plantain (*Alisma plantago-aquatica*), reed sweet-grass (*Glyceria maxima*) and yellow flag.
- The stream and pond on the site could be further enhanced with habitat management works. Clearing the scrub from the stream and pond area would enhance the area allowing more sunlight to reach the banks encouraging the growth of aquatic species such as yellow iris.

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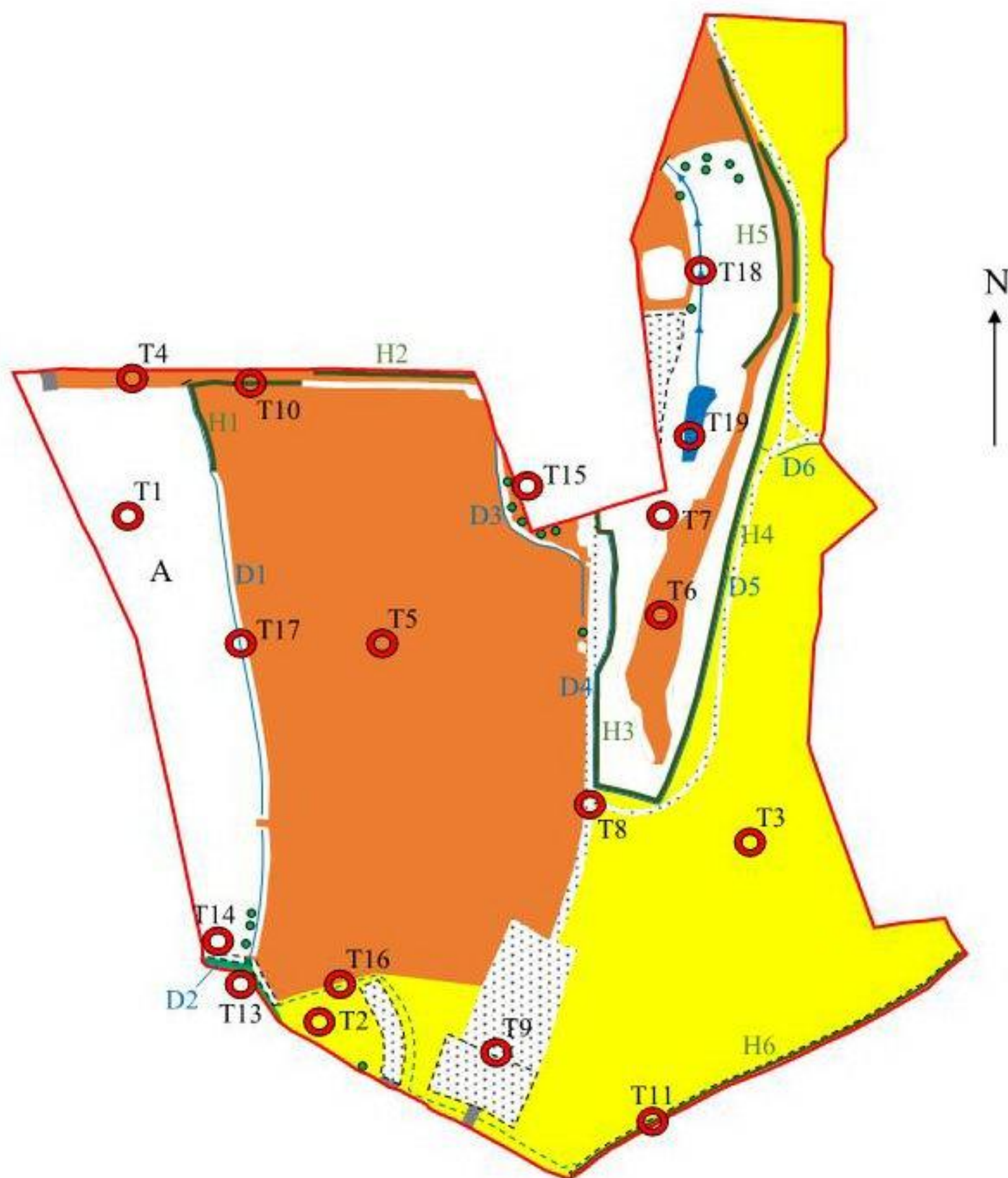
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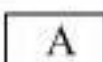
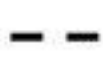
APPENDIX I: Site Location Plan



APPENDIX II: Phase 1 habitat map



Phase 1 habitat key

	Hardstanding
	Bare ground
	Arable
	Amenity grassland
	Semi-improved grassland
	Tall ruderal
 H1 – H6	Native hedgerow
	Scrub
	Native broad-leaved woodland
	Plantation woodland
	Tree
	Fence line
	Wall
	Dry ditch
 D1 – D7	Wet ditch
	Stream
	Pond
	Survey boundary
 T1	Target notes

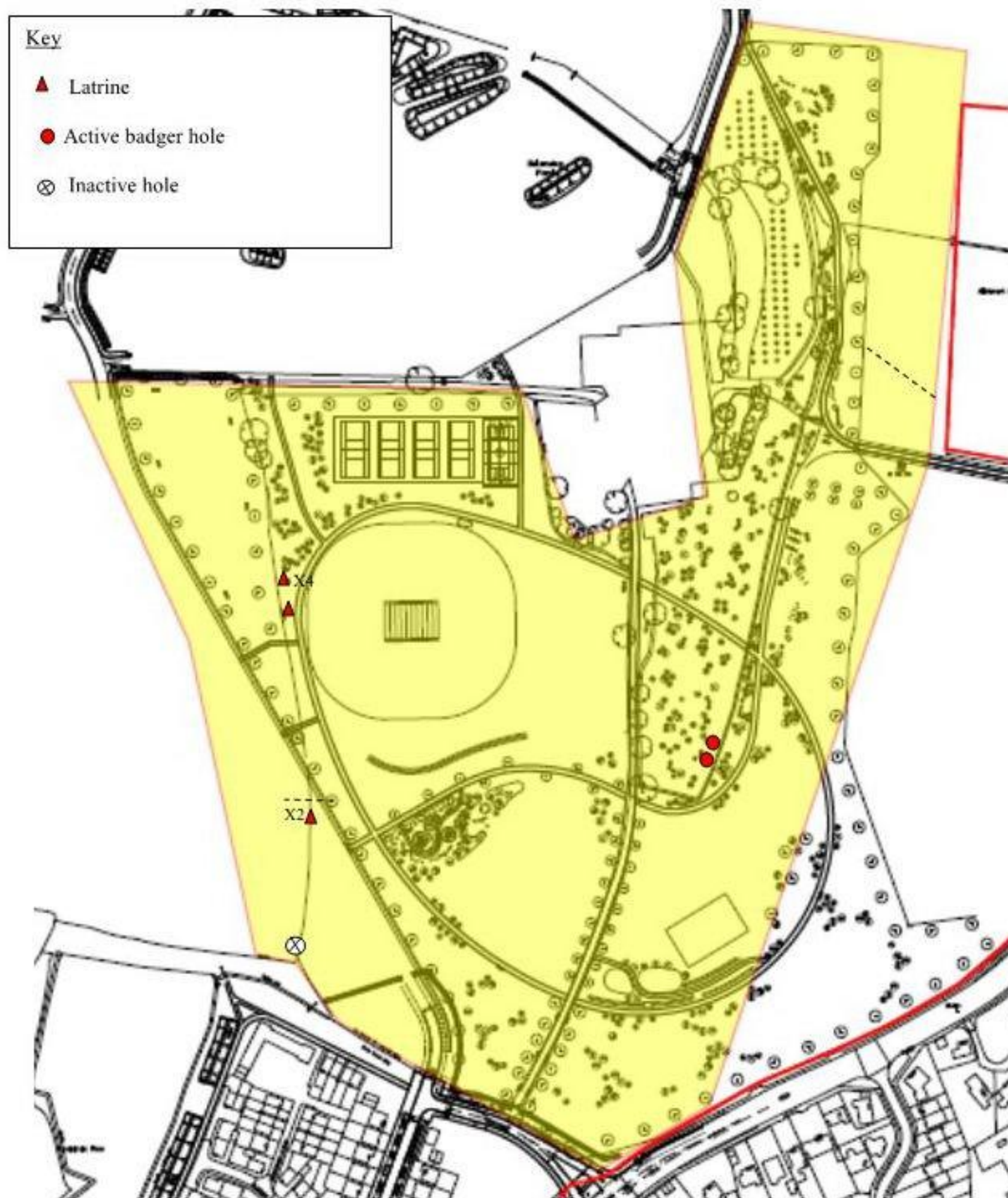
Target notes to accompany Phase 1 habitat map

Target Note	Description
1	Arable land which is currently being used for growing wheat (<i>Triticum sp.</i>).
2	Regularly managed amenity grassland comprising a regularly mown, species-poor sward c. 3-4 centimetres in height. Species recorded include common bent (<i>Agrostis capillaris</i>), Yorkshire fog (<i>Holcus lanatus</i>), daisy (<i>Bellis perennis</i>), dandelion (<i>Taraxacum</i> agg.), white clover (<i>Trifolium repens</i>), common bird's-foot trefoil (<i>Lotus corniculatus</i>), greater plantain (<i>Plantago major</i>), sticky mouse-ear (<i>Cerastium glomeratum</i>), red fescue (<i>Festuca rubra</i>) and cat's-ear (<i>Hypochaeris radicata</i>).
3	Rough amenity grassland which comprises an infrequently managed and mostly species-poor sward c. 10-12 centimetres in average height. Dominant and abundant species recorded within the sward include Yorkshire fog, perennial ryegrass (<i>Lolium perenne</i>), false oat-grass (<i>Arrhenatherum elatius</i>) and creeping bent (<i>Agrostis stolonifera</i>), other species recorded include soft brome (<i>Bromus hordeaceus</i>), red fescue (<i>Festuca rubra</i>), annual meadow-grass (<i>Poa annua</i>), rough-stalked meadow-grass (<i>Poa trivialis</i>), creeping thistle (<i>Cirsium arvense</i>), wild teasel (<i>Dipsacus fullonum</i>), cut-leaved crane's-bill (<i>Geranium dissectum</i>), common bird's-foot trefoil, bristly ox-tongue (<i>Picris echioides</i>), ribwort plantain (<i>Plantago lanceolata</i>), curled dock (<i>Rumex crispus</i>), broad-leaved dock (<i>Rumex obtusifolius</i>), dandelion (<i>Taraxacum</i> agg.), lesser trefoil (<i>Trifolium dubium</i>), white clover (<i>Trifolium repens</i>), common ragwort (<i>Senecio jacobaea</i>) and common vetch (<i>Vicia sativa</i>).
4	Species-poor, semi-improved grassland comprising a mostly grass-dominated sward, c. 8 centimetres in average height, with few common/widespread forbs in limited abundance. Dominant and abundant species recorded within the sward include Yorkshire fog, creeping bent, common bent (<i>Agrostis capillaris</i>), cock's-foot (<i>Dactylis glomerata</i>), white clover and creeping buttercup (<i>Ranunculus repens</i>), other species recorded include red fescue, cut-leaved crane's-bill (<i>Geranium dissectum</i>), cat's-ear, ribwort plantain (<i>Plantago lanceolata</i>), broad-leaved dock (<i>Rumex obtusifolius</i>), dandelion (<i>Taraxacum</i> agg.), red clover (<i>Trifolium pratense</i>) and common ragwort (<i>Senecio jacobaea</i>).
5	Semi-improved grassland comprising a rough, regenerating sward, c. 6 centimetres in average height, with abundant ruderals and scattered goat willow (<i>Salix caprea</i>) and bramble (<i>Rubus fruticosus</i> agg.) scrub. It is considered that this grassland has regenerated on land that was formerly used for arable farming. Dominant, abundant and frequent species within the sward include creeping bent, Yorkshire fog, ribwort plantain, bristly oxtongue (<i>Picris echioides</i>), Canadian fleabane (<i>Conyza canadensis</i>) and willowherb (<i>Epilobium sp.</i>), other species recorded include common bent, cock's-foot, common mouse-ear (<i>Cerastium fontanum</i>), creeping thistle, spear thistle (<i>Cirsium vulgare</i>), cut-leaved crane's-bill, hogweed (<i>Heracleum sphondylium</i>), greater plantain, meadow buttercup (<i>Ranunculus acris</i>), broad-leaved dock, common ragwort, dandelion, white clover and common nettle (<i>Urtica dioica</i>).
6	Moderately species-rich semi-improved grassland comprising a short rabbit (<i>Oryctolagus cuniculus</i>)-grazed sward, approximately 5-7 centimetres in average height. The sward comprises a variety of common grasses and forbs which include Yorkshire fog, creeping bent, common bent, cock's-foot, ribwort plantain, ox-eye daisy (<i>Leucanthemum vulgare</i>), common vetch, creeping cinquefoil (<i>Potentilla reptans</i>), mugwort (<i>Artemisia vulgaris</i>), common mouse-ear, spear thistle, wild teasel, willowherb (<i>Epilobium sp.</i>), cut-leaved crane's-bill, ground ivy (<i>Glechoma hederacea</i>), meadow vetchling (<i>Lathyrus pratensis</i>), cowslip (<i>Primula</i>

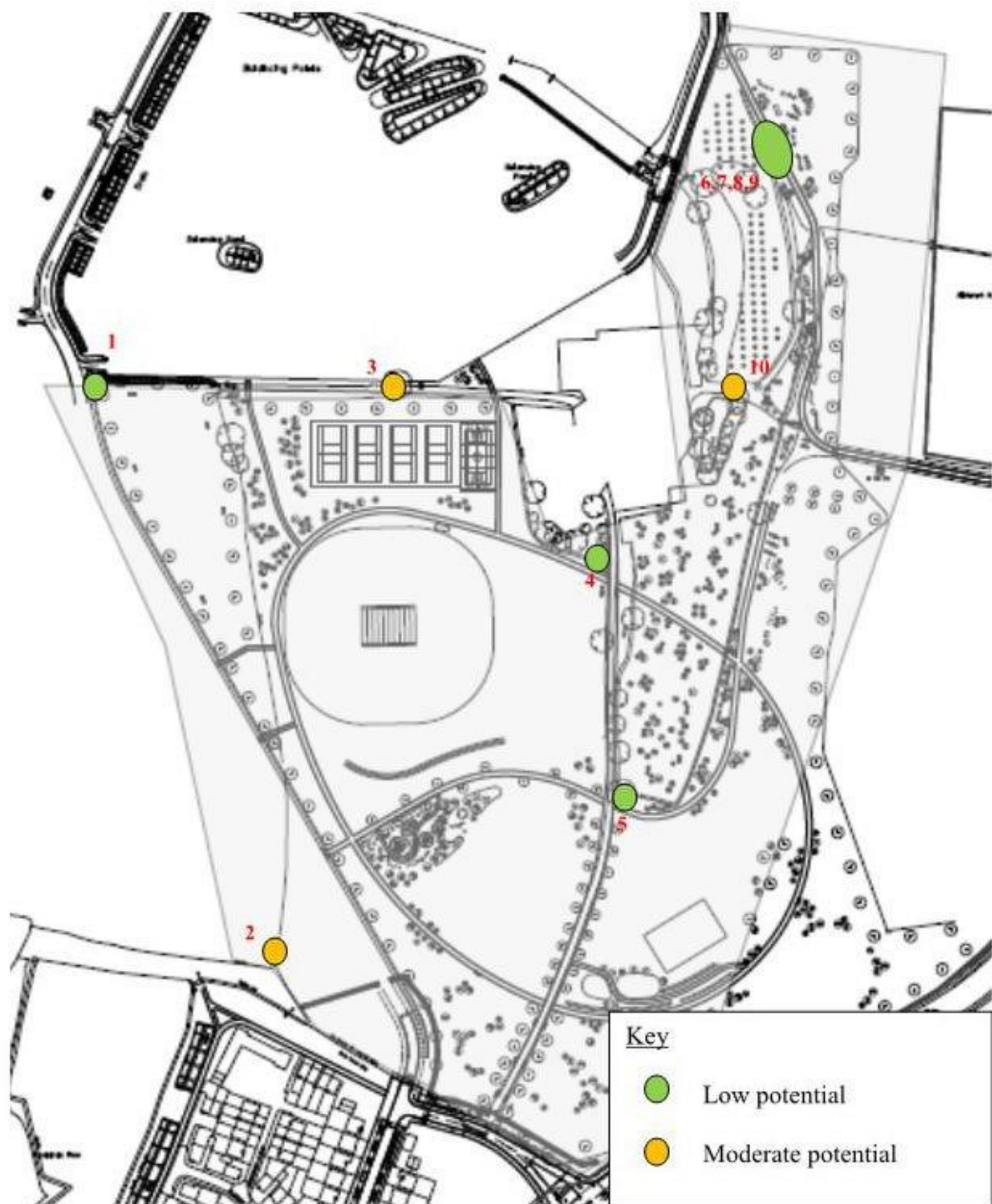
Target Note	Description
	<i>veris</i>), meadow buttercup, curled dock, broad-leaved dock, hoary ragwort (<i>Senecio erucifolius</i>), dandelion, red clover, white clover and common nettle.
7	Stands of tall ruderal vegetation, species recorded include common nettle, cleavers (<i>Galium aparine</i>), hogweed, cock's-foot, willowherb, creeping buttercup (<i>Ranunculus repens</i>), false oat-grass, wild teasel (<i>Dipsacus fullonum</i>) and colt's-foot (<i>Tussilago farfara</i>).
8	Gravel trackways and pedestrian footpaths.
9	Construction site compounds and area of bare earth used for storing construction materials.
10	Established, species-rich native hedgerows comprising a good variety of woody species and a relatively diverse field layer which includes ancient woodland indicator species such as dog's mercury (<i>Mercurialis perennis</i>) and wood false-brome (<i>Brachypodium sylvaticum</i>). The established hedgerows range from approximately 2.5 to 5.5 metres in height and include mature standard trees and adjoining drainage ditches.
11	A recently planted (but well established) native hedgerow (H6) which comprises a mixture of native shrub planting, with some tree guards still in place, that ranges between 2 and 3.5 metres in height, the field layer of this hedgerow is mostly species poor.
12	Stands of scattered and dense scrub. Species recorded include bramble, goat willow, willows (<i>Salix spp</i>), elder (<i>Sambucus nigra</i>), wild plum (<i>Prunus domestica</i>), Wilson's honeysuckle (<i>Lonicera nitida</i>), cherry (<i>Prunus sp</i>), hazel (<i>Corylus avellana</i>), blackthorn (<i>Prunus spinosa</i>), rose (<i>Rosa sp</i>), butterfly-bush (<i>Buddleja davidii</i>), pedunculate oak (<i>Quercus robur</i>), holly (<i>Ilex aquifolium</i>), sycamore (<i>Acer pseudoplatanus</i>), ash (<i>Fraxinus excelsior</i>) and honeysuckle (<i>Lonicera periclymenum</i>).
13	Native, broad-leaved woodland which is floristically diverse and includes a number of ancient woodland indicator species within the ground flora, such as dog's mercury, wood anemone (<i>Anemone nemorosa</i>) and bluebell (<i>Hyacinthoides non-scripta</i>), other species recorded include pedunculate oak, goat willow, hazel, blackthorn, rose, elder, remote sedge (<i>Carex remota</i>), lords and ladies (<i>Arum maculatum</i>), enchanter's nightshade (<i>Circaea lutetiana</i>), cleavers (<i>Galium aparine</i>), herb robert (<i>Geranium robertianum</i>), ivy (<i>Hedera helix</i>), soft shield-fern (<i>Polystichum setiferum</i>), bracken (<i>Pteridium aquilinum</i>), bramble, wood dock (<i>Rumex sanguineus</i>), common figwort (<i>Scrophularia nodosa</i>) and common nettle.
14	Plantation woodland comprising a fenced-off area which contains numerous recently planted native tree and shrub saplings with tree guards in place. Species recorded within this area include dogwood (<i>Cornus sanguinea</i>), hazel, blackthorn, guelder rose (<i>Viburnum opulus</i>), hawthorn, field maple (<i>Acer campestre</i>), rose and cherry (<i>Prunus sp</i>).
15	There are a number of scattered trees within the site which include mature specimens of pedunculate oak, sycamore, ash, field maple, yew (<i>Taxus baccata</i>) and Leyland cypress (<i>Cupressus × leylandii</i>).
16	A dry ditch comprising a recently excavated small earth channel c. 0.5 metres in depth and width. It is vegetated with the surrounding regularly managed amenity grassland vegetation, as described in the relevant section above.
17	Wet drainage ditches which are approximately 0.5 – 0.75 metres in depth and 0.5 – 0.75 metres in width, they are mostly situated in heavily shaded conditions alongside hedgerows, underneath dense scrub and under broad-leaved woodland, with the exception of ditch D5 and part of ditch D3 which are situated within open fields. No macrophytic vegetation was noted within the ditches on site,

Target Note	Description
	instead they are vegetated with the local surrounding flora. Ditch D5 contains some common grasses and ruderals, such as Yorkshire fog, red fescue, rough-stalked meadow grass (<i>Poa trivialis</i>), willowherb (<i>Epilobium sp</i>) and dock (<i>Rumex sp</i>), however it is considered that this ditch is likely to be dry at most times of the year. The wet drainage ditches comprise earth channels and banks, water quality varies from good/clear to very poor/turbid and stagnant with some algal growth also noted.
18	A stream which stretches between the pond (T19) and the northern boundary of the site. The stream is mostly enclosed by mature and dense scrub, it has a shallow channel, c. 0.25 metres in depth, which varies in width from 0.25 – 1.5 metres, in one section the stream channel opens out into a wide muddy flush with some common/widespread macrophytic vegetation including hemlock water-dropwort (<i>Oenanthe crocata</i>), yellow iris (<i>Iris pseudacorus</i>), great willowherb (<i>Epilobium hirsutum</i>) and water figwort (<i>Scrophularia auriculata</i>). The substrate of the stream channel is mostly comprised of earth though it becomes more stony where it nears the northern boundary of the site.
19	A pond which is approximately 150 square metres in size and is enclosed by dense/mature willow (<i>Salix spp</i>) scrub. Water quality varies between average and poor, it is quite turbid and silty in places with some algal growth also noted. Macrophytic vegetation is very limited with only a small amount of yellow iris and hemlock water-dropwort recorded.

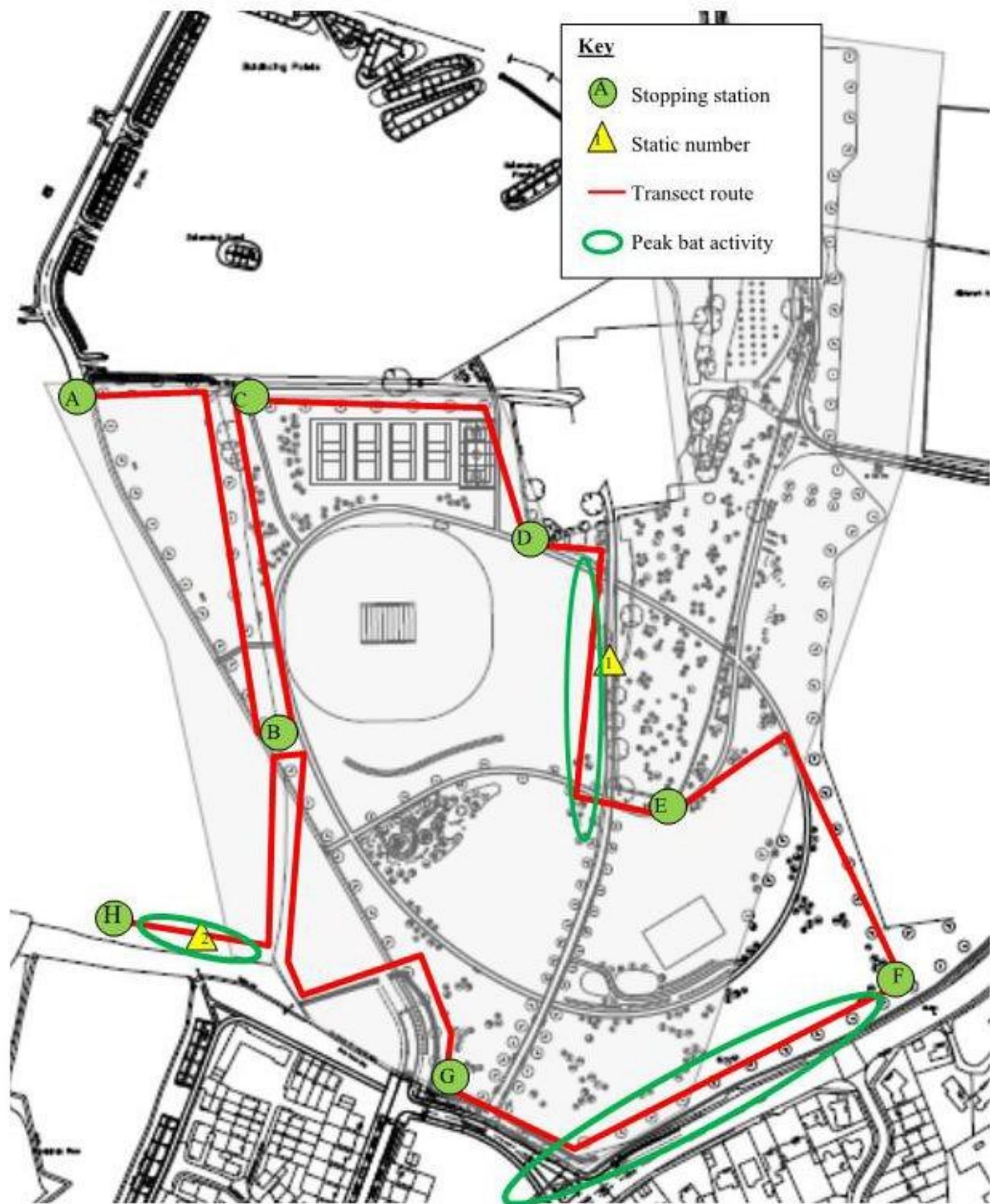
APPENDIX III: Badger map



APPENDIX IV: Bat tree plan



APPENDIX V: Transect map and peak activity areas



APPENDIX VI: Results of bat transect survey

April 2018

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Town Park - Berewood	SURVEYORS:	Pete Duffy, Alex Hannam	DATE:	30.04.2018
TEMP AT START:	9°C	SUNSET:	20:23	START TIME:	20:23
TEMP AT END:	8°C	CLOUD COVER (oktas):	4/8	END TIME:	22:23
WIND (bft):	0/12	RAINFALL:	0	WEATHER:	Dry /cool
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
21:07-21:09	E	Common pipistrelle	1	Foraging along the hedgerow from north to south then south to north.	
21:13	F	Common pipistrelle	1	Foraging along the hedgerow from north to south then south to north.	
21:17	F	Common pipistrelle	1	Foraging along the hedgerow from north to south then south to north.	
21:40	H	Common pipistrelle	1	Heard but not seen, brief call.	
21:42	H	Common pipistrelle	1	Commuting, heard but not seen.	
21:43	H	Common pipistrelle	1	Foraging along edge of the woodland.	
21:55	A	Long-eared	1	Commuting, brief and faint call.	

May 2018

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Town Park - Berewood	SURVEYORS:	Alex Hannam, and Lisa Sharp	DATE:	21/05/2018
TEMP AT START:	17°C	SUNSET:	20:55	START TIME:	20:55
TEMP AT END:	15°C	CLOUD COVER (oktas):	4/8	END TIME:	22:55
WIND (bft):	1/12	RAINFALL:	occasional	WEATHER:	Calm/showers
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
21:34	E	Common pipistrelle	1	Heard not seen	
21:37	E	Common pipistrelle	1	Foraging northwest to southwest.	
21:47	E-F	Common pipistrelle	1	Heard not seen	
21:50	F	Common pipistrelle	1	Commuting northwest to south.	
21:51- 21:53	F	Common pipistrelle	1	Foraging along the tree line.	
21:53	F-G	Common pipistrelle	1	Foraging along the northern boundary.	
21:57	F-G	Common pipistrelle	1	Foraging along northern boundary.	
22:27	A	Common pipistrelle	1	Heard but not seen.	
22:33	B	Common pipistrelle	1	Foraging.	
22:38	B-C	Soprano pipistrelle	1	Commuting.	

June 2018

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Town Park - Berewood	SURVEYORS:	William Davis and Andrew Heideman	DATE:	11.06.2018
TEMP AT START:	18°C	SUNSET:	21:17	START TIME:	21:17
TEMP AT END:	16°C	CLOUD COVER (oktas):	0/8	END TIME:	23:22
WIND (bft):	2/12	RAINFALL:	Nil	WEATHER:	Clear
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.)	
22:05 – 22:13	D - E	Common pipistrelle	3	Foraging along the road, intermittent.	
22:13-22:18	E	Common pipistrelle	1	Heard but not seen.	
22:13	E	Common pipistrelle	2	Foraging south to north along the road, constant calls.	
22:17	E	Common pipistrelle	1	Commuting north along field edge.	
22:21 – 22:24	F	Common pipistrelle	2	Commuting northeast to southeast along the hedgerow.	
22:26 – 22:27	F	Common pipistrelle	1	Heard but not seen, intermittent passes.	
22:30	F	Common pipistrelle	1	Heard but not seen.	
22:32	G	Common pipistrelle	1	Heard but not seen.	
22:34	G	Noctule	1	Heard but not seen.	
22:34	G	Common pipistrelle	1	Heard but not seen.	
22:39	G-H	Noctule	1	Heard not seen	
22:38 – 22:44	G - H	Common pipistrelle	1	Heard but not seen, foraging north to south along the hedgerow.	
22:54	H-A	Common pipistrelle	1	Heard but not seen, foraging around trees.	
22:56 – 23:02	A	Common pipistrelle	1	Heard but not seen.	

July 2018

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Town Park - Berewood	SURVEYORS:	Sam Fletcher and George Hunt	DATE:	23.07.18
TEMP AT START:	21°C	SUNSET:	21:03	START TIME:	21:14
TEMP AT END:	19°C	CLOUD COVER (oktas):	0/8	END TIME:	23:14
WIND (bft):	0/12	RAINFALL:		WEATHER:	Cool, still
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
21:49-21:54	C	Common pipistrelle	1	Seen not heard commuting north through gap	
22:05	D-E	Common pipistrelle	1	Heard not seen	
22:07-22:12	E	Common pipistrelle	2	Circling by treeline	
22:10	E	Noctule	1	Heard not seen	
22:14	E-F	Common pipistrelle	1	Heard not seen	
22:17 – 22:20	E-F	Common pipistrelle	1	Heard not seen	
22:21-21:26	F	Common pipistrelle	3	Foraging continuous, one commuted east to west	
22:32	G	Common pipistrelle	1	Heard not seen, social calling	
22:38	G-H	Common pipistrelle	1	Heard not seen	
22:44	H	Common pipistrelle	1	Heard not seen	

August 2018 - dusk

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Town Park - Berewood	SURVEYORS:	Joe Marcroft & Pete Duffy	DATE:	06.08.2018
TEMP AT START:	22°C	SUNSET:	20:40	START TIME:	20:40
TEMP AT END:	19°C	CLOUD COVER (oktas):	5/8	END TIME:	22:40
WIND (bft):	1/12	RAINFALL:	None	WEATHER:	Dry
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
21:10-12	H-G	Common pipistrelle	1	Heard but not seen, foraging southwest boundary of the site.	
21:12	H-G	Soprano pipistrelle	1	Heard but not seen, foraging southwest boundary of the site.	
21:22	F	Common pipistrelle	1	Heard but not seen.	
21:32-33	E	Common pipistrelle	1	Heard but not seen, continuous foraging.	
21:34	E	Serotine	1	Commuting south east to north west on the western boundary of the site.	
21:38	E-D	Noctule	1	Heard but not seen.	
21:38	E-D	Common pipistrelle	1	Heard but not seen.	
21:39-43	E-D	Common pipistrelle	1	Heard but not seen.	
21:43	E-D	Noctule	1	Heard but not seen.	
21:47	D	Serotine	1	Commuting north to south.	
21:48	D	Common pipistrelle	1	Heard but not seen.	
21:51	D	Common pipistrelle	1	Heard but not seen.	
21:51	D	Serotine	1	Heard but not seen.	
22:00-01	C	Common pipistrelle	1	Heard but not seen.	
22:01	C	Soprano pipistrelle	1	Heard but not seen, foraging on the northwest boundary.	
22:01	C	Myotis sp.	1	Heard but not seen.	
22:02	C-B	Common pipistrelle	1	Heard but not seen on the northwest boundary of the site.	
22:03	C-B	Common pipistrelle	1	Heard but not seen on the northwest boundary of the site.	

22:03	C-B	Myotis sp.	1	Heard but not seen on the northwest boundary of the site.
22:06-08	B	Common pipistrelle	1	Heard but not seen, continuous calls.
22:09	B	Serotine	1	Heard but not seen.
22:10	B	Common pipistrelle	1	Heard but not seen.
22:10-11	B-A	Serotine	1	Heard but not seen.
22:11-12	B-A	Common pipistrelle	1	Heard but not seen.
22:14-15	B-A	Common pipistrelle	1	Heard but not seen.
22:18-20	A	Soprano pipistrelle	1	Foraging under a street light on the northwest corner of the site.
22:24-31	A-H	Common pipistrelle	1	Heard but not seen, foraging on the western boundary of the site.
22:28-33	H	Common pipistrelle	1	Heard but not seen, continuous calls.
22:32	H	Serotine	1	Heard but not seen.
22:34	H-G	Common pipistrelle	1	Heard but not seen.
22:37-22:40	G	-	-	Heard but not seen.
22:38	G	Common pipistrelle	1	Heard but not seen.

August 2018 - dawn

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Town Park - Berewood	SURVEYORS:	Joe Marcroft and Pete Duffy	DATE:	07/08/18
TEMP AT START:	16°C	SUNRISE:	05:40	START TIME:	03:40
TEMP AT END:	16°C	CLOUD COVER (oktas):	0/8	END TIME:	05:40
WIND (bft):	1/12	RAINFALL:	None	WEATHER:	Dry, cool
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
03:41-46	A	Common pipistrelle	1	Heard but not seen, continuous calls.	
03:56	B-C	Noctule	1	Heard but not seen on the western boundary.	
04:02	C	Serotine	1	Heard but not seen.	

04:20	E	Common pipistrelle	1	Heard but not seen.
04:41	G-H	Soprano and common pipistrelle	2	Heard but not seen on the southwest boundary of the site.
04:44-04:45	H	Common pipistrelle	1	Heard but not seen.
04:48	H	Common pipistrelle	1	Heard but not seen.
04:56	H-A	Common pipistrelle	1	Heard but not seen on the northwest corner of the site.
04:58	A	Common pipistrelle	1	Commuting north to south.

September 2018

BAT DETECTOR ACTIVITY SURVEY					
SURVEY LOCATION:	Town Park - Berewood	SURVEYORS:	William Davis & Stuart Woodley	DATE:	13.09.2018
TEMP AT START:	17°C	SUNSET:	19:24	START TIME:	19:24
TEMP AT END:	14°C	CLOUD COVER (oktas):	4/8	END TIME:	21:24
WIND (bft):	1/12	RAINFALL:	Nil	WEATHER:	Calm & dry.
TIME	STOPPING POINT/TARGET NOTE	SPECIES	NUMBER OF BATS	ACTIVITY (behaviour/ commuting/ direction/ foraging/ feeding/ feeding buzzes/ roost/ etc.	
19:54	D-E	Common pipistrelle	1	Heard but not seen, brief call.	
19:55	D-E	Common pipistrelle	2	Commuting along hedgerow.	
20:02	E	Common pipistrelle	1	Heard but not seen.	
20:06	E	Common pipistrelle	1	Heard but not seen, social calling	
20:09	E-F	Common pipistrelle	1	Heard but not seen.	
20:10- 20:13	E-F	Common pipistrelle	1	Heard but not seen, social calling	
20:13	F	Common pipistrelle	1	Heard but not seen, irregular passes.	
20:32	G-H	Common pipistrelle	1	Heard but not seen.	
20:49	Near G	Common	1	Heard but not seen.	

		pipistrelle		
21:22	C	Common pipistrelle	1	Heard but not seen.
21:24	C	Common pipistrelle	1	Heard not seen