The Thomas Family & Bloor Homes Limited

# Land at Newlands Farm, Old Wokingham Road, Wokingham – Proposed SANG

# ECOLOGICAL APPRAISAL

December 2023

*This report may contain sensitive ecological information, it is the responsibility of the Local Authority to determine if this should be made publicly available*

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## APPENDICES

# 1.0 INTRODUCTION

1.1 The following report has been prepared by FPCR Environment and Design Ltd. (FPCR) on behalf of The Thomas Family & Bloor Homes Limited and provides details of an Ecological Appraisal undertaken on Land at Newlands Farm, Old Wokingham Road, Wokingham (hereafter referred to as the 'Site'). The Site measures approximately 16 ha and is centred on ordnance survey grid reference SU 834 664.

## Site Location and Context

1.2 The Site is located between Bracknell and Wokingham in Berkshire. It is surrounded by a mixture of pine woods, grazing pasture, a golf course and fruit farms. The Site itself encompasses a number of grazing pasture field parcels and two small areas of woodland. There is a series of ditches and streams across the Site.

## Development Proposals

1.3 The proposed development is for a change of use of land from agricultural use to Class F2 c) outdoor sport or recreation, for use as suitable alternative natural greenspace (SANG).

## Scope of Appraisal

1.4 This Ecological Appraisal describes the current ecological interest within and around the Site, which has been identified through standard desk- and field-based investigations. It then considers the potential ecological impacts and opportunities for ecological enhancement based on the SANG Framework Plan in the context of relevant legislation and planning policy. Finally, it identifies the necessary additional measures to avoid, mitigate or provide compensation for potential impacts, and the mechanisms for securing such measures.

# 2.0 METHODOLOGY

## Desktop Study

2.1 A Desk Study is an important element of undertaking an initial ecological appraisal of a site proposed for development, enabling the initial collation and review of contextual information, such as designated sites, together with known records of protected and priority species.

2.2 The Desk Study involved collating biodiversity information from the following sources:

- Thames Valley Environmental Record Centre (TVERC); and
- Multi-Agency Geographic Information for the Countryside (MAGIC) website[1].

2.3 The search areas were related to the significance of sites and their potential zones of influence[2], as follows:

- 15km around the Site for sites of International Importance (e.g. Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites);
- 2km around the Site for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs); and
- 2km around the Site for non-statutory sites of Local or County Importance or statutory sites such as Local Nature Reserves (LNRs) and Local Wildlife Sites (LWSs).

2.4 Further inspection, using colour 1:25,000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk), was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside. Results are shown in **Figure 1**.

## Field Survey

### Extended Phase 1 Survey Habitats

2.5 An Extended Phase 1 Habitat Survey was undertaken which involved classification of the broad habitat types present using the system published by the UK Joint Nature Conservation Committee[3]. This comprised a walkover of the Site, mapping and broadly describing the principal habitat types and identifying the dominant plant species present within each habitat type and any invasive weeds (where present). Whilst the plant species lists obtained should not be regarded as exhaustive, sufficient information was obtained to determine broad habitat types.

2.6 Throughout the walkover survey consideration was additionally given to the actual or potential presence of protected species, such as, although not limited to those protected under the Wildlife and Countryside Act 1981 (*as amended*), the Protection of Badgers Act 1992[4] and the Conservation of Habitat and Species Regulations 2017 (*as amended*).

2.7 This survey was originally conducted on 14th April 2022 and updated on 15th May 2023.

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[1] www.magic.gov.uk.
[2] Zone of Influence - the areas and resources that may be affected by the proposed development
[3] JNCC 2010. *Handbook for Phase 1 habitat survey - a technique for environmental audit*, ISBN 0 86139 636 7
[4] *The Protection of Badgers Act 1992* (*as amended*). [Online]. London: HMSO Available from: http://www.legislation.gov.uk/ukpga/1992/51/contents

## Fauna

### Great Crested Newt

2.8 As part of the Phase 1 habitat survey any waterbodies within a 250m radius were identified using OS maps and aerial satellite imagery.

2.9 As shown in **Figure 2**, five ponds were identified within 250m of the Site. Letters of requests for access were sent to the owners of these ponds (identified through land registry searches), however access for survey was only granted to pond P2.

Habitat Suitability Index

2.10 A habitat suitability index (HSI) assessment was undertaken on Pond P2. This assessment[5] provides a measure of the likely suitability that a waterbody has for supporting great crested newts (GCN) *Triturus cristatus*. Whilst not a direct indication of whether or not a pond will support GCN generally, those with a higher score are more likely to support the species than those with a lower score and there is a positive correlation between HSI scores and ponds in which GCN are recorded. Ten separate attributes are assessed for each pond to calculate the suitability of the ponds to support GCN:

| | |
|---|---|
| Geographic location | Presence of water-fowl |
| Pond area | Presence of fish |
| Pond drying | Number of linked ponds |
| Water quality | Terrestrial habitat |
| Shade | Macrophytic coverage |

2.11 A score is assigned according to the most appropriate criteria level set within each attribute and a total score calculated of between 0 and 1. Pond suitability is then determined according to the scale set out in **Table 1** below. Using the index score the predicted presence of GCN being found within a pond can be made, based on the proportion of ponds typically occupied at that suitability level.

**Table 1: HSI Score and Suitability for Supporting Great Crested Newts**

| HSI score | Pond Suitability |
|---|---|
| <0.5 | Poor |
| 0.5 - 0.59 | Below average |
| 0.6 – 0.69 | Average |
| 0.7 – 0.79 | Good |
| >0.8 | Excellent |

2.12 An assessment of the suitability of terrestrial habitats to support GCN was also completed within the Site. Suitable terrestrial habitat includes shelter habitat such as scrub and rank vegetation and habitat that could provide suitable hibernation sites such as rubble piles or tussock grassland.

eDNA Surveys

2.13 Environmental DNA (eDNA) sampling was undertaken of P2 to determine the presence/absence of GCN in accordance with the Technical Advice Note for field and laboratory sampling of GCN eDNA

[5] Oldham et al. 2000. *Herpetological Journal* 10(4); Evaluating the Suitability for the Great Crested Newt.

(WC1067)[6]. This methodology has been approved by Natural England for the determination of GCN presence/absence. Pond P3 was dry and access was not granted to P5 to allow a survey.

2.14 eDNA sampling was undertaken by appropriately licenced ecologists during suitable weather conditions (avoiding heavy rain). Sampling was undertaken using kits obtained from ADAS. The methodology comprised taking samples of agitated water from 20 locations around the pond and mixing thoroughly. 15ml of this water was then placed into each of six sterile sample tubes containing preservative, precipitates and a DNA sequence that was used for degradation control. All samples were stored in accordance with the protocols provided by the laboratory. The samples were then transported under suitable conditions for analysis. Following analysis, results provided by the laboratory could have one of three outcomes described in **Table 2** below.

**Table 2: Description of Possible Results of eDNA Analysis**

| Result | Description |
|---|---|
| Positive | A positive result means that eDNA from GCN was detected and they have been present within the water in the 20 days preceding sampling. An eDNA score would be provided indicating the number of positive replicates from a series of twelve. |
| Negative | DNA from GCN was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample. |
| Inconclusive | Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided. Degradation can occur through poor storage of the samples or kits and inhibition can occur through unexpected chemicals in the sample. |

## Bats

Tree Roost Assessment

2.15 Tree assessments were undertaken from ground level, with the aid of binoculars (where appropriate). These surveys were undertaken during the Extended Phase 1 Survey by a suitably experienced ecologist. During the survey Potential Roosting Features (PRFs) for bats such as the following were sought:

- Natural holes (e.g. knot holes) arising from naturally shed branches or cavities created by branches tearing out from parent stems).
- Man-made holes (e.g. cavities that have developed from flush cuts or branches previously pruned back to a branch collar).
- Woodpecker holes.
- Cracks/splits in stems or branches (horizontal and vertical).
- Partially detached, loose or bark plates.
- Cankers (caused by localised bark death) in which cavities have developed.
- Other hollows or cavities, including butt rots.
- Compression of forks with occluded bark, forming potential cavities.
- Crossing stems or branches with suitable roosting space between.

[6] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. *Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

- Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk).
- Bat or bird boxes.

2.16 Trees were classified into general bat roost potential groups based upon the presence of the above features. **Table 3** describes how trees are assigned a relevant category using recognised best practice guidance[7].

**Table 3: Classification and Survey Requirements for Bats in Trees**

| Classification of Tree | Description of Category and Associated Features (based on Potential Roosting Features listed above) | Likely Further Survey Work / Actions (If a tree will likely be impacted by proposals) |
|---|---|---|
| High Potential | A tree with one or more Potential Roosting Features that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat. Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc. | Aerial assessment by roped access bat workers (if appropriate) and / or nocturnal survey during appropriate period (May to August).<br>Following additional assessments a tree may be upgraded or downgraded based on findings.<br>If roost sites are confirmed and the tree or roost is to be affected by proposals a licence from Natural England will be required.<br>After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate. |
| Moderate Potential | A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat but unlikely to support a roost of high conservation status (i.e. larger roost, irrespective of wider conservation status).<br>Examples include (but are not limited to); woodpecker holes, rot cavities, branch socket cavities, etc. | A combination of aerial assessment by roped access bat workers and / or nocturnal survey during appropriate period (May to August).<br>Following additional assessments a tree may be upgraded or downgraded based on findings.<br>After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate.<br>If a roost site/s is confirmed a licence from Natural England will be required. |
| Low Potential | A tree of sufficient size and age to contain Potential Roosting Features but with none seen from ground or features seen only very limited potential. Examples include (but are not limited to); loose/lifted bark, shallow splits exposed to elements or upward facing holes. | No further survey required but a precautionary working method statement may be appropriate. |
| Negligible/No potential | Negligible/no habitat features likely to be used by roosting bats | None. |

* The Conservation of Habitats & Species Regulations 2017 (*as amended*) affords protection to "breeding sites" and "resting places" of bats. The EU Commission's Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC, February 2007 states that these are places "where there is a reasonably high probability that the species concerned will return".

[7] Collins, J. (ed) 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. (3rd edn) Bat Conservation Trust.

**Badger**

2.17 All hedgerows and other suitable habitats within the Site were searched for evidence of badger *Meles meles* activity. Methodology employed followed that outlined by Harris and Creswell and Jefferies[8].

2.18 Evidence of badger occupation and activity sought included:

- Setts: including earth mounds, evidence of bedding and runways between setts;
- Latrines: often located close to setts, at territory boundaries or adjacent to favoured feeding areas;
- Prints and paths or trackways;
- Hairs caught on rough wood or fencing; and
- Other evidence: including snuffle holes, feeding and playing areas and scratching posts.

**Birds**

2.19 A full suite of Breeding Bird Surveys and a winter bird scoping survey was undertaken in 2023. The survey methodology, results and discussion relating to birds is provided within the separate bird report[9].

**Water Vole and Otter**

2.20 Three ditches and two water courses were recorded within the Site, as shown on **Figure 3**. These were assessed for their suitability to support water vole *Arvicola amphibius* and otter *Lutra lutra*.

2.21 Suitable Habitat for water voles includes:

- Water more than 50cm deep and relatively stable;
- Muddy bottom;
- Static or slow flowing water;
- Earth banks of >45° (for burrowing);
- Dense vegetation cover on the banks of a good mix of grasses and herbs for summer food and cover and some berry bearing bushes, tubers and trees for autumn and winter food;
- Emergent, in-channel vegetation; and
- 1-2m wide.

2.22 Otter have been known to exploit virtually any aquatic habitat and no specific variables have been found to be preferred by otter, thus 'suitable habitat' is a loose term[10].

2.23 A water vole and otter survey was carried out on these ditches on 15th May and 19th July 2023 which involved searching the banks of each ditch for evidence of water voles as per best practice guidelines.[11,12]

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[8] Harris, S., Cresswell, P. & Jefferies, D. 1989. *Surveying for Badgers*. Occasional Publication of the Mammal Society No.9..

[9] FPCR 2023. *Land at Pinewood, Wokingham Breeding and Wintering Bird Survey Report*. Produced for The Thomas Family & Bloor Homes Limited

[10] Chanin, P. 2003. *Ecology of the European Otter*. Conserving Natura 2000 Rivers Ecology Series No.10. English Nature.

[11] Dean, M., Strachan, R., Gow, D. and Andrews, R. 2016. *Water Vole Mitigation Handbook* (Mammal Society Mitigation Guidance Series). Eds Fiona Matthews and Paul Channin. Mammal Society.

[12] https://www.gov.uk/guidance/otters-protection-surveys-and-licences#survey-methods

2.24 Evidence for the presence of water voles includes:

- Feeding signs (neat piles of short pieces of vegetation cut at a 45° angle),
- Latrines (piles of droppings),
- Burrows
- Footprints and pathways; and
- Actual sightings

2.25 Evidence of Otter includes:

- Dung (spraints);
- Tracks (footprints);
- Feeding remains;
- Otter slides (into water);
- Holts (underground dens); and
- Couches (above ground sites where otters rest during the day).

2.26 Banks were searched from within the water channel.

## Surveys Scoped Out

2.27 **Table 4** summarises other survey types which, while commonly required as part of an Ecological Appraisal, were not considered appropriate in this case due to the nature of the proposals only resulting in a habitat 'uplift'. There will be no habitat loss or fragmentation as a result of the proposed SANG and therefore, species specific surveys were limited to species that could be impacted by increased public access and disturbance during the day time.

**Table 4: Ecology Surveys Scoped Out**

| Survey Type | Reasons for Scoping Out |
|---|---|
| Bat Surveys | No trees with roost potential are to be removed as a result of the proposals. No suitable foraging habitats is to be removed and the existing habitat on the Site will be enhanced with additional habitat created. There is to be no lighting on the Site during it's use as a SANG. Impacts on bats can only be neutral or positive. |
| Dormouse Survey | No records within 1km of the Site. No suitable woodland or hedgerow habitat will be lost or fragmented as a result of the proposals. Suitable habitat will be increased on the Site. Impacts on dormice can only be neutral or positive. |
| Other Notable Mammals | The Desk Study returned records of hedgehog which are likely to be present in the grassland, hedgerows and woodlands. Sensitive working measures during creation are considered sufficient to avoid harm to hedgehogs. Suitable habitat will be increased on the Site. Impacts on other mammals can only be neutral or positive. |
| Reptiles | Records of slow worm *Anguis fragilis* and common lizard *Zootoca vivipara* were returned during the desk study. The habitats on the Site have the potential support these species and grass snake *Natrix helvetica* also. No suitable habitat will be lost as a result of the proposals and that present will be enhanced and additional habitat created. Sensitive working measures during creation are considered sufficient to avoid harm to reptiles and amphibians. Impacts on other reptiles and amphibians can only be neutral or positive. |
| Invertebrates | The Site is unlikely to support a large assemblage or notable invertebrates due to the low botanical and species diversity. Proposals will enhance the Site for invertebrates. Impacts on invertebrates can only be neutral or positive. |

# 3.0 RESULTS

## Statutory Designations

3.1 The Site itself is not covered by any statutory designations, however two international and two local designations lie within the potential zone of influence (ZoI) as shown in **Table 5** and **Figure 1**.

**Table 5: Statutory sites of nature conservation importance within the Site's potential zone of influence**

| Site name | Designation | Approx. distance from Site | Interest feature(s) |
|---|---|---|---|
| Thames Basin Heaths | SPA | 1.5km E | The site qualifies under article 4.1 of the Council Directive 79/409/EEC on the conservation of wild birds as it is used regularly by 1% or more of the Great Britain populations of the following Annex I listed species in any season: nightjar *Caprimulgus europaeus* 7.8% of the GB population; woodlark *Lullula arborea* 9.9% of the GB population, Dartford warbler *Sylvia undata* 27.8% of the GB population. |
| Thursley, Ash, Pirbright & Chobham | SAC | 8km SE | Annex I habitats that are a primary reason for site selection:<br>4010 Northern Atlantic wet heaths with *Erica tetralix*<br>4030 European dry heaths<br>7150 Depressions on peat substrates of the *Rhynchosporioni*. |
| Windsor Forest and Great Park | SAC | 11km NE | Annex I habitats that are a primary reason for site selection:<br>9190 Old acidophilous oak woods with *Quercus robur* on sandy plains.<br>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:<br>9120 Atlantic acidophilous beech forests with Ilex and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*).<br>Annex II species that are a primary reason for site selection:<br>1079 Violet click beetle *Limoniscus violaceus*. |
| Heath Lake | SSSI | 540m S | The site consists of a small, shallow lake, surrounded by birch and pine woodland with areas of relict heathland. Heath Lake is a long-established open water habitat supporting specialist communities of native plants and animals. Of particular interest are populations of some uncommon and rare aquatic plant species. |
| Broadmoor to Bagshot Woods and Heaths | SSSI | 1.5km SE | An extensive mosaic of broadleaved woodland, coniferous plantation, dry and wet heathland, valley mire, a series of base-poor ponds and a scarce breeding invertebrate assemblage. In particular, the heathland and coniferous plantation supports internationally important populations of woodlark, nightjar and Dartford warbler, and have a nationally important dragonfly and damselfly population. The site includes the valley bogs of Broadmoor Bottom and Wishmoor Bottom which form the most important remaining examples of this type of habitat in the area. |
| Wykery Copse | SSSI | 2.4km NE | A fragment of ancient broadleaved woodland of a kind now drastically reduced in Berkshire, situated on London Clay on the fringe of Bracknell. It is exceptionally diverse for its size, in terms of both woodland stand-types and herbaceous flora, and it contains several rarities. Its interest is enhanced still further by the presence of a small stream. |

| Site name | Designation | Approx. distance from Site | Interest feature(s) |
|---|---|---|---|
| Wellington College Bog | SSSI | 2.8km S | A small but diverse site situated in the grounds of Wellington College near Crowthorne in south-east Berkshire. It comprises a valley bog or mire, with associated areas of wet heath and marsh grazing into dry heath and secondary woodland. The bog is one of the richest in the county in terms of bryophytes (mosses and liverworts) and flowering plants, containing several species which are uncommon or rare in southern Britain. |
| Longmoor Bog | SSSI | 4.7km W | Longmoor Bog is one of a few examples in Berkshire of a base-poor valley mire, its main features being a well-developed carr of alder *Alnus glutinosa*, grey willow *Salix cinerea*, downy birch *Betula pubescens* and alder buckthorn *Frangula alnus* and an area of wet heathland dominated by purple moor-grass *Molinia caerulea* and cross-leaved heath *Erica tetralix*. The remainder of the site is predominantly secondary mixed woodland. |
| Heathlake | LNR | 360m S | Heathlake is an area of woodland and heathland in the parish of Wokingham Without. The shallow c.7-acre lake is the only acid lake in Berkshire which still retains its characteristic flora. |

## Non-Statutory Designations

3.2 Non-statutory designations in Berkshire are known as Local Wildlife Sites (LWSs) and two lie within 1km of the application Site, as well as a potential LWS and a biodiversity opportunity area as shown in **Table 6** and on **Figure 1**.

**Table 6: Non designated Sites within 1km of the Site**

| Site name | Size (ha) | Approx. distance from Site | Interest feature(s) |
|---|---|---|---|
| Gorrick Plantation LWS | 64.77 | 600m W | This site is largely conifer plantation with some wet alder woodland and supports remnants of heathland and bog habitat. Grass snake, woodlark, woodcock *Scolopax rusticola* and nightjar have been recorded here. Plants recorded here include purple moor-grass, cross-leaved heath, bell heather *Erica cinerea* and round leaved sundew *Drosera rotundifolia*. |
| Wokingham Road/Peacock Lane LWS | 1.4 | 500m NE | A small area split into two by a footpath. The site is partly acidic birch woodland with some wet areas and partly oak woodland with much sycamore and some old lime coppice. Species recorded here include wood anemone *Anemonoides nemorosa*, bluebell *Hyacinthoides non-scripta*, bugle *Ajuga reptans*, primrose *Primula vulgaris*, yellow archangel *Lamium galeobdolon* and Solomon's-seal *Polygonatum multiflorum.* |
| Beaufort Park pLWS | 12.78 | 600m E | The site consists of an area of heathland, in the south-west, acid grassland and woodland. |
| Thames Basin Heaths Biodiversity Opportunity area | Not given | 300m S | Targets and Opportunities: Heathland and bog restoration and management. Access control. Significant areas of land are owned by the MOD, Crown Estate, National Trust and the Berks, Bucks & Oxon Wildlife Trust (BBOWT). |

## Habitats

### Overview

3.3 The habitats described below correspond to those mapped on **Figure 3**.

### Arable Land

3.4 At the time of the initial survey (15th May 2023) the two south-eastern most field compartments consisted of fallow arable land. Both fields had been poached by cattle, with the southernmost field poached to a greater extent. During the second water vole survey visit (19th July 2023) it was noted that both fields had been planted up with maize *Zea mays*.

### Improved Grassland

3.5 The northernmost field parcel adjacent to the woodland W1 (grassland 1) supported species such as Yorkshire fog *Holcus lanatus*, meadow foxtail *Alopecurus pratensis*, cat's ear *Hypochaeris radicata*, white clover *Trifolium repens*, mouse ear *Cerastium fontanum*, dandelion *Taraxicum officinale* agg., and large amounts of creeping thistle *Cirsium arvense* which was frequent in this field. This field encompassed areas of water logged soil and was very poached in places also.

3.6 The westernmost field parcel (grassland 2) supported species such as perennial ryegrass *Lolium perenne*, Yorkshire fog, creeping buttercup *Ranunculus repens*, nettle *Urtica dioica*, cleavers *Galium aparine* and cocksfoot *Dactylis glomerata*. The edges were dominated by broadleaved dock *Rumex obtusifolia* but with discreet patches of soft rush *Juncus effusus*.

### Woodland

3.7 There were two small areas of semi natural broad-leaved woodland at the northern site boundary.

3.8 Woodland 1 to the east is a wet woodland that supported silver birch *Betula pendosa*, willow *Salix* sp., alder *Alnus glutinosa,* pedunculate oak *Quercus robur,* ash *Fraxinus excelsior* and holly *Ilex aquifolium.* The ground flora included wood millet *Milium effusum.*

3.9 Woodland 2 to the west supported oak, elder *Sambucus nigra,* hazel *Corylus avellana*, bramble *Rubus fruticosus agg.,* blackthorn *Prunus spinosa* and holly. The ground flora supported bluebell *Hyacinthoides non-scripta*.

### Hedgerows

3.10 There was a single, gappy hedgerow within the Site (H1) and an additional hedgerow on the northern border (H2). Species within H1 included willow., gorse *Ulex europaeus,* bramble, blackthorn and silver birch. Species in H2 included bramble, silver birch and willow.

### Treelines

3.11 There are four treelines across the Site. Treelines 1, 2 and 4 lie along ditches within the Site, whereas treeline 3 lies along a track on the southern site boundary. Tree species present include pedunculate oak, willow, blackthorn and elder.

### Scrub

3.12 An area of bramble scrub lies along the ditch on the southern boundary of the western grassland field parcel.

### Ditches

3.13 There are three ditches across the Site. These varied in bank height and water depth but water was shallow in all three ditches. Many were tree and scrub lined and shaded with evidence of poaching and other bank damage.

### Water Courses

3.14 Two water courses flow along the boundaries of the Site. They are heavily shaded by the boundary treelines. The in-channel features are diverse with a range of gravel, pebble and silt substrates. Aquatic vegetation is limited due to the shading from the trees and poaching is evident along some of the length. There are small amounts of Himalayan balsam *Impatiens glandulifera* on the southernmost watercourse.

## Fauna

### Great Crested Newt

3.15 No specific records for great crested newt were returned during the desk study.

<u>HSI</u>

3.16 The detailed HSI results are provided in **Appendix B**. The HSI result for pond P2 (0.45) indicates it has 'poor' suitability to support breeding GCN. Access was not granted to any other ponds in **Figure 2**.

<u>Edna</u>

3.17 The eDNA results from pond P2 were returned negative (see **Appendix C**).

3.18 Access was not granted to any other neighbouring ponds.

3.19 As all of the ponds shown on **Figure 2** lie over 100m from the Site boundary, and given the intervening land supports similar habitat to that present within the Site, it is considered unlikely that large numbers of great crested newt would be present on the Site when habitat of similar suitability is closer. In addition, the water courses bounding the Site are relatively fast flowing and thus are considered likely to be barriers to GCN dispersal. Therefore, ponds P3, P4 and P5 are effectively isolated from the Site and any GCN is P1 are isolated from the majority of the Site, limited to accessing the wet woodland between P1 and the water course.

3.20 This wet woodland is to be retained and thus GCN are not considered to be a constraint to proposals.

### Other Amphibians and Reptiles

3.21 Records of common toad *Bufo bufo*, frog *Rana temporaria*, smooth newt *Lissotriton vulgaris*, palmate newt *Lissotriton Helvetica*, slow worm *Anguis fragilis* and common lizard *Zootoca vivipara* were returned during the desk study.

3.22 Most of the Site holds limited potential for reptile and amphibian species due to it primarily comprising intensively grazed grassland and arable land, with resulting high levels of disturbance. The ditch network has some potential to support toads, frogs and grass snake. Low numbers could potentially be present.

**Bats**

3.23 Records of at least six bat species were returned during the desk study: Daubenton's bat *Myotis daubentonii*, Leislers' bat *Nyctalus leislerii*, noctule *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, brown long-eared bat *Plecotus auratus*, and an unconfirmed long-eared bat species.

3.24 Roost records for brown long-eared bat, common pipistrelle and soprano pipistrelle were returned. Many were from confidential locations; the locations of the remainder are shown in **Figure 1**.

Roosting

3.25 Two trees on the Site had features suitable to support roosting bats (see **Figure 3**). A single oak with a woodpecker hole was present along the southern boundary, and a willow with various features was present along hedgerow H1. Woodlands W1 and W2 potentially encompass further trees with roost potential.

Foraging and Commuting

3.26 The Site provides some foraging and commuting habitat for bats, notably along the ditches and woodland edges. This onsite habitat has good connectivity to the network of woodlands and grasslands present in the wider area and likely forms a small part of the foraging territory for the local bat population.

[redacted]

**Breeding and Wintering Birds**

3.30 The results of the breeding and wintering bird surveys are presented in a separate report.

**Otter and Water Vole**

3.31 No records of otter or water vole were returned during the desk study.

3.32 No otter or water voles, or signs of either species, were recorded on either of the two survey occasions.

3.33 Otter could potentially use the water courses for commuting or foraging as part of a much wider territory.

3.34 Water vole are not considered to be present on the Site and these are not considered further in this appraisal.

**Other notable Mammals**

3.35 Records of hedgehog *Erinaceous europaeus* were returned during the desk study.

3.36 The hedgerows, woodlands and grasslands have the potential to support hedgehog, which is assumed to be present on the Site in low numbers.

**Invertebrates**

3.37 Records of stag beetle *Lucanus cervus* were returned during the desk study.

3.38 The Site is limited botanically due to the high levels of management which, in turn, limit the suitability of the site to support a large and/or notable invertebrate assemblage. Stag beetle natural habitat is woodlands, therefore there is some potential for this species to be present within the woodlands on the site, particularly W1 due to the higher amount of deadwood contained within it.

# 4.0 DISCUSSION, RECOMMENDATIONS AND CONCLUSIONS

## Designated Sites

4.1 The Site is a proposed SANG and comprises an area of green space that is of a quality and type suitable to be used as alternative natural destination within the Thames Basin Heaths Planning Zone. Its role is to provide alternative green space to divert visitors from visiting the Thames Basin Heaths SPA. SANG are intended to provide an alternative destination for recreation and as such avoidance measures for the potential impact of residential development on the SPA resulting from an increase in visitor pressure.

4.2 This SANG therefore will potentially benefit each of the designated sites listed in **Tables 5** and **6**.

## Habitats

4.3 The degree to which habitats receive consideration within the planning system relies on a number of mechanisms, including:

- Inclusion within a specific policy, for example veteran trees, ancient woodland and linear habitats within the National Planning Policy Framework (NPPF)[13];
- A non-statutory site designation (e.g. LWS);
- Habitats considered as Habitats of Principal Importance for the conservation of biodiversity as listed within Section 41 of the NERC Act 2006;
- Habitats identified as being a Priority Habitat within the local Biodiversity Action Plan (Staffordshire BAP).

4.4 The habitats identified during the survey that fall within any of the above listed categories are the hedgerows and woodlands. As shown on the SANG Framework Plan (**Appendix A**), all of these woodlands and hedgerows are to be retained. All treelines and ditches are additionally to be retained.

4.5 New species-rich grassland, scattered native scrub and a wetland area will be created in areas currently supporting grassland and arable land. This will result in a permanent grassland loss in the wetland and wet woodland areas and a permanent arable land loss. The new grassland, scrub, woodland and wetland habitats created will be much more ecologically valuable.

4.6 Areas will be lost to new footpath creation however the secondary paths will be ‘mown’ paths within areas of grassland and will therefore have minimal habitat impact. Pathways through areas of wet ground will comprise raised boardwalks both for public convenience and habitat protection.

4.7 The following habitats are incorporated into the SANG design (**Appendix A**):

- Retention of all existing hedgerows, treelines, ditches and water courses;
- Enhancement of the existing hedgerows through additional hedgerow species planting and creation of more species rich habitat surrounding them;
- Retention of the woodlands;
- Creation of further wet woodland;
- Creation of mixed scrub to form a mosaic and ’eco tones’ with species rich grassland;

[13] https://www.gov.uk/government/publications/national-planning-policy-framework--2

- Creation of a wetland area to be maintained as habitat for wildlife as well as a focal point for the users of the SANG; and
- Planting of additional tree species throughout the Site, including fruit and seed-bearing species to add structural and species diversity.

4.8 Specifications for new planting and other habitat creation as well as the measures to maintain existing habitats, to ensure successful establishment of new habitats, and to maintain the value of all ecological features in the long-term should be detailed within a Landscape Ecology Management Plan (LEMP) secured by planning condition.

4.9 The Biodiversity Net Gain calculations for the SANG and the additional units available for net gain purposes are detailed in a separate Ecology Technical Note[14].

**Fauna**

4.10 Principal pieces of legislation protecting wild species are Part 1 of the Wildlife and Countryside Act 1981 (*as amended*) (WCA) and the Conservation of Habitats and Species Regulations 2017 (*as amended*). Some species, for example badgers, also have their own protective legislation (Protection of Badger Act 1992). The impact that this legislation has on the Planning system is outlined in ODPM 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System.

4.11 The presence of protected species is a material consideration in any planning decision, it is essential that the presence or otherwise of protected species, and the extent to which they are impacted by proposals is established prior to planning permission being granted. Furthermore, where protected species are present and proposals may result in harm to the species or its habitat, steps should be taken to ensure the long-term protection of the species, such as through attaching appropriate planning conditions.

4.12 In addition to protected species, there are those that are otherwise of conservation merit, such as Species of Principal Importance for the purpose of conserving biodiversity under the NERC Act 2006. These are recognised in the NPPF, which advises that when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying a set of principles including:

- If significant harm to biodiversity resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

4.13 Potential implications for development at the Site are outlined below:

**Amphibians and Reptiles**

4.14 All British reptiles and common and widespread amphibians are protected from killing and injury under the Wildlife and Countryside Act 1981 (*as amended*) and are listed as Species of Principal Importance for the conservation of biodiversity under Section 41 of the NERC Act, indicating that

[14] FPCR 2023, Land at Newlands Farm, Old Wokingham Road, Wokingham – Proposed SANG. Ecology Technical Note - Biodiversity Net Gain Calculations. Produced for The Thomas Family & Bloor Homes Limited

public bodies, such as the Local Planning Authority, have a duty to have regard to the conservation of these species.

4.15 Small numbers of common and widespread amphibian and reptile species could potentially be present within the Site on the grassland and ditches. As the proposals will only provide a betterment for these species groups, it is proposed that a precautionary method of working during habitat creation will be sufficient to avoid harm, with the development resulting in a benefit in the long term.

*Precautionary Working Methods for Amphibians and Reptiles*

4.16 Prior to any works commencing on site, contractors will be made aware via a tool-box talk of the potential presence of reptiles and amphibians in the grassland, hedgerows and ditches, of their legal protection, and of working practices to avoid harming them. They will be informed that if any reptiles or amphibians are found when an ecologist is not in attendance, works must stop in this area immediately and advice must be sought from the ecologist.

4.17 Immediately prior to any clearance of ground level vegetation required for pond and scrape creation and bund removal, a fingertip search of the area will be undertaken by a suitably qualified ecologist to ensure no reptiles or amphibians are present.

4.18 Any logs or timber or other discarded debris that could form refugia will be moved by hand out of the area to be cleared.

4.19 Any tree or hedgerow root balls that require 'grubbing out' must be removed under supervision by the ecologist and must be completed during April to September to avoid hibernation period.

4.20 All arisings from the vegetation clearance will be taken away from the vicinity of the working area within 24 hours of the clearance works.

4.21 It is recommended that log piles are installed on site to provide additional shelter for these species groups. These will be placed at the interface between woodland edge and grassland habitats, avoiding north facing areas. The logs should be left in contact with the ground in dappled shade and built into a compact pile to maintain humidity. Stakes should be driven into the ground either side of the log pile to prevent the pile from collapsing and strong wire utilised to discourage subsequent removal or dismantling.

4.22 Subject to these recommendations, the proposed scheme is likely to have a positive impact on amphibians and reptiles.

**Bats**

4.23 All UK species of bats and their roosts are listed on the Conservation of Habitats and Species Regulations 2017 (*as amended*), making it illegal to deliberately disturb any such animal or damage / destroy a breeding site or roosting place of any such animal. Bats are also afforded full legal protection under Schedule 5 of the Wildlife and Countryside Act 1981 (*as amended*). Under this legislation it is illegal to recklessly or intentionally kill, injure or take a species of bat or recklessly or intentionally damage or obstruct access to or destroy any place of shelter or protection or disturb any animal whilst they are occupying such a place of shelter or protection. Some bat species, including soprano pipistrelle, noctule and brown long-eared bat are also Species of Principal Importance under the NERC Act.

Roosting

4.24 The Site encompasses at least two trees with bat roost potential, as shown on **Figure 3**. These trees will be retained under the proposals. Woodlands W1 and W2 potentially encompass further trees with roost potential but if present such features would not be impacted by the proposals.

4.25 There will be no artificial lighting at the Site and therefore, potential bat roosts will not be impacted.

4.26 It is recommended that bat boxes of a range of different designs be installed on selected trees to provide enhanced roosting opportunities for bats within the site. These should be installed a minimum height of 4m along retained tree lines and/or within or adjacent to woodland edge habitat.

Foraging/Commuting

4.27 The Site provides some foraging and commuting habitat for bats, associated with the hedgerows, grassland, scrub and the woodland edges.

4.28 There is to be no loss of foraging habitat for bats within the SANG design. Foraging habitat will be increased by the creation of new woodland, treelines, shrub planting and wetland areas. Existing habitat will be enhanced through better grassland management.

4.29 There is to be no artificial lighting at the Site and thus the retained, enhanced and created habitat will remain dark.

4.30 Subject to these recommendations, the proposed scheme is likely to have a positive impact on bats.

**Badger**

4.31 Badgers are a widespread species that are protected from harm and cruelty by the Protection of Badgers Act 1992.

[redacted]

4.34 It is recommended that during any habitat creation methods that involve excavation (such as pond creation), any trenches or excavations are covered at the end of the working day or a means of escape is included within them (such as a provision of a sturdy ramp) to prevent badger (or other mammals) falling into these excavations and becoming trapped.

4.35 There is to be no loss of foraging habitat for badger within the SANG design. Suitable foraging habitat will be increased by the creation of new woodland habitat, shrub and treelines. Existing grassland habitat will be enhanced through better management.

4.36 Subject to these recommendations, the proposed scheme is likely to have a positive impact on badger.

**Birds**

4.37 Breeding and wintering birds are discussed in a separate report.

**Otter**

4.38 Otter could potentially use the water courses for commuting or foraging as part of a wider territory. As otter foraging predominantly at night, when public use will be negligible, and as there will be no artificial lighting, disturbance impacts to otter is considered to be negligible.

4.39 The precautionary measured described above for badger during pond creation will ensure no harm is afforded to otter during this time.

4.40 Subject to these measures, there will be no impact on otter as a result of the proposals.

**Hedgehogs**

4.41 As stated previously, the Site has the potential to support hedgehog in low numbers.

4.42 As hedgehogs hibernate within piles of dead vegetation and debris, removal of such material across the site, if required during habitat creation, should be conducted outside of November to February inclusive. It is also recommended that during any habitat works materials should not be stored near areas of retained habitat, or otherwise should be hand searched prior to removal. The best practice measures for badger will also ensure no harm to hedgehogs occurs.

4.43 There is to be no loss of foraging habitat for hedgehog within the SANG design. The availability of suitable foraging habitat will be increased via the creation of new woodlands, scrub and treelines. Existing grassland habitat will be enhanced through better management which, in turn, should increase the invertebrate diversity and numbers of the Site, thus increasing hedgehog food sources.

4.44 Subject to these recommendations, the proposed scheme is likely to have a positive impact on hedgehog.

**Invertebrates**

4.45 The habitat retention, creation and enhancement measures discussed above for the SANG design will greatly enhance the Site for invertebrates. The number and diversity are likely to increase.

4.46 Additional measures such as installation of insect hotels should be considered within the SANG design to provide additional shelter and breeding opportunities. Deadwood should be retained within the woodlands as part of the management scheme to provide suitable habitat for stag beetle and other invertebrates that rely on deadwood.

4.47 Subject to these recommendations, the proposed scheme is likely to have a positive impact on invertebrates.

## Summary of recommendations

**Reptiles/Amphibians**

- Checks of areas to be cleared by an ecologist prior to bund removal, pond creation and scrape creation.
- Installation of log piles within appropriate habitat.

**Bats**

- Installation of bat boxes in selected trees.

**Badger, Hedgehog and Otter**

- Covering of excavations overnight or insertion of ramp to avoid badger and other mammals becoming trapped.

**Birds**

- Retain arable land in existing management until commencement of habitat creation.
- Breeding bird checks prior to the removal of any vegetation.
- Installation of bird boxes on retained trees.

**Invertebrates**

- Retain deadwood within woodlands.
- Installation of insect hotels and bee posts in flower rich grassland.

## Conclusions

4.48 The initial desk- and field-based baseline investigations have demonstrated that the habitats and species present within and around the Site will not pose an 'in principle' constraint to the proposed SANG and the proposals are likely to have a long-term benefit on all potential notable species present as well as encourage colonisation of the Site by new species.

4.49 All habitats of value (woodlands, treelines, hedgerows and water courses) are to be retained, enhanced and expanded within the scheme, and new habitat types will be created including species rich grassland, additional wet woodland, native scrub and trees planting, ponds and scrapes.

4.50 It is considered that any impacts on the protected/notable species likely to be on the Site that could occur during habitat creation, can be avoided through sensitive working methods.

4.51 Details of the Biodiversity Net Gain assessment for the Site is detailed in the separate Ecology Technical Note[14] and accompanying metrics.

## Key

- Site Boundary
- 1km Buffer
- 2km Buffer
- Local Wildlife Site (LWS)
- Proposed Local Wildlife Site (pLWS)
- Biodiversity Opportunity Area
- Local Nature Reserve (LNR)
- Special Protection Area (SPA)
- Ancient Woodland

Protected/Notable Species Within 1km

- Brown Long-eared Bat
- Bullfinch
- Common Lizard
- Common Pipistrelle
- Daubenton's Bat
- Dunnock
- [redacted]
- Fieldfare
- Grey Wagtail
- Kestrel
- Lapwing
- Linnet
- Long-eared Bat species
- Mallard
- Meadow Pipit
- Mistle Thrush
- Myotis Bat species
- Noctule Bat
- Palmate Newt
- Pipistrelle Bat species
- Red Kite
- Serotine
- Skylark
- Slow-worm
- Smooth Newt
- Song Thrush
- Soprano Pipistrelle
- West European Hedgehog
- Crangonyx pseudogracilis/floridanus
- Rhododendron ponticum

Protected/Notable Species Within Grid

- 8166 - Soprano Pipistrelle
- 8167 - Crossbill, Fieldfar, Pipistrelle Bat sp., Red Kite, Redwing, Starling
- 8265 - Black-headed Gull, Common Pipistrelle, Daubenton's Bat, Gadwall, Grey Wagtail, Long-eared Bat sp., Noctule bat, Pochard, Shoveler, Soprano Pipistrelle, Swift, Woodcock
- 8266 - Lapwing, Red Kite
- 8267 - Common Pipistrelle, Lapwing, Long-eared Bat sp., Pipistrelle Bat sp., Soprano Pipistrelle
- 8365 - Common Pipistrelle, Long-eared Bat sp., Noctule Bat, Pipistrelle Bat sp.
- 8366 - Black-headed Gull, Brown Long-eared Bat, Common Pipistrelle, Fieldfare, Meadow Pipit, Myotis Bat sp., Noctule Bat, Serotine, Skylark, Soprano Pipistrelle
- 8367 - Meadow Pipit, Redwing, Starling
- 8465 - Crossbill, Red Kite
- 8466 - Cuckoo
- 8467 - Black-headed Gull, Bullfinch, Fieldfare, Grey Wagtail, House Sparrow, Kestrel, Mistle Thrush, Peregrine, Red Kite, Redwing, Skylark, Snipe

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**masterplanning ■ environmental assessment ■ landscape design ■ urban design ■ ecology ■ architecture ■ arboriculture**

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client
The Thomas Family & Bloor Homes Limited

project
Land at Newlands Farm, Old Wokingham Road, Wokingham

drawing title
Consultation Plan

scale @ A3 1:25000 | drawn BS / VF | issue date 19/12/2023

drawing / figure number
**Figure 1**

rev
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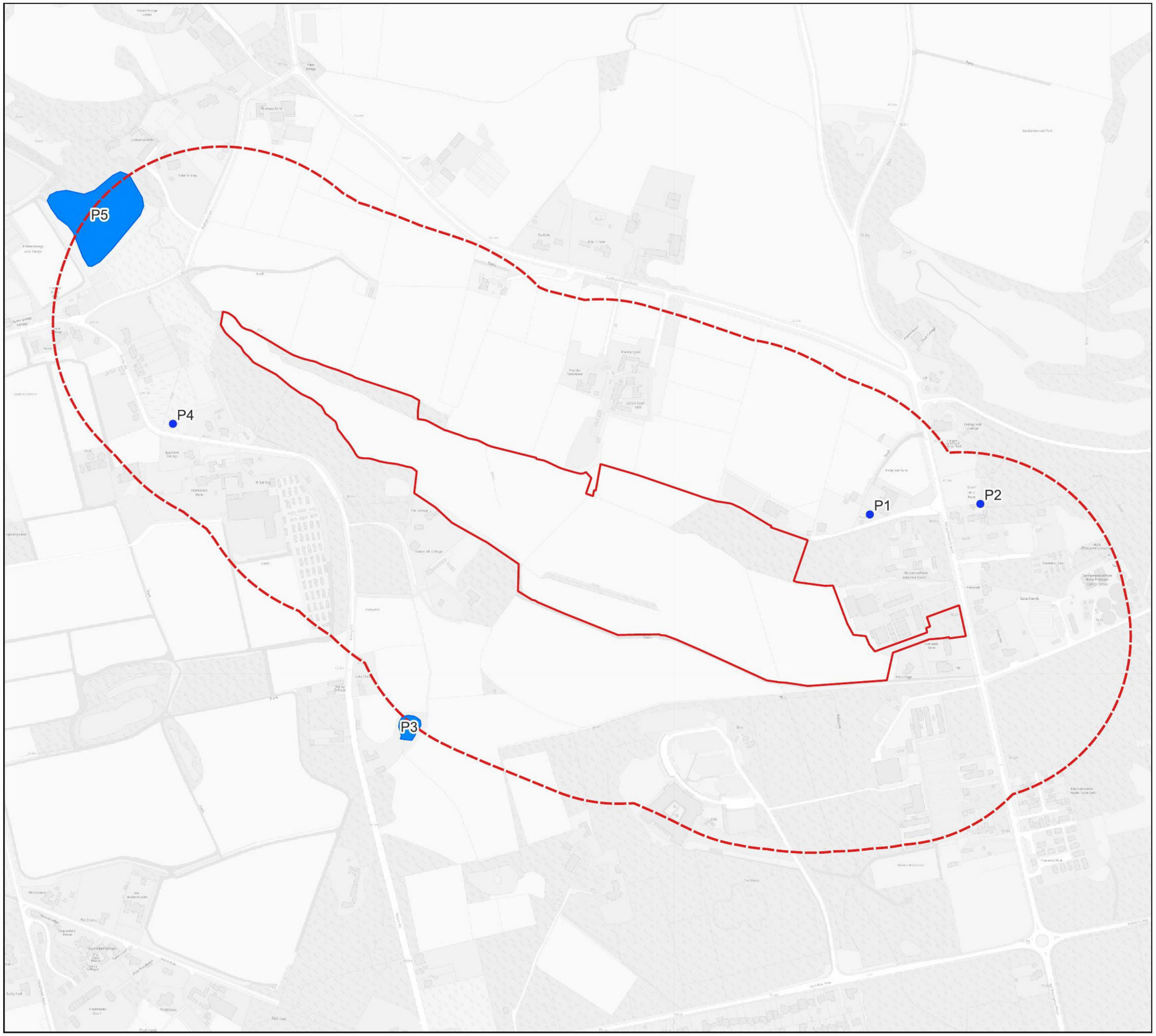




## Key

- **Site Boundary**
- **250m Buffer**
- **Waterbody**
- **Small Ponds**

client
The Thomas Family & Bloor Homes Limited

project
Land at Newlands Farm, Old Wokingham Road, Wokingham

drawing title
WATERBODY LOCATIONS PLAN

scale @ A3
1:6000

drawn
REM

issue date
19/12/2023

drawing / figure number
**Figure 2**

rev
**10930-E-01**

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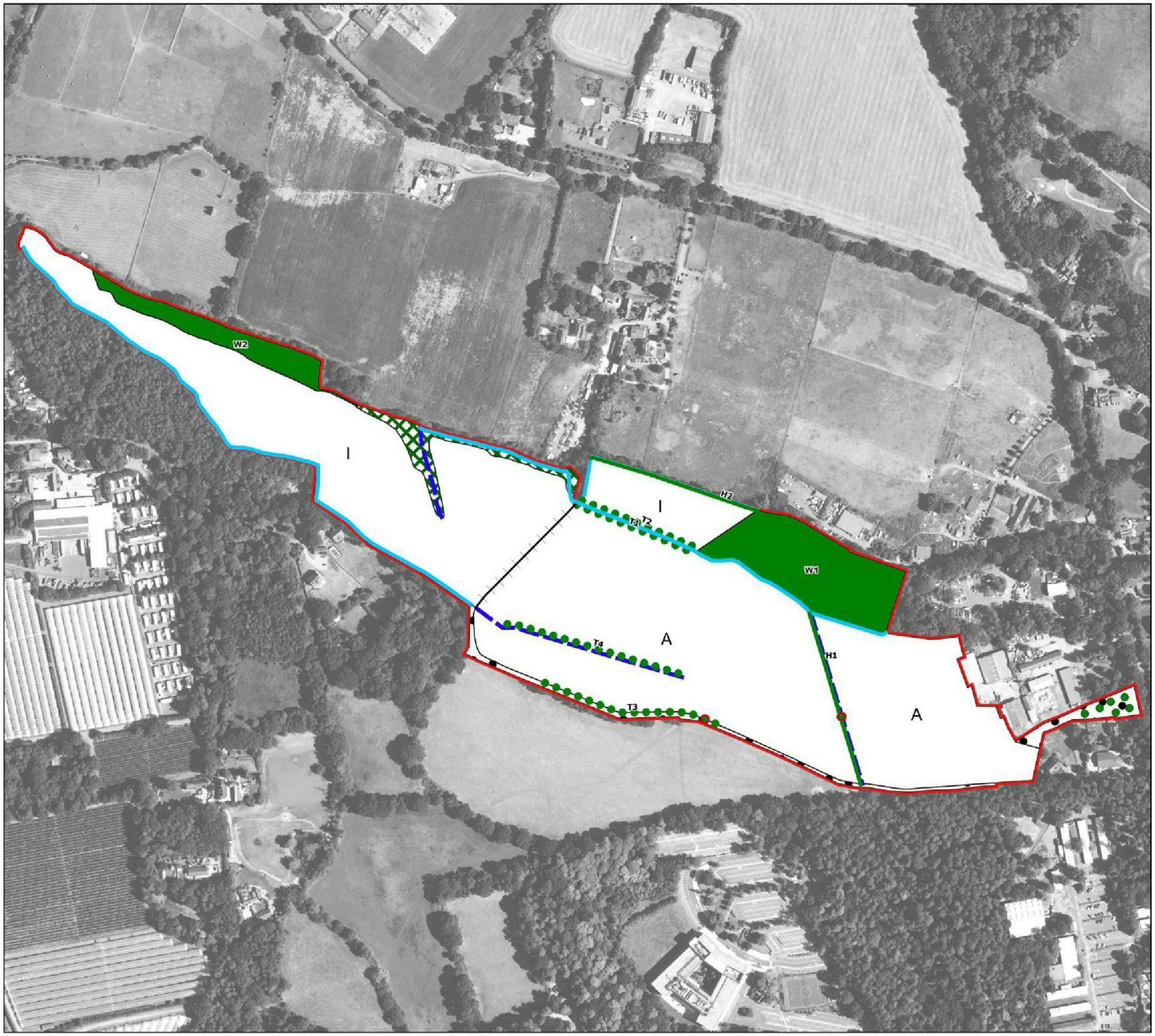
## Key

- Site Boundary
- Bare ground
- Broadleaved woodland - semi-natural
- A — Cultivated/disturbed land - arable
- I — Improved grassland
- Scrub - dense/continuous
- Broadleaved trees
- Water Course
- Intact hedge - species-poor
- Fence
- Ditch
- Scrub - scattered line
- Tree with bat potential
- Broadleaved tree

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client
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project
Land at Newlands Farm, Old Wokingham Road, Wokingham

drawing title
PHASE 1 HABITAT PLAN

scale @ A3 1:4,000 | drawn LJ | issue date 19/12/2023

drawing / figure number
**Figure 3**

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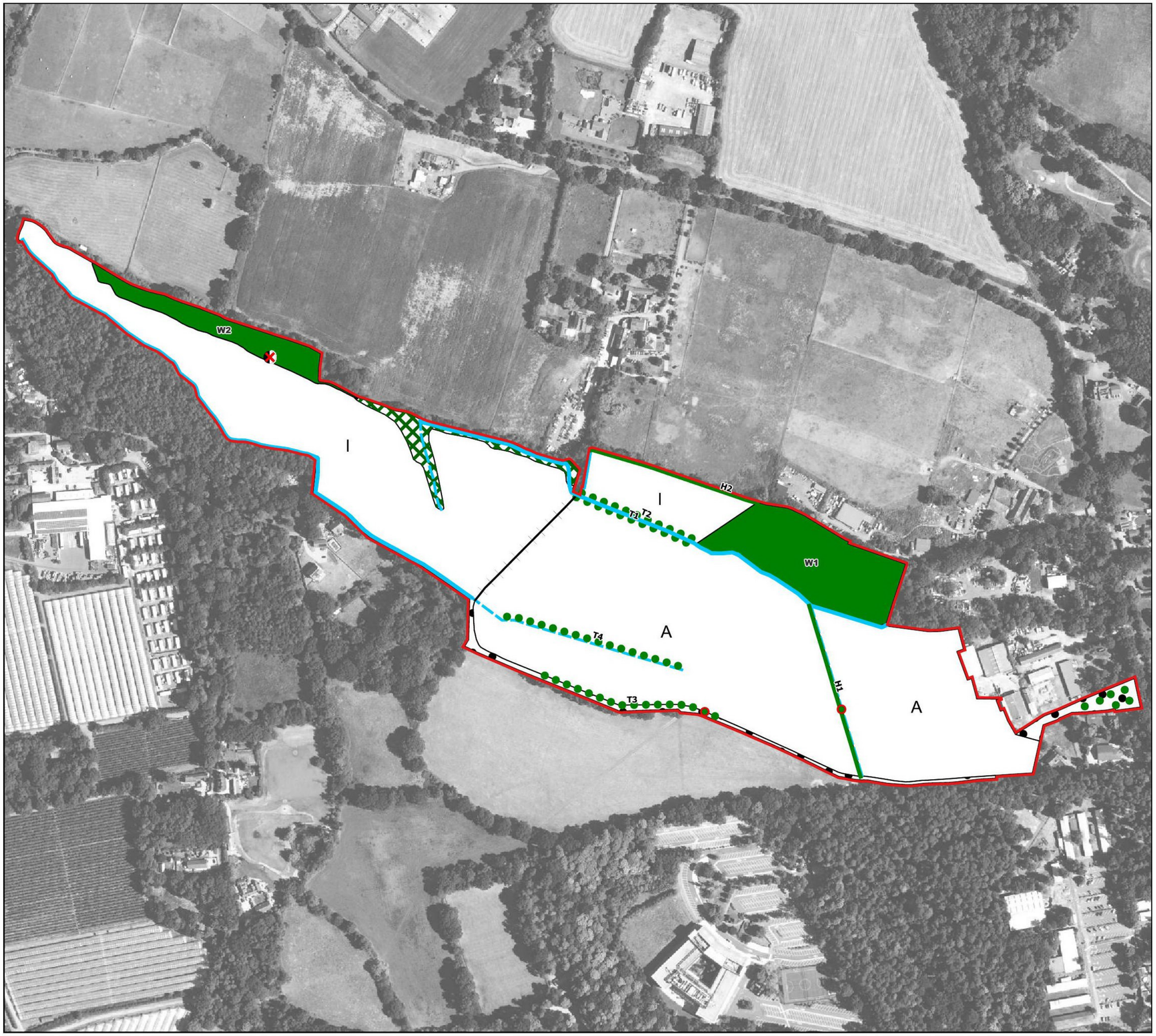
## Key

Site Boundary

Disused Outlier Sett

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client
The Thomas Family & Bloor Homes Limited

project
Land at Newlands Farm, Old Wokingham Road, Wokingham

drawing title
BADGER SURVEY PLAN

scale @ A3
1:4000

drawn
DL / VF

issue date
19/12/2023

drawing / figure number
**Figure 4**

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0 50 100 150 200m

N

FP WOKW8

KEY

- Site Boundary (16.37 ha)
- Main site vehicular access point
- Existing trees
- Existing Wet woodland within site
- Wet woodland planting
- Dry woodland scrub planting
- Flower rich grassland - dry seed mix
- Flower rich grassland - wet seed mix
- Dry Woodland tree planting
- Wet Woodland tree planting
- Ponds with wetland planting (see typical detail for excavation)
- Scrapes with wet grass seed (see typical detail for excavation)
- Carpark (see detailed proposal)
- View corridor
- Floodzone
- Spoil area
- Bund removal
- Boardwalk path route - 2m wide
- Self-binding gravel / hoggin 2m wide with 1m wide mown edges
- Mown grass paths 1.5m wide
- Existing track
- Existing footbridges replaced
- Proposed new footbridges
- Public Right Of Way (PROW)
- Existing Contours
- Close Board Fence
- Post and wire with stock proof fence
- Car Park Fence Gates
- Pedestrian path East
- Paving across track
- Agriculture access
- Mown Grass path
- Areas of Existing vegetation to be removed (refer to Arboricultural Survey)

10930
Land at Newlands Farm, Old Wokingham Road, Wokingham
The Thomas Family & Bloor Homes Limited

# SANG General Arrangement Plan

FINAL 1:2000 @ A1
20 December 2023 JP LP
10930-FPCR-XX-XX-DR-L-0005 ISSUE P05
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

masterplanning
environmental assessment
landscape design
urban design
ecology
architecture
arboriculture

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File: L:\10900\10930\LANDS\Drawings\10930-FPCR-ZZ-ZZ-DR-L-0001 [SANG] v2023 JP 2.vwx

# Appendix B GCN HSI Results

| Suitability Index | Criteria | Definition | Possible Score | P2 |
|---|---|---|---|---|
| $SI_1$ | Geographic Location | Zone A - optimal | 1 | 1 |
| | | Zone B - marginal | 0.5 | |
| | | Zone C - unsuitable | 0.01 | |
| $SI_2$ | Pond Area | Pond surface area to the nearest 50m$^2$ | * | 0.1 |
| $SI_3$ | Permanence | Never Dries | 0.9 | 0.9 |
| | | Rarely dries (Dries no more than 2/10 years or in drought only) | 1 | |
| | | Sometimes dries (Dries between 3/10 years to most years) | 0.5 | |
| | | Dries annually | 0.1 | |
| $SI_4$ | Water Quality | Good (abundant & diverse invertebrate community) | 1 | 0.01 |
| | | Moderate (moderate invertebrate community) | 0.67 | |
| | | Poor (low invertebrate diversity, few submerged plants) | 0.33 | |
| | | Bad (clearly polluted, pollutant tolerant invertebrates present, no submerged plants) | 0.01 | |
| $SI_5$ | Shade | % shade of pond perimeter to at least 1m from the shore | * | 0.8 |
| $SI_6$ | Waterfowl | Absent (no evidence of waterfowl, excluding moorhen) | 1 | 0.67 |
| | | Minor (waterfowl present, though little impact) | 0.67 | |
| | | Major (severe impact of waterfowl) | 0.01 | |
| $SI_7$ | Fish | Absent (no records of fish stocking and no fish seen during survey) | 1 | 1 |
| | | Possible (no evidence of fish, but conditions suggest presence) | 0.67 | |
| | | Minor (small numbers of crucian carp, goldfish or stickleback) | 0.33 | |
| | | Major (dense populations of fish present) | 0.01 | |
| $SI_8$ | Pond Count | No. ponds within 1 km of survey pond not separated by major barriers and divided by 3.14 | * | 0.8 |
| $SI_9$ | Terrestrial | Good (extensive habitat offering good opportunities for foraging and shelter surrounding pond) | 1 | 1 |
| | | Moderate (habitat offering opportunities for foraging and shelter, but not extensive and does not completely surround pond) | 0.67 | |
| | | Poor (habitat with poor structure, offering limited opportunities for foraging and shelter) | 0.33 | |
| | | None (No suitable habitat around pond) | 0.01 | |
| $SI_{10}$ | Macrophytes | % pond surface area occupied by macrophyte cover (excluding duckweed) and submerged plants reaching the surface | * | 0.9 |
| **HSI Score = $(SI_1*SI_2*SI_3*SI_4{}^*SI_5*SI_6{}^*SI_7*SI_8*SI_9*SI_{10})^{1/10}$** | | | | 0.45 |
| **Pond Suitability (<0.5 = poor; 0.5-0.59 = below average; 0.6-0.69 = average; 0.7-0.79 = good; >0.8 = excellent)** | | | | poor |

Client: Ben Long
FPCR Environment and Design Ltd.

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: [redacted]
Email: [redacted]

www.adas.uk

Sample ID: ADAS-514 | Condition on Receipt: Low Sediment | Volume: Passed

Client Identifier: P2, 10930 | Description: pond water samples in preservative

Date of Receipt: 27/04/2023 | Material Tested: eDNA from pond water samples

| Determinant | Result | Method | Date of Analysis |
|---|---|---|---|
| Inhibition Control† | 0 of 2 | Real Time PCR | 02/05/2023 |
| Degradation Control§ | Within Limits | Real Time PCR | 02/05/2023 |
| Great Crested Newt* | 0 of 12 (GCN negative) | Real Time PCR | 02/05/2023 |
| Negative PCR Control (Nuclease Free Water) | 0 of 4 | Real Time PCR | As above for GCN |
| Positive PCR Control (GCN DNA $10^{-4}$ ng/µL)# | 4 of 4 | Real Time PCR | As above for GCN |

| | | | |
|---|---|---|---|
| Report Prepared by: | Dr Helen Rees | Report Issued by: | Dr Ben Maddison |
| Signed: | [redacted] | Signed: | [redacted] |
| Position: | Director: Biotechnology | Position: | MD: Biotechnology |
| Date of preparation: | 03/05/2023 | Date of issue: | 03/05/2023 |

*eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.*

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

*† Recorded as the number of positive replicate reactions at expected $C_t$ value. If the expected $C_t$ value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.*

*§ No degradation is expected within time frame of kit preparation, sample collection and analysis.*

*#Additional positive controls ($10^{-1}$, $10^{-2}$, $10^{-3}$ ng/µL) are also routinely run, results not shown here.*

# Appendix 1: Interpretation of results

## Sample Condition

Upon sample receipt we score your samples according to quality: good, low sediment, medium sediment, high sediment, white precipitate, and presence of algae.

There are three reasons as to why sediment should be avoided:

1. It is possible for DNA to persist within the sediment for longer than it would if it was floating in the water which could lead to a false positive result i.e. in this case GCN not recently present but present a long time ago
2. In some cases sediment can cause inhibition of the PCR analysis used to detect GCN eDNA within samples which could lead to an indeterminate result.
3. In some cases sediment can interfere with the DNA extraction procedure resulting in poor recovery of the eDNA which in turn can lead to an indeterminate result.

Algae can make the DNA extraction more difficult to perform so if it can be avoided then this is helpful.

Sometimes samples contain a white precipitate which we have found makes the recovery of eDNA very difficult. This precipitate can be present in such high amounts that it interferes with the eDNA extraction process meaning that we cannot recover the degradation control (nor most likely the eDNA itself) at sufficient levels for the control to be within the acceptable limits for the assay, therefore we have to classify these type of samples as indeterminate.

## What do my results mean?

A positive result means that great crested newts are present in the water or have been present in the water in the recent past (eDNA degrades over around 7-21 days).

A negative result means that DNA from the great crested newt has not been detected in your sample.

On occasion an inconclusive result will be issued. This occurs where the DNA from the great crested newt has not been detected but the controls have indicated that either: the sample has been degraded and/or the eDNA was not fully extracted (poor recovery); or the PCR inhibited in some way. This may be due to the water chemistry or may be due to the presence of high levels of sediment in samples which can interfere with the DNA extraction process. A re-test could be performed but a fresh sample would need to be obtained. We have successfully performed re-tests on samples which have had high sediment content on the first collection and low sediment content (through improved sample collection) on the re-test. If water chemistry was the cause of the indeterminate then a re-test would most likely also return an inconclusive result.

The results will be recorded as indeterminate if the GCN result is negative and the degradation result is recorded as:

1. evidence of decay - meaning that the degradation control was outside of accepted limits
2. evidence of degradation or residual inhibition - meaning that the degradation control was outside of accepted limits but that this could have been due to inhibitors not being removed sufficiently by the dilution of inhibited samples (according to the technical advice note)