Landscape and Ecology Management Plan

Bicester Motion Innovation Quarter

1395-SP-03

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Contents

1.1. PURPOSE OF THIS DOCUMENT

This document sets down the long-term management and maintenance objectives for the consented Innovation Quarter development (19/02708/OUT) at Bicester Motion in Bicester Oxfordshire, hereafter referred to as 'the site'. The preparation of a Landscape and Ecology Management Plan, LEMP is a requirement of the planning consent for the Innovation Quarter development and forms part of the information required to discharge Condition 23.

Condition 23 (in full) states: -

No development shall take place until a Landscape and Ecology Management Plan (LEMP) including a timetable for its implementation has been submitted to and approved in writing by the Local Planning Authority. Thereafter, the LEMP shall be carried out in accordance with the approved details.

Reason: To protect habitats of importance to biodiversity conservation from any loss or damage in accordance with Policy ESD10 of the Cherwell Local Plan 2011 – 2031 Part 1 and Government guidance contained within Section 15 of the National Planning Policy Framework. This information is required prior to commencement of the development as it is fundamental to the acceptability of the scheme.

The purpose of this LEMP is to:

- Set out the agreed objectives for landscape and ecological management
- Secure net increase in woodland and hedgerow cover over time.
- Maintain habitat connectivity across the site, for bats, badgers, dormouse, amphibians, breeding and wintering birds, invertebrates, and other wildlife
- Set out landscape and ecological maintenance responsibilities
- Set clear standards for performance of landscape and ecological implementation and maintenance work
- Assist in the development of work programmes for landscape / ecological maintenance staff
- Help monitor success / progress against the specified aims and objectives

The Plan sets out a strategy for 25 years. It is recommended that after 10 years the objectives and prescriptions set out in the Plan are reviewed and updated if required.

1.2 THE SITE AND DEVELOPMENT PROPOSAL

The proposed development site is approximately 2.4km (1.5miles) north/north east of the centre of the market town of Bicester at Bicester Motion (formerly known as former RAF Bicester). The total site area is 24.9 acres (10.076 HA).

The proposed development site is located adjacent to the A4421 (Skimmingdish Lane) at the south west corner of Bicester Motion. The proposed Innovation Quarter development site forms one development parcel within the wider Bicester Motion site. The land is flat and low lying.

The masterplan comprises 3 distinct landscape typologies based on their context and function:

1. The airfield side embraces the existing character of the airfield itself with open aspect, long views, and grassland planting.

2. The yard spaces and service areas around the buildings reflect the functionality and industry of the adjacent innovative technologies.

3. The zone to the Skimmingdish Lane boundary draws on the wider natural landscape to integrate parking, access, and surface water drainage infrastructure within a green and attractive setting.

The main landscape types are summarised below:

Retained and Enhanced Grassland and Scrub / Open Mosaic Habitat

A 2.85ha area of land is to be restored as open grassland habitat and bought under appropriate management.

An area of neutral and calcareous grassland that was previously being lost to scrub succession will be restored to a structurally diverse and species rich open grassland.

Areas of the neutral and calcareous mosaic will benefit from an appropriate sowing and meadow cutting regime. These measures would reverse a longer-term trend of adverse scrub succession, reinstating the neutral and calcareous grasslands to greater botanical interest.

1.16ha ha of open space is to be created as open mosaic habitat and bought under appropriate management.

It includes a dedicated ecology enhancement area comprising grassland, bare ground, bee banks, ground scrapes will replicate existing early successional habitats, creating an area of Open Mosaic Habitat. To car parking areas it includes grass concrete paving which comprise a high proportion of unmetalled surface which replicate existing open mosaic habitat on site and provide further valuable opportunities to invertebrates.

Attenuation Ponds and Swales

A key design driver for the landscape has been a progressive approach the management of surface water for the adjacent new building footprints, access roads, footpaths, car parks and service yards.

A fully integrated SuDS system allows the attenuation of stormwater before it enters the drainage system and comprises connected permeable paving attenuating sub-base, swales and attenuation basins. Surface water will be conveyed via pipes and attenuating sub-bases from to the attenuation swales and basins and then released in a managed way. This approach will reduce pressure on the existing drainage infrastructure. Hard surfaces within the site are to be kept to a minimum to allow infiltration of rainfall and minimise run off.

The integration of green and blue infrastructure initiatives such as swales and the associated marginal and wetland planting are aimed at providing resilience and adaptation to climate change and also creating greater habitat diversity.

Amenity Spaces

The yard spaces and service areas around the buildings reflect the functionality and industry of the adjacent innovative technologies.

The Amenity yard spaces between the buildings are kept robust and flexible with a combination of lawn and street tree planting.

1.3. ECOLOGICAL & TREE SURVEYS

Ecology Solutions
This LEMP consolidates information and specifications from the following ecological reports:
Ecological Assessment - 7884.EcoAss (FAST Outline).vf2 July 2019
Ecology Briefing note - 7884M.IQ.S73.EcologyNote.vf.Complete.Issued

Brian Higginson Tree Consultancy
Refer to the following documents prepared by Brian Higginson Tree Consultancy:
Arboricultural Implications Assessment April 2019
Tree protection Plan April 2019
Pre development Tree Survey April 2019

1.4. ECOLOGICAL BACKGROUND

Ecology Solutions carried out an ecological assessment of the Innovation Quarter and compiled a report in July of 2019, refer to document:
7884.EcoAss (FAST Outline).vf2 complete

The report identifies that there are no statutory designated sites were recorded within or immediately adjacent to the site. The site comprises a component two non-statutory sites, Bicester Airfield LWS, and Stratton Audley Quarry LWS. The majority of both sites lies outside of the BRAND red line boundary, but within the wider site. Habitat survey work in 2018 has reaffirmed that both designated sites continue to support the features for which they were designated, albeit the value in some areas has been significantly diminished by on-going scrub succession. Due regard has been given to both LWS, with appropriate mitigation measures proposed to safeguard the sites biodiversity interest in the long-term

Much of the site comprises areas of hardstanding, short mown grassland, scrubby woodland, dense scrub, hedgerows and a waterbody. These habitats are considered to be of limited intrinsic value in the context of the site. Habitats of relatively higher value include those areas of semi-improved calcareous grassland and recolonising hardstanding forming integral components of a wider open mosaic of habitats.

This assessment also identified suitable habitat on the site for bats, reptiles and badgers, as well as suitable off-site habitat for great crested newt. As such, surveys for these specific species were subsequently undertaken, as well as surveys for breeding/wintering birds and invertebrates. The results of those surveys along with a suitable mitigation strategy which was reported in the aforementioned Ecological Assessment.

1.5. MANAGEMENT ARRANGEMENTS

All hardworks and softworks elements of the landscape proposals will be subject to a 12 month maintenance and defects liability period, which will be the responsibility of the Contractor. Tree planting will be subject to a 24 month maintenance period following completion of the works.

1.6. SCOPE OF WORK

The Innovation Quarter will include maintenance requirements relating to the following categories of landscape: -

- Existing Trees and Vegetation
- New Tree Planting
- Hedge Planting

- Amenity Grasslands/Lawns
- Retained And Enhanced Species-Rich Grassland
- Management Of Open Mosaic Habitat
- Wetland Planting to SUDS Features (Pond and Swale Attenuation Basin)
- Hard Landscape Areas
- Grass Paving to Parking Areas

1.7. GENERAL REQUIREMENTS

The Maintenance Contractor is expected to apply best practice landscape management and maintenance, to develop a uniformly full cover of vegetation throughout the site, to present a crisp, leafy environment. Grass areas should be uniformly deep green; areas of wetland planting should have complete leaf-to-leaf cover. Planting has been designed for a maximum potential for colour, biodiversity and year-round interest and structural forms of wetland planting should be left to overwinter where appropriate. Both individual trees and tree groups should be maintained to be healthy specimens with good long-term shape and canopy structure. The maintenance contractor is also expected to comply with all Environmental and Ecological requirements, including those described in section 3 of this report.

1.7.1. The Maintenance Contractor's Specific Responsibilities

The Maintenance Contractor shall:

- Maintain the whole of the planted areas in a manner which ensures the establishment of healthy and vigorous plants and a close textured, weed-free sward and which creates a tidy appearance. Keep all shrub beds and tree planting areas weeded and cleared of litter.
- Establish a regular pattern of maintenance operations throughout the season and according to best practice.
- Ensure all areas are regularly fertilised with appropriate fertilisers.
- Water following handover to provide optimum conditions for early establishment of all subjects. Following the establishment phase, water during prolonged dry periods, particularly in spring, with water focused onto trees and shrubs, particularly semi mature specimens.
- Allow for extra maintenance in any periods of unusually prolific grass and weed growth.

- Correct any defects which become apparent during the earliest suitable weather conditions.
- Check all tree ties, stakes, and other accessories, and remove when appropriate.
- Ensure all hard surfaces and footways are swept and kept weed free.
- Ensure all street furniture is kept in a safe and clean condition.

1.7.2. The Maintenance Contractor shall employ skilled supervisors and operatives who deliver a high-quality level of workmanship. Where necessary, employ specialists, such as arboriculturists, where specialist workmanship and knowledge are required.

1.7.3. Special attention should be given to the maintenance of all newly planted schemes during their most sensitive phase, which is for several years following planting. Particular focus should be placed on watering, tree pruning etc. during this period.

1.7.4. Where there is an issue which may affect the initial design or a change in the overall design intent, the Maintenance Contractor should seek instruction before any work begins on site.

1.7.5. Special attention shall be given in respect of water requirement, particularly in relation to newly planted stock. It is the Maintenance Contractor's responsibility to always be aware of any statutory restrictions on water, and advise the client where restrictions are likely to occur.

1.7.6. **Contract Management**

The contractor shall confirm a named contract supervisor to manage this contract and take instructions on his behalf. The supervisor will not be changed without advanced notice. All work on this contract will be undertaken by suitably skilled and trained staff, provided with appropriate well-maintained and safe equipment.

1.7.7. **Inspections and Monitoring**

The site will be subject to inspection by the client's representative. The contractor shall allow for attendance by the supervisor at regular intervals to monitor the work and to report on progress. The supervisor shall monitor the site for damage, defects, vandalism or thefts. The client's representative should be notified directly of any problems relating to the condition of the landscape outside the remit of the contract.

1.7.8. **Record Sheets**

The operations undertaken during all maintenance visits should be recorded. A monthly record sheet is included in the Appendices. The dates of each visit, and application of all fertiliser, pesticides and herbicides will be confirmed along with the

details of the other general operations undertaken that month. The monthly record sheets will be forwarded to the contractor's agent at the end of each month.

1.7.9. **Health & Safety**

The contractor will be responsible for ensuring the work is carried out in a safe manner avoiding risks to the health and safety of his employees, users of the site and the general public. A site-specific risk assessment for this project should be submitted prior to commencement of the work.

1.7.10. **Protection of the Public**

The works shall be undertaken without risk or inconvenience to the public, site occupants or neighbours. Access to the site and the work shall be undertaken with due regard to the needs of those using the site and surroundings. Work shall be timed to avoid causing unnecessary nuisance or disturbance to site occupants or adjoining residents.

1.7.11. **Protection of Property / Utilities**

All existing features including, fencing, paving, drains, services, surrounding landscape and other property is to be protected from damage during the course of the works. The contractor shall allow for any protective measures required to facilitate the maintenance operations within the price for the work. Any damage caused to such the property, highways, services or other property will be made good by the contractor at his own expense.

1.7.12. **Workmanship, Programming and Cleanliness**

The Landscape Maintenance is to be carried out to a high standard. Planted areas must be kept neat and clean in appearance at all times, weed and litter free, with all planting in a healthy state. The landscape maintenance contractor will allow for carrying out all maintenance works in such a manner to avoid unreasonable disturbance to adjacent residential communities, Northgate Primary School and the users of the Northgate Leisure development (following occupation). The contractor shall ensure that the works themselves do not cause inconvenience or danger to users of the site. At the end of each day of each visit, the contractor shall remove from site all rubbish, trimmings and superfluous materials, leaving the works in a clean and tidy condition. All hard areas are to be left in a clean condition, free from any soil, mud, mulch, leaves, cuttings and plant clippings.

1.7.13. **Disposal of Waste Material**

The contractor shall allow for the removal and safe disposal of all waste materials arising from the landscape maintenance works. Litter collection is to be undertaken on a twice weekly basis from all landscape areas and public realm areas. The contractor

shall allow for the disposal of all litter off site and will be responsible for all waste disposal costs and approvals. Fly tipping and improperly disposed trade waste shall be reported to the Client's representative and removed on instruction
The use of mechanical shredders or chipping machinery on site is not permitted.

1.7.14. **Irrigation / Watering Arrangements**

The intention is for the soft landscape to become well established under an initial maintenance contract. Watering will be via bowser and hose, to be provided by the contractor. Bicester Motion will arrange for access to a maintenance depot local to the site to allow the contractor to fill and refill bowsers as necessary to enable watering of all proposed new landscaped areas and tree pits by the contractor. The contractor will be required to monitor the weather conditions and water the soft landscape areas as appropriate.

1.7.15. **Use of Pesticides and Herbicides**

The maintenance contractor must use a certified operator, take appropriate safety precautions and comply with the Control of Pesticides Regulations 1986, the conditions of approval for the chemical, and any relevant Code of Practice issued by DEFRA.

The maintenance contractor will consider in every instance whether the use of chemicals is strictly necessary before application.

Herbicides used to kill perennial weed growth shall be appropriate foliar applied (i.e. applied to the leaf surface rather than more generally to the soil), non-residual, translocated herbicides.

The maintenance contractor must keep full and accurate records of all herbicides used, the area in question, the amounts and the date of completion. Unintentional spray overlap must be avoided. Spraying must stop whilst turning. The contractor must mark the point where spraying has stopped for refilling or for breaks. Herbicide must never drift, fall or run-off onto open water or onto adjacent sites, gardens or ground not intended for treatment.

The maintenance contractor must dispose of unused and unwanted containers, and chemicals, including unused dilute tank mixtures, in a safe way in accordance with the methods approved by the Control of Pesticides Regulations and relevant Codes of Practice. Disposal will be off site.

1.7.16. **Excess Wet Weather**

If excess wet weather has caused areas of water of to stand, the ground should be spiked as appropriate in order to facilitate drainage of water.

1.7.17. **Programming of Maintenance Work**

- The Maintenance Contractor will allow for carrying out all maintenance works in such a manner to avoid unreasonable disturbance to adjacent residential communities, and the users of the Heritage quarter.

- New planting should be monitored, in order to ensure that there is no loss / deterioration of habitats, during maintenance operations, including pruning works.

- Any necessary removal of vegetation should be undertaken outside of the main bird breeding season (which is March to September inclusive) or where this is not possible, checks should be undertaken by a suitably trained ecologist prior to clearance works within the bird nesting season and 5m buffer zones of 'no disturbance' implemented where active nests are found. The nests should be checked weekly until the suitably experienced ecologist has confirmed that the nests are no longer in use, before works can continue within the former buffer zone area.

- Pruning should be undertaken during autumn / late winter / early spring in order to avoid disturbance during the bird breeding season, which is March to September inclusive. A proportion of the pruning of fruiting trees / shrubs should be undertaken during late February in order to ensure that this foraging resource is available to birds throughout the wintering period.

- Checks for nesting birds must be made before all hedge cutting work and a buffer zone of 'no disturbance' of approximately 5m should be left around any active nests found during the bird activity season which is March to September.

- All vegetation management work should avoid disturbance to nesting birds, which is an offence under the Wildlife and Countryside Act 1981 (as amended).

1.7.18. **Injurious, Non-native Invasive or Harmful Weed and Pest Species**

The following selected species are either Injurious Weeds, as defined by the Weeds Act 1959, Non-native Invasive plant or animal species as identified by the Wildlife and Countryside Act 1981 – Schedule 9 (updated in 2010,) or species considered harmful to the environment, not currently covered by legislation, which are considered to be of particular threat or likely occurrence on this site.

Injurious Weeds as prescribed by the Weeds Act 1959 (must be controlled)	**Selected Species covered by the Wildlife & Countryside Act 1981 (updated 2010)** (illegal to spread in the wild)	**Other Harmful Species**
Spear Thistle (Cirsium vulgare) **Creeping or Field Thistle** (Cirsium arvense) **Curled Dock** (Rumex crispus) **Broad leaved Dock** (Rumex obtusifolius) **Ragwort** (Senecio jacobaea)	**Japanese knotweed** (Reynoutria japonica) **Giant Hogweed** (Heracleum mantegazzianum **Himalayan Balsam** Impatiens glandulifera **Australian Swamp Stonecrop** Crassula helmsii **Parrot's Feather** Myriophyllum **Floating Pennywort** Hydrocotyle ranunculoides **Creeping Water Primrose** **Chinese Mitten Crab**	**Mares-tails** Invasive plant difficult to control **Brown Tail Moths** Caterpillars occur in large numbers and can cause skin irritation

1.7.19. No invasive species listed under Schedule 9 of the Wildlife and Countryside Act (1981, as amended) were recorded to be present on within the curtilage of the proposed development.

Should any of the invasive weeds listed above be found to be present subsequently, then the area should be cleared in accordance with the Environmental Protection Act 1990; Japanese Knotweed is classed as 'controlled waste' and as such must be disposed of safely at a licensed landfill site according to the Environmental Protection Act (Duty of Care) Regulations 1991. The client/client's agent should be made aware of any invasive species found on site.

To monitor the presence of invasive plants, monthly checks through May to September should be made to record the extent of any invasive species and to remove seedlings / young plants of invasive species such as false acacia and to check for the presence of Japanese knotweed, which requires specific management and removal processes.

1.7.20. It is the responsibility of the Contractor to note the presence, or sightings of any further occurrence of Schedule 9 and other legislated species, including the Chinese Mitten Crab, and bring it to the attention of the Landscape Consultant and agree a methodology for the removal of these weeds as appropriate.

1.7.21. It is the Contractor's responsibility to familiarise themselves with updates to legislation covering potential injurious, or non-native invasive plant and animal species, as this can be subject to change at any time.

1.7.22. **Control of Wildlife Pest Species**

The contractor is to maintain any protective fencing or guards provided with the landscape work and monitor the occurrence of pest species on the site.

Employ an approved pest control specialist to control wildlife pest species. Notify the client's representative in advance of any control operation.

1.7.23. **Reinstatement Works**

Where reinstatement works are required either due to contractors' damage or when instructed under the contract, these shall be undertaken in accordance with good horticultural practice. The contractor will be expected to undertake and maintain any reinstatement works so that new works establish well and tie in with existing planting as quickly as possible. The contractor will be responsible for all defects on reinstatement works until the end of the maintenance contract. Reinstatement works shall be carried out during the first available planting season appropriate to the defective items.

Any reinstatement or replanting works on site should respect the original intent of the design and planting proposals. Attention is drawn to the planting plans contained in the appendices which highlight the plants which have been specified for the site.

2. Landscape Management Objectives and Maintenance Operations

2.1. EXISTING TREES AND VEGETATION

2.1.1

Long Term Design Objectives

Areas of existing tree planting to be retained should be managed to ensure good form and growth. Stratified structure of understorey should be encouraged to improve appearance of the planting, screening potential and wildlife opportunities – nesting and foraging opportunities for birds and foraging and commuting opportunities for bats.

Existing trees retained to be managed to ensure healthy growth and good form.

All work to existing trees to take place outside the bird nesting season (March to October inclusive), and ideally before spring growth and flowering, while also allowing any berries to be retained for as long as possible. Late winter is therefore ideal although note that hedges should not be cut during periods of hard frost. Checks for nesting birds must be made before any remedial works or removal works are undertaken and a buffer zone of 5m should be left around any active nests found during the bird activity season which is March to October.

Note: Disturbance to nesting birds is an offence under the Wildlife and Countryside Act 1981 (as amended).

Maintenance Operations

2.1.2 **Tree protection during Construction**

Ensure adequate protection of existing trees to be retained during construction, through temporary fencing, crown lifting and thinning prior to the commencement of the works, in accordance with the works identified in the Tree Survey.

2.1.3 **Remedial Tree Works**

Carry out remedial works to existing trees as identified in the Arboricultural Report and Tree Condition Survey.

2.1.4 **Tree Inspections**

Inspect existing mature trees on a five year cycle, and after strong winds, and carry out appropriate tree surgery to maintain trees in a healthy and safe condition. This is likely

to involve the removal of dead wood, dangerous or broken branches, and crown thinning.

2.1.5 **Structural Diversity**

Improve the structural diversity of the existing trees to be retained through a programme of selective thinning and replanting with native tree species in this location as required.

2.1.6 **Monitoring for Invasive Weeds**

Check the perimeter and park areas for invasive weeds, and take appropriate steps to eradicate.

2.1.7 **Tree Replacement**

This may be necessary when tree stands have passed maturity and need replacing.

2.2. NEW TREE PLANTING

2.2.1. **Long Term Design Objectives**

Maintenance operations geared towards the full establishment of healthy trees with good long-term shape and canopy structure and ensure a diverse age structure of trees across the site. Groups of trees need to be encouraged to develop with consistent shape. Trees also need to be managed to ensure long-term health and safe condition and avoidance of conflict with buildings and other site features.

Trees also need to be managed to:

- Ensure a safe condition
- Avoid conflict with buildings and other site features
- Ensure that their design intent is met
- Promote satisfactory establishment and development;
- To manage the new trees in a traditional manner using good horticultural practices to promote longevity for the benefit of foraging bats, birds and invertebrates.

Regular examination of these trees should be made with proposals for thinning as necessary, to ensure the health and vigour of the trees whilst still maintaining the overall character of the scheme.

All trees, particularly retained mature trees, should be subject to a safety survey every 18 months and after high winds to prevent hazards to publicly accessible areas.

Maintenance Operations

2.2.2. Weed Control

Maintain area of the root ball in a weed free condition. Monitor the growth of shrub material and grass around the base of trees to ensure trees are not suffering from undue competition. Remove selected plants as may be necessary. For all trees in open grass areas maintain a 1.0m ∅ clear zone around the base of trunk for first 3 years after planting and 0.5m ∅ area for older trees.

2.2.3. Stakes, Ties and Guards

All accessories to be checked at the time of each maintenance visit.

- Adjust stakes and ties to allow for increases in stem growth, check during May – June and September – October in each year.
- Ties must be adjusted to allow for stem thickening in the autumn.
- Ensure accessories do not rub against trees.
- Replace broken or damaged accessories as and when any damage or breakages are found and remove redundant stakes and ties as appropriate.
- All stakes and ties ought to be removed from healthy trees by the end of the third winter after planting. Trees still requiring support after this time should have stakes reduced in height to 1/3 of stem height.

2.2.4. Underground Guys

Check condition of underground support systems. Retighten cables as and when required. Remove materials where it is clear they have become redundant.

2.2.5. Fertiliser

Apply Spring top dressing of Enmag or similar approved to root zone of all trees allowing 70g/m² to full area of canopy spread (unless in wildflower areas, where the use of fertilisers should be avoided), in accordance with manufacturer's recommendations.

2.2.6. Watering

Allow for watering during dry / drought periods up to 5 years following planting. Apply sufficient water to bring whole root ball to moist condition. Do not over-water.

Allow for top watering as necessary during the 24-month establishment period (following Practical Completion), and during drought periods up to five years following planting. It is the Maintenance Contractor's responsibility to always be aware of any statutory restrictions on water, and to advise the client where restrictions are likely to occur.

The principal watering of trees should be through top watering, with the surface of the soil around each tree slightly dished to hold irrigation water. If necessary, the bark mulch should be partially pulled away from the ground over the rooting zone to produce a dishing effect.

During the initial two-year establishment phase, watering should occur at a minimum of three times a week, particularly during dry spells. Apply sufficient water to bring whole root ball to moist condition. The frequency of watering should be subject to review following inspections of the trees and the moisture content of the root balls.

Prior to applying water, a core sample should be taken from the top 500mm of soil to the root ball, from a random one in five trees, to ascertain the moisture content of the soil. If the soil is found to be dry, then water should be applied. Core sampling should take place on a minimum of a weekly basis during dry spells.

All watering should occur in a slow, controlled manner, allowing the water to percolate the soil surface. Should water run off the soil surface, the speed / volume of the application should be adjusted. It should be noted that manual watering can result in the loss of 50% of the water through evaporation before it percolates the ground.

Between **50-200 litres of water** should be applied per tree, as often as daily if required, to all semi mature tree stock. The quantity of water required is dependent on tree species, size, location and weather conditions, and should be judged in accordance with the core samples taken.

2.2.7. Thinning and Pruning - Generally

No thinning or pruning should take place without the authority of the client.

2.2.8. Prevention of Damage to Structures

Pruning should occur to avoid conflict with buildings, light columns, CCTV, lines of sight and other site features.

2.2.9. Ecological Timing of Works

Vegetation management will be carried out outside of the main bird breeding season, March to September inclusive. Where essential works occur within that timeframe, a suitably qualified Ecologist will carry out a check of vegetation to ensure no nesting birds are present or would be disturbed by works. 5m Buffer zones of 'no disturbance' can be used to demark nests to be protected and areas where cutting can take place, where active nests are found. The nest should be checked weekly until the suitably experienced ecologist has confirmed that the nest is no longer in use, before works can continue within the former buffer zone area.

Note: All vegetation management work must avoid disturbance to nesting birds, which is an offence under the Wildlife and Countryside Act 1981 (as amended).

2.2.10. **Formative Pruning**

Formative pruning should be carried out during the establishment stage of tree development – typically during the first five years following planting. The main objective of formative pruning is to encourage the formation of good stem and branch structure, and improve the orientation, spacing and growth rate of trees. Where appropriate, pruning should be carried out to stimulate flowering and fruiting.

During the winter months inspect the shape of all trees and allow for formative pruning to appropriate species to ensure continued development of even shape and single central leader. Check for damaged branches after storms or strong winds and remove any damaged growth. Cut back to clean sound wood with angled cuts. Epicormic buds to be rubbed off and basal growth to be pruned off. Work to be carried out between October and February, inclusive, in order to avoid disturbance during the bird breeding season, although the late winter / early spring sap flow period should be avoided.

2.2.11. **Design Intent of Tree Pruning**

Generally, trees should be pruned to enhance an appropriate and natural form and character. On no account shall pruning occur, unless otherwise instructed, to cause a change in the shape or character of a tree from the shape it was when first planted. (e.g. feathered trees must not be made into clear stemmed trees), unless otherwise instructed.

2.2.12. **Selective thinning**

Where established trees are growing closely together to the point that they are prejudicing the formation of good specimens and/ or long term health, they should be thinned to allow proper development of the best specimens, and to allow them to grow to maturity, either by:

- Crown pruning
- 'Lifting' of lower branches
- Complete removal

Careful selection should be made with the aesthetics of the removals/ retentions considered, for example, with a group of three trees reduced to two, etc. Where new trees have been planted in tight groups, thinning should occur to allow selection and retention of the best specimen, with removal of the others. However, the contractor

must ensure any clearance works do not involve any of the individual or Group Tree Preservation Orders (TPO's).

2.2.13. **Replacements**

Monitor establishment of trees. Where stock fails to establish, the maintenance contractor shall seek instruction for replacement planting. Any replacements for grouped trees must be replaced with matched stock from an approved supplier. Refer to Appendix A for a schedule detailing the named nursery suppliers to be referred to for the supply of replacement stock

2.3. HEDGE PLANTING

2.3.1. **Long Term Design Objectives**

Maintain newly established hedge lines clear of weed and grass growth.

Control vegetation growth around the base of the hedge line to maintain a tidy appearance.

On established sections of hedge, allow for annual trimming to keep shaped and to the required height. Native mixed species hedges to be maintained to 1.5m - 1.8m high.

Hedge trimming to take place between October and February to avoid the bird nesting season, and before spring growth and flowering and to allow any berries to be retained through winter. Plants to be trimmed to shape, true to line and level and in line with specification.

Maintenance Operations

2.3.2. **Weed Control**

Allow for applications of suitable residual herbicides prior to the spring growing season, and spot herbicide applications as appropriate to control noxious weeds and unsightly growth in more prominent locations.

Allow for spot weed control of invasive / noxious weed species. Ensure species such as thistle, ragwort, nettle or bramble do not become established or set seed.

2.3.3. **Watering**

Allow for watering in dry / drought periods up to year 10. Apply sufficient water to bring soils up to a moist condition but avoid over-watering.

2.3.4. **Litter Control**

Allow for twice weekly litter picking around all hedge planting.

2.3.5. **Canes and Guards**

All accessories on the native hedge plants should be removed by the end of the third year growing season following planting. Allow for the removal of all redundant canes, guards and shelters and dispose of off-site.

2.3.6. **Firming Up**

Inspect stock regularly, especially after strong frosts or heavy frost. Firm up any stock suffering wind-rock / frost heave.

2.3.7. **Mulch**

Allow for a localised top-up of mulched areas to achieve a 50mm depth over all areas, using bark mulch to the same specification as the original bark mulch (Refer to Appendix B)

2.4. AMENITY GRASSLANDS / LAWNS

2.4.1. **Long Term Design Objectives**

Amenity grass areas are to be maintained to establish a healthy vigorous sward free of moss, thatch, weeds, casts, discoloration, scorch, litter or leaves. Areas are to be maintained in a tidy condition within specified height ranges. Where different mowing regimes are intended to provide varying character to the landscape these shall be closely followed to ensure the design effects as planned.

Maintenance operations should aim to deliver high quality grasslands with optimum use of inorganic fertilizers and minimal use of pesticides and herbicides.

<u>Maintenance Operations</u>

2.4.2. **Amenity Grassland**

Mowing

Mowing is to be undertaken between March and October, to a regular programme but avoiding periods of water logging or drought. All areas are to be cut within the specified height ranges throughout the growing season. All litter or other debris is to

be removed prior to mowing. Areas are to be cut to a neat even finish, without rutting or compaction. All grass is to be neatly trimmed around edges, manholes and other obstacles. Avoid damage to trees; no strimming to be undertaken within 250mm of the base of any trees.

2.4.3. **Mowing Programme**

Grass Moving during normal weather conditions

Area	Max Height	Min No. of Cuts	Removal of Mowings
Mowing strips	50mm	25	Mowings Boxed Off
Amenity Grass Areas	50mm	25	Mowings Boxed Off

During prolonged dry periods mowing should occur throughout the growing season to a maximum height of 50mm.

2.4.4. **Grass Edging**

A mowing strip of 300mm is to be maintained adjacent to all paths and hard landscape areas to a height of 50mm. Edges to mowing strips are to be trimmed with edging shears at time of each mowing visits. Path edgings, hard surface edges are to be cut with half-moon once per month. Remove arisings.

Allow for reforming edges once per winter to all edges including paths, borders, and mowing edges; using a suitable edging tool, to clean straight lines or smooth flowing curves. Form a clean edge and remove soil.

Grassland immediately adjacent to boundary hedgerows will have longer edge zones left where possible to create varied height and structure.

2.4.5. **Bulbs**

Where flowering bulbs species occur delay cutting to bulb growth until 6 weeks after flowering.

2.4.6. **Fertilizers**

Allow for applications of fertilisers to all amenity grass in spring and autumn:
Spring : 12-0-9 NPK + 2% Fe + 2% mg 35-70g /m²
Autumn: 3-12-12 NPK 35-70g/m²
Apply in accordance with manufacturer's instructions.

2.4.7. **Herbicides**

Monitor sward for growth of broadleaved weed species. Allow for selective and spot herbicide applications as necessary to remove weed species from amenity grasslands. Only herbicides with a low impact on the environment, wildlife and soils should be used. Herbicides should accord with the Code of practice for using Plant Protection Products, 'approved' under Part 111 of the Food and Environmental Protection Act, 1985, (FEPA).

When used, steps should be taken to avoid drift onto non-target plants by ensuring correctly maintained equipment, suitable nozzles and operating at pressures below 2.5 bar to keep the droplet size within the specified medium-coarse range (BCPC definition).

The landscape maintenance contractors should minimise and where possible eradiate the use of herbicides.

2.4.8. **Aeration**

Allow for spiking over grass areas to aerate soil and improve drainage in late spring or autumn. Ensure spikes or hollow tines reach to a depth of 75mm. Fork over any areas of compacted soil or where ponding occurs to a minimum of 200mm.

2.4.9. **Scarifying**

Allow for scarifying amenity grassland areas once in spring and autumn.

2.4.10. **Leaf Removal**

Allow for removal of leaves on regular basis from grass areas during October/ November.

2.4.11. **Reinstatement**

Make good worn or damaged areas by reseeding or turfing (depending on original specification). Allow for cultivations, levelling, topdressing and pre-seed turfing fertilizer. Ensure new seed/ turf will match the existing in quality and appearance. Allow for protection to ensure germination/ establishment. Refer to Planting Plans for seed mixes.

2.5 RETAINED AND ENHANCED SPECIES-RICH GRASSLAND

2.5.1.

Long Term Design Objectives

To establish and maintain a diverse sward of wildflower and grasses that:

- provides a habitat for invertebrates, birds and mammals
- foraging opportunities for wildlife
- promoting the growth of less competitive species
- maximum flowering interest

Note: All vegetation management work must avoid disturbance to nesting birds, which is an offence under the Wildlife and Countryside Act 1981 (as amended). The area should be checked by a suitably qualified ecologist if works are to be carried out within the Bird Nesting season of March to September (inclusive).

The wildflower grassland will be managed on a traditional hay management regime with only one main cut per annum in late July – August following flowering, followed by autumn mowing.

This regime is valuable for nature because:

- It allows tall plants to flower, creating an attractive landscape full of nectar sources for butterflies and bees, and cover for nesting birds
- It removes biomass which, over time, and if the sward is not fed, will favour herbs over grasses
- It is not selective, although cutting times will determine if late-flowering plants can thrive

Cuttings will be left on the ground to dry for up to seven days before removal. It is important that these cuttings are then removed from the grassland to prevent nutrient build up, which can encourage competitive species to succeed the wildflowers that are present.

Maintenance Operations

2.5.2. **First Year Management**

The provision of species rich grassland will be achieved through the sowing of a range of species rich seed mixes, thereby allowing for an immediate increase in species

diversity in these areas. The grassland will also be brought under suitable management regimes (e.g. rotational and timed cuts), with longer term management intended to restore the calcareous character of the grassland and also to encourage the gradual growth of structurally and ecologically diverse swards.

The initial management regimes for areas of grassland will vary. Within the areas of existing better quality and undisturbed grassland to be retained, limited new seeding will be undertaken. Where poorer quality grassland exists, these areas will be subject to over-sowing and new seeding as required.

Areas that are proposed for enhancement will be prepared via scarifying (where appropriate) prior to sowing in order to produce a short sward and areas of bare ground within which seed mixes can be sown and bedded for germination.

In the first year after sowing a seed mixture, annual weed growth should be cut back regularly. This will encourage the development of a good perennial ground cover and will to help control problem weeds. Residual perennial weeds such as docks can be dealt with by spot treatment.

Management of retained scrub with follow the management prescriptions set out under section 2.2 above.

2.5.3. Management of established wildflower areas

Once established, the wildflower areas should be cut once or twice a year.

To maintain maximum diversity and flowering interest mow the meadow in sections at different times from late June to the end of August. Do not cut meadows in May or early June to avoid disturbing nesting birds. The main mowing season is July and to maintain flowering interest and balance it is best to complete hay cutting by the end of August. Parts of the meadow may be left occasionally (one year in three in rotation) into September so that late flowering species can seed. Leave some patches or edges uncut through winter to provide winter refuge for insects.

Where Yellow Rattle (Rhinanthus minor) is to be used, cutting will only take place after late July. This semi-parasitic, grassland annual, was in the past a serious pest for farmers as it weakens grasses and as a result can reduce hay yields by as much as 50%, but as a consequence provides ideal conditions for herb establishment particularly where over sowing existing grassland is being undertaken.

Autumn cutting:

After the main cut, additional mowing during late summer and autumn is very effective in removing excessive grass growth and encouraging flowers -particularly on more

fertile sites. Mow with a rotary flail or other suitable mower to 40-75mm. Ideally cut at least twice from the time the hay is removed to the end of November, aiming to leave the grass short through winter.

Weed control:
On most soils there will be some initial problems with perennial weeds. Most grassland weeds such as docks and thistles are suppressed by the annual hay cut in July and will gradually decline with good management. Low level weed populations may be spot sprayed with a herbicide, or pulled (eg ragwort). Selective herbicides are only worth using as a last resort for serious infestations as they will result in the loss of many wild flower species.

Only herbicides with a low impact on the environment, wildlife and soils should be used. Herbicides should accord with the Code of practice for using Plant Protection Products, 'approved' under Part 111 of the Food and Environmental Protection Act, 1985, (FEPA).

When used, steps should be taken to avoid drift onto non-target plants by ensuring correctly maintained equipment, suitable nozzles and operating at pressures below 2.5 bar to keep the droplet size within the specified medium-coarse range (BCPC definition).

The landscape maintenance contractors should minimise and where possible eradiate the use of herbicides.

2.5.4. Management of Damp Grassland Areas

First year management

In the first-year annual weed growth may be cut back to encourage the development of a good perennial ground cover. Establishment on sites prone to flooding may be patchy and may take several years to become fully colonized.

Management once established

Wet grassland which only occasionally or seasonally floods can be managed as meadow or grassland as described elsewhere (see Management of meadows and grassland).

Plant communities established in areas that are more frequently or continuously wet may benefit from a different management approach. Vegetation associated with ponds, ditches and other open water is of particular benefit providing food and shelter to wildlife such as newts and water voles. From a wildlife point of view ponds do not need to have large areas of open water; ponds which appear to be choked with vegetation often support the greatest diversity of plant and animal species. The habitat value is, however, enhanced if there are a variety of vegetation structures from dense tussock stands to bare and recently colonized mud. Management of these

wetland areas should therefore aim to create variation with minimum disturbance to animal populations.

Variation in structure can be achieved by cutting back and removing short sections of vegetation every 2-3 years in rotation. In ditches, cut out sections and /or work from one bank each year. With ponds remove vegetation as a wedge, like removing a slice of cake. Dense stands of single species (e.g. yellow iris) may benefit from selective thinning. Vegetation removal causes the least disruption to wildlife when carried out between September and November.

The vegetation planted should be mown during the growing season during dry spells, to prevent compacting the soil and damaging the plants. To maintain the grass cover and to maintain good infiltration, excessive silt deposits should be removed from the surface. Bare patches of ground should be re-seeded to prevent erosion and allow effective filtering of run-off.

2.6 MANAGEMENT OF OPEN MOSAIC HABITAT

2.6.1 In order to maintain and replicate areas of Open Mosaic Habitat, a dedicated ecology enhancement area to the south of the car park will be used for habitat creation and enhancement purposes. While being of intrinsic ecological value in its own right, it will also provide connectivity between the ecology car park and nearby SuDS features, providing enhanced opportunities for invertebrates, as well as other protected and notable species.

This will be achieved through the provision of areas of open and bare ground, grassland enhancement, retention of scrub, wetland style scrapes and bee banks. This will ensure there is a network of interconnected 'stepping stone' habitats at varying stages of succession. Prescriptions for grassland and scrub management that have been set out in the relevant sections above will also be used in this area to aid in the establishment of the Open Mosaic Habitat.

Bare ground provision

At least 10% of the area will be bare ground in the form of small patches of bare earth and sparsely vegetated ground. This will be created as a result of the scrub clearance that has taken place to facilitate the reinstatement of the open grassland. The patches of bare ground will be interspersed throughout the Open Mosaic Habitat area and will be managed on an annual, rotational basis.

Short and long term management will comprise manual weeding to remove noxious / injurious weeds, allowing some ephemeral vegetation to flourish which will be of value to pollinators in particular.

2.6.2 **Provision of scrapes.**

Establishment and first year management

A number of scrapes will be created within the habitat. Whilst approximate locations will be shown on the appropriate landscaping plans, exact final placement will be undertaken based on ground conditions with areas of either bare-ground or less desirable growth targeted.

The creation of the scrapes will be to ensure that a range of opportunities and micro-habitats are provided within the area, which when working in tandem with the other habitat measures proposed, will provide a range of unique opportunities to invertebrates in particular.

All new scrapes will be designed specifically as biodiversity features which are envisaged to be predominately rainwater filled and subject to drying out on a frequent basis.

The creation of scrapes will be subject to the below requirements:

- Scrapes will be shallow, although not with uniform depth across the whole area. Depth should typically range from 0mm (at margins) to 300mm (at deepest point);
- A 'pochmarked' basin surface should be used to create variations in topography across scrape areas;
- Margins of scrapes should be shallow to allow for retention of muddy edges, these should be kept as open areas.

Scape creation will be undertaken at a suitable time of year and under the supervision of an ecologist.

During the short-term, management will be minimal and the scrapes will be allowed to fill with water on their own accord, however any indication of pollutants or in-fill will be monitored with remedial action taken where required. This may include additional excavation, if required.

2.6.3 **Management once established**

Longer-term management will be largely driven by on-site conditions and success of establishment.

A guiding principle of management however will be to ensure that the margins remain open and exposed (i.e. muddy). If margins become overcrowded by either opportunistic growth or scrub encroachment, they will be cleared either through direct removal or mowing / grazing. These works should occur during autumn or winter.

Should dredging be required in the longer-term, this will only be considered from Years 5 onwards or at the discretion of a suitably qualified ecologist

2.6.4 **Bee banks**

Establishment and first year management

A number of five bee banks will be created within the habitat. Whilst approximate locations will be shown on the appropriate landscaping plans, exact final placement will be undertaken based on ground conditions.

Bee banks should be positioned in well-drained areas and such that they have exposure to sunlight with south-facing slopes for maximum exposure. A nutrient poor substrate should be used to prevent over-vegetation and bank stability. In order to ensure diversity of bee banks, the banks will comprise a variation of substrates and mediums. The following strategy will be employed:

1. Chalky Substrate with Topsoil and Subsoil Layers:
    - North Side: Chalky Substrate: Use crushed or finely ground chalk to create a loose, well-drained substrate. This provides nesting opportunities for bees that prefer loose soils.
    - South Side: Topsoil: Add a layer of topsoil on the south side to support the growth of vegetation, which can provide forage and nesting opportunities for bees.
    - Base: Subsoil: Use subsoil as the base layer to provide stability and drainage for the bee bank.

2. Incorporating Clifflets and Bare Ground:
    - South Side: To provide additional habitat diversity, create clifflets or vertical surfaces using natural materials like rocks or wooden blocks. These structures can offer nesting opportunities for certain bee species that prefer vertical surfaces.
    - Bare Ground: Leave some areas on the south side free of vegetation to create patches of bare ground. This is important for bees that require exposed soil for nesting.

3. Aggregate Size for Chalk:
    - Finer Sediment: Crushed chalk with a finer sediment can provide more nesting opportunities for smaller bees that require fine particles for constructing their nests. This option is suitable for species such as mining bees.
    - Mixed with Builders Sand: Mixing chalk with builders sand can help improve the structural stability of the substrate while still maintaining suitable nesting conditions. It provides a more solid base for larger bees and reduces erosion risk

The banks should all vary in size, but should be ensure the capping material should be sufficiently deep (at least 30cm) and at least the banks should be between 1m-2m high.

Flowering plants should be located within 20-500 meters from the nesting resources. This range allows bees to efficiently forage for pollen and nectar without expending excessive energy in flight. A diverse range of native flowering plants that bloom at different times throughout the year. This ensures a continuous and varied supply of pollen and nectar for the bees.

2.6.5 **Management once established**

Once established, the bee banks will be managed on an annual basis. Each year, one section of the banks will be cleared via hand weeding with only on one side of the bank cleared per management period to ensure there is sufficient bare coverage on the banks, while also maintaining some vegetative cover. Banks and sections are to weeded/cleared on a rotational basis, with the optimal time for undertaking the works being February. Banks will also be checked for erosion, should any erosion occur banks may require reinstatement with additional capping material to ensure stability.

2.7 WETLAND PLANTING TO SUDS FEATURES (PONDS AND SWALE ATTENUATION BASINS)

2.7.1

Long Term Design Objectives

There are attenuation basins and swales within the Innovation Quarter area, which will form areas of permanent water and swales which will dry out seasonally. All the ponds and the swales have areas of wetland planting to their margins.

Planting to swales and ponds is to be maintained to ensure an attractive and varied range of planting for year-round interest and habitat value. Planting is to be managed to ensure plants do not become over dominated by individual species and swales, headwalls and channels do not become impeded by plant growth.

The ponds need to be monitored for algal growth or blanket weed growth and changes in water quality. Measures to protect water features from such growth may be required either as precautionary measures early in the growing season or as a response to a problem.

Maintenance Operations

2.7.2 **Control of Planted Material**

Plant communities will be constantly changing throughout the year. Monitor the condition of planted areas and the growth of individual species. Agree the optimum water/ plant coverage with engineer and control the growth of the more invasive species by cropping or digging out in the autumn. Plants will be thinned every 2 years to prevent dominant species outcompeting less vigorous species. Ensure pond liners, banks, headwalls and other features are properly protected during such work and are not left exposed on completion.

Vegetation build-up in the swale and pond will be regularly cleared to allow water to freely drain away.

At the end of the flowering period dead and dying plant material is to be removed from the beds and composted off site

All planting is to be maintained in a tidy condition with litter picking and removal of dead plant material on a weekly basis.

Ensure nesting birds are not disturbed during operations.

2.7.3 Control of algal growth

Should any weed problems appear, the contractor shall promptly inform the supervising officer and propose a method statement for dealing with the matter.

Pending establishment of any planting incorporated within the scheme the method statement shall include chemical control and/or physical removal of weed and employment of additional means such as contained barley straw. These measures shall, at all times, be in accordance with current Environment Agency regulations and ensure a high standard of presentation.

2.7.4 Physical Removal of Weeds

In the event of any algae bloom or blanket forming prior to treatment, the weed shall be removed by netting or similar effective means or by an approved algaecide. All hard surfaces of weirs, cascade etc. shall be kept clean of algae and staining.

2.7.5 Chemical Control

Chemical control shall, at all times, be strictly in accordance with current Environment Agency published regulations and be carried out by properly trained and certified operatives, with due regard to the health of wetland planting.

2.8 HARD LANDSCAPE AREAS

2.8.1. **Long Term Design Objectives**

All areas of hard landscape, including footpaths, shall be maintained to be free from staining, breakage, litter, and other deleterious matter, and shall be completely weed free.

Maintenance Operations

2.8.2. Health & Safety

Certain cleaning methods described in this specification involve the use of chemicals. Therefore, it is important that any safety warnings issued by the chemical suppliers should be carefully read and strictly adhered to at all time.

In general, the following precautions should be taken:

- When using chemicals, protective clothing such as gloves, goggles, boots and overalls should be worn.
- Adequate ventilation is required when using chemicals in confined spaces.
- When using flammable materials; cigarettes, naked flames and other sources of ignition should be carefully controlled.
- When diluting acids, ALWAYS add acid to water and not water to acid.
- Any clothing that is contaminated with chemicals should be disposed of safely.
- When using any chemicals, care must be taken not to damage, contaminate or stain any adjoining materials, landscaping or finishes.
- Care must be taken to protect personnel operating in the area of the cleaning from any injury or hazard created by the cleaning. The appropriate First Aid must be available on-site.
- Before undertaking any cleaning operation a trial should be carried out on a small, preferably inconspicuous area, to determine the effect of the chemicals before treating a large area.

2.8.3 Winter maintenance of hard paving

Normal de-icing salts can be applied to most concrete and natural stone products without risk of damage to the pavement. Once the pavement has dried out after any thaw, the paving may be temporarily discoloured by the salt material, as for any paved area. Normal weathering should soon remove such discoloration.

If there is concern to avoid temporary discoloration of a paved area, then other de-icing materials, such as 'Urea', should be used.

2.8.4 Cleaning of Paving – General Dirt and Detritus

To remove general dirt and detritus regular brushing is recommended. If detritus reduces the intensity of the colour of the material then this can be re-established by scrubbing with a mild detergent e.g. washing up liquid and hot water.

Ensure all the detergent has been thoroughly washed from the surface on completion of the cleaning and the resulting run-off is carefully channelled to either drainage points or containers where it can be safely disposed of.

2.8.5 Cleaning of Paving – Moss, Lichens and Algae

Moss, lichen and algae can be prevalent on hard surfacing where the area is heavily shaded, is under trees or is not laid to an adequate fall. If such growths do occur and are considered undesirable then the area should be treated with a proprietary weed or moss killer used in accordance with the manufacturers' instructions. Such products take some days to be effective and are most effective when applied during a spell of dry weather. The washes work best if any thick growths are scraped off first and the wash is well brushed in. Some treatments leave a residue to discourage the re-growth of the moss and algae but this will only be of limited value if the surrounding conditions leave the paving damp and in shade.

Note: Products containing Ferrous Sulphate can chemically react with concrete paving products resulting in a brown stain to the surface. The Contractor is to check with the manufacturers of the weed or moss treatment for further advice on this matter.

2.8.6 Cleaning of Paving – Rust Stains

Initially action must be taken to eliminate the sources of staining. To remove the rust stain, the surface should first be wetted with clean water and then the affected area treated with a 7 to 10% dilution of Hydrochloric acid solution. Guidance on the safe use of chemicals is given in Section 2.9.17 (Acid Washing) of this specification.

2.8.7 Cleaning of Paving – Oil Stains

Oil can penetrate readily into hard surfacing materials, but it should not stain if any spillages are removed promptly with an absorbent material e.g. paper towels, cloth or

absorbing granules. Do not attempt to wipe the stain as this will drive the oil into the surface of the units and spread it over a wider area.

If the stain persists then an emulsifying degreaser should be employed. Brush the cleaner onto the affected area, leave for a period of time according to the manufacturer's instructions and then wash the emulsified oil away with plenty of clean water.

Alternatively, the surface can be scrubbed with a detergent and hot water taking care to ensure that the strength of the detergent is not detrimental to the appearance of the paving. However, for persistent oil staining, steam cleaning may have to be considered.

2.8.8 **Cleaning of Paving – Bitumen Stains**

Fresh bitumen should be allowed to cool down before removing it with a paint scraper or similar. If it is particularly resistant, the use of ice to make the bitumen brittle may be required prior to scraping it from the paving. Any residue should be removed with an abrasive powder and finally the whole area rinsed with clean water. Certain proprietary cleaning agents are available to remove bitumen but these should be tested on an inconspicuous area of paving first.

2.8.9 **Cleaning of Paving – Graffiti and Paint Stains**

Both paint and graffiti are difficult to remove from most hard surfacing materials. Fresh wet paint should be soaked up with an absorbent material without wiping the paint, as this will spread the stain. It should then be treated with a suitable solvent such as white spirit and then the area washed with a de-greasing agent taking care in the disposal of the run-off material.

Dried paint should be scraped off as far as possible and then an appropriate paint remover applied. Paint manufacturers may often be able to give more detailed advice on the removal of paint and graffiti. Therefore, they should be consulted directly for specific recommendations.

2.8.10 **Cleaning of Paving – Epoxy and Polyester Stains**

Areas of solidified epoxy or polyester resin can be removed by carefully burning off the area with a blowtorch. Care must be taken not to inhale any fumes given off.
If, after burning, a black stain remains, this can be removed by scrubbing with detergent and hot water. For larger areas grit blasting may have to be considered, however the effect of such treatment on the micro texture of the surface should be carefully considered. It is advised that a small area be tested before any large-scale operations are undertaken.

2.8.11 **Cleaning of Paving – Smoke, Fire and Tobacco Stains**

Normally such stains can be removed by scrubbing with detergent and hot water. Where the stains persist, a mixture of scouring powder and household bleach can be used. It is important the bleach is washed from the area with clean water once cleaning is completed and the run-off carefully disposed of.

2.8.12 **Cleaning of Paving – Beverage Stains**

These can normally be removed by scrubbing the stain with detergent and hot water. If the stain is persistent, apply a household bleach solution and then rinse the area with clean water taking care to dispose of the run-off safely.

2.8.13 **Cleaning of Paving – Chewing Gum**

Chewing gum is a particularly difficult substance to remove from hard surfaces.

Newly discarded gum can be scraped off by using a mechanical scraper, but hardened gum can only be removed by both freezing the gum and chiselling it from the surface of the paving or utilising a hot water/steam cleaner. For specific advice on chewing gum removal, it is recommended that specialist cleaning companies should be contacted directly for further details.

2.8.14 **Cleaning of Paving – Scuff Marks from Vehicle Tyres**

These can normally be removed by steam cleaning, or by scrubbing the area with detergent and hot water.

2.8.15 **Cleaning of Paving – Cement and Lime Stains**

Both types of staining can occur on paved surfaces, usually as a result of contamination from other sources, such as concrete street furniture or the use of onsite mortars and concrete.

Cement and lime deposits are generally insoluble and therefore require treatment by a suitable acid cleaner to fully remove them. Guidance on the safe use of chemicals is given in Section 2.9.17 (Acid Washing) of this specification.

2.8.16 **Efflorescence**

Efflorescence, or lime bloom, is a transient phenomenon of ordinary Portland cement. Its effect is to lighten the colour of concrete and can appear as a white deposit covering part or the entire surface. Except in severe cases, the phenomenon disappears completely when the surface is wet and reappears as the units dry out.

The phenomenon is temporary and will with time disappear because of natural weathering and trafficking processes. Alternatively, efflorescence can be removed chemically by using a suitable acid cleaner. Guidance on the safe use of chemical treatments is given in Section 2.9.17 (Acid Washing) of this specification.

2.8.17 **Acid Washing**

Stubborn and persistent stains that will not generally weather away naturally will require the application of a specific acid cleaning treatment to remove them.

Prior to any acid cleaner being applied, the surface must be thoroughly wetted with clean water to prevent the acid being absorbed directly into the paving. A dilution of 7 to 10% of hydrochloric acid should then be prepared and applied to the affected area.

As the staining begins to dissolve, some frothing may be apparent, which should be followed by agitation of the surface using a stiff bristle brush to completely remove all trace of the stain.

Once this process is complete the whole surface should be rinsed thoroughly with clean water, taking care to dispose of the runoff safely. In the vast majority of cases, one treatment will be sufficient; however, in some cases re-treatment may be required.

When using any form of chemical treatment, the following guidelines should be strictly adhered to:

- With deeper stains, the degree of acid treatment may result in an acid etched appearance.
- Protective clothing (gloves, boots, goggles etc.) should be worn at all times when using chemicals and the appropriate first aid measures must be available on-site.
- Take care to ensure that surrounding materials and landscaping are protected. Soft landscaping and exposed metals can be severely affected by chemical treatments.
- It is better to treat several times with the correct dilution than to use concentrated acid, which may damage the surface of the unit.
- Extreme care must be taken when using chemical cleaners on wet cast concrete products as these are less resistant to such treatments.
- When diluting acids, always add acid to water and not water to acid.

2.8.18 Sealants

Proprietary sealing agents are commonly used on paved surfaces, to reduce moisture penetration of the laying course material, and minimise staining from spillages.

The paving surface must be completely dry and clean before any sealer is applied and this should always be carried out with reference to the manufacturer's latest instructions. Whilst such products may offer certain advantages, careful consideration must be given to the suitability of the sealant and any subsequent effect on the colour appearance and slip/skid resistance of the paving.

2.8.19 Use of Mechanical Sweepers on Paved Areas

The following recommendations deal with vehicles and associated equipment for use on paved footways/footpaths/pedestrian areas and roads.

- The equipment should be purpose designed to sweep the area and surfacing product. If there is any doubt, the vehicle manufacturer should be consulted.
- Where possible, low ground pressure tyres should be fitted to reduce the risk of breaking or cracking of flags.
- Tyres should be inflated according to the manufacturer's recommendations, again to ensure minimum weight distribution per square mm.
- Polypropylene, not wire, brushes should be used.
- Sweeping brush pressures should be set to the minimum required to suit the particular task, i.e. surfaces swept regularly will require a lower setting than those swept infrequently or those covered with heavy deposits.
- When sweeping, engine revolutions should be set at the minimum required to maintain vacuum (suction) pressure.
- Operators, including reliefs, should be trained to manufacturers' recommendations and tyre and brush pressures should be regularly checked.
- Advice should be given to operators that, when equipment is stationary or left unattended, suction, brush rotation and water jetting equipment should be switched off to avoid the risk of damage to the area below the stationary equipment.
- In new or re-laid areas, agreement should be reached on a period of manual cleaning (at least four weeks) to allow the paving to settle and the joints to seal. This period may be reduced by using either a water-based bonding agent or

elastomeric prepolymer sealant and by agreement with the cleansing authority on an appropriate sweeping regime.

- Following the use of mechanical cleaning operations, re-sanding of the joints in flexibly laid areas may be necessary.

2.8.20 Use of Power Washing Equipment on Paved Areas

To aid in the removal of surface staining, power washing equipment is often considered. Whilst such techniques offer certain benefits, particularly for larger areas, it is important that care is taken in their use to avoid damage to the structural integrity of the paving.

When using any form of power washer, the following guidelines should be strictly adhered to:

- The power washer should be used on a setting which is sufficient to remove the dirt without causing any further distress. A low-pressure setting is recommended.
- Do not direct the power lance directly down on to the paving, as this can result in loss of jointing material.
- Ideally a spraying movement should be adopted holding the power lance at a shallow angle, not greater than 300 across the diagonal (i.e. not parallel to joints)
- Certain high-pressure jetting machines have been known to mark / damage the surface of certain types of paving material. It is therefore prudent to carry out a small test area before commencing on a larger area.
- The area should be inspected after cleaning to ensure that joints are full.

2.8.21 Weed Control

Allow for spot spray application of suitable herbicide to any vegetation emerging in hard paved areas or along kerb lines. All public areas to be maintained completely weed free. General areas to be treated on a bi-monthly basis.

2.8.22 Litter

Remove all litter and deleterious material from hard landscape areas at the time of each main visit.

2.8.23 Bark Mulch

Remove any wind-blown bark mulch from hard landscape areas, parking or roadways. Return to planting beds unless contaminated with litter or other material.

2.8.24 Leaf Sweeping

Allow for the removal of autumn leaf fall from hard paved areas during October / November / December along with any other plant material at any other time of year.

2.8.25 Surface Drainage

Allow for the checking and cleaning of all surface water drainage channels and outlets to ensure free flow of surface water.

2.8.26 Street Furniture

Maintain all street furniture to a clean and undamaged condition, monitor street furniture on a regular basis to establish general condition and identify any damage, then clean / repair / replace as necessary.

2.9 GRASS PAVING TO PARKING BAYS

2.9.1. **Long Term Design Objectives**

All grass paving to parking bays shall be maintained to be free from staining, breakage, litter and other deleterious matter, and shall be completely weed free.

Maintenance Operations

2.9.2. **Commissioning**

A grass paving pattern that maximizes green space while providing structural stability will be utilised. Adequate drainage to prevent waterlogging and support healthy grass growth will be ensured.

A native grass/wildflower (80%/20%) species mix with low growing forbs is to be sown in the openings of the grass paving, ensuring even coverage and good soil contact.

After construction, the green paving may be put into use. Re-moisten (sprinkle lightly) after 2 to 3 weeks. Normally a green streetscape is created after 3 weeks.

2.9.3. **Management / Maintenance**

With intensive use, the grass is automatically kept short, and mowing/ trimming is usually not necessary. In places with less intensive use, mow or trim a maximum of 2to 3 times a year. Control weeds manually to prevent them from outcompeting the grass.

Where possible, rotate parking to prevent over-compaction. Preferably fertilise (sprinkle) once a year to maintain a pleasing aesthetical landscape area. Adjust care practices based on grass health, usage patterns, and environmental conditions.

3.0 Monitoring

Landscape Monitoring

The landscape works will be checked and inspected in accordance with the Management and Maintenance Schedules in Appendix C.

4.0 Timetable of Management and Maintenance Works

The timetable for management and maintenance works are set out in Appendix C

APPENDICES

A Supply Nurseries for Replacement Stock
B Replacement Bark Mulch Specification
C Management and Maintenance Schedules
D Maintenance Record Sheet
E Site Maintenance Visit Report
F Ecological Appraisal
G Arboricultural Report

APPENDIX A

Nursery Suppliers for Replacement Stock

All replacement plant stock should be sourced from the named nursery supplier as set out below:

Semi-Mature Trees and Hedge Stock		
Deepdale Trees Tithe Farm Hatley road Potton Sandy Bedfordshire SG19 2DX 01767 262636 mail@deepdale-trees.co.uk Matthias & Susan Anton / Mark Godden	Lorenz von Ehren Maldfeldstrabe 4 D-21077 Hamburg Germany 0049 4076 1080 b.herold@bruns.de Britta Herold	Bruns Pflanzen Postfach 1165 26146 Bad Zwischenahn Germany 0049 4403 6010 peter@LvE.de Peter Flugge

Shrubs and Herbaceous Perennials		
Johnsons of Whixley The Nurseries Whixley York YO5 8AQ 01423 330234 luker@nurserymen.co.uk Luke Richardson	Robin Tacchi Plants Fen Farm Fen Lane Garboldisham Norfolk IP22 2RL 01953 681312 gill@robintacchiplants.com Robin / Gill Tacchi	Palmstead Nurseries Ltd Harville Road Wye Ashford Kent TN25 5EU 01233 811304 simon@palmstead.co.uk Simon King
Crowders & Sons Ltd Lincoln Road Horncastle Lincolnshire LN9 5LZ 01507 525000 tom.owen@crowders.co.uk Tom Owen	Note: It is recognised that for the procurement of small numbers of stock, it may be more economical and practical to use local suppliers. This is acceptable provided the stock meets the NBS specification standards. Confirmation of the provenance of native species will be provided as part of the Employers' Requirements, prior to appointment of the landscape contractor and advance ordering of plant stock.	

APPENDIX B

Bark Mulch Specification

Shrub Beds, Hedging and Tree Circles Within Grass Areas

Replacement bark mulch shall be;

Melcourt 'Ornamental Grade Bark Mulch' or similar equal and approved.

Melcourt Nurseries Ltd
Boldridge Brake
Long Newton
Tetbury
Gloucestershire
GL8 8RT
01666 502711

Bark mulch shall consist of matured conifer bark, dark brown in colour, with an even particle size distribution between 5-35mm. Bark mulch should be sourced from Great Britain wherever possible. All dust and fine material to be expended. The mulch shall contain less than 5% wood and no sticks and shall be pest, disease and weed free and be free of Methyl Bromide contamination.

All bark must have been matured for a minimum of 16 weeks; naturally heat treated to ensure excess volatile substances are driven from the bark. Temperatures must exceed 50˚C for a minimum 14 days continuous period, followed by a further period of stabilisation. The pH to be between 4.5 and 5.8.

The maintenance contractor shall notify the client of the mulch being used prior to spreading. The mulch shall be from an approved source and a representative sample of the mulch shall be supplied for approval prior to delivery to site. All deliveries shall conform to the sample.

To be spread to a depth of 50mm in all areas of shrub, ornamental grasses, herbaceous perennials and hedge planting and in a 1200mm diameter circle around all trees planted in grass areas.

APPENDIX C

Management and Maintenance Schedules

C.1 Vegetation Maintenance and Management Schedule - Over 20 Years

Operation	Year																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C.1.1 Newly planted trees																				
Formative pruning	■									■										■
Adjust tree ties, check stakes / guys and replace as necessary	■	■	■																	
Remove stakes and ties			■																	
Weed control around base of trees	■	■	■																	
Apply fertiliser	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Firming	■	■	■																	
Tree replacements as necessary	■	■	■	■	■															
Watering as necessary	■	■	■	■	■															
Pest and disease control	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Operation	**Year**																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C.1.2 Hedge Planting																				
Weed control – application of residual herbicide	■	■	■	■	■	■														
Formative clipping/pruning as required	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Operation	Year																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C.1.3 Newly planted shrubs																				
Prune (exact timing dependent on species)																				
Application of fertiliser																				
Weed control (spot treatment)																				
Re-mulch																				
Watering as necessary																				
Trim Hedges																				
Pest and disease control																				
Thinning as necessary																				
Replacements as necessary																				
Operation	**Year**																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
C.1.4 Amenity Grass and Verges																				
Mowing																				
Weed control (had weeding)																				
Strimming (to borders and road edges)																				
Fertiliser																				

Aeration																				
Scarifying																				
Rolling of formal lawns																				
Replacement as necessary																				
Operation	**Year**																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
C.1.5 Wildflower Areas and Rough Grass																				
Cutting and removing arisings																				
Strimming (at the same time as every grass cut – to borders, road and footpath edges)																				
Replacement as necessary																				
Operation	**Year**																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
C.1.6 Marginal Planting																				
Prune (exact timing dependent on species)																				
Weed control (hand weeding)																				
Pest and disease control (when required)																				
Replacements as necessary																				
Thinning as necessary																				
Replacement as necessary																				

Operation	Year																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C.1.7 Pond Area																				
De-silt pond as necessary																				

Operation	Year																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C.1.8 Other																				
Litter picking - all areas																				
Hard Landscape – all areas																				
Check furniture - repair and replace as necessary																				
Check play equipment - repair and replace as necessary																				
Check footpaths - repair and replace as necessary																				
Fences - check, repair and replace as necessary																				

C.2 Annual Soft Landscape Maintenance Schedule - 1 Year Operations

Operation	Annual frequency of operation	Month											
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
C.2.1 Tree planting													
Formative pruning	1X	■	■										
Adjust tree ties, replace as necessary	1X									■	■	■	
Weed control around base of trees	1X						■		■				
Apply fertiliser				■	■								
Firming		■	■	■	■	■	■	■	■	■	■	■	■
Check stakes and guys, and re-tighten / replace / remove as necessary	2X					■	■			■	■		
Watering as necessary	12X				■	■	■	■	■				
Tree replacements when required	1X	■	■										
Pest and disease control (when required)		■	■	■	■	■	■	■	■	■	■	■	■
C.2.2 Shrub Planting													
Prune (exact timing dependent on species)	2X			■	■					■			
Pruning of herbaceous perennials	monthly				■	■	■	■	■	■			
Apply fertiliser	1X				■	■							
Weed control (spot treatment and / or hand weeding)	as required			■	■	■	■	■	■	■	■		
Re-mulch	1X			■	■								
Watering as necessary	as required				■	■	■	■	■				
Trim hedges (exact timing dependent on species)	1X			■	■					■	■		
Pest and disease control (when required)	as required	■										■	■
Replacements where necessary	1X	■	■										
Thinning as necessary	1X										■	■	
C.2.3 Amenity Grass and Grass Verges													
Mowing	20-24X			■	■	■	■	■	■	■	■		
Weed control (hand weeding)	as required			■	■	■	■						
Strimming and/ or edging with edging shears	20-24X			■	■	■	■	■	■	■	■		

(to borders and road edges) to occur at each cut													
Fertiliser	2X												
Aeration (every 3 years)													
Scarifying	2X												
Rolling of formal lawns	as required												
Reinstatement as necessary	as required												
C.2.4 Wildflower Areas – following the first year only													
Cutting and remove arisings	2X												
Strimming where required, to occur each cut	2X												
Replacement as necessary													
C.2.5 Marginal Planting													
Prune (exact timing dependent on species)	1X												
Weed control (hand weeding)	2X												
Pest & disease control (when required)													
Replacements as necessary													
Thinning as necessary													
C.2.6 Pond Area													
De-silt pond as necessary	Every 5 years												

C.3.0 Annual Hard Landscape Maintenance Schedule - 1 Year Operations

Feature	Task	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
C.3.1 Benches/Seats/														
	Inspect bench	2	2	2	2	2	2	2	2	2	2	2	2	
	Clean bench	2	2	2	2	2	2	2	2	2	2	2	2	
	Repair / remove graffiti	As needed												
C.3.2 Rubbish / Recycling Bins														
	Empty bins	30	30	30	30	30	30	30	30	30	30	30	35	
	Clean bins	2	2	2	2	2	2	2	2	2	2	2	2	
	Repair and Remove Graffiti	As needed												
C.3.3 Footpaths														
	Inspect	4	4	4	4	4	4	4	4	4	4	4		
	Remove rubbish	4	4	4	4	4	4	4	4	4	4	4		
	Remove weeds		1		1		1		1		1			
	Sweep		1		1		1		1		1			
	Pressure wash		1		1		1		1		1			
	Repair	As needed												
C.3.4 Play Equipment														
	Inspect all play equipment and wetpour safety surfaces	2	2	2	2	2	2	2	2	2	2	2	2	
	Clean all play equipment and wetpour safety surfaces	2	2	2	2	2	2	2	2	2	2	2	2	
	Repair / remove graffiti	As needed												

APPENDIX D: Maintenance Record Sheet

PROJECT: **CONTRACTOR:**

This sheet is to be presented by the Landscape Contractor to the Client for signature each month as per the maintenance programme.

Month: ..... 20.....

Summary of Specified Operation Specified Frequency **Date(s) Carried Out**

Grass

(i) Mowing grass areas
(ii) Edge trimming
(iii) Fertiliser/weed killer
(iv) Check for reptiles prior to mowing operations

Shrub/Groundcover Planting

(i) Watering
(ii) Weeding
(iii) Top up mulch
(iv) Pruning/pest/disease control
(v) Check for damage/failures

Trees

(i) Watering
(ii) Adjustment of stakes and ties
(iii) Firming up
(iv) Weed control

Replacement Planting

(i) Shrubs
(ii) Trees

Operations instructed (written instructions required).
.....
.....
Contractor's Rep. Initials/date
.....
Contractor's comments
..... Visit No 1 ..... Visit No 2 .....

..... Visit No 3 ..... Visit No 4 .....
Client's Rep. Initials/date
.....
Client's comments, if any
..... Visit No 1 ..... Visit No 2 .....

..... Visit No 3 ..... Visit No 4 .....

Appendix E: Site Maintenance Visit Report

DATE:

Address of Store: .....

.....

.....

Contractor: .....

.....

Time Arrived: .....

Time Departed: .....

Work Done: .....

.....

.....

.....

.....

Signed: .....
(Contractor)

.....
(Manager)

COMMENTS FOR ATTENTION OF LANDSCAPE ARCHITECT/SUPERVISING OFFICER

.....

.....

.....

.....

.....

Appendix F: Ecological Appraisal

Ecologist: Ecology Solutions

Refer to the following documents:

- Ecological Assessment - 7884.EcoAss.vf July 2019
- Ecology Briefing note - 7884M.IQ.S73.EcologyNote.vf.Complete.Issued

BICESTER HERITAGE

ECOLOGYSOLUTIONS

Part of the ES Group

BRAND EXPERIENCE,
BICESTER HERITAGE,
BICESTER
OXFORDSHIRE

Ecological Assessment

July 2019
7884.EcoAss.vf

ecology solutions for planners and developers

PROTECTED SPECIES

This report contains sensitive information
relating to protected species.
The information contained herein
should not be disseminated without the
prior consent of Ecology Solutions.

CONTENTS

PLANS

APPENDICES

1. INTRODUCTION

1.1. Background & Proposals

1.1.1. Ecology Solutions was commissioned by Bicester Heritage in 2018 to undertake Ecological Assessment work of lands at Bicester Heritage (Bicester Airfield), Bicester, Oxfordshire (see Plan ECO1), hereafter referred to as the wider site.

1.1.2. Development proposals for the wider site are proposed to come forward on a phased basis. At this stage it is anticipated that the site will come forward across four development phases.

1.1.3. This current ecology report relates specifically to one of these development phases, known as BRAND. The development proposals for the BRAND site are for an Automotive experience centre comprising B1 (business), B2 (light industrial) and D2 (Leisure) uses with ancillary spectator facilities comprising D1 (Non-residential), Sui Generis (workshop/ showrooms), A3 (restaurants and cafes) and offices, storage, display and sales comprising the 'Brand Experience Centre' at Bicester Motion, Bicester, OX26 5HA. The red line boundary for the BRAND site is detailed on Plan ECO1.

1.1.4. Notwithstanding that the BRAND proposals are to come forward as a standalone application, the importance of understanding ecological impacts as a result of site-wide development (i.e. the cumulative impacts and opportunities across all anticipated development phases) is acknowledged. To this end, Ecology Solutions have continued to advise on the formation of a site-wide masterplan, the implementation of which would ensure that re-development of the Bicester Heritage site as a whole would avoid adverse ecological impacts and indeed would ensure opportunities for biodiversity enhancement are realised, thereby complying with planning policy and legislation of relevance to biodiversity and nature conservation.

1.1.5. A copy of this 'guiding' masterplan is provided at Appendix 1 of this Ecological Report, with reference made to it where relevant within this report. It is noted that emerging proposals for a subset of the wider scheme known as F.A.ST. is the subject of a separate pre-app submission which has been made to the LPA.

1.2. Site Characteristics

1.2.1. The wider site comprises a single piece of land located to the north-east of Bicester, Oxfordshire. It is bordered along its length to the south by Skimmingdish Lane beyond which lies an area of residential development in addition to a school; to the west by the A4421 beyond which lies an area of residential and commercial development; to the north by Bicester Road beyond which lie areas of agricultural land; and to the east by areas of agricultural land.

1.2.2. The wider site primarily comprises an airfield largely supporting short mown grassland, associated historical defence structures and infrastructure, in addition to Stratton Audley Quarry, a partially restored quarry and inert landfill, which supports a number of waterbodies, grassland, scrub and young woodland.

1.2.3. The BRAND site forms much of the north-western extent of the wider site, in addition to a circular band of land which comprises an existing hardstanding track (the circular track), adjacent grasslands, an area of dense scrub and a fishing lake.

1.3. Ecological Assessment

1.3.1. This document assesses the ecological interest of the application site as a whole. The importance of the habitats present is evaluated with regard to current guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM)[1].

1.3.2. The report also sets out the existing baseline conditions for the application site, setting these in the correct planning policy and legal framework and assessing any potential impacts which may occur from the proposed development. Appropriate mitigation where necessary is identified such that it will offset any negative impacts and where possible provide for the ecological enhancement of the application site, in accordance with relevant planning policy.

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

2. SURVEY METHODOLOGY

2.1. The methodology utilised for the survey work can be split into three areas, namely desk study, habitat survey and faunal survey. These are discussed in more detail below. Unless otherwise noted, the ecological survey work detailed below was undertaken across the wider site, including for the BRAND site.

2.2. Desk Study

2.2.1. In order to compile background information on the application site and its immediate surroundings, Ecology Solutions contacted the Thames Valley Ecological Records Centre (TVERC). Other third party organisations were also contacted that hold records for protected or notable species / species groups such as the Oxfordshire Bat Group, these records are referred to where appropriate.

2.2.2. Information has been provided by TVERC and is included at Appendix 2. This information is referenced within this report, where appropriate. Information regarding designated sites is also shown where appropriate on Plan ECO1.

2.2.3. Further information on designated sites from a wider search area was also obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC)[2] database. This information is reproduced at Appendix 3 and where appropriate on Plan ECO1.

2.3. Habitat Survey Methodology

2.3.1. Habitat surveys were carried out in May, June and August 2018 to ascertain the general ecological value of the land contained within the boundaries of the wider site and to identify the main habitats and associated plant species, with notes on fauna utilising the site

2.3.2. The application site was surveyed based around extended Phase 1 survey methodology[3], as recommended by JNCC, whereby the habitat types present are identified and mapped, together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential which require further survey. Any such areas identified can then be examined in more detail.

2.3.3. Using the above method, the application site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified.

[2] http://magic.defra.gov.uk
[3] Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit*. England Field Unit, Nature Conservancy Council, reprinted JNCC, Peterborough.

2.3.4. All of the species that occur in each habitat would not necessarily be detected during survey work carried out at any given time of the year, since different species are apparent at different seasons. However, given the habitats present, it is considered that an accurate and robust assessment has been made.

2.4. Faunal Survey

2.4.1. General faunal activity observed during the course of the survey was recorded, whether visually or by call. Specific attention was paid to the potential presence of any protected, rare, notable or Priority Species. In addition, specific surveys were undertaken for Badgers *Meles meles,* birds (breeding and wintering), bats, reptiles, invertebrates and Great Crested Newts.

2.4.2. **Bats**. Bat surveys were undertaken in May, June and August 2018 to assess the potential for roosting bats within trees within and adjacent to the wider site. The work was undertaken by an experienced bat worker and aimed to establish the likelihood of presence / absence of bats.

2.4.3. Field surveys were undertaken with regard to best practice guidelines issued by Natural England (2004[4]), the Joint Nature Conservation Committee (2004[5]) and the Bat Conservation Trust (2016[6]).

2.4.4. The probability of a building / structure being used by bats as a summer roost site increases if it:

- is largely undisturbed;
- dates from pre 20th Century;
- has a large roof void with unobstructed flying spaces;
- has access points for bats (though not too draughty);
- has wooden cladding or hanging tiles; and
- Is in a rural setting and close to woodland or water.

2.4.5. Conversely, the probability decreases if a building / structure is of a modern or pre-fabricated design / construction, is in an urban setting, has small or cluttered roof voids, has few gaps at the eaves or is a heavily disturbed premises.

2.4.6. The main requirements for a winter / hibernation roost site is that it maintains a stable (cool) temperature and humidity. Sites commonly utilised by bats as winter roosts include cavities / holes in trees, underground sites and parts of buildings. Whilst different species may show a preference for one of these types of roost site, none are solely dependent on a single type.

[4] Mitchell-Jones, A. J. (2004). *Bat Mitigation Guidelines*. English Nature, Peterborough.
[5] Mitchell-Jones, A.J. & McLeish, A.P. (Eds.) (2004). *Bat Workers' Manual*. 3rd edition. Joint Nature Conservation Committee, Peterborough.
[6] Collins, J. (Eds.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)*. Bat Conservation Trust, London.

2.4.7. All trees at the wider site were assessed for their potential to support roosting bats. For a tree to be classed as having some potential for roosting bats it must usually have one or more of the following characteristics:

- obvious holes, e.g. rot holes and old woodpecker holes;
- dark staining on the tree below a hole;
- tiny scratch marks around a hole from bats' claws;
- cavities, splits and/or loose bark from broken or fallen branches, lightning strikes etc.;
- very dense covering of mature Ivy *Hedera helix* over trunk.

2.4.8. In addition, bat activity surveys and accompanying static monitoring surveys were undertaken throughout the wider site in order to establish whether there are any features of potential importance for foraging and commuting bats. Activity surveys were undertaken on a monthly basis between May and October 2018.

2.4.9. The evening activity bat surveys were conducted from sunset to approximately 2 hours after sunset. Surveyors utilised EchoMeter Touch 2 Pro (EMT 2 pro) bat detectors to aid identification of bats and record data. Surveyors walked transects in order to encompass all features of potential value to foraging and commuting bats, including hedgerows, treelines and scrub. All bat data recorded was subsequently analysed using Kaleidoscope bat sound analysis software.

2.4.10. Activity surveys undertaken between May and October 2018 were accompanied by static monitoring surveys. SongMeter SM4 bat detectors were deployed at strategic locations, as shown on Plan ECO3, for at least five consecutive nights. These surveys allowed for a longer term assessment of the use of the site by foraging and commuting bats.

2.4.11. **Badgers.** Surveys were undertaken to search for evidence of Badgers in June and August 2018 and comprised two main elements. The first of these was a thorough search for evidence of Badger setts. For any setts encountered each sett entrance would be recorded and plotted, even if the entrance appeared disused. The following information was recorded if appropriate:

- The number and location of well used or very active entrances; these are clear of any debris or vegetation and are obviously in regular use and may, or may not, have been excavated recently.

- The number and location of inactive entrances; these are not in regular use and have debris such as leaves and twigs in the entrance or have plants growing in or around the edge of the entrance.

- The number of disused entrances; these have not been in use for some time, are partly or completely blocked and

cannot be used without considerable clearance. If the entrance has been disused for some time all that may be visible is a depression in the ground where the hole used to be and the remains of the spoil heap.

2.4.12. Secondly, evidence of Badger activity, such as well-worn paths and run-throughs, snagged hair, footprints, latrines and foraging signs, was also searched for in order to build up a picture of the use of the Site by Badgers.

2.4.13. **Amphibians.** There are no suitable waterbodies present within the BRAND site (the presence of a fishing lake is noted). However, a number of waterbodies are present within the wider which were considered to offer potential opportunities for breeding amphibian species (including Great Crested Newts *Triturus cristatus*). The closest of these waterbodies is located adjacent to the BRAND site at its western edge (see Appendix 5).

2.4.14. As such, and given the presence of suitable terrestrial habitat within the FAST site, detailed aquatic surveys were undertaken by Ecology Solutions between May and June 2018 to ascertain the presence or absence of this species from the Site. A summary of the dates of surveys and the weather conditions during these surveys is included at Table 1, below.

Date	Survey Number	Weather Conditions
10.05.18	1	11C, 30% cloud cover, dry
14.05.18	2	7C, 5% cloud cover, dry
16.05.18	3	5C, 25% cloud cover, dry
07.06.18	4	16C, 100% cloud cover, dry
19.06.18	5	19C, 95% cloud cover, dry
21.06.18	6	17C, 5% cloud cover, dry

Table 1: 2018 Great Crested Newt Survey Dates and Weather Conditions

2.4.15. All of the surveys were undertaken in suitable weather conditions in accordance with the Natural England guidelines[7] to determine the presence or absence of Great Crested Newts. Surveys undertaken by Ecology Solutions utilised three methods per visit (torch survey, bottle-trapping and egg searches), where possible.

2.4.16. Suitable survey weather conditions are deemed to be those nights when the night-time air temperature is more than 5°C, with little or no wind, and no rain, and surveys were conducted during such conditions.

[7] English Nature (2001) *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

2.4.17. Torch counting involved the use of high-powered torches to find and, if possible, count the number of adults of each amphibian species. As recommended by Natural England the entire margin of each waterbody was walked once, slowly checking for Great Crested Newts.

2.4.18. Bottle-trapping involved setting traps made from two litre plastic bottles around the margin of each waterbody, and leaving the traps set overnight before checking them the following morning. A density of at least one trap per two metres of shoreline was utilised, where possible, as recommended by Natural England.

2.4.19. In addition an egg search was undertaken of any aquatic vegetation to search for any evidence of breeding Great Crested Newts.

2.4.20. It should also be noted that a significant density of reptile tins were deployed in suitable terrestrial habitat within the Site, which represents an additional form of survey work for amphibian species.

2.4.21. **Reptiles.** Specific surveys to identify the presence or absence of reptiles within the wider site (including the BRAND site) undertaken between August and October 2018.

2.4.22. Following an initial assessment to identify areas of suitable reptile habitat within the Site, refugia surveys were undertaken. It was considered, given the size of the site, that a complete tinning exercise would be impractical, on this basis a sampling survey was utilised. A total of 700 'tins' (0.5 x 0.5 metre squares of heavy roofing felt which are often used as refuges by reptiles) were distributed in groups of between 20 and 60 within specific areas of suitable reptile habitat within the wider site, in order to provide a representative sample of the use of these habitats by reptiles. The sample areas utilised for this tinning exercise included for suitable habitat within the BRAND site boundary.

2.4.23. These tins were left in place for two weeks to 'bed in' and subsequently surveyed for reptiles beneath or upon the tins during suitable weather conditions.

2.4.24. Suitable weather conditions to carry out surveys are when the air temperature is between 9 and 18°C. Heavy rain and windy conditions should be avoided.

2.4.25. The tins provide shelter and heat up quicker than the surroundings in the morning and can remain warmer than the surroundings in the late afternoon. Being ectothermic (cold blooded), reptiles use them to bask and raise their body temperature which allows them to forage earlier and later in the day.

2.4.26. **Breeding Birds.** Given the size of the BRAND site, and the habitats present (predominantly close mown grassland and hardstanding), it was not considered that the BRAND site in isolation would have the potential to provide a significant resource for bird species present in the local area. Notwithstanding this conclusion, it is acknowledged that the BRAND site will comprise one phase of development across

the wider site. Given the size of the wider site, and the variety of habitats present, the potential for significant impacts in cumulation could not be screened out.

2.4.27. As such, and in order to assess the importance of the site to breeding birds, three early morning surveys were conducted between May and July 2018 in order to assess breeding bird activity within the site. The weather conditions during the surveys are given in Table 2.

Date	Start Time	Weather Conditions
15th May 2018	04:45	7C, 70% cloud cover, dry
13th June 2018	04:30	7C, 30% cloud cover, dry
21st June 2018	04:30	10C, 0% cloud cover, dry

Table 2. Dates of breeding bird surveys and weather conditions.

2.4.28. On each survey, an experienced ornithologist walked a circuitous route around the site, covering all field margins, recording the locations, numbers and activity of all bird species present within the area during this time. Over the three visits this methodology should ensure that the vast majority of species present at the site are recorded, although some species that may use the site as part of a larger territory (especially nocturnal species such as owls) may be missed.

2.4.29. To ascertain the breeding status of birds using the site, the following criteria were applied following the methodology used in the 'Atlas' surveys of 1988-1991 (Gibbons et al, 1993). This accepts the following activities as denoting breeding (including those probably breeding although definite proof was lacking):

- Bird apparently holding territory.
- Courtship and display.
- Nest-building (including excavating nest-hole).
- Distraction display or feigning injury.
- Adult carrying faecal sac or food.
- Adult entering or leaving apparently occupied nest site.
- Nest with eggs or eggshells found, or bird sitting but not disturbed.
- Nest with young; or downy young of ducks, game-birds, waders and other nidifugous species.
- Recently fledged young.

2.4.30. **Wintering Birds.** With the exception of the small area of lake present within the site, the majority of habitats present within the BRAND site are not deemed to be of any significance for wintering birds. Nonetheless, the BRAND site was subject to wintering surveys as part of site-wide assessment work, for which surveys were undertaken in January, February and March 2019. The adopted survey methodology includes for a walked transect of the wider site with stops at numerous vantage points. The dates and

weather conditions for the initial survey are detailed in Table 3 below.

Date	Weather Conditions
11th January 2019	50-90% high cloud cover, light air, 6C.
15th February 2019	Cloudless, light air, 14C
4th March 2019	60% Cloud, gentle breeze, 6C

Table 3. Dates of breeding bird surveys and weather conditions.

2.4.31. **Invertebrates.** The wider site supports a mosaic of habitats which were identified to be of potential value to invertebrate assemblage, including botanically diverse grassland as well as areas classified as Open Mosaic Habitat. The calcareous grassland within the BRAND site forms a component of this important habitat mosaic.

2.4.32. Noting the above, specific invertebrate surveys were undertaken at the Site by Colin Plant Associates to assess the importance of the site for a range of invertebrates. A total of 4 surveys were undertaken in 2018, with this allowing for full seasonal coverage of the Site. The dates of these surveys are as follows:

- 13th June 2018
- 9th July 2018
- 14th August 2018
- 11th September 2018

2.4.33. It is noted that further specific invertebrate survey work was undertaken in 2019, with survey visits undertaken on the 7th May 2019 an the 10th June 2019. At the time of writing the findings of these surveys are still being analysed, with the results to be made available to the LPA once complete.

2.4.34. The sampling methodology for the 2019 and 2019 surveys is detailed at Appendix 4 and is summarised below:

***Sweep-netting**. A stout hand-held net is moved vigorously through vegetation to dislodge resting insects. The technique may be used semi-quantitatively by timing the number of sweeps through vegetation of a similar type and counting selected groups of species.*

***Beating trees and bushes**. A cloth tray, held on a folding frame, is positioned below branches of trees or bushes and these are sharply tapped with a stick to dislodge insects. Black or white trays are used depending upon which group of invertebrates has been targeted for search. Insects are collected from the tray using a pooter – a mouth-operated suction device.*

***Grubbing/hand searching**. Important host plants may be searched by hand. This is particularly useful for species which live on or even below the ground surface and can be found by grubbing around and underneath basal leaf rosettes. Other invertebrate microhabitats*

such as loose bark, litter, fungi and various decay features associated with dead wood can also be productive when searched by hand. Turning large stones, pieces of wood and other refuse often reveal species which are nocturnally active, in particular ground beetles and rove beetles.

***Suction Sampling** consists of using a converted leaf blower to collect samples from grass and other longer ground vegetation. The sample is then everted into a net bag and the invertebrates removed with a pooter. The advantage of suction sampling is that it catches species, which do not fly readily, or which live in deep vegetation. It is particularly productive for Coleoptera, some Diptera and Arachnida.*

***Pitfall trapping**. Vending-machine cups or similar are placed in the ground with the rim flush with, or slightly below, the surface. A fluid is added, containing ethylene glycol, sodium chloride and formalin with a little detergent to reduce surface tension. Traps may be covered or uncovered and are typically left in position for a month at a time. Holes made in the sides of the cups a couple of centimetres below the rim permit flood or rain water to drain without the traps over-flowing and the catch becoming lost. Invertebrates simply fall into the traps. This is the single most effective means of recording ground beetles (Carabidae) but is also effective for rove beetles (Staphylinidae), some other beetle groups, spiders and most non-insect soil-dwelling arthropods.*

2.4.35. ***Pond netting**. Pond nets on wooden poles with a mesh diameter of one millimetre are used to capture invertebrates from all available aquatic habitats, including open water and amongst emergent, floating and submerged vegetation. Net samples are sorted in white trays on the bankside and stored in 50% isopropyl alcohol for subsequent identification. All three water bodies inside the Stratton Audley Quarry survey boundary were sampled in June and September, with the exception of P1, which was dry following the first visit.*

3. ECOLOGICAL FEATURES

3.1. The wider site was subject to an ecological habitat survey by Ecology Solutions in May, June and August 2018. The vegetation present enabled the habitat types to be satisfactorily identified and an accurate assessment of the ecological interest of the habitats to be undertaken.

3.2. The ecological baseline gathered for the wider site is detail at Appendix 5 and is given due regard as part of this assessment work. The following sections of this report consider the baseline specifically within the BRAND site boundary.

3.3. The following main habitat / vegetation types were identified within the FAST site:

- Semi-Improved Calcareous Grassland;
- Species-poor Semi-Improved Calcareous Grassland Mosaic;
- Hedgerows/treelines;
- Dense Scrub and Grassland Mosaic;
- Woodland;
- Waterbody; and
- Hardstanding / Recolonising Hardstanding.

3.4. The location of these habitats is shown on Plan ECO2.

3.5. Each habitat present is described below with an account of their representative plant species.

3.6. **Species-poor Semi-Improved Calcareous Grassland**

3.6.1. As with the wider site, a significant component of the BRAND site comprises short grassland, located within the airfield itself, which due to the ongoing management regime that involves regular mowing with the arisings left in-situ, supports a species poor sward of variable composition including species indicative of neutral and calcareous soils.

3.6.2. Species recorded within this habitat include Perennial Rye-grass *Lolium perenne* (F), Smooth meadow-grass *Poa pratensis* (A), Yorkshire Fog *Holcus lanatus* (F), Red Fescue *Festuca rubra* (A), Cock's-foot *Dactylus glomerata* (O), Upright Brome *Bromopsis erecta* (O), Meadow Fescue *Schedonorous pratensis* (O), False Oat-grass *Arrhenatherum elatius* (O), Creeping Bent *Agrostis stolonifera* (O), Common Bent *Agrostis capillaris* (O), Lady's Bedstraw *Gallium verum* (R), Yarrow *Achillea millefolium* (O), White Clover *Trifolium repens* (O), Red Clover *Trifolium pratense* (O), Dandelion *Taraxacum officinale agg.* (O), Common Knapweed *Centaurea nigra* (R), Ribwort Plantain *Plantago lanceolata* (O), Field Bindweed *Convolvulus arvensis* (O), Creeping Thistle *Cirsium arvense* (O), Broad-leaved Dock *Rumex obustifolius* (R), Creeping Cinquefoil *Potentilla reptans* (O), Hogweed *Heracleum sphondylium* (R), Mugwort *Artemisia vularis* (R), Dove's-foot Cranesbill *Geranium*

molle (O), Daisy *Bellis perennis* (O) and Bird's-foot Trefoil *Lotus corniculatus* (R).

3.7. **Semi-Improved Calcareous Grassland**

3.7.1. Areas of grassland which lie outside of the central airfield appear to be subject to an annual hay cut, following which the arisings are removed from the site. It is considered likely that this management has been ongoing for a significant period and this has led to the establishment of a calcareous grassland sward indicative of more nutrient poor and calcareous soils. While areas of this grassland are relatively herb-rich the majority of this grassland is dominated by grasses with a relatively low number of forb species supported, in addition a number of species indicative of improved and neutral conditions are present.

3.7.2. The species composition of this grassland across the wider is variable, however the grassland present along the boundary with Stratton Audley Quarries in the north (i.e. within the BRAND site), supports a relatively herb-rich structure.

3.7.3. Species recorded within this habitat include Upright Brome *Bromopsis erecta* (D), Red Fescue (D), Meadow Fescue (F), Tall Fescue *Schedonorous arundinaceus* (R), Smaller Cat's-tail *Phleum bertolonii* (O), Timothy *Phleum pratense* (R), Creeping Bent (R), Common Bent (O), Tor Grass *Brachypodium pinnatum* (O), Tufted Hair-grass *Deschampsia cespitosa* (O), Meadow Oat-grass *Avenula pratensis* (O), Downy Oat-grass *Avenula pubescens* (O), False Oat-grass *Deschampsia cespitosa* (O), Crested Dog's-tail *Cynosurus cristatus* (R), Smooth Meadow-grass *Poa pratensis* (O), Rough Meadow-grass *Poa trivialis* (R), Perennial Rye-grass (O), Cock's-foot (O), Yorkshire Fog (R), Fern Grass *Catapodium rigidum* (R), Yarrow (A), Wild Carrot *Daucus carotta* (O), Oxeye Daisy *Leucanthemum vulgare* (F), Daisy *Bellis perennis* (O), Common Knapweed *Centaurea nigra* (O), Greater Knapweed *Centaurea scabiosa* (O), Field Scabious *Knautia arvensis* (O), Burnet Saxifrage *Pimpinella saxifraga* (O), Salad Burnet *Sanguisorba minor* (O), Bird's-foot Trefoil *Lotus corniculatus* (O), Lesser Trefoil *Trifolium dubium* (R), Hop Trefoil *Trifolium campestre* (R), Meadow Vetchling *Lathyrus pratensis* (R), Black Meddick *Medicago lupulina* (R), Red Clover *Trifolium pratense* (R), White Clover *Trifolium repens* (R), Common Vetch *Vicia sativa* (O), Common Restharrow *Ononis repens* (R), Wild Mignonette *Reseda lutea* (O), Weld *Reseda luteola* (R), Mouse-ear Hawkweed *Hieracium pilosella* (O), Smooth Hawk's-beard *Crepis capillaris* (R), Common Sorrel *Rumex acetosa* (O), Curled Dock *Rumex crispus* (R), Broad-leaved Dock (R), Field Bindweed (O), Ribwort Plantain (O), Greater Plantain (R), Hoary Plantain *Plantago media,* Selfheal *Prunella vulgaris* (R), Wild Onion *Allium vineale* (R), White Campion *Silene latifolia* (O), Cow Parsley *Anthriscus sylvestris* (O), Wild Parsnip *Pastinaca sativa* (O), Dandelion (R), Cleavers *Galium aparine* (R), Mugwort (R), Creeping Thistle *Cirsium arvense* (R), Spear Thistle *Cirsium vulgare* (R), Nodding Thistle *Carduus nutans* (R), Perforate St. John's Wort *Hypericum perforatum* (O), Wild Marjoram *Origanum vulgare* (R),

Basil Thyme *Clinopodium acinos* (R), Ploughman's Spikenard *Inula conyza* (O), Blue Fleabane *Erigeron acer* (O), Agrimony *Agrimonia eupatoria* (R), Hogweed (O), Creeping Cinquefoil (O), Common Toadflax *Linaria vulgaris* (R), Small Toadflax *Chaenorhinum minus* (R), Thyme-leaved Sandwort *Arenaria serpyllifolia* (O), Fairy Flax *Linum catharticum* (R), Common Nettle *Urtica dioica* (R), Lady's Bedstraw *Gallium verum* (F), Hoary Ragwort *Senecio erucifolia* (R), Ragwort *Senecio jacobaea* (O), Hedgerow Cranesbill *Geranium pyrenaicum* (R), Germander Speedwell *Veronica chamaedrys* (R), Meadow Buttercup *Ranunculus acris* (R), Moss *Rhytidiadelphus squarrosus,* Field Forget-me-not *Myosotis arvensis* (R), Cowslip *Primula veris* (F), Common Centaury *Centaurium erythraea* (O), Eyebright *Euphrasia sp.* (R), Common Mouse-ear *Cerastium fontanum* (R), Sticky Mouse-ear *Cerastium glomeratum* (R) and Field Mouse-ear *Cerastium arvense* (O).

3.8. **Hedgerows/Treelines**

3.8.1. The wider site supports a number of hedgerows and treelines which constitute boundaries to the airfield and also to the Stratton Audley Quarry. None would qualify as species rich under the Hedgerow Regulations 1997.

3.8.2. There are three hedgerows adjacent to the BRAND site boundary at its northern edge. To ensure consistency with numbering of the wider site, these hedgerows are identified as **H9, H10** and **H11** for the purpose of this application. Descriptions of the hedgerows within/adjacent to the brand site are provided below, with their locations identified on Plan ECO2.

3.8.3. **H9** is an unmanaged hedgerow, and associated bands of scrub, and varies in height between 2 and 4m. It comprises Blackthorn, Hawthorn, Hornbeam *Carpinus betulus,* Bramble, Dog Rose, Field Maple, Ash and Elder.

3.8.4. **H10** comprises the northern boundary of the airfield and separates it from the adjacent Stratton Audley Quarries site. It is an unmanaged hedgerow up to 4m in height and is comprised of Blackthorn *Prunus spinosa*, Hawthorn *Crataegus monogyna*, Hornbeam, Bramble *Rubus fruticosus*, Dog Rose *Rosa canina*, Field Maple *Acer campestre*, Ash *Fraxinus excelsior*, Elder *Sambucus nigra* and Sweet Chestnut *Castanea sativa.* In its south-western extent it becomes more wide and scrubby, encroaching upon areas of adjacent grassland.

3.8.5. **H11** is an unmanaged young treeline, up to 8m in height, with associated scrub below. It is comprised of Ash, Sycamore *Acer pseudoplatanus*, Hornbeam, Blackthorn, Hawthorn, Dog Rose and Goat Willow *Salix caprea*.

3.9. **Dense Scrub / Grassland Mosaic**

3.9.1. A single area of established scrub and grassland mosaic lies in the north-west of the Stratton Audley Quarry site. This area has

presumably been recolonised following its previous use as a landfill. It largely supports established scrub with pockets of grassland.

3.9.2. Scrub species are largely comprised of Alder *Alnus glutinosa*, Hawthorn, Blackthorn, Dog Rose, Bramble, Goat Willow, Grey Willow *Salix cinerea,* Apple *Malus sp.*, Ash and Oak *Quercus robur*.

3.9.3. Grassland species largely comprise a range of species which are also present in the adjacent areas of neutral and calcareous grassland mosaic. In addition, some marshy areas are supported which are dominated by Soft and Hard Rush. These grassland areas appear to be subject to continuing succession, resulting in a gradual decline in area.

3.10. **Broadleaved Semi-Natural Woodland**

3.10.1. The wider site supports a number of areas of broad-leaved semi-natural woodland. These habitats are typically comprised of a limited range of woody species and are considered to be relatively young and arising from the development of long established scrub in addition to areas of historical planting.

3.10.2. Areas of woodland are variable in composition however the canopy layer is typically comprised of Hawthorn *Crategus monogyna,* Field Maple *Acer campestre,* Crab Apple *Malus sylvestris,* Apple *Malus domestica,* Sycamore *Acer pseudoplatanus,* Silver Birch *Betula pendula,* Cherry *Prunus avium,* Alder *Alnus glutinosa,* Oak *Quercus robur,* Ash *Fraxinus excelsior* and Crack Willow *Salix fragilis.*

3.10.3. Understorey and shrub layers within these woodlands are of variable structure and composition but are broadly comprised of Blackthorn *Prunus spinosa,* Damson *Prunus domestica sbsp. insititia,* Dog Rose *Rosa canina,* Spindle *Euonymus europaea,* Alder Buckthorn *Rhamnus frangula,* Elder *Sambucus nigra,* Dogwood *Cornus sanguinea,* English Elm *Ulmus minor var. vulgaris,* Gorse *Ulex europaeus,* Broom *Cytisus scoparius,* Redcurrant *Ribes rubrum,* Buddleia *Budleja davidii,* Bramble and Goat Willow *Salix caprea.*

3.10.4. Ground flora is variable given the changes in light levels between more open areas and those with a more closed canopy and include dense carpets of Common Striated Feather-Moss *Eurynchium striatum,* Bramble, Ground Ivy, Lords and Ladies and Bracken *Pteridium aquilinum.* Wood Avens, Ivy *Hedera helix,* Lesser Burdock, Hogweed, False Brome, Teasel, Common Nettle and Ploughman's Spikenard.

3.11. **Waterbody**

3.11.1. The BRAND site includes for approximately half of a single waterbody, **P1**, the remainder of which lies within the wider site subject to survey work by Ecology Solutions. **P1** is a large (around 14,000m²) and deep waterbody which was created through historical mineral extraction at the wider site. It supports little aquatic vegetation and is currently utilised as a stocked fishing lake.

3.12. **Hardstanding / Re-colonising Hardstanding**

3.12.1. The BRAND site includes an existing circular track associated with the historic use of the site as an airfield. Other areas of hardstanding including for 'pan handles' associated with the circular track, in addition to several smaller lengths of track.

3.12.2. Areas of hardstanding are of varying composition with some areas formed of tarmac, concrete and gravel.

3.12.3. Areas of hardstanding are largely bare, particualry along the circular track and subject to minimal colonisation by a limited number of species including Basil Thyme, White Stonecrop *Sedum album*, Field Bindweed, Weld and Knotgrass *Polygonum aviculare.*

3.12.4. Smaller areas of hardstanding within the BRAND site have been subject to more significant levels of colonisation and are identified as '*Re-colonising hardstanding'* on Plan ECO2. Within these areas a range of plant species have been recorded including Basil Thyme, White Stonecrop, Field Bindweed, Prickly Sow-thistle *Sonchus asper*, Perennial Rye-grass, Weld , Wintercress *Barbarea vulgaris*, Creeping Thistle, Lady's Bedstraw, Fat Hen *Chenopodium album,* Oxeye Daisy, Dove's-foot Cranesbill, Knotgrass, Blue Fleabane, Parsley Piert *Aphanes sp.*, Teasel *Dipsacus fullonum*, Thyme-leaved Sandwort *Arenaria serpyllifolia* and Bird's-foot Trefoil.

3.13. **Background Information**

3.13.1. The desk study undertaken with TVERC returned a large number of local plant records, including a relatively high number from within the wider site. Records of notable or protected plant species from within the wider site include that of Basil Thyme, Hoary Plantain, Quaking Grass, Corn Mint *Mentha arvensis* and Field Scabious, all returned from 2014. Additionally Jacob's Ladder *Polemonium caeruleum,* Hairy Rock-cress *Arabis hirsuta* and Bluebell *Hyacinthoides non-scripta* were returned from within the Stratton Audley Quarry from 2009.

3.13.2. With the exception of Corn Mint, Jacob's Ladder and Bluebell, all of these species were recorded during the habitat surveys undertaken in 2018.

3.13.3. A small number of notable plants were also recorded by TVERC during updated habitat survey work undertaken within the Stratton Audley Quarry site in 2018. Additional species recorded in this survey included for Galingale and Lesser Spearwort.

4. WILDLIFE USE OF THE APPLICATION SITE

4.1. During the surveys that have been undertaken across the wider site, general observations have been made of any faunal use, with specific attention paid to the potential presence of protected or notable species. Moreover, specific surveys were completed for bats, Badgers, amphibians, reptiles, invertebrates, breeding and wintering birds across the wider site.

4.2. As stated in Section 2, faunal surveys were completed across the wider site, allowing for a holistic assessment of the sites value, alongside consideration of opportunities within specific development phases.

4.3. The ecological baseline gathered for the wider site is detail at Appendix 5 and is given due regard as part of this assessment work. The following sections of this report consider the baseline specifically within the BRAND site boundary.

4.4. Bats

4.4.1. There are no trees or buildings within the site and moreover no features within a close proximity of the site which offer potential roosting opportunities for bats.

Bat Activity Surveys

4.4.2. Bat activity surveys were undertaken across the wider site between June and October 2018 in line with the methodology outlined in Section 2 above. Table 4 below outlines the weather conditions during this survey visit.

Date	Weather Conditions
26.06.2018	23C, 0% cloud cover, dry, light breeze
19.07.2018	22C, 40% cloud cover, dry, light breeze
29.08.2018	14C, 5% cloud cover, dry, light breeze
25.09.2018	15C, 0% cloud cover,dry, light breeze
15.10.2018	11C, 100% cloud cover, occasional drizzle, light to moderate breeze

Table 4: Weather conditions during bat activity surveys

4.4.3. In addition to transect surveys, static detectors were also deployed across the wider site in each of June, July, August, September and October 2018.

4.4.4. A description of the survey findings from the bat activity survey work, including the locations of static detector deployment, are provided at Appendix 5 of this ecology report.

4.4.5. As set out at Appendix 5, and in summary, generally low levels of bat activity were recorded across the wider site, with activity

unsurprisingly higher in close proximity to linear vegetation, waterbodies and wooded areas. Whilst a good range of bat species were recorded during the course of the surveys, activity was found to be dominated by *Pipistrelle* bat species, with only a low level of registrations pertaining to other species.

4.4.6. Within the FAST site, bat activity was noted to be relatively higher adjacent to the woodland and hedgerows along the northern boundary of the site (along H14 / H15). Very little bat activity was observed within the open grassland areas, particularly that within the inner track.

4.4.7. **Background information.** The desk study undertaken with TVERC returned a number of bat records from the local area. The closest roost records were of unidentified bat species from within the wider Bicester Heritage site in its western extent (albeit in an area outside of the red line to which the emerging masterplan relates). These records consisted of the presence of droppings only and were both returned from 2017. Other records from the locality include activity records of Common Pipistrelle returned from a location approximately 100m to the south-west of the wider site, from 2017.

[redacted]

4.6. Amphibians

4.6.1. Great Crested Newts are known to travel up to 500 metres – without barriers that inhibit dispersal – to a breeding pond, however it is widely accepted that they most commonly utilise suitable terrestrial

habitat within a much closer distance, and activity is usually concentrated within 100 metres of breeding ponds with key habitat being located within 50 metres[8]. Indeed, Research Report 576 produced by English Nature concludes that "Captures on fences (and by other methods) at distances between 100m and 200-250m from breeding ponds tended to be so low as to raise serious doubts about the efficacy of this as an approach".

4.6.2. The only waterbody within the Brand site is P1, a large, stocked fishing lake which is unsuitable to support GCN. There are a number of suitable ponds in the wider site, the closest such feature being located adjacent to the BRAND site boundary at its closest point (this being P9).

4.6.3. As set out above, given the presence of waterbodies in the wider site, a suite of Great Crested Newt (GCN) surveys were undertaken in 2018.

4.6.4. The results of the survey are summarised in **Table 5** below. The locations of the waterbodies are detailed at Appendix 5 (see Plan ECO3A and B).

Waterbody	Maximum count of Great Crested Newts	Date of Maximum Count
P1	N/A	N/A
P2	3	10/05/18
P3	0	N/A
P4	1	10/05/18
P5	14	14.05.18
P6	68	14.05.18
P7	0	N/A
P8	0	N/A
P9	3	14.05.18
P10	0	N/A
P11	2	16.05.18
P12	N/A	N/A
D1	2	14.05.18
D2	0	N/A
D3	3	07.06.18

[8] English Nature (2001) *Great Crested Newt Mitigation Guidelines*. Version: August 2001

Table 5: Maximum count for ponds surveyed for Great Crested Newts within the wider site.

4.6.5. A peak count of 89 Great Crested Newts was recorded during the suite of aquatic surveys undertaken at the wider site. The vast majority of these GCN were recorded within the series of ponds located within quarry area of the site.

4.6.6. The GCN meta-population is considered to be primarily sustained by habitats within the quarry area of the wider site (outside of the BRAND site). Nonetheless, the semi-improved calcareous grassland located outside of the circular track, as well as the dense scrub in the north of the site, is structurally suitable as terrestrial habitat for Great Crested Newts. As such it is considered that these habitats, where they are located within a suitable radius of known GCN waterbodies, may provide a component of the wider habitat resource utilised by GCN during their terrestrial phase.

4.6.7. The grassland within the central airfield is intensively managed and short mown. This habitat is resultantly highly sub-optimal for GCN and is not considered to provide any significant opportunities for the local meta-population.

4.6.8. **Background Information.** The desk study undertaken with TVERC returned a small number of amphibian records from the local area. The closest records of Great Crested Newt were returned from within the Stratton Audley Quarry site, from 2009. Additional records from this area include: Smooth Newt *Lissotriton vulgaris* and Common Frog *Rana temporaria* also returned from within the Stratton Audley Quarry site.

4.7. Reptiles

4.7.1. Areas of calcareous grassland within the BRAND site were identified to provide suitable reptile habitat, with extensive suitable habitat also present within the wider site.

4.7.2. In order to ascertain whether the wider site (including the BRAND site) supports this faunal group, refugia surveys were undertaken from August-October 2018, in line with the methodology outlined in Section 2 above.

4.7.3. The results of the survey are summarised in Table 6 below.

Date	Survey Number	Weather Conditions	Reptiles Recorded Within Wider Site
24/08/18	1	90% cloud cover, 16C	70 Common Lizard
29/08/18	2	10% cloud cover, 17C	7 Common Lizard, 2 Grass Snake
06/09/18	3	60% cloud cover, 19C	11 Common Lizard, 2 Grass Snake

11/09/18	4	100% cloud cover, 18C	24 Common Lizard
17/09/18	5	1% cloud cover, 19C	5 Common Lizard
25/09/18	6	80% cloud cover, 17C	6 Common Lizard
02/10/18	7	100% cloud cover, 17C	10 Common Lizard

Table 6: 2018 Reptile Survey Results (Wider Site Summary)

4.7.4. As set out at Appendix 5, in order to ascertain the relative importance of common reptile populations recorded within the Site, the tinning density, which varies from between 54 tins/ha and 300 tins/ha, has been taken into account in line with guidance and population size estimates set out by the Herpetofauna Groups of Britain and Ireland (HGBI).

4.7.5. On this basis it is considered that rough and unmanaged managed grassland habitats within the wider site support a low to medium population of Common Lizard (around 36/ha) and a low population of Grass Snake (<2/ha). For clarity, these rough grassland habitats are located outside of the BRAND site boundary.

4.7.6. In contrast, the calcareous grassland within the BRAND site is subject to annual cutting and does not support a rough and tussocky sward. This habitat is likely therefore to provide relatively reduced opportunities for reptiles, albeit the habitat remains suitable. This conclusion is substantiated by the results of the tinning surveys which recorded few reptiles in areas of calcareous grassland, limited to a single Common Lizard in areas of calcareous grassland in the south of the wider site, where this grassland closely backs onto an adjacent band of scrub.

4.7.7. Given that the calcareous grassland within the BRAND site is suitable to support reptiles and is continuous with habitats where populations of common reptiles are known, it is considered that the calcareous grassland within the BRAND site will support a small proportion of the population present in the wider site.

4.7.8. **Background Information.** The desk study undertaken with TVERC returned a number of reptile records from the local area. These records include several of Grass Snake, returned from within the Stratton Audley Quarry site, from 1991. A further record of Grass Snake was returned from just outside the eastern boundary of the wider site, from 2016. Several records of Common Lizard were also returned from a location approximately 100m to the south-west of the wider site, from 2017.

4.8. Breeding Birds

4.8.1. The wider site offers opportunities for nesting birds in terms of the hedgerows, treelines, scrub, woodland and grassland areas in addition to waterbodies and areas of recolonising vegetation and reedbed. Within the BRAND site, which supports a reduced range of the habitats present in the wider site, breeding opportunities are

limited to areas dense scrub, woodland and areas of longer grassland at the perimeters of the airfield.

4.8.2. The wider site was subject to three breeding bird survey visits in May and June 2018. The full findings of this survey work are detailed at Appendix 5.

4.8.3. Within the BRAND site, areas of woodland and scrub supported a typical bird assemblage including for Song Thrush *Turdus philomelos*, Goldfinch *Carduelis carduelis*, Wood Pigeon *Columba palumbus*, Blue-tit *Cyanistes caeruleus*, Blackbird *Turdus merula*, Wren *Troglodytes troglodytes*, Robin *Erithacus rubecula* and Bullfinch *Pyrrhula pyrrhula.* Areas of grassland supported small numbers of Skylark *Alauda arvensis* and Meadow Pipit *Anthus pratensis*. Other birds recorded within the site including Swift, Carrion Crow, Buzzard, Kestrel, Black-headed Gull and Black-headed Gull, all of which were generally recorded loafing or flying over.

4.8.4. The wider site supports additional opportunities for the above bird species, with extensive grassland, scrub and woodland habitat present.

4.8.5. **Background Information.** The desk study undertaken with TVERC returned a number of records of notable bird species from the locality. A large proportion of these records were returned from within the wider site, including records of Grey Partridge *Perdix perdix*, Little Ringed Plover *Charadrius dubius,* Lapwing, Common Tern *Sterna hirundo,* Black-headed Gull, Stock Dove, Reed Bunting, Bullfinch, Starling, Skylark, House Sparrow, Yellowhammer and Linnet returned from 2009; and Common Sandpiper *Actitis hypoleucos,* Green Sandpiper *Tringa ochropus,* Redshank *Tringa totanus,* Snipe *Gallinago gallinago,* Turtle Dove *Streptopelia turtur* and Kingfisher *Alcedo atthis,* returned from 2008, all from within the Stratton Audley Quarry site. In addition, a number of records were returned from within Bicester airfield including Song Thrush, Red Kite, Kestrel, Lesser Black-backed Gull, Herring Gull, Skylark and Meadow Pipit returned from between 2003 and 2016. Records which have been withheld in detail, due to their sensitive nature, returned for the locality of the Site, include Hobby *Falco subbuteo* and Peregrine *Falco peregrinus,* from 2006.

4.9. Wintering Birds

4.9.1. The majority of the habitats across the wider site were considered likely to be of limited importance to wintering birds. Nonetheless, given the size of the wider site as well as the presence of wetland habitats, a suite of three wintering bird surveys were undertaken to assess its use by over wintering birds. These surveys were undertaken on a monthly basis between January and March 2019. The full findings of this survey work are detailed at Appendix 5.

4.9.2. The BRAND site, whilst comprising a relatively large component of the wider site, supports only a small sub-set of the wider habitat mosaic.

4.9.3. Reflective of this, winter bird interest within the BRAND site was particularly limited, comprising only small range of common bird species such as Wood Pigeon, Magpie, Carrion Crow and Jackdaw. Waterbody P1 was identified to be of relatively limited interest to wetland birds, with only small numbers of Coot *Fulica atra* and Mallard *Anas platyrhynchos* recorded.

4.9.4. The wider site supports additional opportunities for those bird species recorded within the BRAND site and overall is considered to support a modest assemblage of wintering birds. Wetland habitats, predominantly within the quarry area, were deemed to be of relatively greater interest overall, albeit habitats within the perimeter of the airfield (outside of the BRAND site) were noted to be of some limited value, supporting Grey Partridge and Skylark (albeit in very small numbers).

4.10. **Invertebrates**

4.10.1. The wider site was deemed to support a range of habitats likely to be of importance to invertebrates, including areas of recolonising bare ground, spoil mounds, scrub, waterbodies and rough and calcareous grassland. A component of these habitats, not least areas of calcareous grassland, are present within the BRAND site.

4.10.2. In line with the above, the wider site has been subject to a suite of four specific invertebrate surveys by Colin Plant Associates (CPA), invertebrate survey specialists. Survey visits were undertaken on the 13th June, 9th July, 14th August and 11th September 2018. These surveys encompassed those habitats of potentially greater invertebrate interest across the wider site (including within the BRAND site).

4.10.3. The findings of these surveys are summarised within the baseline information provided at Appendix 5, with further detail provided in the report produced by CPA at Appendix 4.

4.10.4. As stated in the methodology section above, additional survey visits were made in May and June 2019. At the time of writing, the results of these additional surveys are still being analysed, with the results to be made available to the LPA once analysis is complete.

4.10.5. The 2018 surveys recorded a total of 556 terrestrial species, confirming that a good range of invertebrate species utilise the wider site. This assemblage included for four S41 species, three *Nationally Rare* or *Red Data Book* (RDB) species, 34 Nationally Scare (NS) species. Overall, 7% of the total species inventory was recorded to be of formal conservational concern.

4.10.6. No invertebrate species which are afforded direct legal protection under any UK or European legislation were recorded during the surveys.

4.10.7. The full assemblage of invertebrates recorded across the wider site was further assessed using Pantheon, a software tool which allows for the relative conservation value of assemblages to be assessed and subsequently to identify those habitats of relatively greater importance to them. Through this methodology, broad habitats are then afforded a Species Quality Index (SQI).

4.10.8. This analysis identified that a range of broad habitat types across the wider site are of heightened value to invertebrates, with wetland habitats and open habitats (short sward and bare ground) of particular importance. For clarity, this ‘short sward’ habitat categorisation includes for areas of calcareous grassland within the site.

4.10.9. The BRAND site does not include for wetland habitats considered to be of higher value to invertebrates, however, does support a significant component of the open habitat (calcareous) identified to be of at least local importance across the wider site.

5. ECOLOGICAL EVALUATION

5.1. The Principles of Site Evaluation

5.1.1. The latest guidelines for ecological evaluation produced by CIEEM propose an approach that involves professional judgement, but makes use of available guidance and information, such as the distribution and status of the species or features within the locality of the project.

5.1.2. The methods and standards for site evaluation within the British Isles have remained those defined by Ratcliffe[9]. These are broadly used across the United Kingdom to rank sites, so priorities for nature conservation can be attained. For example, current Site of Special Scientific Interest (SSSI) designation maintains a system of data analysis that is roughly tested against Ratcliffe's criteria.

5.1.3. In general terms, these criteria are size, diversity, naturalness, rarity and fragility, while additional secondary criteria of typicalness, potential value, intrinsic appeal, recorded history and the position within the ecological / geographical units are also incorporated into the ranking procedure.

5.1.4. Any assessment should not judge sites in isolation from others, since several habitats may combine to make it worthy of importance to nature conservation.

5.1.5. Further, relying on the national criteria would undoubtedly distort the local variation in assessment and therefore additional factors need to be taken into account, e.g. a woodland type with comparatively poor species diversity, common in the south of England may be of importance at its northern limits, say in the border country.

5.1.6. In addition, habitats of local importance are often highlighted within a local Biodiversity Action Plan (BAP). The local BAP currently lists a number of Conservation Target Areas (CTA) which in turn support a wide range or habitats and/or species of Principal Importance. The site lies outside of any CTA, with the closest being the Ray CTA, within which lowland meadow is a primary interest feature. A number of species and habitat action plans are also set out within the local BAP.

5.1.7. Levels of importance can be determined within a defined geographical context from the immediate site or locality through to the International level.

5.1.8. The legislative and planning policy context are also important considerations and have been given due regard throughout this assessment.

[9] Ratcliffe, D A (1977). *A Nature Conservation Review: the Selection of sites of Biological National Importance to Nature Conservation in Britain*. Two Volumes. Cambridge University Press, Cambridge.

5.2. Habitat Evaluation

Designated sites

5.2.1. **Statutory sites.** There are no statutory designated sites of nature conservation interest located within or immediately adjacent to the application site.

5.2.2. The closest statutory site designated on nature conservation grounds in the surrounding area is Ardley Cutting and Quarry Special Scientific Interest (SSSI), with this located approximately 3.4km west of the BRAND site at its closest point. The biodiversity element of the designation (the SSSI is also designated on geological grounds) primarily accounts for the presence of limestone grassland, as well as scrub, ancient woodland and wetland habitats. There is limited connectivity between this designated site and the Site, on account of the multiple roads and residential development which separate them. As such and given the nature of the proposals (i.e. primarily employment and tourism led) it is not considered that the proposals have any potential to impact on this designated site.

5.2.3. Bure Park Local Nature Reserve (LNR) is located approximately 1.4km to the south west of the FAST site, and is designated on account of the supported habitats, including: meadow, young broad-leaved woodland, hedgerows and scrub. A pond on the LNR also supports Great Crested Newt. This LNR is not directly connected to the BRAND site or wider site and indeed is separated from each by various roads and significant residential development.

5.2.4. Given the distance between the BRAND site and Bure Park LNR it is considered that lighting and noise associated with both the construction and operations phases will not give rise to a significant adverse impact on the LNR.

5.2.5. In relation to recreational pressure, it is considered that the proposals would be highly unlikely to generate significant additional recreational use of the site, given the nature of the proposed development (employment and recreation) and the urbanised context of the LNR.

5.2.6. It is considered that due to the nature of the development proposals (including design and siting), the distances involved and existing management initiatives associated with the LNR, the proposed development is not likely to give rise to any significant adverse impacts on the LNR or any other statutory designated site of nature conservation interest. It is noted that this same conclusion is reached in relation to the masterplan proposals for the wider site.

5.2.7. **Non-statutory sites.** The wider site incorporates the entirety of Stratton Audley Quarry Local Wildlife Site (LWS), as well as the vast majority of Bicester Airfield LWS. The presence of these sites has been given due regard as part of the emerging masterplan proposals and a suite of avoidance, mitigation and enhancement principles

have been identified which will form an intrinsic element of the emerging scheme.

5.2.8. Whilst mitigation measures for each individual phase (including the BRAND site) will primarily seek to off-set any potential adverse impacts arising within that phase, due regard is also given to site wide mitigation principles, ensuring the masterplan impacts and opportunities are considered holistically.

5.2.9. Further detail on Stratton Audley Quarry LWS and Bicester Airfield LWS is provided at Appendix 6, including a summary of the citations, the findings of ecological survey work undertaken in 2018, and the broad mitigation principles which are guiding the site-wide masterplan.

Stratton Audley Quarry LWS

5.2.10. The majority of Stratton Audley Quarry LWS is located outside of the BRAND site and forms much of its western boundary. A small subset of the LWS, supporting an area of dense scrub an area of fishing lake is located within the site boundary.

5.2.11. Emerging proposals for BRAND seek to deliver a 4x4 experience track within the area of Stratton Audley Quarry LWS. These emerging proposals would result in losses to the area of the dense scrub within the site, however the waterbody (**P1**) would remain undisturbed, whilst large areas of semi-natural habitat will be retained or re-instated.

5.2.12. Whilst losses to scrub would result, it is noted that this habitat is considered to be of relatively low ecological value within the context of the site, both from an intrinsic perspective, and given the relatively limited opportunities it provides to faunal species (this largely limited to opportunities for scrub nesting birds). It is further noted that the dense areas of scrub are encroaching on the small pockets of grassland within the mosaic, continually depleting the extent of these relatively more valuable habitats.

5.2.13. Noting the above, it is envisaged that losses of scrub to facilitate a 4X4 track may be appropriately mitigated through the commencement of appropriate habitat creation / reinstatement and management across within the wider 4x4 area (i.e. outside of surfaced track areas). Within these semi-natural areas, it is envisaged that habitat creation / restoration would seek the delivery of an area of Open Mosaic Habitat (OMH) which seeks to replicate desirable examples of this habitat within the wider site. Micor-habitats forming part of this mosaic would include for bare and recolonising ground, ephemeral and short sward habitat and small pockets of more stablished vegetation such as scattered scrub. The creation / reinstatement of these habitats would ensure a net gain in the extent of OMH as part of the emerging BRAND proposals, more than mitigating for scrub losses and contributing towards the safeguarding of the valuable ecology assets noted on the site citation.

5.2.14. It is further envisaged that the proposals would provide a mechanism to secure long-term sensitive management of retained and reinstated habitats within the site post-development, ensuring long-term biodiversity enhancements can be realised.

5.2.15. Areas of the LWS located outside of the BRAND red line boundary would not be subject to direct impacts (i.e. as a result of land take or accidental damage). There is nonetheless the potential for indirect impacts to arise to these areas through the following pathways:

- Dust, pollutants;
- Light / noise pollution; and
- Impacts on supporting habitat for protected faunal species.

5.2.16. In regards dust suppression it is noted that dust arising during construction work only has a significant impact within 20 metres due to heavy soiling of vegetation; further than that it is dispersed and of negligible significance. Notwithstanding the above, the adoption of best engineering practices and protocols during construction (which adhere to current guidance and legislation) would be sufficient to ensure that adverse ecological impacts can be avoided during construction. Given the absence of any hydrological connection, no other potential pollutant pathways are envisaged during either the construction or operational phase.

5.2.17. In regards light pollution, whilst a range of protected and notable species are noted on the citation, these are not typically species deemed to be light sensitive. In any event, the emerging BRAND proposals would give careful consideration to potential lighting impacts, with a sensitive lighting regime to be adopted as part of any adopted scheme (see also faunal section below).

5.2.18. Equally, the majority of cited species would not be considered to be sensitive to potential noise disturbance. Whilst a modest range of birds have been recorded during specific survey work (including many of those noted on the citation), there were no large or notable assemblages of waterfowl or any significant breeding populations recorded. As such, and assuming the adoption of best practice measures in relation to minimising noise during construction, no significant adverse impacts are envisaged to arise in this regard.

5.2.19. Equally, the use of the tracks during the operational phase, as well as the operation of other aspects of the built proposals are not considered to give rise to a level of noise that is significant when considering the limited sensitivity of the LWS, as well as the existing noise levels (with much of the wider site remaining in operational use as an airfield and with busy roads along its perimeters).

5.2.20. The calcareous grassland within the BRAND site will offer opportunities to a range of protected and notable species which are noted on the Stratton Audley Quarry LWS and indeed many of these species are also noted on the citation for Bicester Airfield LWS. The emerging masterplan gives due regard to the overlapping

opportunities the wider site offers to both faunal and floral species, ensuring that site-wide opportunities for these groups can be retained and enhanced in the long-term. Further information is provided in relation to the 'Bicester Airfield LWS' below, as well as in the 'Habitats' and 'Faunal' section of this report.

5.2.21. In regards potential indirect impacts on faunal species, it is noted that the calcareous grassland within the BRAND site has the potential to provide a subset of the wider opportunities available to faunal species primarily sustained within the quarry, namely GCN, reptiles and the invertebrate assemblage. Specific regard has been given to each of these faunal groups in the faunal section of this report (see below). Appropriate mitigation principles have been identified both for the BRAND proposals, as well as the wider emerging masterplan proposals, such that relevant faunal groups can be retained at a favourable conservation status in the short to long-term.

Bicester Airfield LWS

5.2.22. The BRAND site includes a component of the Bicester Airfield LWS. Bicester Airfield LWS is designated primarily on account of its 'lowland calcareous grassland', with the citation also referencing the presence of open habitat mosaic on hardstanding, alongside areas of scrub. Updated survey work undertaken across the wider site by Ecology Solutions in 2018 has reaffirmed the presence of these habitats, albeit with areas of dense scrub again considered to be detracting from the sites value in some areas of the wider site, where it is resulting in a reduction to the extent of grassland habitats which are of greater intrinsic value. Indeed, comparison studies of aerial photography between 2004 and 2018 identify significant scrub encroachment in the south of the wider site (see Appendix 7).

5.2.23. The BRAND development proposals will necessitate losses to areas of calcareous grassland (i.e. the habitat of greater value within the LWS), with these losses largely limited to the northern and western edge of the airfield area.

5.2.24. Where areas of open habitat are to be lost, it is envisaged that these impacts will be mitigated for through the adoption of the following principles:

- Establishment of a suitable, biodiversity led management regime for all retained habitats within the wider Bicester Airfield LWS. This management plan to be secured in the long-term and include for:
    - A suitable cutting regime for areas of grassland to be retained by the emerging masterplan proposals.
    - Completion of initial scrub removal as required in the wider LWS site and the adoption of a long-term, ecologically appropriate scrub and habitat management regime. This to reverse the long-term trend of scrub succession and restore areas of dense scrub to open grassland. Long-term management to

seek retention of scattered scrub as a valuable component of the site-wide habitat mosaic.

- Establishment of appropriate management within grassland surrounding the proposed *Drivers Experiences / Demonstration* track. This grassland, located within the central airfield area, is currently subject to unsuitable management which has prevented the development of a biodiverse sward. Management to achieve qualitative enhancements such that this grassland can reach LWS quality.
- Retention of open mosaic habitat, including retention and/or recreation areas of bare ground as well as degraded or un-metalled hardstanding areas. Opportunities in this regard may be partly realised through the creation of ecology car park' areas. These areas will seek to deliver semi-natural surfacing which may comprise unsealed hardstanding (such as gravels), re-enforced grass or bare ground areas within which a range of early ephemeral floral species can colonise.

5.2.25. Further consideration is given to mitigation and enhancement opportunities for individual habitats and species in the following sections of this note.

5.2.26. Given the nature of the scheme and the separation of the BRAND site (and indeed the wider site) from any other non-statutory designated sites, it is not considered that any adverse impacts would arise on any other designated sites as a result of the emerging proposals.

Habitats within the application site

5.2.27. As identified in the baseline section above, the BRAND site predominantly comprises areas of open grassland and hardstanding, alongside smaller lengths of tree lines and hedgerow.

5.2.28. In assessing and evaluating the biodiversity value of these habitats, consideration has been given to the intrinsic value of the habitats in isolation, as well as their value as a component of a wider habitat mosaic. The wider site supports a mosaic of open and re-colonising habitats, much of which would be considered to comprise Open Mosaic Habitat on Previously Developed Land (OMH). Notwithstanding that the grassland within the BRAND site would not necessarily sit within the habitat categorisation of OMH, the more species-rich areas of calcareous grassland support a floristic assemblage complementary to the site wide OMH and can be considered to be functionally linked. With this in mind, it is important to also consider the holistic impacts of the development proposals on the wider habitat mosaic, not least given its importance to faunal species / assemblages (see also faunal section below).

5.2.29. As stated previously, whilst the primary purpose of this report is to assess and evaluate ecological impacts as a result of the BRAND proposals, due regard is also given to potential cumulative impacts as a result of the emerging, site-wide masterplan. To this end,

mitigation principles for habitat impacts which have the potential to arise as a result of the site-wide masterplan are provided at Appendix 6. Specific impacts and mitigation/enhancement opportunities for habitats within the BRAND site are considered below.

Semi-improved Calcareous Grassland

5.2.30. The emerging proposals will result in losses to areas of semi-improved calcareous grassland, primarily in the north of the site, however habitats elsewhere will be retained and restored/enhanced. As noted previously, the semi-improved calcareous grassland within the BRAND site is considered to be of high ecological value in the context of the site and indeed is considered to be of value at the local level given it forms a primary reason for the Bicester Airfield LWS citation.

5.2.31. Where losses are envisaged, it is considered that these impacts may be appropriately mitigated through the adoption of an appropriate management regime for retained grassland habitats across the wider Bicester Airfield LWS. As set out in the designated sites section above, an appropriate management regime in this regard would include for:

- A suitable cutting and management regime for all areas of grassland to be retained within the Bicester Airfield LWS by the emerging masterplan proposals.
- Completion of initial scrub removal as required across the wider LWS and the adoption of a long-term, ecologically appropriate scrub and habitat management regime. This to reverse the long-term trend of scrub succession and restore areas of dense scrub to open grassland. Long-term management to seek retention of scattered scrub as a valuable component of the site-wide habitat mosaic.

5.2.32. The adoption of this management regime would allow for the biodiversity value of retained grassland habitats to be retained and enhanced in the long-term and would offset the quantitative losses as a result of the BRAND proposals.

5.2.33. As a further measure, the BRAND proposals would facilitate appropriate management of the species-poor grassland surrounding the proposed Drivers Experiences / Demonstration track. Through removing an intensive mowing regime here and instead allowing for a hay cut regime, the emerging proposals would facilitate qualitative enhancements such that this grassland may reach LWS quality post-development.

5.2.34. Further opportunities for grassland creation / restoration would be realised through scrub clearance within the area proposed for the 4x4 track.

5.2.35. The instigation of appropriate grassland and scrub management would complement the ambitions of the nearby Ray CTA, as well as the Oxfordshire LBAPs for *Calcareous Grassland*.

Species-poor Semi-Improved Calcareous Grassland Mosaic

5.2.36. The majority of species-poor semi-improved calcareous grassland is envisaged to be retained as part of the development proposals, albeit there will be losses to facilitate built form (vehicle tracks).

5.2.37. Given the scale of the losses and the low intrinsic value of this habitat, it is not considered that any specific mitigation would be required. Notwithstanding this conclusion, it is noted that the scheme offers opportunities for significant enhancements to be realised to retained areas of this habitat type in the long-term through the implementation of a sensitive management regime with the Driver Experiences / Demonstration track.

5.2.38. As detailed above, and noted within the Bicester Airfield LWS citation, the existing value of this grassland is greatly tempered by an intensive cut and leave management regime. Through implementing a reduced cutting regime, which allows for a wildflowers to flower and set seed each year and moreover removes the arisings to prevent nutrient build-up, it is considered that the value of this habitat may be significantly enhanced in the short to medium term.

5.2.39. Further enhancements, such as completion of a green hay translocation from adjacent (species-rich) grassland areas would further expediate the establishment of a botanically diverse sward.

5.2.40. The implementation of an appropriate regime, as set out above, offers opportunities for the value of the grassland to be enhanced such that it may reach LWS condition in the short to medium term, ensuring establishment of new areas of species-rich grassland within the site. Such management would complement targets set within the Oxfordshire Local Biodiversity Action Plan (LBAP) for *Calcareous Grassland* as well as for the nearby Ray CTA, which include for the management, restoration and creation of lowland meadows.

Hedgerows / treelines

5.2.41. In accordance with the principles guiding the emerging masterplan, the BRAND proposals will retain areas of hedgerow within the site, with only minor losses likely to be required to facilitate drainage and access.

5.2.42. The loss of small sections of hedge will be more than mitigated for through the bolster planting of retained sections of hedge to create a dense linear feature of improved structural and botanical value, ensuring betterment relative to the existing situation.

5.2.43. New and retained areas of hedgerow would moreover be bought under appropriate management in the long-term.

Dense Scrub and Grassland Mosaic

5.2.44. Areas of scrub are of low intrinsic ecological value in the context of both the BRAND site and the wider site, typically supporting only a limited range of woody species. As stated above, scrub with the BRAND site is outcompeting more species-rich ecological habitats, such as areas of neutral and calcareous grassland. As such, in the absence of appropriate management, scrub encroachment will continue to result in a decline in the ecological value of the BRAND site (in addition to the wider site).

5.2.45. The emerging development proposals will result in the loss of significant areas of scrub within the BRAND site, both to facilitate areas of built form, as well as to facilitate habitat restoration (i.e. to reverse the trend of ecological succession within grassland / OMH areas).

5.2.46. Notwithstanding the above, the retention of pockets of scrub will be an important principle governing long-term management, ensuring the structural and botanical diversity of retained are maximised.

Woodland

5.2.47. It is envisaged that the proposals would result in small-scale losses to the young/scrubby woodland within the site. Nonetheless, significant areas of woodland will be retained as part of the proposals.

5.2.48. At this stage it is considered that minor losses to woodland, which is considered to be of reduced intrinsic value in the context of the wider site, may be appropriately mitigated through the provision of new native structure planting within the BRAND site. Moreover, opportunities exist to deliver enhancements to retained areas of woodland, not least through the implementation of appropriate woodland management post-development.

Waterbody

5.2.49. Whilst offering some opportunities to faunal species (see below), P1 is of limited intrinsic interest from a biodiversity perspective. In any event it is envisaged that the existing waterbody will be fully retained as part of emerging BRAND (and masterplan) proposals and as such no mitigation would be required.

5.2.50. Nonetheless, opportunities exist as part of the proposals to deliver enhancements to this waterbody through measures such as sensitive clearance of boundary scrub, small scale bank regrading (for example to enhance the extent of marginal habitat) or localised plug planting of aquatic and marginal vegetation.

Hardstanding / Re-colonising Hardstanding

5.2.51. The vast majority of hardstanding areas lack any significant colonisation by floral species and are considered to be of extremely limited ecological value (notwithstanding the rare presence of Basil

Thyme). Resultantly, no specific mitigation would be required for losses to these habitats.

5.2.52. In some areas, hardstanding has become colonised by a modest range of early successional species (albeit the extent of this habitat is limited within the BRAND site). Given the greater degree of re-colonisation (and noting that the habitat type is noted in the Bicester Airfield LWS citation), these areas are considered to be of improved ecological interest in the context of the BRAND site (and indeed the wider site), forming a component of the wider OMH.

5.2.53. As for the FAST proposals, where losses are required, it is considered that these may be more than mitigated for through the delivery of new ecology car park habitats as part of the scheme. These areas will seek to deliver semi-natural surfacing which may comprise unsealed hardstanding (such as gravels), re-enforced grass or bare ground areas within which a range of early ephemeral floral species can colonise.

Open Habitat Mosaic

5.2.54. As identified above, many of the individual habitats present within the wider site form integral components of a wider open mosaic of habitats (OMH). Combined together, these habitats support a wide and varied floral community, alongside a diverse habitat structure and are resultantly of enhanced (local) value.

5.2.55. The masterplan proposals for the wider site have been specifically informed by the presence of OMH and indeed the retention of a diverse habitat mosaic forms a key element of the overall scheme, as described in more detail at Appendix 6. As for the FAST proposals, careful consideration has been given to the retention or reinstatement of 'open' habitats, with unavoidable losses to be mitigated for through the establishment of a dedicated biodiversity management regime for the wider Bicester Airfield LWS, as well as the enhancement / restoration of currently species-poor calcareous grassland within the proposed demonstration / drivers experience track.

Consideration of No-Development Situation

5.2.56. In the absence of appropriate management (i.e. retention of the status quo), ecological succession will continue within the unmanaged areas of grassland within the wider site, resulting in on-going declines in the sites ecological value and the continuing loss of open habitats.

5.2.57. It is further noted that the current cutting regime which is undertaken within areas of calcareous grassland in the LWS, whilst broadly suitable, is not secured nor guaranteed to continue in the longer term. Indeed, this management is reliant upon the ongoing, viable, operation of the site as an airfield and in the absence of facilitating development, such management is likely to cease in the short to medium term.

5.2.58. Facilitating development is therefore considered to be essential to secure appropriate management and in turn to ensure that the structural and botanical diversity of habitats are retained and enhanced in the long-term.

Summary

5.2.59. In summary, the BRAND site supports a significant component of the semi-improved calcareous grassland habitat present within the wider LWS, as well as small areas of recolonising hardstanding. These habitats are considered to be of higher ecological value in the context of the BRAND site, forming an important component of a wider habitat mosiac.

5.2.60. Of reduced value in the context of the site are areas of dense scrub, woodland and waterbody P1. Areas of species-poor grassland and un-colonised hardstanding are of very little ecological value at present and no mitigation would be required for their loss.

5.2.61. Reflecting the above, A suite of mitigation measures are proposed where potential impacts are envisaged to higher value habitats. It is considered that the adoption of these measures, which would include for the implementation of appropriate habitat management for the wider Bicester Airfield LWS, as well as central grassland areas in the long-term (to be secured by way of a suitably worded condition) would ensure that the emerging masterplan proposals will retain the ecological interest of the BRAND site and ensure that the scheme may fully accord with legislation and planning policy of relevance to nature conservation.

5.3. **Faunal Evaluation**

5.3.1. As noted within the designated sites and habitats sections above, the primary purpose of this report is to assess and evaluate ecological impacts as a result of the BRAND proposals. Nonetheless, due regard is also given to potential cumulative impacts as a result of the emerging, site-wide masterplan. To this end, mitigation principles for impacts on faunal species/groups which have the potential to arise as a result of the site-wide masterplan are provided at Appendix 6.

5.3.2. Specific impacts and mitigation/enhancement opportunities for species within the BRAND site are considered below.

Bats

5.3.3. **Legislation.** All bats are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and included on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (“the Habitats Regulations”), as amended. These include provisions making it an offence:

- Deliberately to kill, injure or take (capture) bats;
- Deliberately to disturb bats in such a way as to:-

(i) be likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or to hibernate or migrate; or
(ii) affect significantly the local distribution or abundance of the species to which they belong;

- To damage or destroy any breeding or resting place used by bats;

- Intentionally or recklessly to obstruct access to any place used by bats for shelter or protection.

5.3.4. While the legislation is deemed to apply even when bats are not in residence, Natural England guidance suggests that certain activities such as re-roofing can be completed outside sensitive periods when bats are not in residence provided these do not damage or destroy the roost.

5.3.5. The words deliberately and intentionally include actions where a court can infer that the defendant knew that the action taken would almost inevitably result in an offence, even if that was not the primary purpose of the act.

5.3.6. The offence of damaging or destroying a breeding site or resting place (which can be interpreted as making it worse for the bat) is an absolute offence. Such actions do not have to be deliberate for an offence to be committed.

5.3.7. European Protected Species licences are available from Natural England in certain circumstances, and permit activities that would otherwise be considered an offence.

5.3.8. Licences can usually only be granted if the development is in receipt of full planning permission and it is considered that:

(i) The activity to be licensed must be for imperative reasons of overriding public interest or for public health and safety;
(ii) There is no satisfactory alternative; and
(ii) The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

5.3.9. **BRAND Site Evaluation.** There are no buildings or trees within or immediately adjacent to the BRAND site which were identified to support potential roosting opportunities for bats.

5.3.10. Bat activity surveys undertaken across the wider site (including the BRAND site) confirmed generally low levels of bat activity, with activity unsurprisingly higher in close proximity to linear vegetation, waterbodies and wooded belts. Whilst a good range of bat species were recorded during the course of surveys, activity was found to be dominated by *Pipistrelle* bat species, with only a low level of registrations pertaining to other species.

5.3.11. **Avoidance, Mitigation and Enhancement Opportunities.** There will be some losses to suitable foraging habitat as a result of the proposals, primarily in the form of semi-improved calcareous grassland. Importantly, the proposals will retain the vast majority of boundary vegetation, including the majority of tree-line/hedgerow along the northern boundary of the BRAND site. This will ensure continued commuting opportunities for bats present in the local area. Indeed, opportunities in this regard will be enhanced through the provision of additional linear woody planting along the sites northern and western edges, with this to comprise a range of native species.

5.3.12. The retention of significant areas of the grassland/open habitat mosiac will ensure continued foraging opportunities within the BRAND site, with these to be safeguarded in the long-term through the establishment of appropriate habitat management which will comprise all habitats within the BRAND site, as well as those within the Bicester Airfield LWS.

5.3.13. The adoption of a sensitive lighting scheme during the construction phase, to include the avoidance of after dark lighting wherever possible, would be sufficient to ensure that adverse impacts on foraging and commuting bats may be avoided.

5.3.14. Where lighting is proposed during the operational phase, the emerging proposals seek a design approach which minimises adverse impacts on light sensitive species. The siting of individual lighting columns (to comprise LED lighting with no UV content) will be considered such that the requirements for areas of built form can be met with minimal spill onto semi-natural habitats. Where necessary, screening vegetation will be provided to minimise light spill into wider semi-natural areas. Additionally, accessories (such as baffles, hoods or louvres) will be utilised to further minimise light spillage and direct light below the horizontal plane to where it is required (limiting light to an angle of 70 degrees or below wherever possible). It is proposed for new lighting to comprise warm white LED with a colour temperature of 3000K or below.

5.3.15. In order to provide new roosting opportunities for bats a number of bat boxes may be installed on suitable trees within the application site, with additional features integrated into the fabric of proposed buildings.

Badgers

5.3.16. **Legislation**. The Protection of Badgers Act 1992 consolidates the previous Badgers Acts of 1973 and 1991. The legislation aims to protect the species from persecution, rather than being a response to an unfavourable conservation status, as the species is in fact common over most of Britain, with particularly high populations in the south.

5.3.17. As well as protecting the animal itself, the 1992 Act also makes the intentional or reckless destruction, damage or obstruction of a Badger sett an offence. A sett is defined as “any structure or place which displays signs indicating current use by a Badger”.

5.3.18. In addition, the intentional elimination of sufficient foraging area to support a known social group of Badgers may, in certain circumstances, be construed as an offence by constituting 'cruel ill treatment' of a Badger.

5.3.19. Previous guidelines were issued by Natural England on the types of activity that it considers should be licensed within certain distances of sett entrances. They stated that works that may require a licence include using heavy machinery within 30m of any entrance to an active sett, using lighter machinery within 20m, and light work such as hand digging within 10m. However, guidance issued by Natural England in September 2007 specifically stated that:

"It is not illegal, and therefore a licence is not required, to carry out disturbing activities in the vicinity of a sett if no Badger is disturbed and the sett is not damaged or obstructed."

5.3.20. More recent guidance produced by Natural England in 2009 states that Badgers are relatively tolerant of moderate levels of disturbance and that low levels of disturbance at or near to Badger setts do not necessarily disturb the Badgers occupying those setts. However, Natural England's guidance continues by stating that any activity that will, or is likely to cause one of the interferences defined in Section 3 (such as damaging a sett tunnel or chamber or obstructing access to a sett entrance) will continue to be licensed.

5.3.21. This guidance no longer makes reference to any 30m/20m/10m radius as a threshold for whether a licence would be required. Nonetheless, it is stated that tunnels may extend for 20m so care needs to be taken when implementing excavating operations within the vicinity of a sett and to take appropriate precautions with vibrations and noise, etc. Fires / chemicals within 20m of a sett should specifically be avoided.

5.3.22. This interim guidance allows greater professional judgement as to whether an offence is likely to be committed by a particular development activity and therefore whether a licence is required or not. For example, if a sett clearly orientates southwards into an embankment it may be somewhat redundant to have a 30m-exclusion zone to the north.

5.3.23. **BRAND Site Evaluation**. There are no Badger setts recorded within the BRAND site or its immediate proximity (within 30m). A number of setts or potential setts are however noted in the wider site.

5.3.24. Suitable foraging habitat is present for Badgers within the BRAND site, albeit no evidence of significant foraging activity was recorded during the survey work undertaken.

5.3.25. **Avoidance, Mitigation and Enhancement Opportunities**. Notwithstanding the absence of any setts, given the mobile nature of Badgers, further update survey work would be undertaken at a detailed stage of planning to further inform the proposals, as well as prior to any construction works on site.

5.3.26. Subject to the findings of updated surveys in due course, forthcoming works may require a Natural England licence will be required to facilitate elements of the emerging masterplan. The emerging development proposals would easily be able to accommodate any mitigation measures which may be required as part of this licence process (including an artificial sett in the unlikely scenario that this is required).

5.3.27. In regards foraging opportunities, it is noted that extensive areas of optimal foraging habitat are to be retained as part of the emerging proposals, with new landscaping (to include the provision of native fruiting species) to provide continued opportunities for this faunal group within the BRAND site.

Amphibians

5.3.28. **Legislation**: All British amphibian species receive a degree of protection under the 1981 Wildlife and Countryside Act (as amended). The level of protection varies from protection from sale or trade only, as is the case with species such as Smooth Newt and Common Toad, to the more rigorous protection afforded to Great Crested Newts, which is protected at the European level.

5.3.29. Although Great Crested Newts are regularly encountered locally and throughout much of England, the UK holds a large percentage of the world population of the species. As such the UK has an international obligation to conserve the species and they receive full protection under domestic and European legislation and are a material consideration under NPPF.

5.3.30. Great Crested Newts are also listed in Annex IV(a) of the European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, more commonly known as the Habitats Directive. The Habitats Directive was transposed into UK law by the Conservation of Habitats and Species Regulations 2017 (as amended), which lists Great Crested Newts under Schedule 2.

5.3.31. The legislation includes provisions making it an offence to:

- Deliberately to kill, injure or take (capture) Great Crested Newts;
- Deliberately to disturb Great Crested Newts in such a way as to:-
    1. Be likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or to hibernate or migrate; or

    2. Affect significantly the local distribution or abundance of the species to which they belong;
- Deliberately takes or destroys the Great Crested Newts eggs;
- To damage or destroy any breeding or resting place used by Great Crested Newts;

- Intentionally or recklessly to obstruct access to any place used by Great Crested Newts for shelter or protection (even if individuals are not in residence).

5.3.32. Licences can be granted that would permit otherwise unlawful activities. In every case, a licence cannot be granted unless:

i. There is no satisfactory alternative; and
ii. The action authorised would not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

5.3.33. It should be noted that a licence could only be granted following the receipt of a full valid planning permission.

5.3.34. **BRAND Site Evaluation**: The wider site supports a notable population of GCN, with this population primarily supported within Stratton Audley Quarry LWS.

5.3.35. Given the suitability of some of the terrestrial habitats (i.e. the calcareous grassland) within the BRAND site, alongside its proximity to known breeding ponds (the closest pond, P9, being adjacent to the site boundary at it closest point), it is considered that the local GCN population will utilise these habitats to some extent during their terrestrial phase.

5.3.36. In line with the above, it is considered that a derogation licence would be required to facilitate the BRAND proposals.

5.3.37. **Avoidance, Mitigation and Enhancement Opportunities.** Whilst the details of any mitigation strategy would need to be agreed as part of a derogation licence in due course, consideration is given to the principles of a mitigation strategy below.

5.3.38. At this stage it is envisaged that a GCN translocation will be required to facilitate the BRAND proposals. This exercise would include for the installation of exclusion fencing along the relevant boundaries of the BRAND site prior to any translocation of newts commencing. The purpose of this exclusion fencing would be to prevent further GCN entering the BRAND site during either the translocation exercise or the subsequent construction phase. It is likely that further temporary fencing would be installed within areas of the site in order to further compartmentalise the site and assist in the capture of target species (i.e. GCN but also common amphibians).

5.3.39. Translocated amphibians would be relocated to a safe location either within the BRAND site or more likely within an area of the wider site which lies within the applicants control. The identified ‘receptor location(s)’ would be chosen on the basis of them supporting sufficient aquatic and terrestrial habitat to safeguard any translocated animals. Where necessary, small-scale enhancements of these areas may be undertaken prior to the relocation of GCN, ensuring the holding capacity of these areas are maximised.

5.3.40. It is noted that the extent and location of the chosen receptor location(s) would be informed by some extent to the wider masterplan proposals and indeed it is likely that a 'Great Crested Newt Masterplan Document' would need to be prepared at the time of the initial licence submission. Such Masterplan documents are required by Natural England for any multi-phase sites such that cumulative impacts on GCN may be understood and appropriately mitigated.

5.3.41. Translocated GCN would be safeguarded in the receptor site(s) up until the completion of relevant construction works within the wider site, at which time any remaining exclusion fencing will be removed and GCN will be free to disperse into the wider site.

5.3.42. It is noted that the wider masterplan proposals, particularly the 'restoration' of Stratton Audley Quarry give specific regard to GCN, as is detailed at Appendix 6. The retention of the mosaic of wetland habitats within Stratton Audley Quarry LWS, as well as adjacent terrestrial habitats, forms a founding principle guiding the wider masterplan proposals for the wider site.

Reptiles

5.3.43. **Legislation**. All six British reptile species receive a degree of legislative protection that varies depending on their conservation importance.

5.3.44. Rare, endangered or declining species receive 'full protection' under the Wildlife and Countryside Act 1981 as well as protection under The Conservation of Habitats and Species Regulations 2010, which transposed into UK law the European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, more commonly known as the Habitats Directive. Species that are fully protected include Smooth Snake *Coronella austriaca* and Sand Lizard *Lacerta agilis*. These receive the following protection from:

- killing, injuring, taking;
- possession or control (of live or dead animals, their parts or derivatives);
- damage to, destruction of, obstruction of access to any structure or place used for shelter or protection;
- disturbance of any animal occupying such a structure or place; and
- selling, offering for sale, possession or transport for purposes of sale (live or dead animal, part or derivative).

5.3.45. Due to their abundance in Britain, Common Lizard *Zootoca vivipara*, Slow-worm *Anguis fragilis*, Grass Snake *Natrix natirx* and Adder *Vipera berus* are only 'partially protected' under the Wildlife and Countryside Act 1981 (as amended) and as such only receive protection from:

- deliberate killing and injuring;
- being sold or other forms of trading.

5.3.46. **BRAND Site Evaluation**: The calcareous grassland and, to a lesser extent, the open mosaic habitats within the wider site support Common Lizard at a low to medium population density (around 36/ha) and Grass Snake at a low population density (<2/ha), albeit only very low numbers of reptiles were recorded within areas of calcareous grassland. The area of dense scrub and grassland mosaic is considered likely to be of reduced importance to reptiles (given the limited extent of grassland remaining), nonetheless a degree of this mosaic remains suitable for reptiles at present.

5.3.47. **Mitigation / Enhancements.** A significant component of the suitable grassland habitats within the BRAND site is to be retained or otherwise reinstated as part of proposals and this will ensure continued foraging, breeding and resting opportunities for common reptiles.

5.3.48. Where losses to suitable reptile habitat is required to facilitate the proposals, it will be necessary to adopt an appropriate avoidance and mitigation strategy to avoid impacts on common reptiles.

5.3.49. Any adopted strategy would need to give due regard to the presence of GCN and be compatible with the mitigation strategy adopted for this species.

5.3.50. Consideration has been given to the completion of a conventional translocation exercise and this would be a suitable approach where impacts are envisaged on larger blocks of grassland (such as around the proposed Automotive Demonstration & Experience Centre and potentially the 4x4 Track). Any such exercise would likely involve the installation of reptile exclusion fencing and the deployment of a large number of reptile tins (envisaged at a minimum density of 100 tins per hectare). Tins would be subsequently checked twice daily in suitable weather conditions for a minimum 30 day period, only ceasing once no reptiles were recorded for a period of 5 consecutive days. Reptiles would be relocated to a suitable holding area within the wider site which would be safeguarded from future development.

5.3.51. Given the relatively small extent of habitat to be impacted elsewhere and given that the BRAND site boundary is continuous with suitable reptile habitat in the wider site, it is considered likely to be more appropriate in to commence a sensitive habitat manipulation, encouraging reptiles to disperse into the wider site on their own accord.

5.3.52. A suitable habitat manipulation strategy in this regard would include for the completion of a two-stage cut of grassland, initially to no less than 10cm and subsequently to ground level (following a rest period). Any cuts would only be undertaken in warm (>10c), dry conditions in the reptile active season (typically late March - October). Cutting would be directional and methodical, removing narrow strips each day (no more than 20m wide per day) and

persuading reptiles to disperse towards retained habitats in the wider site.

5.3.53. Following the cutting exercise, a topsoil strip would be undertaken as a final measure, with this to be overseen by an ecologist. Any reptiles found during this exercise would be translocated to suitable retained habitats in the wider site.

5.3.54. Following the completion of the above cutting works, reptile exclusion fencing would be installed around the extent of the proposed work area(s) to prevent any potential recolonisation of these areas until construction is completed.

5.3.55. The establishment of a suitable management regime across the BRAND site, as well as for the wider Bicester Airfield LWS (to include for a scrub management regime where relevant) will mitigate losses of suitable habitat to built form and ensure that suitable reptile habitat is retained within the BRAND site (and across much of the wider site) in the long-term.

5.3.56. As noted at Appendix 6, the majority of suitable reptile habitat will be retained within the wider site and bought under an appropriate management regime in the long-term.

Breeding Birds

5.3.57. **Legislation**. Section 1 of the Wildlife & Countryside Act is concerned with the protection of wild birds. With certain exceptions all wild birds and their eggs are protected from intentional killing, injuring and taking; and their nests, whilst being built or in use, cannot be taken, damaged or destroyed.

5.3.58. Schedule 1 of the Wildlife & Countryside Act 1981 is a list of the nationally rarer and uncommon breeding birds for which all offences carry special (i.e. greater) penalties. These species also enjoy additional protection whilst breeding, as it is also an offence to disturb adults or their dependant young when at the nest.

5.3.59. **BRAND Site Evaluation.** The habitats present within the BRAND site provide limited opportunities for breeding bird assemblages, albeit opportunities exist for scrub/woodland birds as well as small numbers of ground nesting species such as Skylark and Meadow Pipit. It is considered that the site is of no particular significance for its supported bird assemblage.

5.3.60. **Mitigation and Enhancements.** As all species of birds receive general protection whilst nesting, to avoid a possible offence it is recommended that any clearance of suitable nesting habitat (including grassland) is undertaken outside the breeding season (March to August inclusive) or alternatively that checks be made for nesting birds by an ecologist immediately prior to any vegetation removal.

5.3.61. Losses to suitable ground nesting bird habitat (semi-improved calcareous grassland) would be offset by the provision of new areas of meadow grassland within the central airfield area (around the proposed demonstration / drivers experience track), as well as through securing long-term management of the grassland habitat in the wider Bicester Airfield LWS.

5.3.62. The retention of the vast majority of woodland areas, as well as the retention and strengthening of hedgerows within the BRAND site will also help off-set losses to scrub. New planting will comprise native thicket and berry bearing species which provide foraging habitat, as well as high quality nesting opportunities for scrub nesting species such as Bullfinch, Whitethroat, Linnet and Dunnock which are recorded in the wider site.

5.3.63. To realise an enhancement for a range of species, the emerging proposals will include for the provision of a range of nesting features within the BRAND site, with this to include integrated features within buildings, as well as the provision of boxes upon retained trees. The design of bird boxes will be tailored to those species recorded within the wider site (targeting species such as Tawny Owl, House Sparrow and Swift), as well as species likely to be present in the local area.

5.3.64. It is noted that the wider emerging masterplan seeks to retain the full complement of habitats recorded on site, ranging from recolonising ground and open water to scrub, hedgerows and semi-mature woodland. The retention of these habitats and their enhancement through establishment of a sensitive biodiversity led management regime will ensure continued opportunities for breeding birds post-development.

Wintering Birds

5.3.65. **Site usage.** The wider site supports a modest assemblage of wintering birds, with much of this interest arising due to the presence of waterbodies within Stratton Audley Quarry LWS.

5.3.66. Reflecting the fact that much of the BRAND site comprises short mown grassland and hardstanding, and notwithstanding the presence of P1, the BRAND site is not considered likely to be of any significant important to wintering birds. Indeed, this is reflected in the findings of the survey work undertaken in 2019.

5.3.67. **Mitigation and Enhancements.** Given the limited interest of the BRAND site, it is not considered that any specific mitigation would be required as part of the emerging proposals. The retention of a range of the waterbody, open habitats, scattered scrub and linear planting, as well as the establishment of an appropriate management regime, will be sufficient to retain opportunities for wintering birds within the site.

Invertebrates

5.3.68. **BRAND Site Evaluation**: Based on the 2018 survey findings, the wider site is known to support a notable population of invertebrates,

with a total of 556 species recorded. No species afforded direct legal protection under any UK or European legislation were recorded during the surveys.

5.3.69. Whilst the wetland habitats within Stratton Audley Quarry LWS supported the highest proportion of species of conservation concern, a significant component of the assemblage was noted to be supported by areas of grassland and OMH within the wider airfield area, including the BRAND site. Habitats within the site are therefore considered to support a component of a wider resource which is of at least local (Borough) interest.

5.3.70. It is noted that the timings of surveys in 2018, combined with the 'advanced spring' may have prevented some early spring species from being recorded. With this in mind, and to further ascertain the value of the site to invertebrates, further surveys were undertaken in Spring 2019.

5.3.71. These additional surveys were undertaken on the 7th May and 10th June 2019. At the time of writing, the results of these additional surveys are still being analysed, with the results to be made available to the LPA once analysis is complete.

5.3.72. Whilst the completion of additional spring surveys will further inform appropriate mitigation and enhancement measures as part of the emerging masterplan proposals (and indeed the restoration scheme coming forward separately), it is considered that the baseline information collected to date provides an appropriate evidence base upon which the relative value of habitats within the site can be assessed, likely impacts identified and initial mitigation principles proposed.

5.3.73. The BRAND proposals would result in the loss of some areas of calcareous grassland, as well as small areas of recolonising hardstanding. Other habitat losses, such as areas of dense scrub and young woodland are considered to be of limited importance to invertebrate communities.

5.3.74. **Avoidance, Mitigation and Enhancement Opportunities**. As set out in the habitats section above, losses to areas of open sward will be off-sett by new habitat creation or restoration within the wider site.

5.3.75. Such measures will include the clearance of extensive areas of dense scrub in the vicinity of the proposed 4x4 track and the establishment of an area of OMH which will be subject to a sensitive management regime in the long-term. The creation of additional areas of calcareous grassland, such as within the vicinity of the proposed Driver Experience Track, will provide additional opportunities for invertebrate assemblages reliant on short sward habitats.

5.3.76. Scrub will be maintained as an important component of this mosaic, particularly early flowering species such as Blackthorn and Goat

Willow which provide a valuable early foraging resource for nectar feeding insects.

5.3.77. Where possible, areas of recolonising vegetation will be retained as part of the BRAND proposals. Where losses will result, it is proposed for these to be off-set through the creation of 'ecology car-park' areas, similar to that proposed within the FAST site. It is envisaged that these areas would be constructed from appropriate materials upon which early successional habitat and ephemeral vegetation can establish. Surfaces in this regard should be unmetalled, with materials such as compacted soils, gravels and reinforced grass (comprising bespoke seed mixes) to be considered as appropriate.

5.3.78. As set out at Appendix 6, masterplan proposals for the wider site are further guided by the presence of notable invertebrate populations and the functional value of OMH across the wider site.

6. PLANNING POLICY CONTEXT

6.1. The planning policy framework that relates to nature conservation in Bicester, Oxfordshire is issued at two main administrative levels: nationally through the National Planning Policy Framework (NPPF); and at the local level through policies in the Cherwell Local Plan 2011-2031 in addition to saved policies in the Cherwell Local Plan 1996 and policies in the Non-Statutory Cherwell Local Plan 2011. Any proposed development will be judged in relation to the policies contained within these documents.

6.2. National Policy

National Planning Policy Framework (February 2019)

6.3. Guidance on national policy for biodiversity and geological conservation is provided by the NPPF, published in March 2012, revised on 24 July 2018 and updated on 19 February 2019. It is noted that the NPPF continues to refer to further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system provided by Circular 06/05 (DEFRA / ODPM, 2005) accompanying the now-defunct Planning Policy Statement 9 (PPS9).

6.4. The key element of the NPPF is that there should be "a presumption in favour of sustainable development" (paragraphs 10 to 11). It is important to note that this presumption "*does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site*" (paragraph 177). 'Habitats site' has the same meaning as the term 'European site' as used in the Habitats Regulations 2017.

6.5. Hence the direction of Government policy is clear; that is, the presumption in favour of sustainable development is to apply in circumstances where there is potential for an effect on a European site, if it has been shown that there will be no adverse effect on that designated site as a result of the development in prospect.

6.6. A number of policies in the NPPF are comparable to those in PPS9, including reference to minimisation of impacts to biodiversity and provision of net gains to biodiversity where possible (paragraph 170).

6.7. The NPPF also considers the strategic approach that Local Authorities should adopt with regard to the protection, maintenance and enhancement of green infrastructure, priority habitats and ecological networks, and the recovery of priority species.

6.8. Paragraphs 174 to 176 of the NPPF comprise a number of principles that Local Authorities should apply, including encouraging opportunities to incorporate biodiversity in and around developments; provision for refusal of planning applications if significant harm cannot be avoided, mitigated or compensated for; applying the protection given to European sites to

potential SPAs, possible SACs, listed or proposed Ramsar sites and sites identified (or required) as compensatory measures for adverse effects on European sites; and the provision for the refusal for developments resulting in the loss or deterioration of 'irreplaceable' habitats – unless there are 'wholly exceptional reasons' (for instance, infrastructure projects where the public benefit would clearly outweigh the loss or deterioration of habitat) and a suitable compensation strategy exists.

6.9. National policy therefore implicitly recognises the importance of biodiversity and that with sensitive planning and design, development and conservation of the natural heritage can co-exist and benefits can, in certain circumstances, be obtained.

6.10. **Local Policy**

Cherwell Local Plan 2011-2031

6.10.1. The principal document for planning control purposes in Cherwell District is the Cherwell Local Plan 2011-2031, Part 1 of which was adopted in July 2015 and re-adopted in December 2016. The Plan provides the strategic planning policy framework for the District and outlines the basis for decisions on land use planning affecting the Cherwell District.

6.10.2. It is noted that much of the Site (the airfield) is located within an area covered by Policy Bicester 8 (Former RAF Bicester) which seeks to secure a long-lasting, economically viable future for the Former RAF Bicester technical site and flying field. Additionally, much of the quarry area within the site is identified as 'existing greenspace' under Policy BSC 10, noting the desire to encourage recreational use within this area.

6.10.3. There are four policies relevant to ecology and nature conservation in the Local Plan.

6.10.4. Policy ESD9 relates specifically to the protection of Oxford Water Meadows Special Area of Conservation (SAC). Given the distance between this designated site and the Site, this policy is not considered to be of any relevance in this case.

6.10.5. Policy ESD10 is the primarily policy in the Local Plan which relates to ecology and nature conservation and is concerned with the protection and enhancement of biodiversity and the natural environment. The policy makes reference to the protection afforded to sites of international, national, regional or local importance and notes that proposals will be expected to incorporate features to encourage biodiversity, as well as maintain and enhance existing ecological networks and provide new green infrastructure.

6.10.6. Policy ESD11 refers to the approach to be adopted in Conservation Target Areas (CTA). The Site does not lie within or adjacent to a CTA, and as such this policy is not considered to be of any relevance in this case.

6.10.7. Policy ESD17 relates to green infrastructure and highlights the importance of maintaining and improving the green infrastructure network, with reference made to its contribution to biodiversity and nature conservation.

6.10.8. Part 2 of the Local Plan is being prepared and will contain detailed planning policies to assist with the implementation of strategic policies and the development management process. The policies contained within this document will replace saved policies of the Local Plan 1996, once adopted (see below).

6.10.9. Part 1 of the Local Plan will also be undergoing a partial review as the Council considers how to contribute to Oxford's unmet housing need.

Developer Contributions Supplementary Planning Document (February 2018)

6.10.10. The Developer Contributions SPD was adopted by Cherwell District Council in February 2018 and, amongst other matters, sets out the mechanism by which financial contributions will be sought from developers.

6.10.11. Of relevance to biodiversity and nature conservation, the SPD notes that in some instances (where developments result in net harm to biodiversity as measured by DEFRA Offsetting Metrics), financial contributions may be sought to deliver off-site compensation within appropriate Conservation Target Areas.

Cherwell Local Plan 1996

6.10.12. The Cherwell Local Plan 1996 was adopted in November 1996 and contains a number of saved policies which remain part of the statutory development plan in determining planning applications.

6.10.13. There are three saved policies within the Local Plan 1996 that relate to nature conservation. Policy C1 relates to the protection of statutory and non-statutory designated sites, while policy C2 relates to protected species. Policy C4 refers to the creation of new habitats.

Non-Statutory Cherwell Local Plan 2011

6.10.14. There are also a number of policies relevant to ecology and nature conservation in the Non-Statutory Cherwell Local Plan 2011. The original intention was that this plan would replace the policies in the Cherwell Local Plan 1996; however work was discontinued prior to adoption of this plan.

6.10.15. Whilst policies in the Non-Statutory Local Plan 2011 are not part of the statutory development plan, the document has been approved as interim planning policy for development control purposes. As such some weight may also be given to the policies contained in this document.

6.10.16. There are nine policies within the Non-Statutory Local Plan 2011 that relate to nature conservation.

6.10.17. Policy EN1 states that in determining planning applications the Council will take into account the likely impact of the proposal on the natural environment. Policy EN2 relates to environmental replacement through provision of compensatory habitat. Policy EN6 refers to the impact of light pollution, while policy EN13 relates to development adjacent to watercourses. Policy EN22 states that development proposals will be expected to incorporate features of nature conservation interest, and retain and enhance features of value where possible. Policy EN23 relates to ecological surveys, while policies EN24 and EN25 relate to the protection of designated sites and species respectively. Policy EN27 states that development proposals should also incorporate the creation of new habitats.

6.11. **Discussion**

6.11.1. Recommendations have been put forward in this report that would allow the emerging BRAND proposals to fully safeguard the existing ecological interest of the Site. Wherever possible, measures to enhance ecological and biodiversity value have been set out. Based on surveys undertaken and assessment, the presence and potential presence of protected species has been given due regard and measures to enhance the BRAND site for such species have been put forward.

6.11.2. In conclusion, implementation of the guiding principles and measures set out in this report would enable the emerging development proposals for the Site to fully accord with planning policy for ecology and nature conservation at all administrative levels, whilst delivering the clearly identified requirements for (heritage based) conservation led development within the site, in line with Policy Bicester 8.

6.11.3. As identified throughout this report, due regard has further been given to the emerging masterplan for the wider site. To this end, the mitigation measures proposed for the BRAND site are consistent and indeed complimentary to those mitigation principles identified to safeguard and enhance the biodiversity interest across the wider site.

7. SUMMARY AND CONCLUSIONS

7.1. Ecology Solutions was commissioned by Bicester Heritage to undertake Ecological Assessment work of land within the BRAND site boundary (a component of the wider Bicester Heritage site).

7.2. The development proposals for the BRAND site are for an Automotive experience centre comprising B1 (business), B2 (light industrial) and D2 (Leisure) uses with ancillary spectator facilities comprising D1 (Non-residential), Sui Generis (workshop/ showrooms), A3 (restaurants and cafes) and offices, storage, display and sales comprising the 'Brand Experience Centre' at Bicester Motion, Bicester, OX26 5HA.. These emerging proposals are envisaged to comprise the second phase of a wider, four phase masterplan for the wider site.

7.3. Notwithstanding that the BRAND proposals are to come forward as a standalone application, the importance of understanding ecological impacts as a result of site-wide development (i.e. the cumulative impacts and opportunities across all anticipated development phases) is acknowledged. To this end, Ecology Solutions have continued to advise on the formation of a site-wide Masterplan, the implementation of which would ensure that re-development of the wider site would avoid adverse ecological impacts and indeed would ensure opportunities for biodiversity enhancement are realised.

7.4. No statutory designated sites were recorded within or immediately adjacent to the BRAND site. The BRAND site comprises a component two non-statutory sites, Bicester Airfield LWS, and Stratton Audley Quarry LWS. The majority of both sites lies outside of the BRAND red line boundary, but within the wider site. Habitat survey work in 2018 has reaffirmed that both designated sites continue to support the features for which they were designated, albeit the value in some areas has been significantly diminished by on-going scrub succession. Due regard has been given to both LWS, with appropriate mitigation measures proposed to safeguard the sites biodiversity interest in the long-term

7.5. Much of the BRAND site comprises areas of hardstanding, short mown grassland, scrubby woodland, dense scrub and a waterbody. These habitats are considered to be of limited intrinsic value in the context of the site. Habitats of relatively higher value include those areas of semi-improved calcareous grassland and recolonising hardstanding.

7.6. A number of protected species surveys and assessments have been undertaken across the wider site (including the BRAND site). These surveys have identified the wider site to support a range of species, not least a notable invertebrate assemblage (of at least local value), a medium population of GCN and small to medium populations of common reptiles. Of additional interest is the presence of a modest assemblage of wintering and breeding birds, Badgers and low levels of foraging and commuting bats.

7.7. The BRAND site, as a component of the wider site, provides a subset of the wider resource for the above faunal assemblages, albeit it supports only a relatively limited range of the habitat mosaic present within the

wider site (with much of the biodiversity interest confined areas of Stratton Audley Quarry which are located to the south of the BRAND site). Opportunities nonetheless exist for common reptiles, GCN and a range of invertebrates within the BRAND site, with limited opportunities for foraging and commuting bats, breeding and wintering birds.

7.8. The ecological survey work undertaken at the site has informed emerging masterplan proposals for the wider site, as well as the BRAND site. Appropriate principles and measures have been identified to avoid impacts where possible and otherwise to guide appropriate mitigation and enhancement opportunities which may be implemented at a detailed stage of planning.

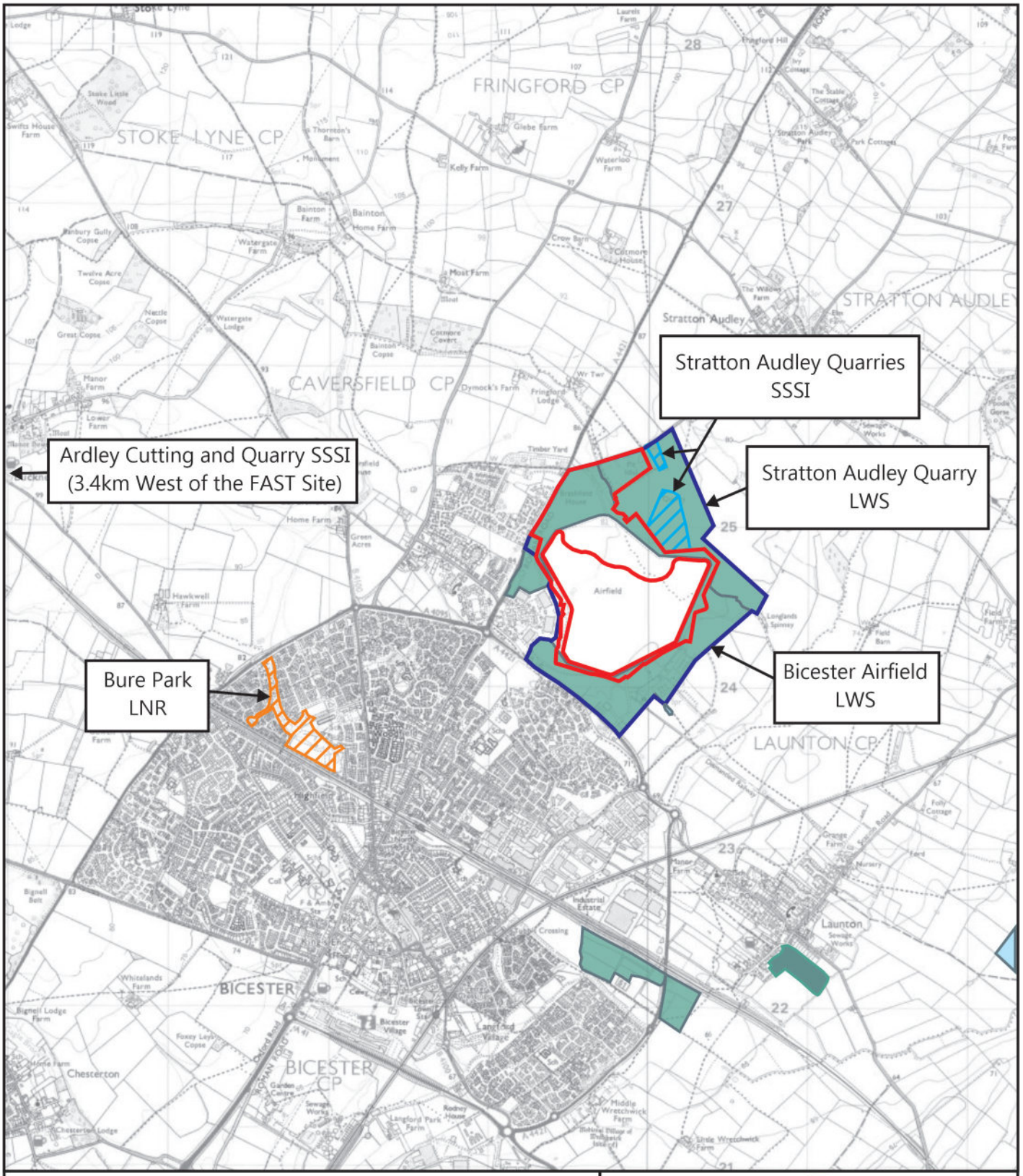
7.9. As such, it is considered that the emerging BRAND proposals may offer long-term enhancements for biodiversity over the existing situation, in line with relevant legislation and planning policy.

PLANS & APPENDICES

PLANS

PLAN ECO1

Application Site Location and Ecological Designations



KEY:

- BRAND SITE BOUNDARY
- WIDER SITE BOUNDARY
- SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)
- LOCAL NATURE RESERVE (LNR)
- LOCAL WILDLIFE SITE (LWS)
- PROPOSED LOCAL WILDLIFE SITE (pLWS)
- WOODLAND TRUST RESERVE

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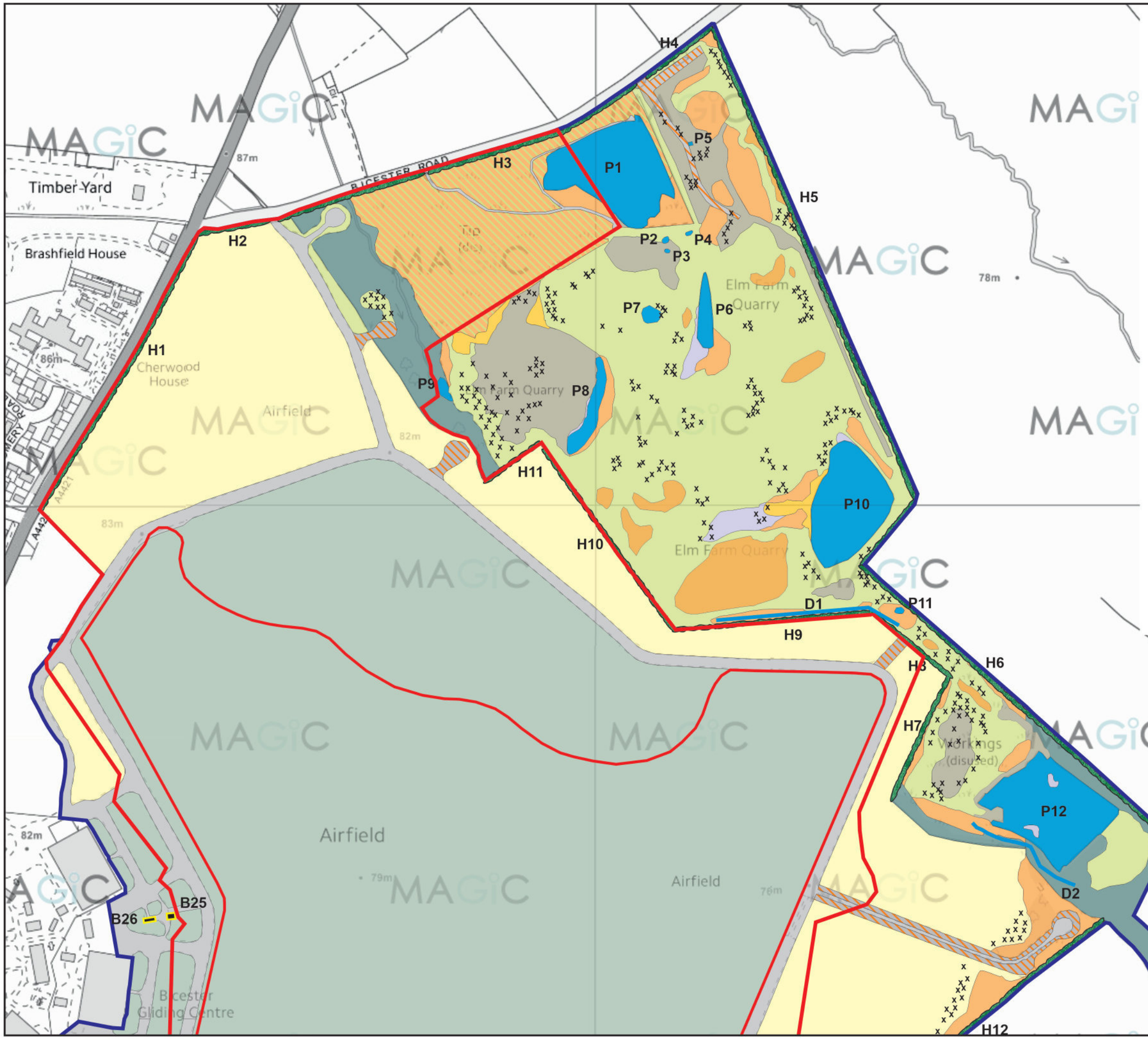
7884: BICESTER HERITAGE, BICESTER

PLAN ECO1: SITE LOCATION & ECOLOGICAL DESIGNATIONS

PLAN ECO2

Ecological Features



KEY:

- BRAND SITE BOUNDARY
- WIDER SITE BOUNDARY
- SEMI-IMPROVED CALCAREOUS GRASSLAND
- SPECIES POOR SEMI-IMPROVED CALCAREOUS GRASSLAND
- SEMI-IMPROVED NEUTRAL AND CALCAREOUS GRASSLAND MOSAIC
- BROAD-LEAVED SEMI-NATURAL WOODLAND
- DENSE SCRUB
- DENSE SCRUB / GRASSLAND MOSAIC
- SCATTERED SCRUB
- REEDBED
- MARGINAL VEGETATION / MARSHY GRASSLAND
- HEDGEROW / TREELINE
- RECOLONISING BARE GROUND
- HARDSTANDING / BARE GROUND
- RECOLONISING HARDSTANDING
- WATERBODIES
- WET DITCH
- BUILDINGS

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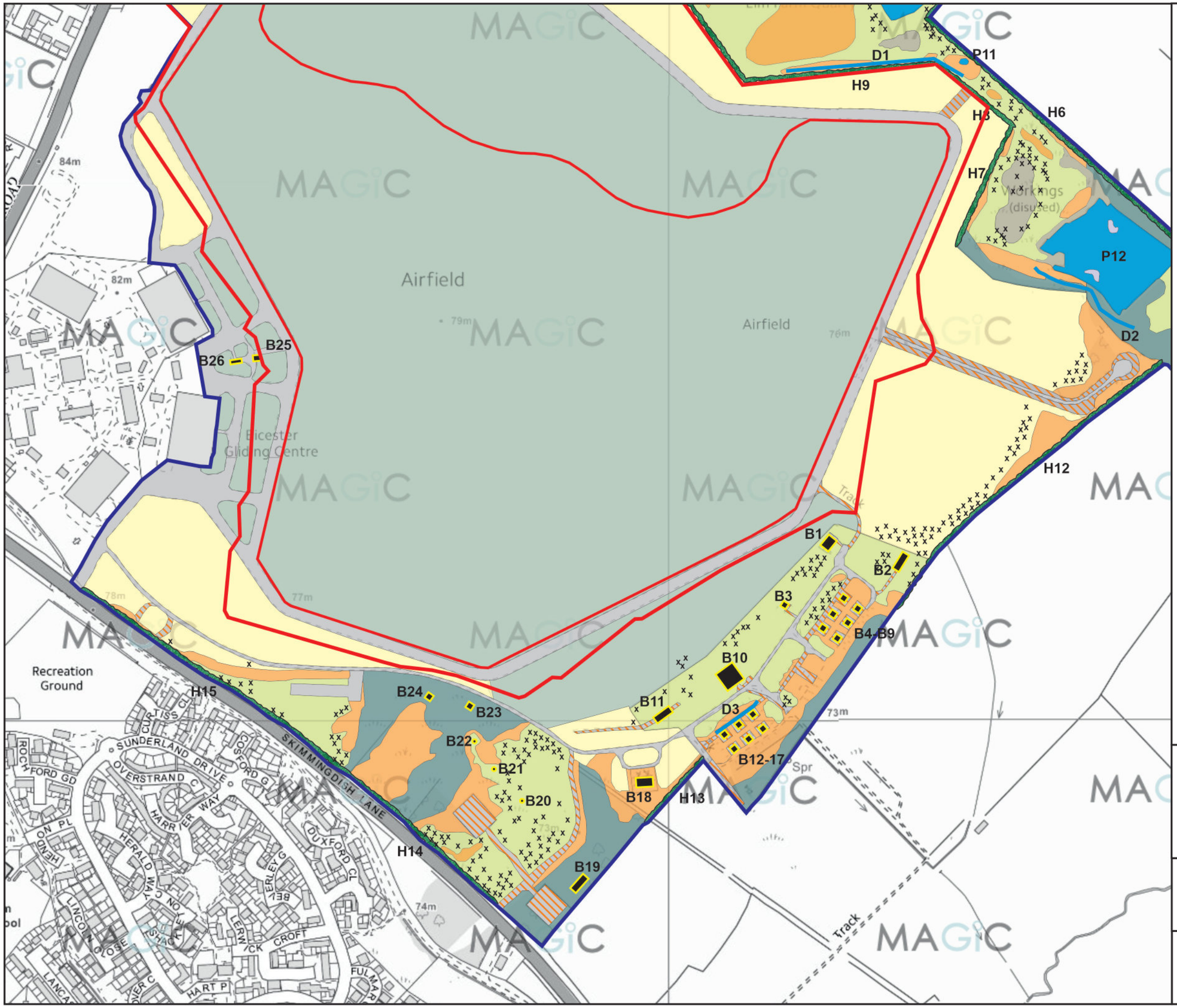
7884: BICESTER HERITAGE, BICESTER

PLAN ECO2A: ECOLOGICAL FEATURES (NORTH)



KEY:

- FAST SITE BOUNDARY
- WIDER SITE BOUNDARY
- SEMI-IMPROVED CALCAREOUS GRASSLAND
- SPECIES POOR SEMI-IMPROVED CALCAREOUS GRASSLAND
- SEMI-IMPROVED NEUTRAL AND CALCAREOUS GRASSLAND MOSAIC
- BROAD-LEAVED SEMI-NATURAL WOODLAND
- DENSE SCRUB
- DENSE SCRUB / GRASSLAND MOSAIC
- SCATTERED SCRUB
- REEDBED
- MARGINAL VEGETATION / MARSHY GRASSLAND
- HEDGEROW / TREELINE
- RECOLONISING BARE GROUND
- HARDSTANDING / BARE GROUND
- RECOLONISING HARDSTANDING
- WATERBODIES
- WET DITCH
- BUILDINGS

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ecology solutions ltd

7884: BICESTER HERITAGE, BICESTER

PLAN ECO2B: ECOLOGICAL FEATURES (SOUTH)

APPENDICES

APPENDIX 1

Site Wide Masterplan

BICESTER MOTION

BICESTER MOTION MASTERPLAN

DRAWN BY: AH CHECKED BY: GB

A-9902 REV:C 2019.06.14

SCALE 1:2500 @ A0

RIDGE

APPENDIX 2

Information returned as part of the desk study

Thames Valley
Environmental Records Centre

TVERC

Sharing environmental information in Berkshire and Oxfordshire

BIODIVERSITY REPORT

Site: Bicester Heritage

TVERC Ref: TVERC/18/095

Prepared for: Ecology Solutions

On: 21/05/2018

By: Thames Valley Environmental Records Centre
01865 815 451
datasearch@tverc.org
www.tverc.org

This report should not to be passed on to third parties or published without prior permission of TVERC.

Please be aware that printing maps from this report requires an appropriate OS licence.

TABLE OF CONTENTS

The following are included in this report:

GENERAL INFORMATION:

- ☑ Terms & Conditions
- ☑ Species data statements

PROTECTED & NOTABLE SPECIES INFORMATION:

- ☑ Table of legally protected and notable species within 3x4km search area
- ☑ Table of Invasive species records within 3x4km search area
- ☑ Species status key
- ☑ Data origin key

DESIGNATED WILDLIFE SITE INFORMATION:

- ☑ Map of non-statutory designated wildlife sites within 5x6km search area
- ☑ Descriptions/citations for designated wildlife sites
- ☑ Designated wildlife sites guidance

TERMS AND CONDITIONS

The data should be considered valid for a maximum 12 months from the date on the cover of this report. If the data is to be used after that time an update should be requested. The data must not be added to any permanent database system.

The absence of any species or habitat data for any site, area or location does not mean that any species or habitat is not present.

MAPS

DATA STATEMENTS

STATEMENT ON OXFORDSHIRE BAT GROUP DATA

TVERC has agreed an exchange of data with Oxfordshire Bat Group (OBG) which enables us to provide records belonging to them with the grid reference given to 1 km precision. Such records are indicated by the term "Confidential, refer to OBG for further details" in the location column and OBG in the data origin column of the species table. Enquirers are recommended to contact OBG for further information.

David Endacott
27 Hedge Hill Road
East Challow
Wantage
Oxon
OX12 9SD

davidendacott@hotmail.com

STATEMENT ON BIRD RECORDS IN OXFORDSHIRE (DATA MARKED AS OOS" IN THE DATA ORIGIN COLUMN

The majority of bird records in Oxfordshire, except those in the north of the county, have been provided by the Oxford Ornithological Society. Such records have a value of OOS in the data origin column . Please note that:

a. Not all species are subject to the same degree of recording; the absence of records of a species in a given geographical area does not necessarily indicate absence of that species.

b. Not all parts of the county are subject to the same degree of recording; the absence of records for a given area does not necessarily indicate the absence of bird species.

c. Records of species regarded as sensitive have been provided with reduced information about location. Any requests for more precise information about the location of such "confidential" sites should be addressed directly to OOS (www.oos.org.uk) You can use the following email contacts chairman@oos.org.uk (the chairman) and ian@recorder.fsnet.co.uk (the county bird recorder).

STATEMENT ON WILDLIFE TRUST WATER VOLE DATA

Since 2008 data has been collected as positive or negative sections of watercourses. Positive sections crossing into search areas are included within the data. These are shown with the central grid reference for the stretch of watercourse. This may fall outside the search area but
the stretch will be at least partly within the search area. The location information shows the beginning and end points of the stretch of watercourse.

USE OF NBN GATEWAY DATA

Commercial organisations and members of the public may refer to the National Biodiversity Network (NBN) Gateway for wildlife records and habitat and designated site information for their own private use.

The NBN Gateway's Terms and Conditions state "*You may not republish wholesale the material, data and/or information made available to you, or exploit it for commercial or academic research purposes without first obtaining written permission from the relevant data provider*". This means that environmental consultants cannot use NBN data in ecology reports for planning applications unless they have obtained written permission from all the data providers. If NBN Gateway data are also provided for this project please make sure that the NBN Gateway's terms and conditions are followed precisely.

The National Planning Policy Framework states that "planning policies and decisions should be based on up-to date information about the natural environment and other characteristics of the area". The NBN Gateway does not hold the most up-to-date, comprehensive or highest resolution information on protected and notable species, local sites or habitats in Berkshire and Oxfordshire.

TVERC have advised planning authorities in Berkshire and Oxfordshire that ecology reports using only NBN data should not usually be validated and the NBN has requested that suspected breaches of NBN terms and conditions are reported to the NBN Data Access Officer, who will take appropriate action. Further detail is available on our website: http://www.tverc.org/cms/content/ecological-survey-reports-planning-applications.

STATEMENT OIN GRID REFERENCES

The following types of grid references are provided:

- Six figure grid references. Many of these will be an assigned relatively central grid reference for a site though with small sites the assigned grid reference for a site could be close to the edge. The record may have come from anywhere within the site. Where additional location information is provided the reference may be more accurate or central to a subsite within the larger site. Where the location is not site based, the grid reference should be within 100 metres of the location.

- Four figure grid references. Generally these are 1km square records often with some location information to give an idea of which part of the 1km square the record was found. Sometime this information can be quite accurate. Where a large site is referred to the location should be in that part of the 1km square that is within the site. In some case these may be tetrad records with grid reference referring to a 2km x 2km square. This includes some confidential records from Oxford Ornithological Society. Other tetrad data is rarely included.

- Eight and ten figure grid references: These are generally accurately worked out to the location where the species was found. However for small and narrow sites eight figure grid references may be used as a central grid reference for a site.

- TVERC intends to start tagging data to qualify these grid references but at present only a limited amount of qualification is provided. 1km square records are tagged as 1km record and 2km square records are tagged as 2km record.

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Amphibians												
Smooth Newt	Lissotriton vulgaris	1 Male	07/04/2009	SP59872520		Stratton Audley Quarry		OLWS		WACA-Sch5-s9.5a		
Smooth Newt	Lissotriton vulgaris	2 Females	07/04/2009	SP59872520		Stratton Audley Quarry		OLWS		WACA-Sch5-s9.5a		
Smooth Newt	Lissotriton vulgaris	2 Females	07/04/2009	SP59912525		Stratton Audley Quarry		OLWS		WACA-Sch5-s9.5a		
Smooth Newt	Lissotriton vulgaris		26/02/1991	SP603251		Stratton Audley Quarry	field record	OBRC		WACA-Sch5-s9.5a		
Great Crested Newt	Triturus cristatus	1 Male	07/04/2009	SP59872520		Stratton Audley Quarry		OLWS	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	
Great Crested Newt	Triturus cristatus	1 Female	07/04/2009	SP59912525		Stratton Audley Quarry		OLWS	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	
Great Crested Newt	Triturus cristatus		20/03/1988	SP599252		Stratton Audley Quarry	field record	LN	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	
Great Crested Newt	Triturus cristatus	Immatures	19/06/1992	SP599252		Stratton Audley Quarry	field record	LN	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	
Great Crested Newt	Triturus cristatus		20/03/1988	SP603251		Stratton Audley Quarry	field record	LN	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	
Great Crested Newt	Triturus cristatus	1 Adult Male	27/04/2004	SP61782308		Upper Laurels Farm, Launton	egg	BBOWT	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a	NERC-S41	
Common Frog	Rana temporaria	Spawn	25/03/2016	SP5881025179		Bicester, OX27 8FB	field record	ARGUK	HabDir-A5	WACA-Sch5-s9.5a		
Common Frog	Rana temporaria	1	31/07/2008	SP605246		Stratton Audley Quarry		OLWS	HabDir-A5	WACA-Sch5-s9.5a		
Common Frog	Rana temporaria	2	31/07/2008	SP605246		Stratton Audley Quarry		OLWS	HabDir-A5	WACA-Sch5-s9.5a		
Birds												
Mute Swan	Cygnus olor	2	20/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Mute Swan	Cygnus olor	2	05/08/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Mute Swan	Cygnus olor	2	11/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Mallard	Anas platyrhynchos	1 Female; 5 Juveniles	20/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Mallard	Anas platyrhynchos		11/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Mallard	Anas platyrhynchos		05/08/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Mallard	Anas platyrhynchos		31/07/2008	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Mallard	Anas platyrhynchos		02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC				Bird-Amber
Grey Partridge	Perdix perdix	10 Individuals	10/07/2006	SP5725	1 km record	Caversfield	field record	OOS			NERC-S41	Bird-Red
Grey Partridge	Perdix perdix	17 Individuals	10/07/2006	SP5725	1 km record	Caversfield	field record	OOS			NERC-S41	Bird-Red
Grey Partridge	Perdix perdix	2	11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Grey Partridge	Perdix perdix		31/07/2008	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Red Kite	Milvus milvus	1 Individual	28/07/2006	SP5725	1 km record	Caversfield	field record	OOS	BirdsDir-A1	WACA-Sch1-p1		RL-Global-post2001-NT
Red Kite	Milvus milvus	1 Individual	26/02/2006	SP5725	1 km record	Caversfield	field record	OOS	BirdsDir-A1	WACA-Sch1-p1		RL-Global-post2001-NT
Red Kite	Milvus milvus	1 Individual	26/02/2006	SP5725	1 km record	Caversfield	field record	OOS	BirdsDir-A1	WACA-Sch1-p1		RL-Global-post2001-NT
Red Kite	Milvus milvus	1 Individual	18/07/2006	SP5823	1 km record	Bicester	field record	OOS	BirdsDir-A1	WACA-Sch1-p1		RL-Global-post2001-NT
Red Kite	Milvus milvus	1 Individual	21/02/2006	SP5825	1 km record	Caversfield	field record	OOS	BirdsDir-A1	WACA-Sch1-p1		RL-Global-post2001-NT
Red Kite	Milvus milvus	1 Individual	21/02/2006	SP5825	1 km record	Caversfield	field record	OOS	BirdsDir-A1	WACA-Sch1-p1		RL-Global-post2001-NT
Red Kite	Milvus milvus	2	19/07/2012	SP601241		Bicester Airfield		OLWS	BirdsDir-A1	WACA-Sch1-p1		RL-Global-post2001-NT
Kestrel	Falco tinnunculus	1 Individual	10/10/2006	SP5725	1 km record	Caversfield	field record	OOS				Bird-Amber
Kestrel	Falco tinnunculus	1 Nest; 2 Individuals	15/05/2006	SP5725	1 km record	Caversfield	field record	OOS				Bird-Amber
Kestrel	Falco tinnunculus	1	19/07/2012	SP601241		Bicester Airfield		OLWS				Bird-Amber
Kestrel	Falco tinnunculus	1	31/07/2008	SP601250		Stratton Audley Quarry		OLWS				Bird-Amber
Kestrel	Falco tinnunculus	1	31/07/2008	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Kestrel	Falco tinnunculus		28/05/2009	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Kestrel	Falco tinnunculus	1	20/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Kestrel	Falco tinnunculus	1	11/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Kestrel	Falco tinnunculus		15/09/1982	SP603251		Stratton Audley Quarry	field record	OBRC				Bird-Amber
Kestrel	Falco tinnunculus		23/09/1987	SP603251		Stratton Audley Quarry	field record	OBRC				Bird-Amber

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Kestrel	Falco tinnunculus	1	10/06/2003	SP6224	1 km record	Poundon Hill	field record	OOS				Bird-Amber
Hobby	Falco subbuteo	1 Individual	15/09/2006	SP52S	1 km record	Confidential, refer to OOS for further details	field record	OOS		WACA-Sch1-p1		
Hobby	Falco subbuteo	1 Individual	28/08/2006	SP52S	1 km record	Confidential, refer to OOS for further details	field record	OOS		WACA-Sch1-p1		
Hobby	Falco subbuteo	2 Individuals	15/08/2006	SP52S	1 km record	Confidential, refer to OOS for further details	field record	OOS		WACA-Sch1-p1		
Hobby	Falco subbuteo	1 Individual	10/06/2006	SP52W	1 km record	Confidential, refer to OOS for further details	field record	OOS		WACA-Sch1-p1		
Hobby	Falco subbuteo	1	04/07/2003	SP62H	1 km record	Confidential, refer to OOS for further details	field record	OOS		WACA-Sch1-p1		
Peregrine	Falco peregrinus	1 Individual	26/02/2006	SP52S	1 km record	Confidential, refer to OOS for further details	field record	OOS	BirdsDir-A1	WACA-Sch1-p1		
Little Ringed Plover	Charadrius dubius	4	28/05/2009	SP602250		Stratton Audley Quarry		OLWS		WACA-Sch1-p1		
Little Ringed Plover	Charadrius dubius	1	31/07/2008	SP602250		Stratton Audley Quarry		OLWS		WACA-Sch1-p1		
Little Ringed Plover	Charadrius dubius	2	11/06/2003	SP602250		Stratton Audley Quarry		OLWS		WACA-Sch1-p1		
Little Ringed Plover	Charadrius dubius		30/07/2009	SP602250		Stratton Audley Quarry		OLWS		WACA-Sch1-p1		
Little Ringed Plover	Charadrius dubius		15/05/1996	SP602251		Stratton Audley Quarry	field record	OBRC		WACA-Sch1-p1		
Lapwing	Vanellus vanellus	50 Individuals	26/02/2006	SP5725	1 km record	Caversfield	field record	OOS			NERC-S41	Bird-Red
Lapwing	Vanellus vanellus	50 Individuals	26/02/2006	SP5725	1 km record	Caversfield	field record	OOS			NERC-S41	Bird-Red
Lapwing	Vanellus vanellus	300 Individuals	30/12/2006	SP5925	1 km record	Balscote: Balscote Quarry	field record	OOS			NERC-S41	Bird-Red
Lapwing	Vanellus vanellus		09/07/2007	SP598253			field record	EC			NERC-S41	Bird-Red
Lapwing	Vanellus vanellus	6	28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Lapwing	Vanellus vanellus	7	10/06/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Lapwing	Vanellus vanellus	3	14/05/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Common Sandpiper	Actitis hypoleucos	1	31/07/2008	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Snipe	Gallinago gallinago	19 Individuals	30/12/2006	SP5925	1 km record	Balscote: Balscote Quarry	field record	OOS				Bird-Amber
Snipe	Gallinago gallinago	1	31/07/2008	SP601250		Stratton Audley Quarry		OLWS				Bird-Amber
Snipe	Gallinago gallinago		15/09/1982	SP603251		Stratton Audley Quarry	field record	OBRC				Bird-Amber
Redshank	Tringa totanus	2	28/05/2009	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Greenshank	Tringa nebularia	2 Individuals	03/08/2006	SP5724	1 km record	Caversfield	field record	OOS		WACA-Sch1-p1		Bird-Amber
Green Sandpiper	Tringa ochropus	1 Individual	07/12/2006	SP5725	1 km record	Bucknell	field record	OOS		WACA-Sch1-p1		Bird-Amber
Green Sandpiper	Tringa ochropus	1 Individual	15/12/2006	SP5725	1 km record	Bucknell	field record	OOS		WACA-Sch1-p1		Bird-Amber
Green Sandpiper	Tringa ochropus	1 Individual	30/12/2006	SP5925	1 km record	Balscote: Balscote Quarry	field record	OOS		WACA-Sch1-p1		Bird-Amber
Green Sandpiper	Tringa ochropus	1	31/07/2008	SP602250		Stratton Audley Quarry		OLWS		WACA-Sch1-p1		Bird-Amber
Lesser Black-backed Gull	Larus fuscus	30	19/07/2012	SP601241		Bicester Airfield		OLWS				Bird-Amber
Lesser Black-backed Gull	Larus fuscus		05/08/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Lesser Black-backed Gull	Larus fuscus		30/07/2009	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Herring Gull	Larus argentatus	30	19/07/2012	SP601241		Bicester Airfield		OLWS			NERC-S41	Bird-Red
Great Black-backed Gull	Larus marinus	1 Individual	30/12/2006	SP5925	1 km record	Balscote: Balscote Quarry	field record	OOS				Bird-Amber
Black-headed Gull	Chroicocephalus ridibundus	3	19/07/2012	SP601241		Bicester Airfield		OLWS				Bird-Amber
Black-headed Gull	Chroicocephalus ridibundus		28/05/2009	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Black Tern	Chlidonias niger		15/05/1996	SP602251		Stratton Audley Quarry	field record	OBRC	BirdsDir-A1	WACA-Sch1-p1		
Common Tern	Sterna hirundo	Breeding	09/07/2007	SP598253			field record	EC	BirdsDir-A1			Bird-Amber
Common Tern	Sterna hirundo		30/07/2009	SP602250		Stratton Audley Quarry		OLWS	BirdsDir-A1			Bird-Amber
Stock Dove	Columba oenas	2	19/07/2012	SP601241		Bicester Airfield		OLWS				Bird-Amber
Stock Dove	Columba oenas		28/05/2009	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Stock Dove	Columba oenas	1	20/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Stock Dove	Columba oenas	8	11/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Stock Dove	Columba oenas		31/07/2008	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Turtle Dove	Streptopelia turtur		01/06/1998	SP5925	1 km record	Bicester: Bicester Quarry	field record	OOS			NERC-S41	Bird-Red
Turtle Dove	Streptopelia turtur	6	31/07/2008	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Tawny Owl	Strix aluco	1 Individual	28/12/2006	SP5725	1 km record	Caversfield	field record	OOS				Bird-Amber
Tawny Owl	Strix aluco	2 Individuals	07/08/2006	SP5825	1 km record	Caversfield	field record	OOS				Bird-Amber
Swift	Apus apus		2009	SP582230		New Road, Bicester	Flying	CSP				Bird-Amber
Swift	Apus apus		2010	SP582230		New Road, Bicester	Flying	CSP				Bird-Amber
Swift	Apus apus	3 Nests	2015	SP58352376		21 Windmill Avenue, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus	3 Nests	2014	SP58352376		21 Windmill Avenue, Bicester	nest	CSP				Bird-Amber

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Swift	Apus apus	12 Adults	01/01/2010-31/12/2010	SP58512376		Windmill Avenue, Bicester	Flying	RSPB				Bird-Amber
Swift	Apus apus		2012	SP58512378		83 Windmill Avenue, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus		2013	SP58512378		83, Windmill Avenue, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus	3 Adults	01/01/2007-31/12/2007	SP58522382		OX26 3XW (Larch Close, Bicester)	Flying	RSPB				Bird-Amber
Swift	Apus apus		2017	SP58552374		Windmill Avenue, Bicester	Flying	CSP				Bird-Amber
Swift	Apus apus		2013	SP58552376		87, Windmill Avenue, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus		2012	SP58552376		87 Windmill Avenue, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus		2010	SP586239		Soutwold Estate, off of Buckingham Road, Banbury	Flying	CSP				Bird-Amber
Swift	Apus apus		2012	SP58932329		6 Nuffield Close, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus		2012	SP58962337		2 Keble Road, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus		2017	SP58982470		Manzel Road, Caversfield	Flying	CSP				Bird-Amber
Swift	Apus apus		2015	SP5899023328		8 Merton Walk, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus		2014	SP5899023328		8 Merton Walk, Bicester	nest	CSP				Bird-Amber
Swift	Apus apus		2012	SP59002331		Merton Walk, Bicester	Flying	CSP				Bird-Amber
Swift	Apus apus		2014	SP59062469		Turnpike Road, Caversfield	Flying	CSP				Bird-Amber
Swift	Apus apus		2017	SP59062469		Turnpike Road, Caversfield	Flying	CSP				Bird-Amber
Swift	Apus apus		2013	SP59062469		Turnpike Road, Caversfield	Flying	CSP				Bird-Amber
Swift	Apus apus	1	19/07/2012	SP601241		Bicester Airfield		OLWS				Bird-Amber
Swift	Apus apus		28/05/2009	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Swift	Apus apus		11/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Swift	Apus apus	1	20/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Swift	Apus apus		30/07/2009	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Kingfisher	Alcedo atthis	1 Individual	10/09/2006	SP52S	1 km record	Confidential, refer to OOS for further details	field record	OOS	BirdsDir-A1	WACA-Sch1-p1		Bird-Amber
Kingfisher	Alcedo atthis		14/08/2003	SP60202345		Bicester Airfield		OLWS	BirdsDir-A1	WACA-Sch1-p1		Bird-Amber
Kingfisher	Alcedo atthis	1	31/07/2008	SP602250		Stratton Audley Quarry		OLWS	BirdsDir-A1	WACA-Sch1-p1		Bird-Amber
Willow Warbler	Phylloscopus trochilus	56	1980	SP597245		Bicester Airfield		LN				Bird-Amber
Willow Warbler	Phylloscopus trochilus		20/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Willow Warbler	Phylloscopus trochilus	1	05/08/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Willow Warbler	Phylloscopus trochilus	20	11/06/2003	SP602250		Stratton Audley Quarry		OLWS				Bird-Amber
Willow Warbler	Phylloscopus trochilus		17/06/2014	SP611231		Land at Grange Farm, Launton	field record	EC				Bird-Amber
Skylark	Alauda arvensis		20/08/2002	SP599252		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	6	19/07/2012	SP601241		Bicester Airfield		OLWS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	5	31/07/2008	SP601250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Skylark	Alauda arvensis		28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	4	20/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	2	11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Skylark	Alauda arvensis		20/08/2002	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	1	04/07/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	4	10/06/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	8	04/07/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	1	10/06/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Skylark	Alauda arvensis	7	14/05/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
House Martin	Delichon urbicum	1	19/07/2012	SP601241		Bicester Airfield		OLWS				Bird-Amber
Meadow Pipit	Anthus pratensis	40 Individuals	26/02/2006	SP5725	1 km record	Caversfield	field record	OOS				Bird-Amber
Meadow Pipit	Anthus pratensis	40 Individuals	26/02/2006	SP5725	1 km record	Caversfield	field record	OOS				Bird-Amber
Meadow Pipit	Anthus pratensis	1	19/07/2012	SP601241		Bicester Airfield		OLWS				Bird-Amber
Yellow Wagtail	Motacilla flava subsp. flavissima	15 Individuals	29/09/2006	SP5725	1 km record	Caversfield	field record	OOS			NERC-S41	Bird-Red
Grey Wagtail	Motacilla cinerea	2 Individuals	15/10/2006	SP5725	1 km record	Caversfield	field record	OOS				Bird-Red
Grey Wagtail	Motacilla cinerea		28/05/2009	SP602250		Stratton Audley Quarry		OLWS				Bird-Red

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Dunnock	Prunella modularis		2016 - 2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC			NERC-S41	Bird-Amber
Dunnock	Prunella modularis		12/04/2000-31/05/2000	SP591242		Caversfield Park, Bicester	field record	EC			NERC-S41	Bird-Amber
Dunnock	Prunella modularis	44	1980	SP597245		Bicester Airfield		LN			NERC-S41	Bird-Amber
Dunnock	Prunella modularis	1	19/07/2012	SP601241		Bicester Airfield		OLWS			NERC-S41	Bird-Amber
Dunnock	Prunella modularis		30/07/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Dunnock	Prunella modularis		28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Dunnock	Prunella modularis		11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Dunnock	Prunella modularis		20/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Dunnock	Prunella modularis		31/07/2008	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Redstart	Phoenicurus phoenicurus	1 Individual	06/08/2006	SP5725	1 km record	Caversfield	field record	OOS				Bird-Amber
Song Thrush	Turdus philomelos		2016 - 2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC			NERC-S41	Bird-Red
Song Thrush	Turdus philomelos	10	1980	SP597245		Bicester Airfield		LN			NERC-S41	Bird-Red
Song Thrush	Turdus philomelos	1	19/07/2012	SP601241		Bicester Airfield		OLWS			NERC-S41	Bird-Red
Song Thrush	Turdus philomelos		28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Redwing	Turdus iliacus	1	1980	SP597245		Bicester Airfield		LN		WACA-Sch1-p1		Bird-Red
Willow Tit	Poecile montana	4	1980	SP597245		Bicester Airfield		LN			NERC-S41	Bird-Red
Marsh Tit	Poecile palustris	2	1980	SP597245		Bicester Airfield		LN			NERC-S41	Bird-Red
Marsh Tit	Poecile palustris		05/08/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Starling	Sturnus vulgaris		12/04/2000-31/05/2000	SP591242		Caversfield Park, Bicester	field record	EC			NERC-S41	Bird-Red
Starling	Sturnus vulgaris	1	1980	SP597245		Bicester Airfield		LN			NERC-S41	Bird-Red
Starling	Sturnus vulgaris	50	27/09/2006	SP59902537		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Starling	Sturnus vulgaris	1	19/07/2012	SP601241		Bicester Airfield		OLWS			NERC-S41	Bird-Red
Starling	Sturnus vulgaris		28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Starling	Sturnus vulgaris		30/07/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Starling	Sturnus vulgaris		17/06/2014	SP611231		Land at Grange Farm, Launton	field record	EC			NERC-S41	Bird-Red
Starling	Sturnus vulgaris	1	14/05/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Starling	Sturnus vulgaris	2	14/05/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
House Sparrow	Passer domesticus		2016 - 2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC			NERC-S41	Bird-Red
House Sparrow	Passer domesticus		30/07/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
House Sparrow	Passer domesticus		17/06/2014	SP611231		Land at Grange Farm, Launton	field record	EC			NERC-S41	Bird-Red
Tree Sparrow	Passer montanus	6	1980	SP597245		Bicester Airfield		LN			NERC-S41	Bird-Red
Linnet	Linaria cannabina	50 Individuals	18/12/2006	SP5725	1 km record	Caversfield	field record	OOS			NERC-S41	Bird-Red
Linnet	Linaria cannabina		30/07/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Linnet	Linaria cannabina		28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Linnet	Linaria cannabina		11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Linnet	Linaria cannabina		20/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Linnet	Linaria cannabina		05/08/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Linnet	Linaria cannabina		31/07/2008	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Linnet	Linaria cannabina		31/07/2008	SP605246		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Bullfinch	Pyrrhula pyrrhula		2016 - 2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC			NERC-S41	Bird-Amber
Bullfinch	Pyrrhula pyrrhula	2	13/07/2012	SP596230		Jarvis Lane		OLWS			NERC-S41	Bird-Amber
Bullfinch	Pyrrhula pyrrhula	38	1980	SP597245		Bicester Airfield		LN			NERC-S41	Bird-Amber
Bullfinch	Pyrrhula pyrrhula	2	19/07/2012	SP601241		Bicester Airfield		OLWS			NERC-S41	Bird-Amber
Bullfinch	Pyrrhula pyrrhula		28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Bullfinch	Pyrrhula pyrrhula	1	11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Bullfinch	Pyrrhula pyrrhula		31/07/2008	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Bullfinch	Pyrrhula pyrrhula		02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC			NERC-S41	Bird-Amber
Bullfinch	Pyrrhula pyrrhula		31/07/2008	SP605246		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Yellowhammer	Emberiza citrinella	17	1980	SP597245		Bicester Airfield		LN			NERC-S41	Bird-Red
Yellowhammer	Emberiza citrinella		28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Yellowhammer	Emberiza citrinella	8	11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Red
Yellowhammer	Emberiza citrinella	3	10/06/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Yellowhammer	Emberiza citrinella	5	14/05/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Yellowhammer	Emberiza citrinella	11	04/07/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Yellowhammer	Emberiza citrinella	1	04/07/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Yellowhammer	Emberiza citrinella	9	14/05/2003	SP6224	1 km record	Poundon Hill	field record	OOS			NERC-S41	Bird-Red
Reed Bunting	Emberiza schoeniclus	2 Individuals	26/02/2006	SP5725	1 km record	Caversfield	field record	OOS			NERC-S41	Bird-Amber
Reed Bunting	Emberiza schoeniclus	2 Females	26/02/2006	SP5725	1 km record	Caversfield	field record	OOS			NERC-S41	Bird-Amber
Reed Bunting	Emberiza schoeniclus		30/07/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Reed Bunting	Emberiza schoeniclus		31/07/2008	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Reed Bunting	Emberiza schoeniclus	8	11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Reed Bunting	Emberiza schoeniclus	8	28/05/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	Bird-Amber
Reed Bunting	Emberiza schoeniclus		02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC			NERC-S41	Bird-Amber
Higher Plants - Flowering Plants												
Bluebell	Hyacinthoides non-scripta		25/04/2009	SP60172513		Stratton Audley Quarry	field record	LN		WACA-Sch8		
Galingale	Cyperus longus		21/06/2006-09/07/2007	SP598253			field record	EC				Status-NS RL-Eng-post2001-NT RL-GB-post2001-NT
Quaking-grass	Briza media	R (DAFOR)	31/07/2008	SP601250		Stratton Audley Quarry		OLWS				RL-Eng-post2001-NT
Lesser Spearwort	Ranunculus flammula		05/07/2013	SP600236		Skimmingdish Lane, Bicester	field record	EC				RL-Eng-post2001-VU
Lesser Spearwort	Ranunculus flammula		08/07/1981	SP603251		Stratton Audley Quarry	field record	OBRC				RL-Eng-post2001-VU
Wild Strawberry	Fragaria vesca	R (DAFOR)	15/08/2014	SP597253		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Hoary Plantain	Plantago media	O (DAFOR)	15/08/2014	SP595251		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Hoary Plantain	Plantago media	R (DAFOR)	15/08/2014	SP597249		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Hoary Plantain	Plantago media	O (DAFOR)	15/08/2014	SP597253		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Hoary Plantain	Plantago media	R (DAFOR)	19/07/2012	SP59822379		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Hoary Plantain	Plantago media	R (DAFOR)	03/08/2012	SP60162405		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Hoary Plantain	Plantago media	R (DAFOR)	03/08/2012	SP60162405		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Heath Speedwell	Veronica officinalis	O (DAFOR)	03/08/2012	SP60162405		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Heath Speedwell	Veronica officinalis	R (DAFOR)	03/08/2012	SP60162405		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Basil Thyme	Clinopodium acinos	LF (DAFOR)	15/08/2014	SP597253		Bicester Airfield		OLWS			NERC-S41	RL-Eng-post2001-VU RL-GB-post2001-VU
Basil Thyme	Clinopodium acinos	R (DAFOR)	19/07/2012	SP59822379		Bicester Airfield		OLWS			NERC-S41	RL-Eng-post2001-VU RL-GB-post2001-VU
Basil Thyme	Clinopodium acinos	O (DAFOR)	03/08/2012	SP60162405		Bicester Airfield		OLWS			NERC-S41	RL-Eng-post2001-VU RL-GB-post2001-VU
Corn Mint	Mentha arvensis	R (DAFOR)	15/08/2014	SP597253		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Corn Mint	Mentha arvensis	R (DAFOR)	31/07/2008	SP605246		Stratton Audley Quarry		OLWS				RL-Eng-post2001-NT
Eyebright	Euphrasia nemorosa	LF (DAFOR)	27/09/2006	SP59902537		Stratton Audley Quarry		OLWS				RL-Eng-post2001-NT
Spiny Restharrow	Ononis spinosa		May-99	SP591243		Buckingham Road Field	field record	CDC				RL-Eng-post2001-NT
Spiny Restharrow	Ononis spinosa		May-99	SP591243		Buckingham Road Field	field record	CDC				RL-Eng-post2001-NT
Spiny Restharrow	Ononis spinosa		May-99	SP591243		Buckingham Road Field	field record	CDC				RL-Eng-post2001-NT
Jacob's-ladder	Polemonium caeruleum		25/05/2009	SP60172513		Stratton Audley Quarry	field record	LN				Status-NR
Hairy Rock-cress	Arabis hirsuta		10/09/2009	SP60172513		Stratton Audley Quarry	field record	LN				RL-Eng-post2001-NT
Shepherd's Cress	Teesdalia nudicaulis		05/07/2013	SP600236		Skimmingdish Lane, Bicester	field record	EC				RL-Eng-post2001-NT RL-GB-post2001-NT
Marsh Ragwort	Senecio aquaticus		23/09/1987	SP603251		Stratton Audley Quarry	field record	OBRC				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis	LA (DAFOR)	19/07/2012	SP59402413		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis	LA (DAFOR)	19/07/2012	SP59502405		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis	R (DAFOR)	15/08/2014	SP595251		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis	LF (DAFOR)	03/08/2012	SP60162405		Bicester Airfield		OLWS				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis		02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis		20/08/2002	SP602251		Stratton Audley Quarry		OLWS				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis		20/08/2002	SP602251		Stratton Audley Quarry		OLWS				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis		23/09/1987	SP603251		Stratton Audley Quarry	field record	OBRC				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis	R (DAFOR)	31/07/2008	SP605246		Stratton Audley Quarry		OLWS				RL-Eng-post2001-NT
Field Scabious	Knautia arvensis	R (DAFOR)	31/07/2008	SP605246		Stratton Audley Quarry		OLWS				RL-Eng-post2001-NT
Invertebrates - Ants, Bees, Sawflies & Wasps												

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Backthorn Mining Bee	Andrena (Andrena) varians		20/04/2003	SP602251		Stratton Audley Quarry		OLWS				Notable-B
Southern Bronze Furrow Bee	Halictus (Seladonia) confusus		2003	SP602251		Stratton Audley Quarry		OLWS				RL-GB-pre94-R
Orange-footed Furrow Bee	Lasioglossum (Lasioglossum) xanthopus		13/06/2003	SP602251		Stratton Audley Quarry		OLWS				Notable-B
Sharp-collared Furrow Bee	Lasioglossum (Evylaeus) malachurum		07/07/2003	SP602251		Stratton Audley Quarry		OLWS				Notable-B
Lobe-spurred Furrow Bee	Lasioglossum (Evylaeus) pauxillum	1 Adult Male	30/07/2012	SP590253		Caversfield, Bicester		LN				Notable-A
Lobe-spurred Furrow Bee	Lasioglossum (Evylaeus) pauxillum		16/05/2003	SP602251		Stratton Audley Quarry		OLWS				Notable-A
White-footed Furrow Bee	Lasioglossum (Dialictus) leucopus		16/05/2003	SP602251		Stratton Audley Quarry		OLWS				RL-GB-pre94-R
Swollen-thighed Blood Bee	Sphecodes crassus		13/06/2003	SP602251		Stratton Audley Quarry		OLWS				Notable-B
Red-tailed Mason Bee	Osmia (Neosmia) bicolor		13/06/2003	SP602251		Stratton Audley Quarry		OLWS				Notable-B
Small Tiphia	Tiphia minuta		07/07/2003	SP602251		Stratton Audley Quarry		OLWS				Notable-B
Invertebrates - Beetles												
A Beetle	Microplontus campestris		02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC				Notable-B
A Beetle	Microplontus campestris		02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC				Notable-B
A Beetle	Thamiocolus viduatus	Adults	18/06/2013	SP5922	1 km record	Gavray Drive, Bicester		WBBRS				Notable-B
A Beetle	Rhinocyllus conicus	Adults	18/06/2013	SP5922	1 km record	Gavray Drive, Bicester		WBBRS				Notable-A
A Beetle	Sepedophilus pedicularius		16/01/2003	SP6022	1 km record	Gavray Drive Meadows	Collection from 'grass-tussocks'	OBRC				Notable
A Beetle	Haploglossa picipennis		14/03/2000	SP602251		Stratton Audley Quarry	field record	OBRC				Notable
A Beetle	Philonthus fumarius		16/01/2003	SP5922	1 km record	Gavray Drive Meadows	Collection from 'grass-tussocks'	OBRC				Notable-B
Bombadier Beetle	Brachinus (Brachinus) crepitans		18/08/1988	SP603251		Stratton Audley Quarry	field record	LN				Notable-B
Bombadier Beetle	Brachinus (Brachinus) crepitans	21 to 100 Adults; Immature Males	27/07/1988	SP603251		Stratton Audley Quarry	field record	LN				Notable-B
A Beetle	Bembidion (Semicampa) gilvipes		16/01/2003	SP5922	1 km record	Gavray Drive Meadows	Collection from 'grass-tussocks'	LN				Notable-B
A Beetle	Bembidion (Diplocampa) clarkii		14/03/2000	SP598251		Stratton Audley Quarry	Collection from 'grass-tussocks'	OBRC				Notable-B
A Beetle	Bembidion (Diplocampa) clarkii		13/03/2000	SP598251		Stratton Audley Quarry	field record	LN				Notable-B
A Beetle	Pterostichus (Pseudomaseus) anthracinus		27/07/1988	SP603251		Stratton Audley Quarry	field record	LN				Notable-B
A Beetle	Ophonus (Ophonus) azureus		27/07/1988	SP603251		Stratton Audley Quarry	field record	LN				Notable-B
A Beetle	Lebia (Lamprias) chlorocephala		26/02/1991	SP599252		Stratton Audley Quarry	field record	OBRC				Notable-B
A Beetle	Cryptocephalus aureolus		02/06/2004	SP599252		Stratton Audley Quarry	field record	OBRC				Notable-B
A Beetle	Cryptocephalus aureolus		02/06/2004	SP599252		Stratton Audley Quarry	field record	OBRC				Notable-B
A Beetle	Cryptocephalus aureolus		02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC				Notable-B
Invertebrates - Butterflies												

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Grizzled Skipper	Pyrgus malvae	1 Adult	18/05/1997	SP5723	1 km record	Bicester N W	field record	BC			NERC-S41	RL-GB-post2001-VU
Grizzled Skipper	Pyrgus malvae	1	18/05/1997	SP5723	1 km record		field record	BBOWT			NERC-S41	RL-GB-post2001-VU
Grizzled Skipper	Pyrgus malvae		30/07/2009	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-VU
Wood White	Leptidea sinapis	10 to 29	1995	SP601245			field record	BBOWT		WACA-Sch5-s9.5a	NERC-S41	RL-GB-post2001-EN
Wall	Lasiommata megera		1980	SP597245		Bicester Airfield		LN			NERC-S41	RL-GB-post2001-NT
Wall	Lasiommata megera		10/08/1983	SP599252		Stratton Audley Quarry	field record	OBRC			NERC-S41	RL-GB-post2001-NT
Wall	Lasiommata megera	Adults	02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC			NERC-S41	RL-GB-post2001-NT
Wall	Lasiommata megera		10/08/1983	SP603251		Stratton Audley Quarry	field record	OBRC			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	2 to 9	18/05/1997	SP5723	1 km record	Bicester N W	field record	BC			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	1 Adult	06/07/1997	SP5823	1 km record	Bicester N	field record	BC			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus		1980	SP597245		Bicester Airfield		LN			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus		27/09/2006	SP59902537		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus		08/07/1991	SP599252		Stratton Audley Quarry	field record	OBRC			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	Adults	02/06/2004	SP599252		Stratton Audley Quarry	field record	OBRC			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	Adults	20/08/2002	SP599252		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	2	05/08/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus		20/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus		11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus		07/07/2003	SP602251		Stratton Audley Quarry	field record	LN			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	3; Adults	16/07/2003	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	Adults	02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	Adults	20/08/2002	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	Adults	02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	34; Adults	06/08/2003	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	Adults	13/06/2003	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	57; Adults	27/08/2003	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	30; Adults	17/06/2003	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	12; Adults	15/09/2003	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	9; Adults	29/05/2003	SP602251		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus		08/07/1981	SP603251		Stratton Audley Quarry	field record	OBRC			NERC-S41	RL-GB-post2001-NT
Small Heath	Coenonympha pamphilus	1	31/07/2008	SP605246		Stratton Audley Quarry		OLWS			NERC-S41	RL-GB-post2001-NT
Black Hairstreak	Satyrium pruni	3 Adults	03/06/2011	SP61502344		Railway North of Launton	field record	BC		WACA-Sch5-s9.5a		RL-GB-post2001-EN
Black Hairstreak	Satyrium pruni	3 Adults	25/06/2010	SP61522344		Launton railway footpath	field record	BC		WACA-Sch5-s9.5a		RL-GB-post2001-EN
Black Hairstreak	Satyrium pruni	4 Adults	28/06/2010	SP61522344		Launton - area by pond and railway	field record	BC		WACA-Sch5-s9.5a		RL-GB-post2001-EN
Small Blue	Cupido minimus	1 Adult	2002	SP599252		Stratton Audley Quarry	field record	BC		WACA-Sch5-s9.5a	NERC-S41	RL-GB-post2001-NT
Small Blue	Cupido minimus	Adults	20/08/2002	SP599252		Stratton Audley Quarry		OLWS		WACA-Sch5-s9.5a	NERC-S41	RL-GB-post2001-NT

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Small Blue	Cupido minimus	1 Adult	2002	SP602251		Stratton Audley Quarry	field record	BC		WACA-Sch5-s9.5a	NERC-S41	RL-GB-post2001-NT
Small Blue	Cupido minimus	Adults	20/08/2002	SP602251		Stratton Audley Quarry		OLWS		WACA-Sch5-s9.5a	NERC-S41	RL-GB-post2001-NT
Small Blue	Cupido minimus	Adults	20/08/2002	SP602251		Stratton Audley Quarry		OLWS		WACA-Sch5-s9.5a	NERC-S41	RL-GB-post2001-NT
Small Blue	Cupido minimus	Adults	20/08/2002	SP602251		Stratton Audley Quarry		OLWS		WACA-Sch5-s9.5a	NERC-S41	RL-GB-post2001-NT
Adonis Blue	Polyommatus bellargus		1980	SP597245		Bicester Airfield		LN		WACA-Sch5-s9.5a		RL-GB-post2001-NT
Invertebrates - Moths												
Ghost Moth	Hepialus humuli		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Oak Hook-tip	Watsonalla binaria		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Blood-vein	Timandra comae		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Small Phoenix	Ecliptopera silaceata		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Latticed Heath	Chiasmia clathrata		08/08/1986	SP603251		Stratton Audley Quarry	field record	OBRC			NERC-S41	
Buff Ermine	Spilosoma lutea		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
White Ermine	Spilosoma lubricipeda		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Cinnabar	Tyria jacobaeae		1980	SP597245		Bicester Airfield		LN			NERC-S41	
Cinnabar	Tyria jacobaeae	4	19/07/2012	SP59822379		Bicester Airfield		OLWS			NERC-S41	
Cinnabar	Tyria jacobaeae	Adults	02/06/2004	SP599252		Stratton Audley Quarry	field record	OBRC			NERC-S41	
Cinnabar	Tyria jacobaeae		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Cinnabar	Tyria jacobaeae		03/08/2012	SP60162405		Bicester Airfield		OLWS			NERC-S41	
Cinnabar	Tyria jacobaeae		31/07/2008	SP605246		Stratton Audley Quarry		OLWS			NERC-S41	
Knot Grass	Acronicta rumicis		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Mottled Rustic	Caradrina morpheus		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Dusky Brocade	Apamea remissa		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Large Nutmeg	Apamea anceps		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Broom Moth	Ceramica pisi		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Shoulder-striped Wainscot	Leucania comma		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Small Square-spot	Diarsia rubi		06/06/2004	SP600240		Bicester Airfield	field record	LN			NERC-S41	
Invertebrates - True Bugs												
A True Bug	Macropsis glandacea		08/08/1986	SP603251		Stratton Audley Quarry	field record	OBRC				Notable-B RL-GB-pre94-Insu
Mammals - Terrestrial (bats)												
Bats	Chiroptera	1 Dropping; Droppings	06/01/2017	SP59282441		Building 103, Bicester Heritage, Buckingham Road, Bicester	dung/droppings/frass/pellet, etc.	EC	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-Global-post2001-NT
Bats	Chiroptera	1 Sign; Signs	06/01/2017	SP59282448		Building 103, Bicester Heritage, Buckingham Road, Bicester	Dung or other signs	EC	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-Global-post2001-NT
Unidentified Bat	Myotis	Flying	31/08/2016-27/09/2016	SP60652592		Squash Court, Stratton Audley Hall	aural bat detector	EC	HabDir-A2np HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	RL-Global-post2001-NT
Natterer's Bat	Myotis nattereri		09/10/1993	SP595259		Bicester	field record	NE	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Noctule Bat	Nyctalus noctula		07/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Noctule Bat	Nyctalus noctula		03/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Noctule Bat	Nyctalus noctula		21/09/2016	SP59152412		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Noctule Bat	Nyctalus noctula	Flying	31/08/2016-27/09/2016	SP60652592		Squash Court, Stratton Audley Hall	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Common Pipistrelle	Pipistrellus pipistrellus		29/12/1999	SP609258			field record	OBRC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Nathusius's Pipistrelle	Pipistrellus nathusii	Flying	31/08/2016-27/09/2016	SP60652592		Squash Court, Stratton Audley Hall	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Common Pipistrelle	Pipistrellus pipistrellus	Droppings	24/07/2015	SP58102530		St Lawrences Church, Caversfield	dung/droppings/frass/pellet, etc.	NE	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		03/05/2017	SP58932426		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		07/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		21/09/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		22/09/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		24/09/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		04/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		03/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		23/09/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		05/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus		21/09/2016	SP59152412		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus	Flying	31/08/2016-27/09/2016	SP60652592		Squash Court, Stratton Audley Hall	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Common Pipistrelle	Pipistrellus pipistrellus	1 Individual	27/09/2016	SP60652592		Squash Court, Stratton Audley Hall	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b		
Soprano Pipistrelle	Pipistrellus pygmaeus		23/09/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus		05/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus		04/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus		21/09/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus		22/09/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus		03/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus		24/09/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus		07/05/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus		11/10/2016	SP59102409		Land adjacent to Skimmingdish Lane, Bicester	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Soprano Pipistrelle	Pipistrellus pygmaeus	Flying	31/08/2016-27/09/2016	SP60652592		Squash Court, Stratton Audley Hall	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Brown Long-eared Bat	Plecotus auritus	Droppings	24/07/2015	SP58102530		St Lawrences Church, Caversfield	dung/droppings/frass/pellet, etc.	NE	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Brown Long-eared Bat	Plecotus auritus	Flying	31/08/2016-27/09/2016	SP60652592		Squash Court, Stratton Audley Hall	aural bat detector	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Brown Long-eared Bat	Plecotus auritus	10 Droppings	19/08/2016	SP60652592		Squash Court, Stratton Audley Hall	dung/droppings/frass/pellet, etc.	EC	HabDir-A4	HabReg-Sch2 WACA-Sch5-s9.4b/s9.4c/s9.5a/s9.5b	NERC-S41	
Mammals - Terrestrial (excl. bats)												
West European Hedgehog	Erinaceus europaeus	1 alive	2012	SP579240		Confidential	hibernating	PTES			NERC-S41	

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
West European Hedgehog	Erinaceus europaeus	3 alive	2014	SP581230		Confidential	hibernating	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	1	30/10/2006	SP582229		Bicester	field record	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	2	19/08/2006	SP585239		Bicester	field record	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	1	16/08/2006	SP586243		Bicester	field record	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	3	31/08/2007	SP587238		Bicester	field record	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	1	31/08/2007	SP587238		Bicester	field record	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	2	18/10/2006	SP587241		Bicester	field record	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	1	07/11/2006	SP591232		Churchill Road, Bicester	field record	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	1	27/09/2006	SP591250		Caversfield, Bicester	field record	PTES			NERC-S41	
West European Hedgehog	Erinaceus europaeus	2	07/11/2006	SP596235		Bicester	field record	PTES			NERC-S41	
[redacted]												
European Water Vole	Arvicola amphibius		01/06/2003	SP580230		Bicester		BBOWT		WACA-Sch5-s9.4a/s9.4b/s9.4c	NERC-S41	
European Water Vole	Arvicola amphibius		08/04/1999	SP580236		Ray Catchment		BBOWT		WACA-Sch5-s9.4a/s9.4b/s9.4c	NERC-S41	
Brown Hare	Lepus europaeus		1980	SP597245		Bicester Airfield		LN			NERC-S41	
Brown Hare	Lepus europaeus		11/06/2003	SP602250		Stratton Audley Quarry		OLWS			NERC-S41	
Brown Hare	Lepus europaeus	2 Adults	02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC			NERC-S41	
Reptiles												
Common Lizard	Zootoca vivipara	1 Female; 3 Adults; 3 Juveniles	29/09/2017	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Juvenile	07/10/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	3 Males; 3 Females; 6 Juveniles	05/10/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Juvenile; 2 Females; 3 Males	02/10/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Juvenile; 1 Male; 1 Female; 2 Adults	09/10/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Female; 5 Juveniles	11/10/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	2 Juveniles	15/10/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	European Directives	UK Legislation	NERC s41	Other Designations
Common Lizard	Zootoca vivipara	1 Female; 2 Juveniles; 3 Adults	18/10/2016	SP590241		Land adjacent to Skimmingdish Lane, Bicester	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Individual	25/05/2016	SP600238		Skimmingdish Lane, Caversfield	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Adult	04/06/2015	SP611230		Land at Grange Farm, Launton	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Adult	11/06/2015	SP611230		Land at Grange Farm, Launton	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Adult	03/06/2015	SP611230		Land at Grange Farm, Launton	Reptile Refugia	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Adult Female	07/05/2015	SP611230		Land at Grange Farm, Launton	Reptile Refugia	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Adult	07/05/2015	SP611230		Land at Grange Farm, Launton	Reptile Refugia	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	3 Adult Males	04/06/2015	SP611230		Land at Grange Farm, Launton	Reptile Refugia	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Adult Male	11/06/2015	SP611230		Land at Grange Farm, Launton	Reptile Refugia	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Common Lizard	Zootoca vivipara	1 Adult Female	03/06/2015	SP611230		Land at Grange Farm, Launton	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Grass Snake	Natrix helvetica	2 Individuals	25/05/2016	SP600239		Skimmingdish Lane, Caversfield	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Grass Snake	Natrix helvetica		08/07/1991	SP602251		Stratton Audley Quarry	field record	OBRC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Grass Snake	Natrix helvetica	Adults	08/07/1981	SP603251		Stratton Audley Quarry	field record	OBRC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Grass Snake	Natrix helvetica	1 Individual	19/04/2016	SP6066423598		Skimmingdish Lane, Caversfield	field record	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Grass Snake	Natrix helvetica	1 Adult	16/07/2014	SP6090225775		Stratton Audley, OX27 9AS	field record	ARGUK		WACA-Sch5-s9.1k/s9.5a	NERC-S41	
Grass Snake	Natrix helvetica	1 Adult	11/06/2015	SP611230		Land at Grange Farm, Launton	Reptile Refugia	EC		WACA-Sch5-s9.1k/s9.5a	NERC-S41	

Taxon Name	Common Name	Abundance / Sex / Stage	Date	Grid Ref.	Grid Ref. Qualifier	Location	Type of Record	Data Origin	Invasive Status
Higher Plants - Flowering Plants									
Nuttall's Waterweed	Elodea nuttallii		20/08/2002	SP602251		Stratton Audley Quarry		OLWS	INNS-Priority-2015
Nuttall's Waterweed	Elodea nuttallii		20/08/2002	SP602251		Stratton Audley Quarry		OLWS	INNS-Priority-2015
Nuttall's Waterweed	Elodea nuttallii		31/07/2008	SP605246		Stratton Audley Quarry		OLWS	INNS-Priority-2015
Butterfly-bush	Buddleja davidii	R (DAFOR)	24/08/2015	SP590242		Skimmingdish Lane Balancing Pond		TVERC	INNS-Other-2015
Butterfly-bush	Buddleja davidii		01/04/2017	SP59072423		Land adjacent to Skimmingdish Lane, Bicester	field record	EC	INNS-Other-2015
Butterfly-bush	Buddleja davidii	R (DAFOR)	13/07/2012	SP596230		Jarvis Lane		OLWS	INNS-Other-2015
Butterfly-bush	Buddleja davidii	R (DAFOR)	19/07/2012	SP59702397		Bicester Airfield		OLWS	INNS-Other-2015
Butterfly-bush	Buddleja davidii	R (DAFOR)	15/08/2014	SP597253		Bicester Airfield		OLWS	INNS-Other-2015
Butterfly-bush	Buddleja davidii		02/06/2004	SP602251		Stratton Audley Quarry	field record	OBRC	INNS-Other-2015
Italian Alder	Alnus cordata		01/04/2017	SP59152412		Land adjacent to Skimmingdish Lane, Bicester	field record	EC	INNS-Other-2015
Winter Heliotrope	Petasites fragrans		07/04/2009	SP602250		Stratton Audley Quarry		OLWS	INNS-Other-2015
Invertebrates - Crustaceans									
A Crustacean	Crangonyx pseudogracilis		20/03/2006	SP613256		Stratton Audley, Audley Brook		EA	INNS-Other-2015

Status Key. Produced January 2014 by Thames Valley Environmental Records Centre

EUROPEAN DIRECTIVES

- BirdsDir-A1 - Species listed on Annex 1 of EC Directive 79/409/EEC on the Conservation of Wild Birds.
- HabDir-A2, HabDir-A4 & HabDir-A5 - Annex 2 and Annexes 4/5 respectively of the EC Habitats Directive. This is the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora.

UK LEGISLATION: CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2010

This legislation translates the European Habitats Directive (see above) into UK law where species are listed in Schedule 2 and Schedule 4. Species are tagged as HabReg-Sch2 or HabReg-Sch4.

UK LEGISLATION: WILDLIFE AND COUNTRYSIDE ACT 1981

Schedule 1 Wild Birds
prohibits the intentional killing, injuring or taking of any wild bird and the taking, damaging or destroying of the nest (whilst being built or in use) or eggs. It prohibits possession of wild birds (dead or alive) or their eggs. In addition:

- WACA-Sch1(pt 1) – There are additional penalties for offences relating to birds on this schedule and it is also an offence to disturb such birds at the nest or with dependent young.
- WACA-Sch1(pt 2) – Covers the protection of birds which may be killed during the open season.

(Please note that some schedule 1 bird records will refer to species that do not breed in the county, e.g. over-wintering birds such as Redwing or Fieldfare. Although we include them in the annotated records, only they and their nests, eggs and dependent young enjoy extra protection under the W&C 1981 act. If you are in any doubt about the breeding status of a bird please contact us at TVERC)

Schedule 5 Wild Animals

- WACA-Sch5_sect9.1 – covers intentional killing injuring or taking (species are covered by all or some of these)
- WACA-Sch5_sect9.2 – Covers possession or control (live or dead animal, part or derivative)
- WACA-Sch5_sect9.4a – Covers damage to or destruction of any structure or place used by a scheduled animal for shelter or protection.
- WACA-Sch5_sect9.4b – Covers disturbance of animal occupying such a structure or place.
- WACA-Sch5_sect9.4c – Covers obstruction of access to any structure or place which any such animal uses for shelter or protection
- WACA-Sch5_sect9.5a – Covers selling, offering for sale, possessing or transporting for the purpose of sale (live or dead animal, part or derivative).
- WACA-Sch5_sect9.5b – Covers advertising for buying or selling such things.

Schedule 8 Wild Plants

- WACA-Sch8 - Covers any picking, uprooting or destruction of plants listed on the Schedule. It also prohibits the sale, etc, or possession for the purpose of sale of any plants on the Schedule.

PRIORITY NERC S.41 2006

Species listed in Section 41 of the Natural Environment and Rural Communities Act 2006 as a species of principle importance. These are very similar to the list of UKBAP and have superseded them. Species are tagged NERC S.41.

OTHER DESIGNATIONS: RED LISTS

Global Red List Species (tagged GlobalRed) - Species listed by the International Union for Conservation of Nature (IUCN) in the IUCN Red List of Threatened Species. Species included are from post 1994 and post 2001 lists.

GB Red List Species (tagged GBRed) - Species included in national red lists. Species included are from pre 1994 and post 2001 lists. Please note not all taxon groups are currently covered, for example fungi.

Abbreviations:

EX – Extinct A taxon is Extinct when there is no reasonable doubt that the last individual has died.
EW – Extinct in the Wild. Species known to survive only in cultivation, in captivity or as a naturalised population(s) well outside the past range.
CR – Critically Endangered (CR) Species facing an extremely high risk of extinction in the wild in the immediate future.
EN – Endangered: Species that are not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
VU – Vulnerable: A species is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future
NT – Near Threatened – A taxon considered to llikely to become endangered in the near future.
LR(cd) – Lower risk (conservation dependent)
DD – Data deficient – A taxon with insufficient data to make an assessment of its risk of extinction.
RE – Regionally Extinct – Taxa that are considered extinct within the region but populations exist elsewhere in the world.
Inde – indeterminate – based on a pre 1994 category: Taxa which are known to be Endangered, Vulnerable or Rare but with insufficient data to place them in one of the categories.
Insu – Insufficiently known - based on a pre 1994 category which equates to data deficient.

Species included here are from information compiled by JNCC (The Joint Nature Conservation Committee).

OTHER DESIGNATIONS: NATIONALLY NOTABLE SPECIES

This covers invertebrate species not falling within IUCN categories but never the less uncommon in Britain.

Nationally Notable A (Tagged Notable-A): Taxa which occur in <30 10 km (hectad) squares or for less well recorded groups within <7 vice counties.

Nationally Notable B (Tagged Notable-B): Taxa which don't fall within IUCN categories but are uncommon in Britain and occur in 31-100 10 km sq/ or for less or for less well recorded groups between 8 and 20 vice counties

Notable (Tagged Notable): Taxa known to be scarce (occurring in between 16 and 100 10km squares) but for which there is insufficient information to assign them to the above categories.

This designation comes from the National Biodiversity Network (NBN) species dictionary but is supported by JNCC.

OTHER DESIGNATIONS: NATIONALLY RARE OR SCARCE SPECIES

This designation covers species that are recognised to occur in only a few locations in Britain.

Rare (tagged as Status-NR) = occurring in 15 or fewer hectads (10 km squares) in the UK

Scarce (tagged as Status-NS) = occurring in 16 – 100 hectads in the UK.

OTHER DESIGNATIONS: BIRDS OF CONSERVATION CONCERN LISTS & RED LIST FUNGI

These lists were drawn up by leading governmental and non-governmental conservation organizations including the RSPB and British Trust for Ornithology. The most recent version was published in May 2009.

Red List (tagged Bird-Red) - species are those that are globally threatened, whose population or range has declined rapidly in recent years (i.e. by more than 50% in 25 years), or which have declined historically and not recovered.

Amber List (tagged Bird-Amber) - Amber list species are those whose population or range has declined moderately in recent years (by more than 25% but less than 50% in 25 years), those whose population has declined historically but recovered recently, rare breeders (fewer than 300 pairs), those with internationally important populations in the UK, those with localised populations, and those with an unfavourable conservation status in Europe.

Red List Fungi – This designation uses the Red Data List of Threatened British Fungi (preliminary assessment) by Shelley Evans (BMS Conservation Officer). Species are designated as:

Fungi Red-CR – Critically Endangered

Fungi Red-EN – Endangered

Fungi Red-NT – Near Threatened

Fungi Red-VU – Vulnerable

These follow current IUCN guidelines (2001) as closely as possible but with adaptations to take into account the fungal lifestyle and associated practicalities of fungal recording.

OTHER DESIGNATIONS: LOCAL BAP SPECIES

For any Local Authority that has drawn up a list of BAP species. Designations will only apply to species recorded from the Local Authority area.

Currently, only Bracknell Forest Council have such a BAP list and relevant records are tagged Bracknell LBAP.

INVASIVE NON-NATIVE SPECIES

Species appearing on the Environment Agency list of non-native invasive species 2014. Species may have the following designations:

Priority Species: Species affecting EA interests the most

Rapid Response Species: Very invasive species that are not yet established

DATA ORIGIN KEY – March 2018

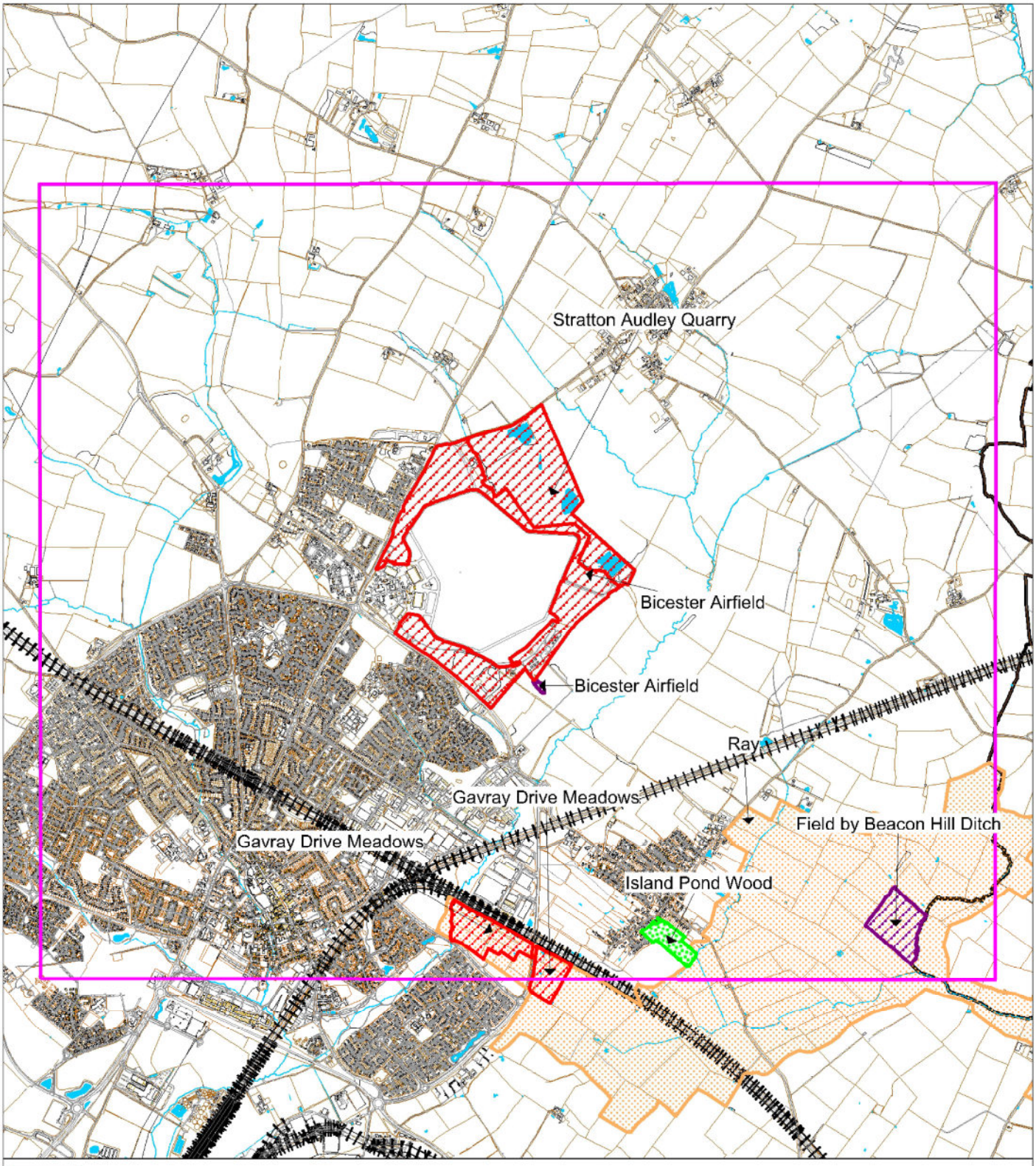
Data Origin Abbreviation	Origin Details
ABFG	Association of British Fungus Groups
AC	Academic Researcher
AN	Abingdon Natural History Society
ARC	Amphibian & Reptile Conservation
ANHSO	Ashmolean Natural History Society (& Rare Plant Group)
ARGUK	UK Amphibian & Reptile Groups
BAT	Bat Licence Returns (from licenced Bat Recorders)
BBG	Binfield Badger Group
BBOWT	Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust
BC	Butterfly Conservation (includes Upper Thames and National Data)
BDS	British Dragonfly Society
BENHS	British Entomological Natural History Society
BFC	Bracknell Forest Council
BFVT	Bracknell Forest Veteran Tree Survey
BGG	Bicester Green Gym
BIG	Berkshire Invertebrate Group
BLS	British Lichen Society
BLWS	Berkshire Local Wildlife Sites Project
BMG	Berkshire Mammal Group
BOC	Berkshire Bird Clubs
BOS	Banbury Ornithological Society
BRAG	Berkshire Reptile & Amphibian Group
BRC	Biological Record Centre (Monk's Wood)
BSBBG	Berks & South Berks Bat Group
BSBI	Botanical Society of the British Isles
BTC	Banbury Town Council
BTO	British Trust for Ornithology
BUWG	Bracknell Urban Wildlife Group
BWARS	Bees Wasps & Ants Recording Society
CalRS	National Calliphoridae Recording Scheme
CBT	Childe Beale Trust
CDC	Cherwell District Council
COS	County Ornithological Services (also known as BCS)
CRPG	Cotswold Rare Plant Group
CSP	Cherwell Swift Project
EA	Environment Agency (formally the National Rivers Authority)
EC	Professional Ecological Consultant
ESB	Earthworm Society of Great Britain
ET	The Earth Trust (formally the Northmoor Trust)
FFF	Friends of Faringdon Folly

FHT	Freshwater Habitat Trust
FLC	Friends of Longcot Churchyard
FROG	Froglife
FSO	Fungus Survey of Oxfordshire
FWAG	Farmland Wildlife Advisory Group
GCN	GCN Licence Return Records
HA	Highways Agency
HWMT	Hurst Water Meadows Trust
IOSF	International Otter Survival Fund
IREC	IRECORD Website
LBRS	Longhorn Beetle Recording Scheme
LN	Local/National Expert (known to TVERC)
LWVP	Lower Windrush Valley Project
MGLG	Moor Green Lakes Group
MOD	Ministry of Defence
MOP	Member of the Public
MS	Mammal Society
NCRS	National (Trichoptera) Caddisfly Recording Scheme
NDD	National Dormouse Database
NE	Natural England/EN/NCC
NFC	Newbury Field Club
NHM	Natural History Museum
NNSS	Non-native Species Secretariat
NPD	National Ponds Database
NRG	Newbury Ringing Group
NT	National Trust
OBG	Oxfordshire Bat Group
OBRC	Oxfordshire Biological Record Centre
OBU	Oxford Brookes University
OCC	Oxfordshire County Council
OFG	Oxfordshire Flora Group
OLWS	Oxfordshire Local Wildlife Sites Project
OMG	Oxfordshire Mossing Group
OOS	Oxfordshire Ornithological Society
ORAG	Oxfordshire Reptile & Amphibian Group
OS	Otter Spotter Project
OUNHM	Oxford University Natural History Museum
OUWG	Oxford Urban Wildlife Group
OX	Oxford City Council
OxMG	Oxford Mammal Group
PC	Pond Conservation
PL	Plantlife
PT	Plant Tracker (non-native plant tracking app.)
PTES	People's Trust for Endangered Species

RBC	Reading Borough Council
RBWM	Royal Borough of Windsor & Maidenhead
RDNHS	Reading and District natural History Society
RM	Reading Museum
RRS	Riverfly Recording Scheme
RSPB	Royal Society for the Protection of Birds
RUWG	Reading Urban Wildlife Group
RWP	Reading Woodlands Plan
SARS	Soldierflies and Allies Recording Scheme
ScRS	Scarabaeoidea Recording Scheme
SepRS	Sepsidae Recording Scheme
SO	Science Oxford
SODC	South Oxfordshire District Council
SW	Shotover Wildlife
TVERC	Thames Valley Environmental Record Centre
TVFG	Thames valley Fungus Group
TW	Thames Water
U	Unknown
UKWOT	UK Wild Otter Trust
VCH	Victoria County History (historical records)
VWH	Vale of White Horse District Council
VWT	Vincent Wildlife Trust
WB	West Berkshire District Council
WBBRS	Weevil & Bark beetle Recording Scheme
WBC	Wokingham Borough Council
WFG	Wychwood Flora Group
WIA	Wildlife in Ascot Group
WILDCRU	Wildlife Conservation Research Unit
WMUWG	Windsor & Maidenhead Urban Wildlife Group
WODC	West Oxfordshire District Council
WS	Wytham Survey
WT	Woodland Trust
WWT	Wildfowl & Wetlands Trust
YE	Dick Greenaway, concerning land owned by Yattendon Estate

Bicester Heritage
Designated Wildlife Sites

TVERC



Local Wildlife Site

Proposed Local Wildlife Site

Woodland Trust Reserve

Biodiversity Opportunity Area/Conservation Target Area

Search Area

Scale: 1:35000

Map produced by Thames Valley Environmental Records Centre in 2018

Oxfordshire Local Wildlife Site Citation

GAVRAY DRIVE MEADOWS

Site Code: 52W01

Grid Reference: SP595226 Area (ha): 15.2

Local Authority: Cherwell Last Survey Date(s): February 2014

Date Selected or Reconfirmed:

Site Description

These meadows form a mosaic of small damp fields with ponds, divided by thick hedges with old trees. Most of the fields are probably former hay meadows over medieval ridge and furrow field patterns, and have a sward mostly dominated by tufted hair-grass with some meadow foxtail and meadow barley. However, fields 5 and 6 appear to be old pasture, with ragged robin, dropwort, devil's-bit scabious and common spotted orchid. Fields 7, 11 and 12 contain devil's-bit scabious and betony. Great burnet is frequent in fields 7 and 11, and scattered in fields 12, 14 and 16. Sneezewort and pepper saxifrage were only found in field 11. Common marsh bedstraw, bugle, greater bird's-foot trefoil, common knapweed and short-fruited willowherb are occasional throughout the fields. There is a very good range of rushes and sedges across the site, with nine species of sedge: glaucous, common, carnation, brown, hairy, false fox, spiked, slender tufted and oval. Grasses include yellow oat-grass, sweet vernal grass, tall fescue, meadow fescue and red fescue. In the drier areas, slightly acid conditions are indicated by frequent tormentil, lesser stitchwort and sweet vernal grass, especially in fields 5, 6, 14 and 15.

Most of the ponds in the western half of the site are shaded and./or only damp in summer. They have a species-poor vegetation of compact rush, plicate sweet-grass and tufted water-forget-me-not. CPM surveyed the ponds on the west side of the north-south road and reported great crested newt (a priority Biodiversity Action Plan species) in 3 ponds and a channel. Smooth newts were found in all ponds and the channel, and one palmate newt was recorded in field 9. The large water-filled pond in field 14 (on the eastern side of the road) contains greater reedmace, gypsywort, marsh foxtail, tufted water-forget-me-not, sharp-flowered rush and soft rush. The brook running along the western margin of the County Wildlife Site contains reed canary-grass, redshank, water chickweed and greater water plantain.

The hedges across the entire site are mostly tall and thick, and contain hawthorn with bramble, blackthorn and elder, as well as occasional crack willow, field maple, oak, ash, crab apple, English elm, dogwood, holly, wayfaring tree, guelder rose, buckthorn, hop and honeysuckle. They are probably post-medieval, as they dissect the ridge and furrow pattern that runs through most of the fields. The hedge that separates fields 5 and 6 from

fields 7 and 12 is a double hedge, with black bryony, mature oak, ash and crack willow, including one large collapsed crack willow pollard. The hedge that runs along the eastern edge of fields 11 and 12 is also double. These double hedge lines include Midland hawthorn, wood meadow-grass, great hairy brome and three-nerved sandwort; all four are ancient woodland indicator species (characteristic of woodlands more than 400 years old). The gappy hedge line between fields 11 and 12 contains five large mature oaks. The hedges around fields 8 and 9 contain abundant English elm suckers, as well as hawthorn and bramble. The bullace plum (*Prunus domestica* ssp*. insititia*), a rare and declining species in the county, is found in the hedge between fields 8 and 9.

Numerous birds are using the proposed County Wildlife Site, including reed bunting (which was seen flying across the road between fields 14 and 4), willow warbler, garden warbler, blackcap, whitethroat, lesser whitethroat, chiffchaff, bullfinch, linnet, song thrush, yellowhammer, sedge warbler, hobby and kestrel. Common pipistrelle, noctule, *Myotis sp*. and, possibly, serotine bats were recorded foraging over the site (CPM). Butterflies include large skipper, ringlet, common blue, small heath and marbled white. Twenty-six species of ground beetles were found in fields 5, 6, 11 and 12, including the nationally scarce *Bembidion gilvipes*.

SECTION 41 HABITATS OF PRINCIPAL IMPORTANCE: lowland meadows

SECTION 41 SPECIES OF PRINCIPAL IMPORTANCE: Reed bunting (3 or 4 singing males), song thrush (2 or 3 singing males), bullfinch, linnet; great crested newt.

RED DATA BOOK SPECIES:

NATIONALLY SCARCE SPECIES: *Bembidion gilvipes* a ground beetle

BIRDS OF CONSERVATION CONCERN:

Red list: Bullfinch, reed bunting, song thrush, yellowhammer, linnet.

Amber list: Dunnock, willow warbler.

TYPICAL SPECIES of LOWLAND MEADOW: Great burnet, greater bird's-foot trefoil, betony, cuckooflower, devil's-bit scabious, sneezewort, pepper saxifrage, brown sedge, carnation sedge, common sedge and meadow barley.

Oxfordshire Local Wildlife Site Description

BICESTER AIRFIELD

Site Code: 52X10

Grid Reference: SP599240

Area (ha): 161

Local Authority: Cherwell District Council

Last Survey Date(s): July & August 2012; Aug 2014

Designation Date: 2012, 2014

Site Description

The site is an airfield and surrounding areas of grassland and scrub. It includes areas of species-rich grassland and rough grassland around the periphery of the short mown grassland used as runways. There are also several old track ways that are breaking up and have an interesting range of plants.

To the south, the mosaic of species-rich grassland, early successional vegetation and scrub fits the description for open mosaic habitat on previously developed land. This area is species-rich with 24 of the species typical of this habitat as described in the 2010 DEFRA survey methodology for this habitat type.

The northern areas of the site are similar with areas of species-rich calcareous grassland. It includes upright-brome, cowslip, burnet saxifrage and common restharrow. To the north east, there are areas of open mosaic habitat including areas of degrading hard-standing with early successional vegetation, species-rich grassland and scrub. These areas include species such as mouse-ear hawkweed, black medick, common stork's-bill and the rare basil thyme.

There is a proposed extension to this site which consists of an area west of Skimmingdish Lane which supports grassland habitat.

SECTION 41 HABITATS OF PRINCIPAL IMPORTANCE: Lowland calcareous grassland, open mosaic habitats on previous developed land.

SECTION 41 SPECIES: Brown hare, Song Thrush, Common Starling, Dunnock, Tree Sparrow, Marsh Tit, Willow Tit, Common Bullfinch, Herring Gull, Yellowhammer, Skylark, Basil thyme, Small Heath, Buff Ermine, White Ermine, Cinnabar, Oak Hook-tip, Small Phoenix, Ghost Moth, Knot Grass, Large Nutmeg, Dusky Brocade, Mottle Rustic, Small Square-spot, Broom Moth, Shoulder-striped Wainscot

LEGALLY PROTECTED SPECIES: Badger, Red Kite

RED DATA BOOK SPECIES: Basil thyme, Adonis Blue, Small Heath

NATIONALLY SCARCE or NOTABLE SPECIES:

BIRDS OF CONSERVATION CONCERN:

Red list: Herring Gull, Song Thrush, Redwing, Common Starling, Tree Sparrow, Marsh Tit, Willow Tit, Yellowhammer, Skylark

Amber list: Green Woodpecker, Stock Pigeon, Red Kite, Common Kestrel, Common Bullfinch, House Martin, Meadow Pipit, Dunnock, Willow Warbler, Common Whitethroat, Lesser Black-backed Gull, Common Swift

TYPICAL SPECIES OF LOWLAND CALCAREOUS GRASSLAND: upright brome, greater knapweed, basil thyme, blue fleabane, burnet saxifrage, common restharrow, cowslip, hoary plantain, mouse-ear hawkweed, fairy flax, field scabious, ploughman's-spikenard, salad burnet, hairy violet, downy oat-grass, fern-grass, meadow oat-grass, musk thistle, common centaury and wild marjoram.

TYPICAL SPECIES OF OPEN MOSAIC HABITAT ON PREVIOUSLY DEVELOPED LAND: mugwort, black knapweed, common mouse-ear, smooth hawk's-beard, blue fleabane, perforate St. John's-wort, common toadflax, fairy flax, black medick, red bartsia, ribwort plantain, goat's-beard, hop trefoil, bladder campion, lesser trefoil, red clover, common centaury, field horsetail, eyebright, purple toadflax, tall melilot, wild mignonette, weld, lesser trefoil, yellow oat-grass and tufted vetch.

Oxfordshire Local Wildlife Site Citation

STRATTON AUDLEY QUARRY

Site Code: 62C01

Grid Reference: SU600251

Area (ha): 36.95

Local Authority: Cherwell

Last Survey Date(s): 31st July 2008 and 7th April 2009

Designation Date: 2010

Site Description

Stratton Audley Quarry is a former limestone quarry site. Since the cessation of quarrying the site has developed and is thought to qualify as Section 41 habitat of principal importance 'open mosaic habitats of previously developed land'. The southern area appears to be the most diverse botanically where the site is made up of a fine mosaic of habitats with areas of bare ground, ephemeral community, stunted willows, developing calcareous and neutral grassland with an area of narrow-leaved bird's foot-trefoil (currently on the Oxfordshire rare plants register), areas of marshy grassland, stands of bulrush and a large fishing lake where stonewort species are present. There is also structural diversity across the site with a couple of large spoil mounds, a steep slope adjacent to the lake and the variation from dry to wet/marshy habitats. The northern area has been worked until quite recently and is now made up of ephemeral and tall herb with a small lake, ponds and a couple of ephemeral shallow pools around the edge which hold stonewort species. The European Protected great crested newt is present at the site. Grey club-rush (currently on the Oxfordshire rare plants register) was recorded in 2003 in the northern small ditches. A range of plant species have been recorded at the site and include southern marsh orchid, bee orchid, common centaury, greater knapweed, eyebright, blue fleabane and fairy flax. The site is used by a range of birds including little ringed plover, snipe and skylark. Nationally scarce invertebrates recorded include hymenoptera species and a rove beetle *Haploglossa picipennis*, in 2000. There are also records for 33 'local' species, including banded demoiselle damselfly and black-tailed skimmer dragonfly. The site also includes a geological SSSI.

SECTION 41 HABITAT(S) of PRINCIPAL IMPORTANCE: Open Mosaic Habitats on Previously Developed Land, Ponds, Lowland Calcareous Grassland

SECTION 41 SPECIES OF PRINCIPAL IMPORTANCE: brown hare, skylark, lapwing, linnet, grey partridge, great crested newt, house sparrow, song thrush, small blue, small heath, grizzled skipper, bullfinch, dunnock, reed bunting, yellowhammer, marsh tit and starling.

RED DATA BOOK SPECIES: Great crested newt, Solitary bees - *Halictus confuses* and *Lasioglossum leucopum* ; and rove beetle - *Haploglossa picipennis*

NATIONALLY SCARCE SPECIES: ruddy darter, ground beetles *Harpalus azureus*, *Lebia chlorocephala* and bombardier beetle, a rove beetle *Haploglossa picipennis*, and; solitary bees and wasps - *Sphecodes crassus, Tiphia minuta*, *Lasioglossum malachurum, Lasioglossum pauxillum, Osmia bicolour* and *Andrena apicata*.

BIRDS OF CONSERVATION CONCERN:

Red list: grey partridge, skylark, linnet, lapwing, bullfinch, song thrush, yellowhammer, house sparrow, starling, marsh tit

Amber list: whitethroat, kestrel, snipe, green sandpiper, lesser black-backed gull, black-headed gull, stock dove, reed bunting, bullfinch, common tern, grey wagtail, common redshank, sand martin, swallow, swift, willow warbler, dunnock, green woodpecker and kingfisher.

TYPICAL SPECIES OF LOWLAND CALCAREOUS GRASSLAND: Field scabious, greater knapweed, fairy flax, common centaury, quaking grass, kidney vetch, upright brome, fern grass, greater knapweed, blue fleabane, eyebright, ploughman's spikenard, bee orchid, mouse-ear-hawkweed and salad burnet.

TYPICAL SPECIES OF WETLAND: water mint, pink water-speedwell, water forget-me-not, gypsywort, common reedmace, Nuttal's pondweed, grey clubrush, great willowherb, wild angelica, common spike-rush, common club-rush, bittersweet, brooklime, reed canary-grass and marsh thistle.

Oxfordshire Proposed Local Wildlife Site Description

BICESTER AIRFIELD

Site Code: 52X10

Grid Reference: SP599240 Area (ha): 161.5

Local Authority: Cherwell

Site Description

Bicester airfield has extensive areas of grassland with extensive areas of lowland calcareous grassland at the edges along with developing species rich open mosaic communities on areas of hardstanding. The central areas appear to be short mown grassland. There are also areas with scrub habitat.

Oxfordshire Proposed Local Wildlife Site Citation

FIELD BY BEACON HILL DITCH

Site Code: 62G01

Grid Reference: SP624224 Area (ha): 9.46

Local Authority: Cherwell Last Survey Date(s): 2008

Site Description

This field was identified by the Berkshire. Buckinghamshire and Oxfordshire Wildlife Trust as supporting lowland meadow habitat during grassland inventory work. Species found here include ragged robin, sneezewort, great burnet, pepper saxifrage, tubular water-dropwort and narrow-leaved water dropwort.

SECTION 41 HABITAT(S) OF PRINCIPAL IMPORTANCE: Lowland meadow

Island Pond Wood

Island Pond Wood is a small site of just over 4Ha located close to the village of Launton. It is a relatively new woodland planted in 1999 as part of The Woodland Trust's 'Woods on Your Doorstep' (WOYD) scheme. The local community help plant it and continue to take an active part in its management. The site is prone to flooding and the species mix reflects the low-lying wet conditions, with a high proportion of willow, alder and ash and also a minor component of native black poplar. Oak is also present. There is a pond in the northern corner that is fished under a permit system by local people. A main circular path goes around the bulk of the wood, together with other connecting paths.

Ray CTA (Conservation Target Area)

The alluvial floodplain of the River Ray extending along a number of small tributary streams and including some areas of land between these streams. This area extends into Buckinghamshire. The area extends onto the clay to included known areas of wet grassland and the main areas of ridge and furrow.

Joint Character Area: Thames and Avon Vales

Landscape Types: Alluvial Lowland with some areas of Clay Vale.

Geology: Mainly alluvium along the Ray. Alluvium is also present in narrow bands along the small streams and there are Oxford Clay mudstones away from the streams and river.

Topography. Flat riverside land. **Area of CTA:** 1192 hectares

Biodiversity:

- Lowland Meadow. The key habitat in this area. It is found in a number of SSSIs and Local Wildlife Sites mainly at least partly on the alluvium. North-west of Blackthorn Hill there is a larger group of meadows which are largely on the Oxford Clay. Remnants of this habitat are found elsewhere especially between Bicester and Blackthorn Hill and in some meadows in Buckinghamshire including BBOWT's recent addition to their Upper Ray Meadows Reserve at Leaches Farm.
- Wet Grassland/Floodplain Grazing Marsh. Wet grassland is found in meadows along with lowland meadow habitat with remnants elsewhere. Parts of the BBOWT Upper Ray Reserves have been restored to floodplain grazing marsh.
- Hedgerows. Some rich and well structured hedgerows with brown and black hairstreak.
- Ponds at Leaches Farm BBOWT reserve.
- Other Species: true fox sedge is found in a number of sites in the area.

Access: Largely restricted to bridleways and footpaths. There are a number of BBOWT nature reserves. Dorothy Bolton Meadow & Leaches Meadow currently have no public access, whilst Long Herdon & Grange are accessed via a public footpath. Access routes to a further two BBOWT reserves at Cow Leys and Leaches Farm are by existing public footpaths.

Archaeology: Extensive ridge and furrow.

Oxfordshire Biodiversity Action Plan Targets associated with this CTA:

1. Lowland meadow – management[1], restoration and creation (with a focus on MG4 hay meadows).
2. Floodplain grazing marsh - management, restoration and creation (with a focus on breeding waders).
3. Reedbed – creation.
4. Ponds – creation (particularly of pond complexes).
5. Hedgerows – management (good management of existing hedgerows on short and long-term rotation, which will benefit brown and black hairstreaks and other wildlife).
6. Rivers – management and restoration (resource protection of watercourses to maintain and improve water quality).

[1] "Management" implies both maintaining the quantity, and maintaining and improving the quality of existing BAP habitat and incorporates the following target definitions: "Maintaining extent" and "Achieving Condition".

GUIDANCE ON THE VARIOUS STATUTORY AND NON-STATUTORY WILDLIFE SITE DESIGNATIONS

SITE DESIGNATIONS THAT PROTECT THE UK'S NATURAL HERITAGE THROUGH STATUTE

LOCAL NATURE RESERVES (LNRS) (IN ENGLAND, SCOTLAND AND WALES)

Under the National Parks and Access to the Countryside Act 1949 LNRs may be declared by local authorities after consultation with the relevant statutory nature conservation agency. LNRs are declared and managed for nature conservation, and provide opportunities for research and education, or simply enjoying and having contact with nature.

NATIONAL NATURE RESERVES (NNRS)

NNRs contain examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats or to provide special opportunities for scientific study of the habitats communities and species represented within them.

NNRs are declared by the statutory country conservation agencies under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981. In Northern Ireland, Nature Reserves are designated under the Amenity Lands Act (Northern Ireland) 1965.

RAMSAR SITES

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. Originally intended to protect sites of importance especially as waterfowl habitat, the Convention has broadened its scope over the years to cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. The Convention adopts a broad definition of wetland, namely "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres". Wetlands "may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands".

There is only one Ramsar site in Berkshire or Oxfordshire, South West London Waterbodies.

SITES OF SPECIAL SCIENTIFIC INTEREST (SSSI) (ENGLAND, SCOTLAND AND WALES)

The SSSI series has developed since 1949 as the national suite of sites providing statutory protection for the best examples of the UK's flora, fauna, or geological or physiographical

features. These sites are also used to underpin other national and international nature conservation designations. Most SSSIs are privately-owned or managed; others are owned or managed by public bodies or non-government organisations.

Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs have been renotified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and the Nature Conservation (Scotland) Act 2004.

SPECIAL AREAS OF CONSERVATION (SAC) AND SITES OF COMMUNITY IMPORTANCE (SCI)

SACs are designated under the EC Habitats Directive. SACs are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs in terrestrial areas and territorial marine waters out to 12 nautical miles are designated under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). New and/or amended Habitats sites which have been submitted to the European Commission by Government, but not yet formally adopted by the Commission, are referred to as candidate Special Areas of Conservation (cSACs). Sites which have been adopted by the EC, but not yet formally designated by governments of Member States are known as Sites of Community Importance (SCIs). In the UK, designation of SACs is devolved to the relevant administration within each country.

SACs, together with SPAs, form the Natura 2000 network.

SPECIAL PROTECTION AREAS (SPA)

SPAs are classified by the UK Government under the EC Birds Directive. SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union. SPAs in terrestrial areas and territorial marine waters out to 12 nautical miles are classified under the Wildlife and Countryside Act 1981.

SPAs, together with SACs, form the Natura 2000 network.

NON-STATUTORY NATURAL HERITAGE CONSERVATION DESIGNATIONS

LOCAL WILDLIFE SITES

Local authorities for any given area may designate certain areas as being of local conservation interest. The criteria for inclusion, and the level of protection provided, if any, may vary between areas. Most individual counties have a similar scheme, although they do vary.

Most Local Wildlife Sites systems involve a panel of ecologists and others in the development of local criteria and the selection of the sites. Panels usually include a local government ecologist, an Natural England representative, the Local Wildlife Trust, the Local Environmental Record Centre and sometimes include a representative of local landowners and local naturalists.

These sites, which may be given various titles such as 'County Wildlife Sites' (CWS), 'Local Wildlife Sites' (LWS), 'Local Nature Conservation Sites' (LNCS), 'Sites of Importance for Nature Conservation' (SINCs), or Sites of Nature Conservation Importance' (SNCIs), together with statutory designations, are defined in local plans under the Town and Country Planning system and the National Planning Policy Framework and are a material consideration when planning applications are being determined.

As part of a national standardisation process these sites have recently been renamed as Local Wildlife Sites in Oxfordshire and Berkshire. Previously they were known as County Wildlife Sites in Oxfordshire and Wildlife Heritage Sites in Berkshire. Although the use of these names, especially in citations and descriptions, is being edited and replaced with Local Wildlife Sites or LWS it is likely that some references will remain to these former names until this is complete.

PROPOSED LOCAL WILDLIFE SITES AND EXTENSIONS

These are also included on designated sites maps. They are areas thought to include important areas of UKBAP habitat or priority or protected species populations. Extensions are likely to have similar habitats to the adjacent Local Wildlife Sites. Local Authorities are made aware of these sites. They will not have been fully surveyed and taken to the selection panel as yet.

NGO PROPERTIES / NATURE RESERVES

A variety of non-governmental organisations such as the John Muir Trust, Plantlife, the Royal Society for the Protection of Birds, Wildlife Trusts and Woodland Trust own or manage nature reserves or other areas of land that are important for biodiversity. These sites may be intended primarily for nature conservation, or for other purposes such as protection of landscape features or the provision public access to the countryside. These areas of themselves have no statutory basis, but a large number are also designated SSSIs / NNRs / SPAs / SACs / Ramsar sites, etc.

In Berkshire and Oxfordshire, BBOWT (Berks, Bucks & Oxon Wildlife Trust), Woodland Trust and RSPB sites fall into this category.

LOCAL GEOLOGICAL SITES (LGS)

Local Geological Sites formerly known as Regionally Important Geological and Geomorphological Sites (RIGS) are the most important places for geology and geomorphology outside statutorily protected land such as Sites of Special Scientific Interest (SSSI). As part of a national

standardisation process these sites have recently been renamed as Local Geological Sites in Oxfordshire and Berkshire. Sites are selected under locally-developed criteria, according to their value for education, scientific study, historical significance or aesthetic qualities. Whilst not benefiting from statutory protection, LGS are equivalent to Local Wildlife Sites, and "...*consideration of their importance becomes integral to the planning process*".

OTHER SITES

Occasionally other sites might be shown on maps. These are likely to be sites with some wildlife interest, usually managed by local groups, local authorities or town councils but which do not have a specific statutory or non-statutory designation.

Some local authorities within Oxfordshire and Berkshire have identified other sites which are protected through policies in their local plans, including Oxford Local Wildlife Sites in Oxford City and district wildlife sites in Cherwell.

CONSERVATION TARGET AREAS/ BIODIVERSITY OPPORTUNITY AREAS

These landscape scale areas have been identified as supporting high concentrations of UKBAP habitats and species populations and the potential to restore habitats at a landscape scale. These areas act as a focus for targeting resources into habitat management and restoration.

ANCIENT WOODLAND

Ancient woodland areas within Bracknell Forest and Wokingham Borough are from an updated layer of ancient woodland produced by TVERC for Bracknell Forest Council and Wokingham Borough Council in 2015-16. This data has been provided to Natural England but has not yet been made available and thus differs from that shown on the Magic Map Interactive Map. For information of the methodology for selecting ancient woodland areas please contact TVERC.

APPENDIX 3

Information downloaded from MAGIC

MAGiC

7884: Bicester Heritage

Legend

- Local Nature Reserves (England)
- National Nature Reserves (England)
- Ramsar Sites (England)
- Sites of Special Scientific Interest (England)
- Special Areas of Conservation (England)
- Special Protection Areas (England)

Projection = OSGB36
xmin = 455100
ymin = 222200
xmax = 463300
ymax = 227600

0 0.35 0.7
km

Map produced by MAGIC on 26 June, 2018.

APPENDIX 4

Colin Plant Associates: Bicester Heritage Invertebrate Survey Report

Commissioned by
Ecology Solutions Limited
Farncombe House
Farncombe Estate
Broadway
Worcestershire
WR12 7LJ

BICESTER HERITAGE, BICESTER

INVERTEBRATE SURVEY REPORT

Report number: CPA-18077

October 2018

Prepared by

Colin Plant Associates (UK)
Consultant Entomologists
30a Alexandra Rd
London
N8 0PP

1 INTRODUCTION AND METHODOLOGY

1.1 Introduction

1.1.1 On 12th June 2018 **Colin Plant Associates (UK)** were commissioned by **Ecology Solutions Ltd** to undertake an invertebrate survey of Bicester Heritage, a site on the northern edge of Bicester, in Oxfordshire.

1.1.2 The wider site comprises Bicester airfield and the adjacent Stratton Audley Quarry. The survey area included Stratton Audley Quarry and several parcels of land around the perimeter of the airfield, but excluded the built environment of Bicester Heritage, the working area of the airfield and a fishing lake close to the eastern boundary (Fig. 1). The northernmost water body inside the quarry boundary is also used as a fishing lake and was excluded from survey.

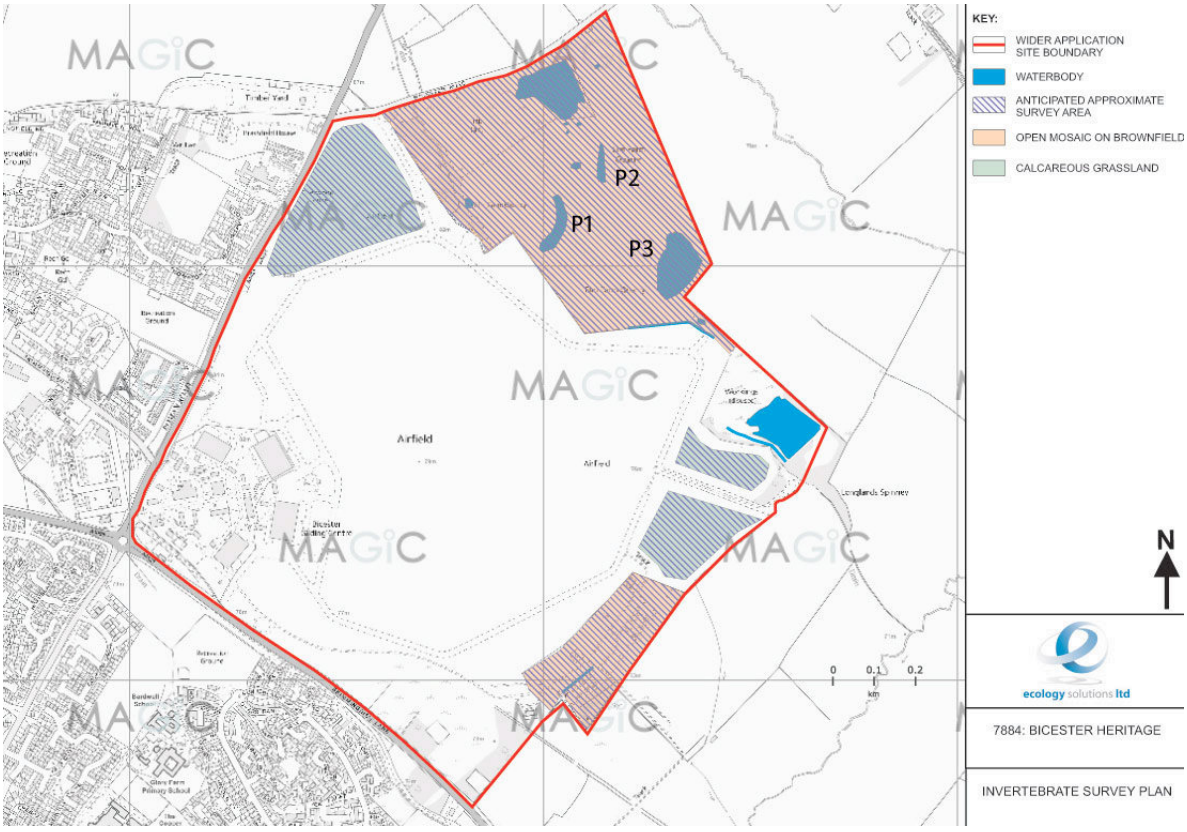


Fig. 1. Site plan showing site boundary and survey areas. Sampled ponds are marked P1, P2 and P3.

1.2 Invertebrate habitats

1.2.1 Bicester airfield is a Local Widlife Site (LWS) that supports areas of species-rich calcareous grassland around its periphery. To the south of the working area, the mosaic of species-rich grassland, early successional vegetation and scrub fits the description of Open Mosaic Habitat on Previously Developed Land (OMH) (Riding et al., 2009).

1.2.2 Stratton Audley Quarry is also a designated LWS. Since cessation of limestone quarrying the site has developed extensive areas of OMH. These are characterised by sparsely-vegetated ground supporting a botanically rich ephemeral community, as well as areas of recolonising tall ruderal sward and developing neutral and calcareous grassland. These give way to marshy grassland around the margins of several ponds. One of these, P1, is shallow-bottomed and botanically rich.

Several large spoil mounds are also present which add to the topographic and structural interest of the site.

1.2.3 The habitats described above are varied in nature and all present a potentially high intrinsic invertebrate interest. OMH is now a UK Biodiversity Action Plan (BAP) habitat and frequently of very high value to invertebrates. Between 12% and 15% of all Nationally Rare and Nationally Scarce invertebrates are recorded from OMH sites (Gibson, 1998), including 30 Section 41 Species of Principal Importance.

1.2.4 Formal guidelines produced by Natural England for invertebrate surveys call for a full cross-seasonal sampling effort from April-May to September-October, with the precise effort likely to vary between sites of different character. Given the date of commission, we agreed to make four monthly visits between mid June and September.

1.3 Previous invertebrate records

1.3.1 Various species of conservation significance are known from the survey area (TVERC, 2018). These are summarised in Table 1. Section 41 'Research only' species are not included in Table 1 (see 2.2.6 and 2.2.7).

Table 1. Legally protected or notable invertebrate species known from the survey area

Species	Vernacular	Location	Date of last record	Conservation status
Andrena varians	a bee	Stratton Audley Quarry	2003	NS(Nb)
Halictus confusus	a bee	Stratton Audley Quarry	2003	RDB3
Lasioglossum xanthopus	a bee	Stratton Audley Quarry	2003	NS(Nb)
Lasioglossum malachurum	a bee	Stratton Audley Quarry	2003	NS(Nb)
Lasioglossum pauxillum	a bee	Stratton Audley Quarry	2003	NS(Nb)
Sphecodes crassus	a bee	Stratton Audley Quarry	2003	NS(Nb)
Osmia bicolor	a bee	Stratton Audley Quarry	2003	NS(Nb)
Tiphia minuta	a wasp	Stratton Audley Quarry	2003	NS(Nb)
Microplontus campestris	a weevil	Stratton Audley Quarry	2004	NS(Nb)
Haploglossa picipennis	a rove beetle	Stratton Audley Quarry	2000	NS(Nb)
Brachnius crepitans	Bombardier beetle	Stratton Audley Quarry	1988	NS
Pterostichus anthracinus	a ground beetle	Stratton Audley Quarry	1988	NS
Ophonus azureus	a ground beetle	Stratton Audley Quarry	1988	NS
Lebia chlorocephala	a ground beetle	Stratton Audley Quarry	1991	NS
Cryptocephalus aureolus	a leaf beetle	Stratton Audley Quarry	2004	NS
Macropsis glandacea	a leafhopper	Stratton Audley Quarry	1986	NS(Nb)
Pyrgus malvae	Grizzled Skipper	Stratton Audley Quarry	2009	S41, VU
Lasiommata megera	Wall	Bicester airfield	1980	S41
Lasiommata megera	Wall	Stratton Audley Quarry	2004	S41
Coenonympha pamphilus	Small Heath	Bicester airfield	1980	S41
Coenonympha pamphilus	Small Heath	Stratton Audley Quarry	2008	S41
Cupido minimus	Small Blue	Stratton Audley Quarry	2002	S41, WCA, NT
Polyommatus bellargus	Adonis Blue	Bicester airfield	1980	S41, WCA

1.3.2 Two species cited in the TVERC report are not included here. The bee *Lasioglossum leucopus* is erroneously listed as an RDB species, while the ground beetle *Bembidion clarkii* is no longer considered Nationally Scarce following recent IUCN review.

1.3.3 We consider that all the species listed in Table 1 could plausibly exist or have been present on the site in question, with the possible exception of the bee *Halictus confusus*, a species which is strongly tied to sandy situations on lowland heathland. The validity of this record is thrown into further question by the extreme similarity of the species to the closely-related *Halictus tumulorum*, which is very common and widespread.

1.4 Survey Constraints

1.4.1 The relatively late date of commission (June 12th) would not normally present a significant survey constraint, but in 2018 exceptionally warm conditions across much of southern England from mid May onwards advanced the invertebrate season such that many spring species were almost over by the date of our first visit.

1.5 Methodology

1.5.1 Invertebrate sampling visits were made on 13th June, 9th July, 14th August and 11th September.

1.5.2 Sampling was undertaken by two surveyors, each with a different specialist area of invertebrate knowledge/experience.

1.5.3 Coleoptera (beetles), Hemiptera (true bugs), aculeate Hymenoptera (bees and wasps) and aquatic invertebrates were specifically targeted as primary ecological indicators, given the nature of the habitats present. These groups were identified systematically and numerous others were included at the discretion of the surveyors.

1.5.4 Invertebrate sampling was undertaken by direct observation/capture and by the following active sampling methods:

Sweep-netting. A stout hand-held net is moved vigorously through herbaceous vegetation or scrub to dislodge resting insects. This technique is effective for many invertebrates, including bees and wasps, flies, many groups of beetles and true bugs and large number of other insects that live in vegetation of this type.

Beating. A cloth tray, held on a folding frame, is positioned below branches of trees or bushes which are sharply tapped with a stick to dislodge insects. This technique is effective in obtaining arboreal species, including many beetle groups, true bugs, caterpillars of Lepidoptera, spiders and others.

Suction Sampling. A garden vacuum with a mesh bag fitted inside the inlet pipe is used to collect samples from low vegetation and the ground surface by suction. The sample is then everted into a large net bag or white trays for examination. The advantage of suction sampling is that it quickly collects strongly ground dwelling species which do not fly or ascend the vegetation readily, as well as species which live in deep, structurally complex habitats such as dense grass tussocks and reed beds, which are difficult to sample by other methods. It is particularly productive for certain groups of beetles, true bugs and spiders.

Grubbing/hand searching. Important host plants may be searched by hand. This is particularly useful for species which live on or even below the ground surface and can be found by grubbing

around and underneath basal leaf rosettes. Other invertebrate microhabitats such as loose bark, litter, fungi and various decay features associated with dead wood can also be productive when searched by hand. Turning large stones, pieces of wood and other refuse often reveals species which are nocturnally active, in particular spiders, ground beetles and rove beetles.

Pond netting. Pond nets on wooden poles with a mesh diameter of one millimetre are used to capture invertebrates from all available aquatic habitats, including open water and amongst emergent, floating and submerged vegetation. Net samples are sorted in white trays on the bank-side and stored in 50% isopropyl alcohol for subsequent identification. All three water bodies inside the Stratton Audley Quarry survey boundary were sampled in June and September, with the exception of P1, which was dry following the first visit.

Pitfall Trapping. Thick plastic cups are placed in the ground such that the rim is flush with or slightly below the surface and these are half filled with saturated sodium chloride solution. Additional salt is added to counteract any dilution effect caused by rainfall and a little detergent is added to reduce surface tension. Traps are covered with a square of coarse mesh which excludes small mammals and amphibians but allows the largest invertebrates to fall through. Traps are marked and typically set in groups along a fixed transect. This is the single most effective means of recording ground beetles (Carabidae) but is also effective for rove beetles (Staphylinidae), some other groups of beetles and true bugs, spiders and many other soil-dwelling invertebrates. Eight pitfall traps were set on the transition between OMH and marshy grassland inside the Stratton Audley Quarry survey boundary close to pond P1 operated throughout the survey period.

2 INVERTEBRATE SPECIES

2.1 Summary

2.1.1 Appendix 1 details the complete list of terrestrial insect taxa encountered during the survey period; a total of 556 species was recorded. The list is annotated with formal conservation status codes which are explained in Appendix 2.

2.1.2 The list is also annotated with the primary ecological associations of each species, where known. This allows species with differing habitat affinities to be immediately discerned.

2.2 Species of conservation interest

2.2.1 Several categories of invertebrates are of raised significance in an ecological assessment. These categories are explained in Appendix 2 and the corresponding species found during the survey are now examined.

UK Biodiversity Action Plan (UK BAP) Priority Species/Section 41 Species

2.2.2 UK BAP priority species were those identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP). The original UK BAP list was created between 1995 and 1999 and stood at 577 species. Following a two year review, a revised list was produced in 2007 which increased the number of BAP priority species to 1149. A total of 123 species no longer met the criteria for selection and were removed.

2.2.3 As a result of devolution, and new country-level and international drivers and requirements, much of the work previously carried out by the UK BAP is now focussed at a country level rather than a UK level, and the UK BAP has recently (July 2012) been succeeded by the *UK Post-2010 Biodiversity Framework*. The full list of priority invertebrate species can be viewed at: *http://jncc.defra.gov.uk/page-5169*.

2.2.4 The UK BAP list remains an important reference source and has been used to help draw up statutory lists of priorities in England, Scotland, Wales and Northern Ireland. For England and Wales these statutory lists are currently presented in *The Natural Environment & Rural Communities Act, 2006: Section 41. List of Species of Principal Importance for Conservation of Biological Diversity in England* and *Section 42: List of Species of Principal Importance for Conservation of Biological Diversity in Wales*.

2.2.5 Two such Species of Principal Importance for Conservation of Biological Diversity in England was recorded during the present survey:

Grizzled Skipper *Pyrgus malvae* S41 VU is a butterfly that occurs in discrete colonies, many of which are very small and typically contain fewer than 100 adults. It favours a variety of open habitats, in particular unimproved calcareous grassland, open woodland rides and post-industrial sites. The larval food plants include a variety of Rosaceae; Agrimony *Agrimonia eupatoria*, Creeping Cinquefoil *Potentilla reptans* and Wild Strawberry *Fragaria vesca* are most frequently used. The butterfly occurs very locally across central and southern England, and in south and north east Wales. It has declined in several regions, especially in eastern England away from chalk soils. A single butterfly was noted at both Bicester airfield and Stratton Audley Quarry on the first survey visit.

Small Heath *Coenonympha pamphilus* S41 is a butterfly found in various open habitats on dry, light soils, the larvae feeding on fine-leaved grasses such as *Festuca* species. Although widespread throughout Britain, the species has undergone a significant decline in recent decades due to the widespread loss and improvement of species-rich grassland and is formally regarded as being "Near Threatened". It was added to the UK BAP list at the end of 2007, and although there were disagreements over the need for this action, it has been automatically included in the Section 41 lists of the NERC Act. It appears to have declined more at inland sites than it has in coastal areas, though it remains present throughout at lower density than before. The presence of large numbers, indicating a thriving population, at an inland site is potentially more important than a similar discovery in a coastal locality, although that should not imply that coastal colonies are unimportant. Butterflies were noted on several dates at both Bicester airfield and Stratton Audley Quarry.

Former UK Biodiversity Action Plan (UK BAP) "Research only" moth species

2.2.6 The original list of UK Biodiversity Action Plan Priority Species of butterflies and moths was divided into two sections. In the first, a total of 81 species are afforded the status of UK BAP Priority Species; none of these are recorded in the surveyed area and none are likely to be present. The second section is a list of 69 species that have declined in population strength by a significant amount in the past 25 years. These were defined as "not yet rare" and were flagged as UK BAP species "**for research only**".

2.2.7 It is unfortunate that this "Research Only" list has been incorporated into the current priority listing process and that these species are now, therefore, of statutory interest. Some bodies now specifically recommend that these species are excluded from an appraisal of Section 41 and Section 42 species and this is a view with which we fully agree. Unfortunately, the species are not listed separately so that non-specialists are unable to discern them.

2.2.8 At the site under discussion two such "Research Only" moth species were recorded:

Latticed Heath *Chiasma clathrata* S41 is a moth found in various open habitats including grasslands, open woodland and post-industrial sites, the larvae feeding on herbaceous legumes including clovers, trefoils and lucerne. Widespread and often common throughout England, Wales and southern Scotland. This species was recorded at Bicester airfield.

Cinnabar *Tyria jacobaeae* S41 is a moth found in various open and disturbed habitats, the larvae feeding on ragworts *Senecio* species, especially Common Ragwort *S. jacobaea*. Widespread throughout much of England and Wales, although rather local and mainly coastal in the southern half of Scotland. The species was recorded on ragwort as a larva at both Bicester airfield and Stratton Audley Quarry.

Nationally Rare / Red Data Book species

2.2.9 The following three species listed in the British Red Data Books (Shirt, 1987; Bratton, 1991) or which have been elevated to the status of Nationally Rare by subsequent formal reviews were recorded by the present survey (see Appendix 2):

***Lygus pratensis* RDB3** is a true bug which feeds on various species of Asteraceae. Although formerly extremely local and confined to lowland heathland in southern England, it has recently undergone a significant range expansion and is now widespread throughout much of southern Britain. It no longer warrants any conservation status. This species was swept from areas of tall ruderal vegetation at both Bicester airfield and Stratton Audley Quarry.

Placochilus seladonicus **RDBK** is a true bug found in various open habitats on calcareous soils, in particular chalk downland. Adults and nymphs feed on Field Scabious *Knautia arvensis*. Unknown in Britain before 1977 when it was found in Bedfordshire, it is most likely a recent arrival in Britain rather than an overlooked native. Most records are from the chalk districts of Oxfordshire. This species was swept from chalk grassland at Bicester airfield.

Cistogaster globosa **RDB2** is a parasitic fly which is a larval parasitoid of the Bishop's Mitre *Aelia acuminata*, a widespread species of shieldbug. The host feeds on grasses and most records of *C. globosa* are from dry grasslands. It is a local species in southern England and Wales but is now much more widespread than its RDB2 designation would indicate. This species was swept from areas of tall ruderal vegetation at both Bicester airfield and Stratton Audley Quarry.

Nationally Scarce Species

2.2.10 The following 34 Nationally Scarce species were recorded by the present survey (see Appendix 2):

Acupalpus exiguus **NS** is a ground beetle found in litter and tussocks in damp grasslands and situations near water, both inland and in saltmarshes. It is a local and predominantly coastal species found in south England and south Wales as far north as Yorkshire. Specimens were suction-sampled from damp grassland at Stratton Audley Quarry.

Bembidion octomaculatum **NS** is a small ground beetle which inhabits bare and muddy freshwater margins. The species disappeared from Britain in the late nineteenth century and was presumed extinct, before reappearing in the early 1990s. It has since been recorded in south east England and East Anglia, but remains very scarce and local. Specimens were suction-sampled from the margins of pond P1 at Stratton Audley Quarry.

Ophonus azureus **NS** is a ground beetle found in various open habitats on dry, well-drained and particularly calcareous soils on or near the coast. A local species confined to southern England and the coast of south Wales. Specimens were recorded in pitfall traps at Stratton Audley Quarry.

Pterostichus anthracinus **NS** is a large predatory ground beetle inhabiting marshes, fens and various other freshwater wetlands. Widespread in England and Wales but local and scarce and rarely found in numbers. Specimens were recorded in pitfall traps at Stratton Audley Quarry.

Pterostichus gracilis **NS** is a predatory ground beetle inhabiting wetlands, including the margins of lakes and ponds and in marshes and wet grassland. Widespread throughout Britain but very local and rarely found in numbers. Specimens were recorded in pitfall traps at Stratton Audley Quarry.

Syntomus truncatellus **NS** is a small ground beetle found in dry, open habitats including field margins, open woodland and coastal dunes. A very local species largely confined to eastern England and occasionally the coasts of south west England, Wales and Scotland. Specimens were suction-sampled from areas of OMH at Stratton Audley Quarry.

Peltodytes caesus **NS** is a crawling water beetle found in well-vegetated ponds and drainage ditches, usually with some exposed clay, sand or silt substrate. It has a south-eastern distribution with all modern records concentrated below the Wash/Severn line. Specimens were collected from ponds P1 and P2 at Stratton Audley Quarry.

Hydaticus seminiger **NS** is a diving beetle associated with permanent standing water amongst dense vegetation or debris in partly shaded sites, such as weed-choked ponds and ditches, avoiding brackish water. Largely confined to areas of lowland heaths and ancient fenland in England, with

outlying populations on the Somerset Levels and Cheshire Plain. Specimens were collected from ponds P1 and P2 at Stratton Audley Quarry.

Aleochara brevipennis **NS(Nb)** is a small rove beetle which is hygrophilous, typically found in damp situations, amongst mosses including *Sphagnum* and at the roots of grasses. It is widespread but local throughout Britain. Specimens were suction-sampled from damp grassland at Stratton Audley Quarry.

Dacrila fallax **NS(Nb)** is a small rove beetle associated with various wetlands including fens, marshes and dune slacks, living in reed debris, *Typha* litter and moss. A local species in southern Britain as far north as Yorkshire. Specimens were suction-sampled from damp grassland at Stratton Audley Quarry.

Olibrus pygmaeus **NS(Nb)** is a small beetle found in various open habitats and associated with cudweeds *Filago* species, although also known from *Leontodon* and *Crepis* on the continent. The larvae develop in the flower heads and the adults feed on pollen. Widespread but local in southern and central England and East Anglia. Specimens were suction-sampled from areas of OMH at Stratton Audley Quarry.

Chaetocnema confusa **NS** is a flea beetle inhabiting various wetland habitats; adults feed on leaves of sedges *Carex* including Carnation Sedge *Carex panicea* and Pale Sedge *Carex pallescens*, as well as Purple moor-grass *Molinia caerulea* and possibly rushes *Juncus*, the larvae feeding at the roots. Local in southern England and Wales, becoming very scarce further north. Specimens were suction-sampled from damp grassland at Stratton Audley Quarry.

Oxystoma cerdo **NS(Nb)** is a weevil found in various open habitats, the larvae developing in the seed pods of vetches *Vicia* species. Widespread in much of England but very local in Wales and Scotland. There have been recent signs of spread, particularly in southern and central England. Specimens were swept from areas of calcareous grassland at Bicester Airfield.

Squamapion cineraceum **NS(Na)** is a small weevil which feeds on Self-heal *Prunella vulgaris*, the larvae occurring in the roots. Associated with sparsely-vegetated grasslands and brownfield sites, particularly on base-rich soils. Very local in southern England. Specimens were suction-sampled from areas of calcareous grassland at Bicester Airfield.

Catapion pubescens **NS(Nb)** is a small ground dwelling weevil found in various open habitats and associated with various trefoils *Trifolium* species, the larvae feeding in a stem gall. A widespread but local species in England and Wales. Specimens were suction-sampled from areas of calcareous grassland at Bicester Airfield.

Tychius squamulatus **NS(Nb)** is a small ground-dwelling weevil found on Common Bird's-foot Trefoil *Lotus corniculatus* in various dry, calcarerous habitats. Widespread but very local outside southern England and exclusively coastal in Wales. Specimens were suction-sampled from areas of calcareous grassland at Bicester Airfield.

Zacladus exiguus **NS(Nb)** is a small ground dwelling weevil associated with smaller flowered annual Geranium species in various open, warm habitats, the larvae feeding in the roots. Very local in southern England although frequent in the London area and often numerous where it occurs. Specimens were swept areas of calcareous grassland at Bicester Airfield.

Notaris scirpi **NS(Nb)** is a large weevil associated with various wetlands, the larvae feeding in the roots of sedges *Carex*, rushes *Juncus* and Bulrush *Typha*. Local in southern and central England,

Wales and Ireland, becoming much more scarce in northern England. Specimens were suction sampled from the margins of pond P2 at Stratton Audley Quarry.

Larinus planus **NS(Nb)** is a weevil which breeds in the flower heads of thistles and possibly other closely related composites such as knapweeds and is found in various open habitats. Local in southern England and Wales, most frequently on or near the coast. Specimens were swept from areas of OMH at Bicester Airfield.

Ceraleptus lividus **NS** is a true bug which is strongly ground dwelling. A local and uncommon species found across southern and central England, favouring dry open habitats such as grasslands, sand dunes and gravel pits, feeding on clovers and other legumes. Specimens were swept from areas of OMH at Bicester Airfield.

Megalonotus antennatus **NS(Nb)** is a true bug which is strongly ground dwelling. A scarce and local species which has been recorded from southern England, particularly the south-east. Its ecology remains obscure; there are no confirmed host plants and it has been found in a range of habitats on various soil types. These include woodland clearings, grasslands, sparsely-vegetated sites and limestone quarries. Specimens were suction-sampled from areas of calcareous grassland at Bicester Airfield.

Glaenocorisa propinqua propinqua **NS** is a water boatman found in various water bodies, in particular deep upland lakes and pools in northern England and Scotland. It is very local further south and seems to be a retreating glacial relict species. Specimens were collected from pond P2 at Stratton Audley Quarry.

Saldula pallipes **NS** is a predatory bug found on bare, wet sand silt or gravel, usually at the margins of standing water. Frequently at the edge of recently flooded mineral workings and also on rivers margins and in brackish habitats. Found locally throughout England and Wales. Specimens were suction sampled from the margins of pond P1 at Stratton Audley Quarry.

Scottlianella dalei **NS(Nb)** is a planthopper found in various dry, open grasslands where it is presumably polyphagous on a range of grasses. A local species confined to southern England, although can be abundant where it occurs. Specimens were swept from areas of OMH at Bicester Airfield.

Iassus scutellaris **NS(Na)** is a leafhopper which was discovered in Britain in Surrey in 1978, and is now found more widely across southern England, despite its classification as Nationally Scarce. It is associated with English Elm *Ulmus procera* and is able to persist on low re-growth following die-back due to Dutch Elm Disease. Specimens were swept from elms at Stratton Audley Quarry.

Thereva plebeja **NS** is a stiletto fly found in habitats with disturbed sandy soils in which the larvae are active predators. Historically not uncommon, but the species has declined in recent years. Locally distributed in southern England and Wales. Specimens were swept from areas of OMH at Bicester Airfield.

Orellia falcata **NS(Nb)** is a picture-winged fly found in various open habitats, the larvae forming a gall in the root or stem base of Goat's-beard *Tragopogon pratensis*. A widespread but local species found in much of southern England between the Wash and south Wales, although absent from the south west. Specimens were swept from areas of OMH at Bicester Airfield.

Tiphia minuta **NS(Nb)** is a small solitary wasp found in various open habitats, usually on sandy or chalky soils. The larvae are parasitoids of scarab beetle larvae which feed on the roots of grasses. A

widespread but local species across much of England and Wales as far north as Yorkshire. Specimens were swept from areas of OMH at Stratton Audley Quarry.

Red-backed Mining Bee *Andrena similis* (NS)Nb is a solitary bee which favours various open habitats rich in legumes, including calcareous grassland, heathland, woodland rides and post-industrial sites. Pollen is gathered mainly from legumes, including bird's-foot trefoils and gorse. A declining species which is scarce and local across the southern half of Britain north to Yorkshire, with a cluster of records from the Scottish highlands. Specimens were swept from areas of OMH at Stratton Audley Quarry.

Large Yellow-face Bee *Hylaeus signatus* NS(Nb) is a solitary bee which nests in open conditions in a variety of cavities including hollow stems, vertical clay or sand banks, and occasionally holes in masonry. Pollen is obtained exclusively from Weld and Wild Mignonette (*Reseda* species) although it has been recorded visiting other flowers for nectar. Primarily found on calcareous soils in a variety of habitats including downland, gardens, open woodland, ruderal sites and coastal marshes. Widespread but local as far north as Yorkshire, with most records from southern England. Specimens were swept from areas of OMH at Bicester Airfield.

Sharp-collared Flower Bee *Lasioglossum malachurum* NS(Nb) is a solitary bee found in various habitats, including arable areas and urban greenspace, with a preference for clay soils. It nests in fairly bare soil and sometimes forms huge aggregations along paths and south-facing slopes. A wide variety of plants are used as pollen sources. Formerly scarce, it has expanded its range since 1990 and is now widespread in southern and central England and no longer worthy of a conservation status. Specimens were swept from areas of OMH at Stratton Audley Quarry.

Lobe-spurred Furrow Bee *Lasioglossum pauxillum* NS(Na) is a solitary bee recorded from a wide variety of situations in southern and central England including sandy heathland, calcareous grassland, coastal locations such as soft rock cliffs and other disturbed habitats. Nesting occurs in light soils. Formerly regarded as scarce, it now no longer warrants a conservation status. Specimens were swept from areas of OMH at Stratton Audley Quarry.

Swollen-thighed Blood Bee *Sphecodes crassus* NS(Nb) is a cuckoo bee associated with various *Lasioglossum* species which is found in a range of dry open habitats. The species has become more frequent in recent years and is now widespread and locally common in southern and central England. Its formal status is in need of reassessment. Specimens were swept from areas of OMH at Stratton Audley Quarry.

Variable Damselfly NT NS is a blue damselfly found in stagnant or slow-flowing water such as ponds, ditches and slow rivers adults, flying amongst fringing vegetation. Populations can be small and colonies restricted to small areas. A local species with a very scattered distribution across parts of southern England and Wales, although much more widespread and common in Ireland. Larvae were collected from pond P1 at Stratton Audley Quarry.

2.3 The overall invertebrate community

2.3.1 Rarity is only one factor to be taken into account in the assessment of the ecological value of a site. Some sites may have immensely diverse invertebrate assemblages but few rare species within these; they are of equal, if different, ecological value. It is therefore important to carry out a further assessment that also includes all the remaining species.

2.3.2 We have undertaken this using Osiris, a habitat and resource association utility found within Pantheon, a database tool developed by Natural England and the Centre for Ecology and Hydrology and freely accessible online at www.brc.ac.uk/pantheon. This system has updated and replaced the Invertebrate Species-habitats Information System (ISIS) as of 2017. A major improvement achieved by Pantheon has been the incorporation of current species conservation status designations, as many have changed since the original release of ISIS.

2.3.3 Pantheon interprets species lists by recognising assemblage types and scoring each type according to its conservation value. This information is used to assess the overall quality of the site, reveal its key ecological resources and ultimately inform decisions regarding habitat management and mitigation. In some cases, habitats that may have been overlooked or not considered important during the survey might be identified as significant.

2.3.4 To date around 12,000 species are included in the Pantheon database, around a quarter of the total macro-invertebrate fauna. It remains limited to those taxa and families where there is enough ecological information to give a fair level of coding accuracy. These include species such as beetles, flies, true bugs, moths, bees and many others.

2.3.5 Invertebrate species are linked to habitats and resources in a large hierarchical database. The hierarchy is arranged with 'Broad biotopes' as the highest level.

2.3.6 Each Broad biotope can be divided into more detailed 'Habitats' (previously known as 'Broad Assemblage Types' (BATs) in ISIS).

2.3.7 Each Habitat contains a set of 'Resources', defined by typing species to other environmental factors or microhabitats. Only those resources that are considered important to the completion of the life cycle of a species are included. Typing was not attempted for species that are either very catholic or where their ecology was not well defined in the literature.

2.3.8 Specific assemblage types' (SATs) are characterised by stenotopic (ecologically restricted) species that are of intrinsic nature conservation value. SATs are more narrowly defined than Habitats and each SAT is nested within a parent Habitat. *Note that the use of SATs is restricted to Natural England Common Standards Monitoring on SSSIs*.

2.3.9 Pantheon provides the following scoring systems for Broad biotopes, Habitats, Resources and SATs:

- A total count of species in each category.
- The number of species represented in each category which have a conservation status.
- The number of species belonging to each category as a percentage of the total number of species belonging to each category.
- A Species Quality Index (SQI) score for each category where more than 15 species are represented. Each species recorded from the sample is given a Species Quality Score (SQS) based on their conservation status. The SQI score is equal to the sum of all SQS scores divided by the number of species and then multiplied by 100 to give a 3-figure score that does not contain decimal places (e.g. 100 rather than a 1.00).

2.4 Pantheon output

Table 1. Pantheon sample scores by Broad biotope.

Broad biotope	No. of species	% representation	SQI	Species with conservation status	Conservation status
open habitats	301	7	118	24	2 S41, 2 S41 Research only, 1 RDB3, 1 RDBK, 3 NS, 2 Na, 13 Nb
wetland	153	6	124	13	1 NT, 9 NS, 3 Nb
tree-associated	55	2	109	2	1 NS, 1 Na
coastal	1	<1	N/A		

2.4.1 Pantheon sample scores by Broad biotope are shown in Table 1. Of the 556 species recorded by the survey, 535 are represented in the Pantheon database and 510 are typed to at least the level of Broad Biotope.

2.4.2 Almost 60% of these are associated with open habitats, 30% with wetlands and around 10% with trees. The SQI score corresponding to wetland habitats is the highest, indicating that this broad biotope contains the greatest proportion of rare and scarce species.

2.4.3 Pantheon sample scores by Habitat are shown in Table 2. Species associated with tall sward & scrub, marshland and arboreal habitats make up the majority of the open habitat, wetland and tree-associated species respectively.

2.4.4 The highest SQI scores correspond to those species associated with peatland (SQI = 138), wetland short sward and bare ground (SQI = 126) and marshland (SQI = 121) indicating that these habitats contain the greatest proportion of rare species.

2.4.5 However, these values do not reach a SQI score of 150 which Natural England suggests as the approximate threshold corresponding to a 'good' site supporting a regionally important invertebrate fauna.

Table 2. Pantheon sample scores by Habitat.

Broad biotope	Habitat	No. of species	% representation	SQI	Species with conservation status	Conservation status
open habitats	tall sward & scrub	233	9	116	10	2 S41 Research only, 1 RDBK, 1 NS. 6 Nb
wetland	marshland	107	13	121	8	1 NT, 6 NS, 1 Nb
open habitats	short sward & bare ground	70	5	126	13	2 S41, 2 NS, 2 Na, 7 Nb
wetland	peatland	40	4	138	5	2 NS, 2 Nb
tree-associated	arboreal	33	2	109	1	1 Na
tree-associated	shaded woodland floor	14	1	N/A	1	1 NS

tree-associated	decaying wood	10	<1	N/A		
wetland	lake	8	6	N/A		
wetland	running water	6	<1	N/A		
tree-associated	wet woodland	7	3	N/A	1	1 NS
wetland	wet woodland	7	3	N/A	1	1 NS
open habitats	upland	1	<1	N/A		
coastal	saltmarsh	1	<1	N/A		

3 DISCUSSION AND RECOMMENDATIONS

3.1 Overview

3.1.1 The site under discussion supports a large invertebrate fauna and the Pantheon analysis indicates that the majority of this is associated with tall sward grassland, marshland and short sward and bare ground habitats. These are characteristic of the network of OMH, grassland and ponds found throughout the survey area, with scrub and mature trees of secondary interest.

3.1.2 The greatest proportion of rare and scarce species is associated with wetland habitats, in particular those characterstic of peatland in which soils remain inundated throughout much of the year. These habitats are represented by the three ponds sampled in Stratton Audley Quarry.

3.1.3 In combination with the species dependent on marshland, this assemblage includes 12 species of conservation significance, including the ground beetles *Bembidion octomaculatum*, *Pterostichus gracilis* and *Pterostichus anthracinus,* the water beetles *Hydaticus seminiger* and *Peltodytes caesius*, the water bug *Glaenocorisa propinqua propinqua* and the Variable Damselfly *Coenagrion pulchellum*.

3.1.4 All the above species were found in ponds P1 and P2, which support a much greater invertebrate interest than P3.

3.1.5 Short sward and bare ground habitat, in the form of areas of OMH and calcareous grassland are also flagged up as important by the Pantheon analysis and this assemblage includes the greatest number of rare and scarce species.

3.2 Conclusions

3.2.1 Although none of the Habitat scores assigned by Pantheon exceed 150, suggesting that the site in question does not qualify as regionally important, we believe that the Pantheon analysis may be underestimating its overall importance for several reasons.

3.2.2 Firstly, the late date of the first visit in a year with a particularly advanced spring may explain the absence of early spring species known to be present on the site. Some of these are of conservation significance, for example the bees *Andrena varians* and *Osmia bicolor* and the ground beetle *Lebia chlorocephala*.

3.2.3 Although these species have not been recorded in recent years (see 1.3.1), aerial imagery of the site indicates that sufficient quantities of the micro-habitats required by these significant species have remained broadly unchanged over the last 15 years and there is no obvious reason to suggest that habitat loss is responsible for their disappearance at this time.

3.2.4 Secondly, some of the species recorded by the current survey are extremely rare in a regional context. In particular the beetles *Hydaticus seminiger* and *Bembidion octomaculatum* and the water bug *Glaenocorisa propinqua propinqua* appear to be extremely localised in Oxfordshire and may not be known from other sites within the county.

3.2.5 In conclusion, we believe that the habitats represented on the periphery of Bicester airfield and within Stratton Audley Quarry are of regional importance for invertebrates and support an intrinsic invertebrate interest that is significantly raised above the background level.

4 REFERENCES CITED IN THE PREPARATION OF THIS REPORT AND APPENDICES

Ball, S. G. (1986) Terrestrial and freshwater invertebrates with Red Data Book, Notable or habitat indicator status. Invertebrate Site Register internal report number 66. NCC.

Bratton, J.H. (ed) (1991) British Red Data Book: Invertebrates other than insects Book 3. Joint Nature Conservation Committee, Peterborough.

Gibson, C.W.D. (1998) Brownfield: red data. The values artificial habitats have for uncommon invertebrates. English Nature Resource Report, No. IN54, Peterborough.

IUCN (2012a). Guidelines for application of IUCN Red List criteria at regional and national levels: Version 4.0. Gland: IUCN.

IUCN (2012b). IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland: IUCN. Available at http://www.iucnredlist.org/technical-documents/categories-and-criteria

IUCN (2014). Guidelines for Using the Red List Caetegories and Criteria. Version 11. IUCN Species Survival Commission. IUCH, Gland.

Shirt, D.B. (ed.) (1987). British Red Data Books: 2. Insects. Peterborough: Nature Conservancy Council.

Riding, A., Critchley, N., Wilson, L. & Parker, J. (2009) Definition and mapping of open mosaic habitats on previously developed land: Phase 1 Final Report. ADAS UK Ltd, December 2009

TVERC (Thames Valley Environmental Records Centre) (2018). Biodiversity Report: Bicester Heritage. Report prepared for Ecology Solutions on 21/05/2018.

Webb, J. & A. Brown, A. (2016) The conservation status of British invertebrates. British Wildlife 27(6): 410-421

Webb, J., Heaver, D., Lott, D., Dean, H.J., van Breda, J., Curson, J., Harvey, M., Gurney, M., Roy, D.B., van Breda, A., Drake, M., Alexander, K.N.A. and Foster, G. (2017). Pantheon - database version 3.7.6 [online] Available at: http://www.brc.ac.uk/pantheon/ [Accessed October 2018].

APPENDIX 1: INVERTEBRATE SPECIES RECORDED

National status codes are explained in Appendix 2.

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
AMPHIPODA	**AMPHIPODS**			
Gammaridae				
Gammarus pulex	Freshwater Shrimp	NE		Often abundant in running water but less frequently found in still water. An important detritivore
ISOPODA	**ISOPODS**			
Asellidae				
Asellus aquaticus		LC		Found among water plants. It is tolerant of organically polluted waters, high salinities, low pH and high metal concentrations
HIRUDINEA	**LEECHES**			
Erpobdellidae				
Erpobdella octoculata		NE		Found in all types of fresh water though often considered an 'indicator species' for organic enrichment
Glossiphoniidae				
Helobdella stagnalis		NE		An ectoparasite of freshwater invertebrates in eutrophic waters that are organically enriched
Theromyzon tessulatum		NE		Found in all types of water. It is a common parasite in the nasal cavity of water birds
Piscicolidae				
Piscicola geometra		NE		Mostly found on the wave-washed shores of lakes as well as fast flowing streams and rivers where is feeds on fish
MOLLUSCA	**MOLLUSCS**			
Lymnaeidae				
Lymnaea stagnalis		NE		
Radix peregra		NE		
Planorbidae				
Planorbis planorbis	Ram's-horn Snail	NE		Common in all types of freshwater habitat with pondweeds
ARANEAE	**SPIDERS**			
Araneidae	**Orb-web spinners**			
Araneus quadratus		LC		In tall grassland and low scrub. Widespread and common
Araniella opisthographa		LC		On trees and bushes. England north to Yorks, less common that the very similar A. cucurbitina
Hypsosinga pygmaea		LC		In low vegetation in damp places, especially on heathland. Widespread but very local throughout Britain
Larinioides cornutus		LC		Along watersides, on tall vegetation. Widespread througout Britain
Mangora acalypha		LC		In grassland and low vegetation. Widespread in southern England
Nuctenea umbratica		LC		Usually under bark. Widespread and common

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Clubionidae				
Cheiracanthium erraticum		LC		Usually among grass and low plants. Locally common in southern England; scarcer in the north
Clubiona phragmitis		LC		In low vegetation in wet places, especially amongst common reed Phragmites. Widespread in southern Britain
Linyphiidae				
Erigone atra		LC		Widespread and common throughout Britain in many habitats and a frequent aeronaut.
Erigone dentipalpis		LC		A small money spider commonly found in a wide variety of habitats. Widespread in Britain
Lycosidae	**Wolf spiders**			
Alopecosa pulverulenta		LC		On open ground, heaths, pastures and even urban gardens. Widespread
Philodromidae				
Tibellus oblongus		LC		Amongst grasses in damp places. Common throughout Britain
Pisauridae				
Pisaura mirabilis	Nursery Web Spider	LC		Various open habitats. Very common and widespread
Salticidae	**Jumping spiders**			
Euophrys frontalis		LC		In low vegetation or under stones in woods, on heaths, etc. Common and widespread
Heliophanus cupreus		LC		On low vegetation. Common in southern England, very local in the north
Heliophanus flavipes		LC		On low vegetation on rough, open ground. Widespread and common in southern England, but scarce in the north
Tetragnathidae				
Pachygnatha degeeri		LC		Various habitats in low vegetation. Widespread throughout Britain
Tetragnatha extensa		LC		Amongst low vegetation in damp places. One of our commonest spiders
Tetragnatha montana		LC		On trees and bushes, often but not always near water. Locally common throughout Britain
Theridiidae				
Enoplognatha ovata		LC		In grassland and low vegetation. Widespread throughout Britain
Neottiura bimaculata		LC		Widespread, chiefly amongst low vegetation
Theridion pictum		LC		Among bushes and low vegetation, usually in damp places. Local, mainly southern species
Theridion sisyphium		LC		A spider commonly found throughout Britain on shrubs and other low vegetation
Thomisidae				
Xysticus cristatus		LC		On the ground or in low vegetation. Common and widespread throughout much of Britain
OPILIONES	**HARVESTMEN**			
Phalangiidae				

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Mitopus morio		NE		A harvestman, usually found amongst low vegetation, but also in bushes and trees. Widespread and very common
Phalangium opilio		NE		One of the commonest British harvestmen. Most habitats. Under stones, etc
Phalangium opilio		NE		One of the commonest British harvestmen. Most habitats. Under stones, etc
COLEOPTERA	**BEETLES**			
Anthicidae				
Anthicus antherinus		LC		Various open habitats. Adults and larvae are saprophagous. Widespread
Apionidae	**Weevils (part)**			
Catapion pubescens		NE	NS(Nb)	In open habitats, larvae in the stems of Trifolium. Local in England and Wales
Ceratapion onopordi		NE		Larvae in the stems and upper parts of the roots of various thistles. Very common
Ischnopterapion loti		NE		On Lotus corniculatus and Lotus tenuis in various habitats. Common and widespread
Ischnopterapion virens		NE		On variouis vetches. Fairly common
Oxystoma cerdo		NE	NS(Nb)	Associated with vetches. Widespread but local throughout England
Oxystoma craccae		NE		On vetches throughout England and Wales, the larvae developing within the pods
Oxystoma pomonae		NE		On vetches throughout England and Wales, the larvae developing within the pods
Protapion apricans		NE		In seed heads of red clovers - various Trifolium spp. Very common
Protapion fulvipes		NE		On clovers. Widely distributed and common
Protapion nigritarse		NE		Within flowerheads of yellow-flowered Trifolium spp. Widespread through England and Wales
Squamapion cineraceum		NE	NS(Na)	On selfheal Prunella vulgaris. Local in southern England
Stenopterapion tenue		NE		In grasslands, on medicks, Medicago spp. Widely distributed and common in southern Britain
Cantharidae	**Soldier beetles**			
Cantharis lateralis		LC		In open marshy vegetation and damp grassland. Predatory. Widespread in England and Wales
Cantharis rufa		LC		Various habitats, primarily lowland marshy situations. Predatory. Widespread throughout Britain
Rhagonycha fulva		LC		Ubiquitous in habitat. Predatory. Widespread throughout Britain
Rhagonycha limbata		LC		Open grasslands on dry, free-draining soils. Predatory. Widespread throughout Britain
Carabidae	**Ground beetles**			
Acupalpus dubius		LC		In litter, moss and tussocks near fresh water

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Acupalpus exiguus		LC	NS	In marshy sites with litter or tussocks, both inland and in salt marshes
Acupalpus parvulus		LC		In damp habitats near vegetation
Agonum emarginatum		LC		In marshes, and near fresh water
Agonum gracile		LC		In marshes, bogs and on upland grasslands and moors
Badister bullatus		LC		A 'larger form' on drier habitats; heaths, grasslands, dunes etc, a 'smaller form' on lowland river banks
Bembidion articulatum		LC		In cracks on bare sand or mud near fresh water
Bembidion assimile		LC		In marshes, fens and saltmarshes
Bembidion biguttatum		LC		On open mud and silty ground near standing fresh water
Bembidion clarkii		LC		In shaded wet sites near water, usually inland
Bembidion guttula		LC		Ubiquitous in almost all habitats, especially near water
Bembidion lunulatum		LC		On damp bare ground near water
Bembidion octomaculatum		LC	NS	On bare mud near fresh water - extremely local in Dorset, Sussex, Kent, Berks and Norfolk
Bembidion properans		LC		On dry, open clay soils
Bembidion quadrimaculatum		LC		In fields and gardens on open dry soils
Chlaenius nigricornis		LC		In damp grasslands and lowland marshes, also coastal litter
Clivina fossor		LC		In almost all open habitats, especially arable land, pasture and gardens
Demetrias atricapillus		LC		On dunes, in tussocky grasslands and agricultural fields
Ophonus azureus		LC	NS	In open coastal sites, also inland on warm chalk or limestone slopes
Oxypselaphus obscurus		LC		In marshes and damp shaded habitats including woodland
Paradromius linearis		LC		In dry grasslands, arable fields and dunes
Poecilus cupreus		LC		In dry habitats and fields
Poecilus versicolor		LC		In grasslands, moors and arable land, especially if wet
Pterostichus anthracinus		LC	NS	In marshes, fens and near fresh water
Pterostichus gracilis		LC	NS	In wet vegetated sites near water. Widespread but local throughout Britain
Pterostichus macer		LC		On clay soils, often in cracks in the ground, also under bark and in coastal marshes

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Pterostichus madidus		LC		In woodlands, gardens and dry grasslands
Pterostichus minor		LC		In marshes and wet grasslands
Pterostichus nigrita		LC		In almost all damp lowland habitats, especially near fresh water
Pterostichus strenuus		LC		In almost all habitats except at high altitudes, especially grasslands
Pterostichus vernalis		LC		In most damp or shaded lowland habitats, especially grasslands
Stenolophus mixtus		LC		In marshes and at the edges of standing water, especially on clay soils
Syntomus foveatus		LC		On dry heaths, watse ground, arable land, grasslands and dunes
Syntomus truncatellus		LC	NS	On open ground in fields, pasture woodland and dunes
Cerambycidae	**Longhorn beetles**			
Clytus arietis		NE		Larvae in dead branches of deciduous treees; adult a wasp mimic; visits fllowers
Altica palustris		LC		Various habitats; adults and larvae feed on leaves of various willowherbs. Widespread
Chrysomelidae	**Leaf beetles**			
Bruchidius varius		NA		Various habitats; adults feed mainly on pollen of clovers, larvae probably within clover seeds
Bruchus loti		LC		Various habitats; adults feed mainly on pollen of legumes, larvae probably within legume seeds
Bruchus rufimanus		LC		Various habitats; adults feed on pollen of various plants, larvae develop within seeds of bean plants
Cassida rubiginosa		LC		Wide range of habitats; adults and larvae feed on leaves of Asteraceae
Cassida vibex		LC		Various habitats; adults and larvae feed on several species of Asteraceae
Chaetocnema concinna		LC		Wide range of habitats; adults feed on leaves of Polygonaceae, larvae mine the roots
Chaetocnema confusa		LC	NS	Various wet habitats; adults feed on leaves of sedges Carex as well as purple moor-grass Molinia caerulea and possibly rushes Juncus, larvae feed at grass or sedge roots
Chaetocnema hortensis		LC		Various habitats; adults feed on leaves of wild and cultivated Poaceae, larvae mine the stems
Chrysolina herbacea		LC		Wetlands and wet areas in a range of habitats; adults and larvae feed on leaves of various Lamiaceae, especially water mint Mentha aquatica
Chrysolina hyperici		LC		Various habitats; adults feed on leaves and flowers of St. John's-worts Hypericum, larvae feed on the stems and leaves
Crepidodera fulvicornis		LC		Wide range of habitats; adults feed on leaves of willows Salix (and possibly pollen and other trees), larvae feed on the roots
Crepidodera plutus		LC		Wide range of habitats; adults feed on the leaves of willows Salix (possibly also other trees), larvae feed at the roots

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Cryptocephalus fulvus		LC		Various mainly open habitats; adults and larvae on various herbaceous plants
Cryptocephalus moraei		LC		Various habitats; adults and larvae feed on the leaves and flowers of St John's-worts Hypericum
Epitrix pubescens		LC		Wide range of habitats; adults feed on large leaves of Solanaceae (nightshades), larvae feed within the roots
Gastrophysa polygoni		LC		Various habitats; adults and larvae feed on leaves of knotgrass Polygonum aviculare and other Polygonaceae
Hippuriphila modeeri		LC		Various habitats; adults feed on leaves and stems of horsetails Equisetum, larvae mine younger stems
Longitarsus flavicornis		LC		Various habitats; adults feed on the leaves of ragworts Senecio, larvae develop at the roots
Longitarsus gracilis		LC		Various habitats; adults feed on the leaves of ragworts Senecio and other Asteraceae, larvae at the roots
Longitarsus luridus		LC		Wide range of habitats; adults feed on numerous plants, larvae develop at roots
Longitarsus succineus		LC		Wide range of habitats; adults feed on leaves of many Asteraceae, larvae on roots of common ragwort Senecio jacobaea
Oulema melanopus		LC		Farmland, gardens and many other habitats; adults and larvae feed on leaves of cereals and wild grasses
Phaedon armoraciae		LC		Various habitats, mainly wetlands; adults feed on the leaves of a range of water plants
Phratora vulgatissima		LC		Various habitats; adults and larvae feed on the leaves of willows Salix and possibly poplars Populus and birches Betula
Phyllotreta diademata		LC		Wide range of habitats; adults feed on the leaves of many Brassicaceae, larvae feed on the roots
Phyllotreta exclamationis		LC		Wide range of habitats with or near water; adults feed on leaves of Brassicaceae especially water-cresses Rorippa and bitter-cresses Cardamine, larvae feed at the roots
Phyllotreta nigripes		LC		Wide range of habitats; adults feed on the leaves of many Brassicaceae, larvae feed on the roots
Phyllotreta undulata		LC		Wide range of habitats; adults feed on the leaves of many Brassicaceae, larvae feed on the roots
Psylliodes chrysocephala		LC		Wide range of habitats; adults feed on Brassicaceae, and sometimes plants in other families, larvae mine the stems
Psylliodes napi		LC		Various habitats; adults feed on leaves of Brassicaceae, larvae mine stems and leaves
Sermylassa halensis		LC		Wide range of habitats; on the leaves of various bedstraws Galium
Sphaeroderma rubidum		LC		Wide range of habitats; adults feed on leaves of Asteraceae, larvae mine leaves
Sphaeroderma testaceum		LC		Wide range of habitats; adults feed on leaves of Asteraceae especially thistles Cirsium and Carduus, larvae mine leaves
Coccinellidae	**Ladybirds**			
Adalia decempunctata	1-spot ladybird	NE		A ubiquitous species associated with a wide variety of deciduous trees
Anisosticta novemdecimpunctata	Water ladybird	NE		In reed-beds and grasslands in marshy or wet locations

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Coccinella septempunctata	7-spot ladybird	NE		A ubiquitous species
Harmonia axyridis	Harlequin ladybird	NE		A recent arrival (2003) that has rapidly spread - a ubiquitous generalist species
Nephus redtenbacheri		NE		In undisturbed grassland, dunes, heathland and bogs - often coastal
Propylea 14-punctata	14-spot ladybird	NE		A ubiquitous species
Psyllobora 22-punctata	22-spot ladybird	NE		On low vegetation in grassland habitats - feeds on mildews on leaves
Rhyzobius litura		NE		A widespread grassland species
Scymnus frontalis		NE		On low plants in heathland and other dry habitats on chalky or sandy soils
Scymnus haemorrhoidalis		NE		In damp habitats such as bogs, water margins and undisturbed grassland
Subcoccinella 24-punctata	24-spot ladybird	NE		A grassland species but also recorded from marshy sites and scrub
Tytthaspis sedecimpunctata	16-spot ladybird	NE		Primarily a grassland species but also found in scrub, saltmarsh and dunes
Curculionidae	**Weevils (part)**			
Anthonomus pedicularius		NE		On hawthorn blossom, larvae in the developing stone of the fruit. Widespread and common
Anthonomus rubi		NE		Develops in fruits of bramble, raspberry and strawberry. Widespread and common
Barypeithes pellucidus		NE		Among leaf litter and in dry grassland. Apparently polyphagous. Widespread and generally common.
Ceutorhynchus pallidactylus		NE		On a range of Brassicaceae. Widely distributed and common
Cionus alauda		NE		On figworts but also mullein. Widespread throughout Britain
Cionus scrophulariae		NE		On figworts and sometimes Buddleia. Widespread in southern Britain
Cionus tuberculosus		NE		On figworts and sometimes Buddleia. Widespread in southern Britain
Coelositona cambricus		NE		On Lotus pedunculatus in damp habitats. Widespread throughout Britain
Datonychus melanostictus		NE		On foliage of water mint. Mainly southern. Local
Hypera plantaginis		NE		On the flowers of Lotus corniculatus. Widespread throughout Britain
Larinus planus		NE	NS(Nb)	On thistles. Local in southern England and Wales
Mecinus pascuorum		NE		On Plantago lanceolata. Widespread and often common
Phyllobius roboretanus		NE		On various herbaceous plants, shrubs and trees. Widespread in England and Wales, local further north
Phyllobius virideaeris		NE		On various herbaceous plants, shrubs and trees. Widespread in England and Wales, local further north
Sitona lepidus		NE		Associated with leguminous plants, including clovers. Widespread in England and Wales, local further north

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Sitona lineatus		NE		On most species of leguminosae mainly in grassland. Very common and widespread
Sitona sulcifrons		NE		On various legumes including red clover Trifolium pratense. Widespread throughout Britain
Sitona suturalis		NE		On various Leguminininosae, especially meadow vetchling Lathyrus pratensis. Widespread in England and Wales, local further north
Trichosirocalus troglodytes		NE		On ribwort plantain Plantago lanceolata. Widespread and common throughout much of Britain
Tychius junceus		NE		On Medicago lupulina in grassy and ruderal places. Locally common in southern and eastern England, much more local elsewhere
Tychius picirostris		NE		In grassy places on white clover Trifolium repens. Widespread in England and Wales, local further north
Tychius squamulatus		NE	NS(Nb)	On Lotus corniculatus in various open habitats. Widespread but local in England and Wales
Zacladus exiguus		NE	NS(Nb)	On smaller flowered Germanium species. Local in southern England
Dasytidae				
Dasytes aeratus		LC		Open woodland situations, often on hawthorn blossum. Widespread throughout Britain
Dryopidae				
Dryops luridus		LC		
Dytiscidae	**Diving beetles**			
Acilius sulcatus		LC		Typical of steep-sided pools, often ranging into depth and clear water in the absence of fish
Agabus nebulosus		LC		An early coloniser of sparsely vegetated silt ponds, also found in horse troughs
Colymbetes fuscus		LC		Common throughout lowland Britain and Ireland - coastal in highland areas
Graptodytes granularis		LC		In well-vegetated, permanent ponds and ditches, often with flunctuating margins
Graptodytes pictus		LC		In permanent ponds, lakes, canals and other slow-moving water with plenty of vegetation
Hydaticus seminiger		LC	NS	Associated with permanent standing water, amongst dense vegetation or debris in partly shaded sites
Hydroglyphus geminus		LC		In still lowland waters with a disturbed and exposed substratum of clay
Hydroporus angustatus		LC		Associated with permanently flooded fens, usually in mesotrophic but also enriched sites - common
Hydroporus planus		LC		In temporary grassy ponds but, as it flies freely, is found in other water bodies
Hydroporus pubescens		LC		Very common in all types of temporary water, often also in permanent acid waters
Hygrotus inaequalis		LC		In a wide range of permanent habitants, often in very shallow water
Hygrotus versicolor		LC		Amongst thin vegetation in ponds, canals and drainage ditches, usualy on exposed peat or clay substrate
Hyphydrus ovatus		LC		In deep and richly vegetated permanent lakes, ponds, ditches, canals and occasionally river backwaters

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Ilybius fenestratus		LC		In still, permanent waters in lakes, large ponds and canals and usually associated with sparse vegetation
Laccophilus minutus		LC		A common species of lowland ponds, lakes and ditches, rarely found in slow running water
Liopterus haemorrhoidalis		LC		In richly vegetated lowland ponds and ditches, usually with mosses and often cool, shaded or spring-fed
Suphrodytes figuratus		LC		In lowland pools and fenland ditches in part shade - now split from dorsalis (above) - often together
Elateridae	**Click beetles**			
Agriotes lineatus		NE		Larvae develop in grass roots. Common in the south; local north of the Midlands.
Agriotes obscurus		NE		Larvae develop in grass roots. Widespread and common throughout much of Britain
Elmidae				
Oulimnius tuberculatus		LC		Usually in flowing water
Erirhinidae	**Weevils (part)**			
Notaris scirpi		NE	NS(Nb)	On Carex, Juncus and Typha in wet places. Occurs in England as far north as Durham.
Tanysphyrus lemnae		NE		Associated with Duckweed Lemna sp. Marshy places. Widespread in southern Britain
Haliplidae				
Haliplus confinis		LC		A widely distributed sp of base-rich waters such as lakes, quarry ponds and fen ditches with sparse vegetation
Haliplus immaculatus		LC		Associated with man-made stagnant water habiatats in the lowlands, even polluted sites and balancing pools
Haliplus lineatocollis		LC		A widespread species - usually the commonest in running water
Haliplus ruficollis		LC		The commonest species of Haliplus in all types of water
Peltodytes caesus		LC	NS	Confined to lowland rich fen pools and ditches from the Welsh and English fens and lowlands wets of London
Helophoridae				
Helophorus aequalis		LC		Summer adults are found in almost any habitat, but breeding confined to stagnant freshwater amongst grass
Helophorus brevipalpis		LC		Ubiquitous in almost any aquatic habitat but breeds in exposed muddy edges of pools and streams
Helophorus minutus		LC		A more or less ubiquitous water beetle found in grassy-edged pools, lakes and slow rivers
Heterocerus fenestratus		LC		
Hydraenidae				
Hydraena riparia		LC		In gravelly streams and thickly vegetated ditches and ponds
Ochthebius minimus		LC		In canals, ditches, lakes, ponds and pools in both brackish and fresh water
Hydrophilidae				
Anacaena bipustulata		LC		Associated with lowland, slow-running water, especially on exposed clayey substratum

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Anacaena limbata		LC		In mud and decaying vegetation at the edge of well-vegetated, eutrophic, still waters
Anacaena lutescens		LC		In well-vegetated still waters, also amongst Sphagnum and also in wooland pools amongst dead leaves
Berosus affinis		LC		In well-vegetated pools and ditches in grazing levels - modern records south of a line from The Wash to s Wales
Berosus signaticollis		LC		Amongst thin vegetation in nearly created still water habitats, also occasionally in brackish water
Cercyon sternalis		LC		In a wide range of lowland freshwater habitats, also sometimes brackish water, associated with tussocks
Enochrus testaceus		LC		In fens and richly vegetated ponds, lakes and ditches
Helochares lividus		LC		In vegetated lowland freshwaters, often in areas with a brackish influence
Hydrobius fuscipes		LC		A more or less ubiquitous water beetle
Hygrobiidae				
Hygrobia hermanni	Screech Beetle	LC		Usually confined to still water, usually over mud in ponds and ditches - frequent across lowland England and Wales
Latridiidae				
Enicmus transversus		NE		
Malachiidae	**Soldier beetles**			
Cordylepherus viridis		LC		Adults feed on pollen and nectar; larvae in dead stems. Widespread in England; coastal in Wales
Malachius bipustulatus		LC		Adults feed on pollen and nectar; larvae are active predators on tree trunks. Widespread in England and Wales
Nitidulidae				
Meligethes aeneus		NE		A small pollen beetle. Very common species, feeding in a very wide variety of Brassicaceae
Noterus clavicornis		LC		Common in permanent, base-rich, lowland ponds in England, Ireland and Wales
Oedemeridae				
Oedemera lurida		LC		The larvae develop in the old stems of various plants. Widespread and common throughout England and Wales
Oedemera nobilis		LC		The larvae develop in the old stems of various plants. Widespread and common throughout England and Wales
Phalacridae				
Olibrus aeneus		NE		Larvae develop on various composites, especially Matricaria, Artemisia and Tanacetum. Adults on flowers. Widespread and common
Olibrus affinis		NE		Larvae develop on various composites, particularly Tragopogon and Hypochaeris, adults feeding on pollen. Primarily southern
Olibrus corticalis		NE		Small shiny black beetle. Associated with Senecio spp. and Conyza canadensis. Dorset to Northumberland
Olibrus pygmaeus		NE	NS(Nb)	On Filago in various open habitats; widespread but local in southern England

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Stilbus oblongus		NE		Associated with Typha latifolia. S England, S Wales and E Anglia, rare elsewhere
Scraptiidae				
Anaspis frontalis		LC		Has been reared from decaying wood of oak and maple in Sweden; frequently found at hawthorn blossom
Anaspis garneysi		LC		Has been reared from dry wood mould of oak, beech & larch
Anaspis maculata		LC		Larvae in dead wood, adults frequently on hawthorn blossom. Widespread in England and Wales
Silvanidae				
Psammoecus bipunctatus		NE		In reed litter in fens and marshes. Widespread in southern Britain
Staphylinidae	**Rove beetles**			
Achenium depressum		NE		Various subterranean habitats
Aleochara brevipennis		NE	NS(Nb)	Hygrophilous, in moss and roots of grasses. Local throughout Britain
Anotylus rugosus		NE		In damp vegetable litter; marshes
Carpelimus corticinus		NE		Various wetland and riparian habitats with silty substrates
Dacrila fallax		NE	NS(Nb)	Found among reed debris. A southern species which is very uncommon in the north
Dimetrota nigripes		NE		
Drusilla canaliculata		NE		Under stones, in litter and moss, most often in grassland. Very common
Erichsonius cinerascens		NE		Among Sphagnum moss. Predominantly a northern species. Local
Gabrius breviventer		NE		In marshes and damp grassland; widespread
Hygronoma dimidiata		NE		In leaf litter and moss in rich marshland
Mocyta fungi		NE		
Pachnida nigella		NE		Found in marshy places. Southern England, local
Pella limbata		NE		In the nests of ants of the genus Lasius. Local, but possibly under-recorded
Philonthus micans		NE		Undisturbed fluctuating marsh. Widely distributed but generally local
Philonthus quisquiliarius		NE		In open fluctuating marsh; often on mud at pool edges
Rybaxis longicornis		NE		Among moss and in grass tussocks in marshy places, particularly by standing water. Not uncommon in S England, more local in the north
Stenus aceris		NE		In lowland tussocky grasslands
Stenus boops		NE		Various wetlands amongst low vegetation
Stenus canaliculatus		NE		Sparsely vegetated ground, beside rivers, lakes and ponds

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Stenus cicindeloides		NE		Various wetlands amongst tall emergent vegetation; including seasonally wet habitats
Stenus flavipes		NE		In litter in wet woodland and carr
Stenus fulvicornis		NE		In moss and litter in wet pastures and marshy areas, including pools in woodlands
Stenus juno		NE		In a wide range of wetland habitats including reed beds
Stenus latifrons		NE		In wetlands including mires, bogs, fens, and lake margins
Stenus nanus		NE		In a wide variety of open dry habitats including dunes, grassland, grassy heaths and gardens
Stenus ossium		NE		In damp habitats in, grassland, dunes, and marshy but rarely in very wet areas
Stenus pallipes		NE		In well vegetated fens, dyke margins, and richer mire areas, avoiding acidic bogs
Stenus providus		NE		In grasslands, grazing marsh, richer mires, lakeshores and riparian habitats
Stenus pusillus		NE		In wetland margins and in grasslands
Sunius propinquus		NE		
Tachyporus chrysomelinus		NE		In moss, leaf litter, grass tussocks on heavier or less well drained soils.
Tachyporus dispar		NE		In moss, leaf litter, grass tussocks
Tachyporus hypnorum		NE		In moss, leaf litter, grass tussocks etc. Very common in most habitats
Tachyporus nitidulus		NE		In moss, leaf litter and grass tussocks etc. Very common in most habitats
Throscidae				
Trixagus carinifrons		NE		In litter, moss and under bark. England S to Yorkshire
Trixagus obtusus		NE		In moss, amongst low vegetation, etc. Widely distributed but chiefly southern and rather local
DERMAPTERA	**EARWIGS**			
Forficulidae				
Forficula auricularia	Common Earwig	LC		Ubiquitous
DIPTERA				
Asilidae	**Robber flies**			
Dioctria atricapilla		LC		Predatory; grassland and woodland margins, local in southern and central England
Dioctria rufipes		LC		Predatory; scrubby grassland and woodland margins, widespread throughout Britain
Leptogaster cylindrica		LC		Predatory; dry grassland, larvae in sandy soil. Widespread in southern Britain
Conopidae				
Physocephala rufipes		NE		In meadows, heaths and open-structured woodland, usually feeding on umbels and composites. The larvae are parasitoids of adult bees
Empididae				

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Empis livida		NE		Large, predatory fly typically seen visiting flowers in mid-summer. Common and widespread
Ephydridae				
Discomyza incurva		NE		A small blackish fly with a broad flat abdomen. Larvae have been recorded as developing in a snail
Ptychopteridae				
Ptychoptera contaminata		NE		By water margins, ditches, ponds, lakes,and sluggish rivers, larvae aquatic. Local in England (mainly southern) and Wales
Rhagionidae				
Chrysopilus asiliformis		LC		In lush damp vegetation, often near streams or ponds. Local abundant in the south, scarce in the north
Scathophagidae				
Scathophaga stercoraria		NE		Abundant predatory fly which breeds in dung. Widespread throughout Britain
Sciomyzidae	**Snail-killing flies**			
Coremacera marginata		NE		Various dry habitats, especially on calcareous soils. Larvae are parasitoids of various snails, especially Cochlicopa and Discus spp. Widespread
Euthycera fumigata		NE		Snail-killing fly found in damp places near permanent water. Biology unknown
Ilione albiseta		NE		In a wide variety of wetland situations including bogs providing that conditions are not very acid. Widespread and common
Limnia unguicornis		NE		Various open habitats, larvae feed on aquatic snails. Widely distributed and generally common on Britain
Sepedon sphegea		NE		In open situations near ponds and in marshes. Larvae are vigorous aquatic predators feeding on a variety of snails. Widespread
Tetanocera elata		NE		Various habitats, particularly on vegetation bordering ponds or streams and in marshes, larvae are predators of slugs. Widespread
Stratiomyidae	**Soldier flies**			
Beris vallata		LC		In grassy places, larvae in rotting litter at the soil surface. Widespread and common
Chloromyia formosa		LC		In woods, hedges, parks and gardens, larvae in rotting vegetable matter in damp soil, rotting bark and leaf litter. Widespread throughout much of Britain
Chorisops tibialis		LC		In hedgerows and scrub, larvae terrestrial, living in rotting vegetable matter. Fairly common in southern Britain
Pachygaster atra		LC		In hedgerows and woodland margins, larvae in rotting organic matter. Widely distributed and common
Pachygaster leachii		LC		In hedgerows and woodland margins, larvae in rotting organic matter. Widely distributed and common
Syrphidae	**Hoverflies**			
Baccha elongata		LC		Frequent in shady situations. The larvae are predatory on aphids. Widespread throughout Britain
Eristalis arbustorum		LC		Various habitats, larvae aquatic. Widespread throughout Britain
Eupeodes luniger		LC		In gardens, grassland, hedgerows and woodland edge. Larvae predatory on aphids. Widespread throughout Britain

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Melanostoma mellinum		LC		In grassy places throughout Britain. The larvae are predatory on aphids
Neoascia podagrica		LC		Various habitats with lush vegetation, larvae in wet decaying vegetation. Widespread throughout Britain
Paragus haemorrhous		LC		In short grassland and sparsely vegetated, dry situations, larvae are predatory on aphids. Widespread throughout southern Britain
Pipizella viduata		LC		Various dry habitats, associated with various root aphids. Widespread throughout Britain
Platycheirus granditarsus		LC		In wetlands including ponds and marshes, larvae are predatory on aphids. Widespread throughout Britain
Sphaerophoria scripta		LC		Various grasslands, larvae feeding on aphids on herbaceous plants. Widespread in southern Britain
Syritta pipiens		LC		Various habitats including urban areas, larvae develop in rotting organic matter. Widespread throughout Britain
Tabanidae	**Horse flies**			
Chrysops relictus		LC		Various damp habitats, larvae in rotting vegetation. Widespread in southern Britain
Haematopota pluvialis		LC		In damp habitats, larvae in wet soil, often congregated beneath dung. Common throughout Britain
Tachinidae				
Cistogaster globosa		NE	RDB2	A parasitoid of the shieldbug Aelia acuminata. Very local in southern England and Wales
Eriothrix rufomaculata		NE		Various grassland habitats, parasitic on the crambid moth Crysoteuchia culmella. Generally distributed and very common
Tephritidae	**Picture-winged flies**			
Anomoia purmunda		NE		Various open habitats, larvae develop in the fruits of Crataegus Widespread in southern Britain
Chaetorellia jaceae		NE		Various grasslands, larvae in the flower-heads of Centaurea nigra and probably C. debeauxii. Widespread in southern and central England
Orellia falcata		NE	NS(Nb)	Larvae form a gall in Goat's Beard. Local in the southern half of England
Tephritis divisa		NE		In open habitats, larvae in the flower head of Picris echioides. Southern England
Tephritis neesii		NE		In grasslands, larvae in the capitulum of Leucanthemum species. Throughout Britain
Terellia colon		NE		In grasslands, larvae forming a gall in the flower heads of Centaurea scabiosa. Occurs in southern England as far north as Yorkshire
Terellia serratulae		NE		In grasslands, larvae form a gall in the flower head of various thistles. A common species in southern Britain
Urophora cardui		NE		Various grasslands, larvae develop in a gall on the stem of Cirsium arvense. Widespread in southern Britain
Urophora quadrifasciata		NE		Various grasslands, larvae develop in the flower head of Centaurea nigra and probably C. debeauxii. Southern Britain
Therevidae				
Thereva plebeja		LC	NS	Found in open sandy habitats, larvae in the soil. Local in Wales and the southern half of England
Tipulidae	**Craneflies**			

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Nephrotoma flavescens		NE		In dry, open grasslands, larvae feeding on roots. Widespread throughout Britain
Nephrotoma flavipalpis		NE		In damp woodland and hedgerows, widespread throughout Britain
Tipula oleracea		NE		In marshes, wet pastures and water margins, larvae feed on roots. Widespread throughout Britain
Tipula vernalis		NE		A spring cranefly of dry or moist grassland, mainly confined to lowland areas. Larvae in soil. Common
Ulidiidae				
Herina lugubris		NE		In various habitats including dunes, dry calcareous grassland, cliff seepages, woodland rides and acidic marsh. More common in the south
HEMIPTERA	**TRUE BUGS**			
Acanthosomatidae	**Shieldbugs (part)**			
Elasmostethus interstinctus	Birch Shieldbug	LC		In decidous woodland and scrub, feeding on catkins of Betula and occasionally Alnus
Anthocoridae				
Anthocoris nemoralis		NE		Predatory species, on a range of deciduous trees
Anthocoris nemorum		NE		Predatory species, on a range of deciduous tree and herbs, particularly Urtica dioica
Cardiastethus fasciiventris		NE		Predatory species, on conifers and deciduous trees and shrubs, particularly Ulex and lichen covered Prunus
Orius laticollis		NE		Predatory species, on various trees and herbaceous species
Orius niger		NE		Predatory species, on various trees and herbaceous species
Coreidae				
Ceraleptus lividus	Slender-horned Leatherbug	LC	NS	Mainly ground-dwelling. Sparsely-vegetated soils on sand or chalk; associated with various legumes
Coreus marginatus	Dock Bug	LC		In grasslands and ruderal habitats, feeding principally on Rumex, but other species of Polygonaceae are also used
Coriomeris denticulatus	Denticulate Leatherbug	LC		Mainly ground-dwelling. Sparsely-vegetated dry grasslands and ruderal habitats, principally on Medicago and other legumes
Corixidae				
Corixa dentipes		LC		
Corixa punctata		LC		In a wide range of still or gently-flowing water bodies, although it is rare in the uplands of North Wales and the Lake District.
Glaenocorisa propinqua propinqua		LC	NS	In deep upland pools in northern England and Scotland
Hesperocorixa linnaei		LC		In still, sometimes slightly saline, waters, generally with extensive emergent vegetation.
Hesperocorixa moesta		LC		Usually found in shallow water amongst marginal vegetation, often in recently created or temporary pools.
Hesperocorixa sahlbergi		LC		Particularly associated with densely vegetated or heavily shaded pools with a bottom of mud or dead leaves
Sigara distincta		LC		

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Sigara iactans		NA		
Sigara lateralis		LC		Particularly associated with brackish pools and ditches, heavily polluted ponds, and temporary and recently created pools with little vegetation
Sigara nigrolineata		LC		Typically an inhabitant of small weedy ponds in the lowlands and of small dystrophic pools in the uplands, but also found in a range of other water bodies
Gerridae	**Pondskaters**			
Gerris argentatus		LC		A widespread but very local species of still waters, usually with richly-vegetated margins
Gerris lacustris		LC		On most still or slow-flowing waters. Widespread throughout Britain
Gerris odontogaster		LC		A widely distributed and common pondskater throughout Britain, on the surface of various types of still or gently-flowing water
Lygaeidae	**Ground bugs**			
Chilacis typhae	Bulrush Bug	NE		On Typha latifolia in wetlands, feeding on the seeds
Cymus glandicolor		NE		On various Carex species
Cymus melanocephalus		NE		On various Juncus species
Heterogaster urticae		NE		On Urtica dioica in dry, warm situations
Ischnodemus sabuleti		NE		Polyphagous on a range of grasses
Megalonotus antennatus		NE	NS(Nb)	Strongly ground-dwelling. Dry grasslands and woodland rides
Nysius ericae		NE		Strongly ground-dwelling. Dry grasslands and sparsely vegetated habitats. Polyphagous on a range of plant species
Nysius huttoni		NE		Strongly ground-dwelling. Dry grasslands and sparsely vegetated habitats. Polyphagous on a range of plant species. Known as the 'Wheat Bug' in New Zealand but unlikely to become a crop pest in Britain
Peritrechus lundii		NE		Strongly ground-dwelling. Dry grasslands and sparsely vegetated habitats. Probably polyphagous on various plant species
Scolopostethus affinis		NE		A variety of habitats, frequently associated with Urtica dioica
Scolopostethus puberulus		NE		Strongly ground-dwelling. Dry and moist grasslands, particularly on calcareous soils
Scolopostethus thomsoni		NE		A variety of habitats, frequently associated with Urtica dioica
Stygnocoris fuligineus		NE		Strongly ground-dwelling. Dry grasslands, probably polyphagous
Stygnocoris sabulosus		NE		Strongly ground-dwelling. Dry grasslands, probably polyphagous
Miridae	**Plant bugs**			
Adelphocoris lineolatus		NE		On a range of Fabaceae in dry and damp grasslands. Adults also feed on Asteraceae
Amblytylus nasutus		NE		In dry grasslands; polyphagous on a range of grasses

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Apolygus lucorum		NE		Primarily on Artemesia vulgaris
Atractotomus mali		NE		On Malus and Crataegus
Charagochilus gyllenhalii		NE		Associated with Galium species in dry grasslands
Chlamydatus pullus		NE		Strongly ground-dwelling. Warm, dry sparsely-vegetated habitats on various legumes
Closterotomus fulvomaculatus		NE		In damp, humid grasslands on various plants including Filipendula ulmaria, Urtica dioica and Humulus lupulus
Closterotomus norwegicus		NE		Polyphagous on various herbaceous plants in various open habitats
Deraeocoris flavilinea		NE		Predatory species. On various deciduous trees
Deraeocoris lutescens		NE		Predatory species. On various deciduous trees
Deraeocoris ruber		NE		Predatory species in a range of grassland habitats
Deraeocoris scutellaris		NE		Predatory species in a range of habitats, including chalk downland, heathland and wetlands
Dicyphus annulatus		NE		In dry, open habitats on Ononis repens
Dicyphus epilobii		NE		On Epilobium speices
Dicyphus globulifer		NE		On Silene species
Europiella artemisiae		NE		On Artemesia vulgaris in various open habitats
Halticus luteicollis		NE		On a variety of plants, particularly Galium species and Bryonia dioica in various habitats
Heterotoma planicornis		NE		Ubiquitous on Urtica dioica
Hoplomachus thunbergii		NE		On Hieracium pilosella in sparsely-vegetated habitats
Leptopterna dolabrata		NE		Ubiquitous in various grassland habitats and polyphagous on a range of grass species
Leptopterna ferrugata		NE		Dry grasslands; polyphagous on a range of grass species
Liocoris tripustulatus		NE		Ubiquitous on Urtica dioica
Lygocoris rugicollis		NE		On Salix and Malus species
Lygus pratensis		NE	RDB3	In dry open habitats on a range of Asteraceae
Lygus rugulipennis		NE		In dry open habitats on a range of Asteraceae
Macrotylus paykulli		NE		In dry, open habitats on Ononis repens
Megaloceroea recticornis		NE		In dry grasslands; polyphagous on a range of grass species

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Megalocoleus molliculus		NE		On Achillea millefolium
Miris striatus		NE		Predatory species; frequently associated with Crataegus and Quercus
Neolygus contaminatus		NE		On Betula species
Notostira elongata		NE		Polyphagous on various grasses
Oncotylus viridiflavus		NE		On Centaurea nigra in dry, open habitats
Orthonotus rufifrons		NE		On shaded stands of Urtica dioica
Orthops basalis		NE		On various species of Apiaceae
Orthops campestris		NE		On various species of Apiaceae
Orthops kalmii		NE		On various species of Apiaceae
Orthotylus marginalis		NE		On Salix species
Phytocoris varipes		NE		Dry grasslands, polyphagous on a range of grasses and herbaceous plants
Pinalitus cervinus		NE		On a variety of deciduous trees and Hedera helix
Pithanus maerkelii		NE		Dry and damp grasslands; probably partly predatory
Placochilus seladonicus		NE	RDBK	On Knautia arvensis in chalk grassland
Plagiognathus arbustorum		NE		Ubiquitous on Urtica dioica
Plagiognathus chrysanthemi		NE		Polyphagous on a range of herbaceous plants
Polymerus unifasciatus		NE		Dry grasslands, on Galium species
Psallus ambiguus		NE		On a variety of deciduous trees, including Malus, Crataegus and Alnus
Stenodema calcarata		NE		Polyphagous on various grasses
Stenodema laevigata		NE		Polyphagous on various grasses
Stenotus binotatus		NE		Polyphagous on various grasses
Nabidae	**Damselbugs**			
Himacerus major		NE		Strongly ground-dwelling. Predatory species in a range of grasslands and other open habitats, including saltmarshes
Himacerus mirmicoides		NE		Strongly ground-dwelling. Predatory species in a range of dry, open habitats, often with sparse vegetation
Nabis ferus		NE		Strongly ground-dwelling. Predatory species in dry grasslands
Nabis flavomarginatus		NE		Predatory species in grasslands
Nabis limbatus		NE		Predatory species, particularly associated with damp grasslands

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Naucoridae				
Ilyocoris cimicoides	Saucer Bug	LC		In still water, living on or near the bottom, often amongst dense vegetation. Predacious.
Nepidae				
Nepa cinerea	Water Scorpion	LC		A large predacious water bug of clean well-vegetated ponds and other still or gently flowing water
Ranatra linearis	Water Stick Insect	LC		Large, elongate water bug found in ponds and canals with emergent vegetation. Predacious
Notonectidae				
Notonecta glauca	Common Backswimmer	LC		In still or slow-flowing lowland waters where there is some vegetation. Predacious.
Notonecta viridis		LC		Particularly common in brackish pools, ditches and slow rivers where there is some vegetation, but increasingly frequent in non-brackish pools, and apparently spreading.
Pentatomidae	**Shieldbugs (part)**			
Aelia acuminata	Bishop's Mitre Shieldbug	LC		Dry grasslands, polyphagous on a range of grass species
Dolycoris baccarum	Hairy Shieldbug	LC		Ruderal habitats; polyphagous on a wide range of herbaceous plants
Eurydema oleracea	Brassica Shieldbug	LC		Grasslands and ruderal habitats on a range of Brassicaceae
Palomena prasina	Common Green Shieldbug	LC		Grasslands and scrub, polyphagous on a very wide range of plants
Picromerus bidens	Spiked Shieldbug	LC		A predator of Lepidopteran and Hymenopteran larvae (moths, butterflies and sawflies). Widespread in a variety of open habitats
Pleidae				
Plea minutissima		LC		A predator, living amongst dense weed in ponds and ditches, or at the margins of larger pools and lakes or slow rivers.
Rhopalidae				
Corizus hyoscyami		LC		Ruderal habitats, polyphagous on a range of composites
Myrmus miriformis		LC		Dry acidic and calcareous grasslands, polyphagous on grasses
Rhopalus subrufus		LC		Grasslands and ruderal habitats on a variety of herbs, including Hypericum, Geranium and Marjorum
Saldidae	**Shore bugs**			
Chartoscirta cincta		LC		Found amongst rather vegetation at the margins of all types of water body
Saldula pallipes		LC	NS	Various wetland margins. Local in England and Wales
Saldula saltatoria		LC		Found in almost all wet habitats from river and lake margins to saltmarshes and small temporarily flooded hollows
Scutelleridae	**Shieldbugs (part)**			
Eurygaster testudinaria	Tortoise Shieldbug	LC		Grasslands and ruderal habitats; polyphagous on a range of grasses and composites

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Tingidae				
Acalypta parvula		NE		Strongly ground-dwelling. In various pleurocarp and acrocarp mosses in a variety of dry, open habitats
Derephysia foliacea		NE		On old stands of Hedera helix
Dictyla convergens		NE		A range of wetland habitats. Monophagous on Myosotis scorpioides
Tingis ampliata		NE		Various habitats, monophagous on Cirsium arvense
Tingis cardui		NE		Various habitats, monophagous on Cirsium vulgare
Veliidae				
Microvelia reticulata		LC		
Liviidae	**Psyllids**			
Livia juncorum		NE		Small brown jumping plant louse which feeds on Juncus in wetland situations. Widespread but local
Aphrophoridae	**Froghoppers**			
Aphrophora alni		NE		Adults are found on a wide range of trees and shrubs and low vegetation; nymphs feed in froth-lumps on a wide range of plants
Neophilaenus campestris		NE		On grasses in dry open habitats
Neophilaenus lineatus		NE		On grasses in a wide range of habitats
Philaenus spumarius	Common Froghopper	NE		Ubiquitous on a very wide range of herbaceous plants
Cicadellidae	**Leafhoppers**			
Anaceratagallia venosa		NE		Strongly ground-dwelling. In dry grasslands on various herbs including Lotus corniculatus
Anoscopus albifrons		NE		Strongly ground-dwelling. In dry grasslands
Aphrodes makarovi		NE		On herbs in moist eutrophic habitats, particularly Urtica dioica
Arboridia parvula		NE		On various herbs in calcareous grassland
Arthaldeus pascuellus		NE		In moist grasslands on a range of grasses
Athysanus argentarius		NE		In various grasslands
Cicadella viridis		NE		On Juncus in damp grasslands and marshes
Cicadula frontalis		NE		On Carex or Scirpus in marshy places
Cicadula quadrinotata		NE		On Carex, usually in marshy places
Dikraneura variata		NE		In dry grasslands
Doratura stylata		NE		On fine-leaved grasses in dry grasslands
Eupelix cuspidata		NE		Strongly terrestrial. In dry grasslands
Eupteryx aurata		NE		On a wide range of low-growing plants, including Urtica dioica

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Eupteryx vittata		NE		On a wide range of low-growing plants, including Glechoma hederacea, mints and buttercups
Graphocraerus ventralis		NE		On various grasses in dry grasslands
Iassus scutellaris		NE	NS(Na)	On elms
Idiocerus herrichi		NE		On Salix alba and S. fragilis
Idiocerus lituratus		NE		On various Salix species
Kybos butleri		NE		On various Salix species
Limotettix striola		NE		In marshy places, associated with Eleocharis
Macropsis cerea		NE		On various Salix species
Macropsis prasina		NE		On various Salix species
Megophthalmus scanicus		NE		On the ground at the base of grasses
Metidiocerus rutilans		NE		On various Salix species
Mocydiopsis attenuata		NE		On grasses in open habitats, particularly on calcareous soils
Populicerus confusus		NE		On various Salix species
Psammotettix confinis		NE		In various grasslands
Zyginidia scutellaris		NE		In various dry grasslands
Cixiidae	**Planthoppers (part)**			
Cixius nervosus		NE		In a wide range of habitat types, but most frequent in woods
Tachycixius pilosus		NE		Nymphs develop at the base of grasses in dry places, adults on low vegetation, bushes and trees
Delphacidae	**Planthoppers (part)**			
Anakelisia fasciata		NE		On tall sedges in fens and marshes
Conomelus anceps		NE		On Juncus species
Hyledelphax elegantulus		NE		On grasses in open fairly dry situations; probably particularly associated with Deschampsia flexuosa
Javesella pellucida		NE		On grasses in a wide range of situations
Muellerianella fairmairei		NE		On Holcus lanatus in various grasslands
Scottianella dalei		NE	NS(Nb)	In dry grassland
Stenocranus major		NE		On Phalaris arundinacea in marshes

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
HYMENOPTERA				
Andrenidae	**Bees (part)**			
Andrena haemorrhoa		NE		Visits numerous spring flowers and nests in many habitats. Widespread and common
Andrena minutula		NE		Nests in the ground in a range of open, particularly disturbed, sites. Double brooded. Widespread and common
Andrena similis		NE	NS(Nb)	Various open habitats, collecting pollen from legumes. Widespread but very local in England and Wales, also in Scotland
Andrena subopaca		NE		Nests in open woodland situations. Usually single brooded. Locally frequent throughout Britain as far north as Moray
Apidae	**Bees (part)**			
Bombus hypnorum		NE		Colonised southern England in the late 1990s and is now well established. Often found in gardens. Nests in holes in trees and bird boxes
Bombus lapidarius		NE		Various habitats, nesting underground. Very widespread and common throughout Britain
Bombus lucorum		NE		Various habitats, typically nesting in rodent burrows. Widespread in lowland Britain
Bombus pascuorum		NE		Various habitats, nesting under dense vegetation. Very common and widespread throughout Britain
Bombus terrestris		NE		Various habitats, nesting underground. Veru widespread and common in lowland Britain
Colletidae	**Bees (part)**			
Colletes hederae		NE		Found in Britain for the first time in Dorset in 2001, where it has since proved to be abundant. An autumnal species often seen on ivy flowers
Hylaeus hyalinatus		NE		In a wide range of habitats on light soils, nesting in the ground. Widespread in southern Britain
Hylaeus signatus		NE	NS(Nb)	Various calcareous habitats, collecting pollen from Reseda species. Local in southern Britain
Halictidae	**Bees (part)**			
Halictus tumulorum		NE		A ground-nesting species, exploiting various habitats on light soils. Widespread and common
Lasioglossum fulvicorne		NE		Strongly associated with unimproved chalk grassland, nesting in light soils.Widespread but local in England
Lasioglossum leucopus		NE		Various habitats, nesting in a range of soils and visiting numerous flowers. Widespread and locally common
Lasioglossum malachurum		NE	NS(Nb)	Various habitats, using a variety of plants as pollen sources. Formerly scarce, but now widespread in southern and central England
Lasioglossum morio		NE		Various open habitats, nesting in south-facing slopes and visiting a range of flowers. Widespread in southern Britain
Lasioglossum pauxillum		NE	NS(Na)	Various open habitats on light soils. Southern and central England
Sphecodes crassus		NE	NS(Nb)	A cuckoo bee of various Lasioglossum species. Locally common in southern England
Megachilidae	**Bees (part)**			
Hoplitis spinulosa		NE		Favours open, calcareous habitats, nesting in snail shells and visiting composites. Local in southern England and Wales

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Crabronidae	**Digger wasps**			
Passaloecus singularis		NE		Various habitats, nest in dead wood and stems. Prey, aphids. Widespread in England and Wales
Eumenidae				
Gymnomerus laevipes		NE		Various habitats, nests in hollow stems. Usual prey is larvae of Hypera weevils. Local in southern England
Formicidae	**Ants**			
Formica fusca		NE		Various open habiats. Common throughout southern Britain, but rare in Scotland
Lasius flavus	Yellow Meadow Ant	NE		Common species but a high density of large nests indicates long undisturbed grassland
Lasius niger		NE		Numerous habitats including gardens. Widely distributed, but absent from some parts of Scotland
Myrmica scabrinodis		NE		Various open habitats which are not too dry. Widespread in Britain
Pompilidae	**Spider-hunting wasps**			
Priocnemis parvula		NE		various habitats on sandy soils, nests stocked with wolf spiders. Widespread but local throughout Britain
Argidae	**Sawflies (part)**			
Arge cyanocrocea		NE		Common in England and Ireland on Umbelliferae. Larvae feed on Rubus
Arge melanochroa		NE		Larvae feed on Crataegus. In England south of the Wash-Severn line
Tenthredinidae	**Sawflies (part)**			
Dolerus aericeps		NE		Larvae on Equisetum. Very common in England but scarcer in Scotland and Wales
Dolerus vestigialis		NE		Larvae on Equisetum. Widely distributed throughout Britain.
Nematus oligospilus		NE		Larvae on Salix. Found throughout Britain
Selandria serva		NE		Larvae on various Cyperaceae, Gramineae and Juncaceae. Widespread and common in marshy places throughout
Selandria sixii		NE		
Tenthredopsis coqueberti		NE		
Tiphiidae				
Tiphia minuta		NE	NS(Nb)	In open habitats on sandy and chalky soils. Local throughout England and Wales
Vespidae				
Vespula vulgaris	Common Wasp	NE		A social wasp found in various habitats, widespread throughout Britain
LEPIDOPTERA	**BUTTERFLIES & WASPS**			
Crambidae				
Chrysoteuchia culmella		NE		In dry grassland, larvae feed on various grasses. Widespread throughout Britain

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Crambus perlella		NE		Various grasslands, larvae feed on grasses. Widespread throughout Britain
Erebidae				
Eilema griseola	Dingy Footman	NE		Inhabits fenland, damp woodland and coastal cliffs, the larva feeding on unspecified lichens. Widely distributed in the southern half of Britain
Euclidia glyphica	Burnet Companion	NE		Downland, woodland rides and clearings, the larva feeding on Trifolium spp. and Lotus spp. Local throughout Britain
Tyria jacobaeae	Cinnabar	NE	S41	Various open habitats; larvae on ragworts. Widespread througout much of Britain
Geometridae				
Aplocera plagiata	Treble-bar	NE		Inhabits downland, moorland and woodland, the larva feeding on Hypericum spp. Throughout the British Isles, represented in parts of central and northern Scotland by the race scotica
Camptogramma bilineata	Yellow Shell	NE		Very common species of various habitats, the larvae developing on docks, chickweeds and various other low herbage species
Chiasmia clathrata	Latticed Heath	NE	S41	In various open habitats, larvae on herbaceous legumes. Widespread
Hesperiidae				
Ochlodes sylvanus	Large Skipper	LC		Various open habitats, larvae feed on grasses. Widespread in England and Wales
Pyrgus malvae	Grizzled Skipper	VU	S41	Various open habitats, larvae feeding on Agrimony, Wild Srawberry and Creeping Cinquefoil. Local in southern England and parts of Wales
Thymelicus lineola	Essex Skipper	LC		Various open habitats, larvae feed on grasses, Widespread in southeast and central England
Nemophora metallica		NE		In calcaerous grassland, larvae feed on scabious. Very local in southern Britain
Lycaenidae				
Polyommatus icarus	Common Blue	LC		Various open habitats. larvae feed on various herbaceous legumes. Widespread throughout Britain
Noctuidae				
Autographa gamma	Silver Y	NE		Mainly a migrant moth, most abundant in southern and eastern England but reaching all the British Isles
Nymphalidae				
Aglais urticae	Small Tortoiseshell	LC		Various habitats, larvae feed on Urtica dioca. Widespread throughout Britain
Aphantopus hyperantus	Ringlet	LC		Damp woodland rides and scrub on heavy soils, larvae feed on various grasses. Widespread throughout England, Wales and parts of Scotland
Coenonympha pamphilus	Small Heath	NT	S41	Various open habitats; larvae on fine-leaved grasses. Widespread throughout Britain
Maniola jurtina	Meadow Brown	LC		Various grasslands, very common throughout Britain
Melanargia galathea	Marbled White	LC		Various open habitats, including calcareous grassland, road verges and field margins. Larvae feed on grasses. Local in southern and central England and south Wales

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Pyronia tithonus	Gatekeeper	LC		Various open habitats, including woodland rides, larvae feed on grasses. Widespread throughout England and Wales
Vanessa atalanta	Red Admiral	LC		Various habitats, larvae feed on Urtica dioca. A migrant but also overwinters. Widespread throughout Britain
Pieridae				
Gonepteryx rhamni	Brimstone	LC	WNI	Various habitats, larvae feed on Frangula and Rhamnus. Widespread in England and Wales
Pieris brassicae	Large White	LC		Various habitats, larvae feed on Brassicaceae. Widespread throughout Britain
Pieris napi	Small White	LC		Various open habitats, larvae feed on various Brassicaceae. Widespread throughout Britain
Plutellidae				
Plutella xylostella	Diamond-backed Moth	NE		A common migrant
Pterophoridae				
Marasmarcha lunaedactyla	Crescent Plume	NE		In calcaerous grassland, quarries and sand dunes, larvae feeding on rest harrow. Widespread in southern England and parts of Wales
Pyralidae				
Homoeosoma sinuella		NE		Various dry open habitats, larvae feeding in the roots of plantains. Southern and central England and south Wales
Tortricidae				
Acleris variegana		NE		Various habitats, larvae feeding on Rosaceae. Common throughout England, Wales and southern Scotland
Aethes hartmanniana		NE		
Dichrorampha petiverella		NE		In grasslands, larvae feed on Yarrow. Widespread in Britain
Endothenia gentianaeana		NE		Various open habitats, larvae in teasel flowerheads. Widespread in southern Britain
Eucosma cana		NE		Various open habitats, larvae feed in the flowerheads of thistles and knapweed. Widespread throughout Britain
Grapholita compositella		NE		In grassland, larvae feed on the leaves, flower-heads and in the stem of Trifolium species.Widespread in England and Wales
Zygaenidae				
Zygaena filipendulae	Six-spot Burnet	NE		Various open habitats; larvae on Lotus corniculatus. Widespread and common in England and Wales, coastal in Scotland.
NEUROPTERA	**LACEWINGS**			
Chrysopidae				
Chrysopa perla		NE		In the undergrowth of deciduous woods, feeding on aphids. Widespread throughout Britain
Chrysoperla carnea		NE		Various habitats including gardens. Larvae are active predators on the foliage of shrubs and trees. Widespread throughout Britain
Dichochrysa prasina		NE		In a wide range of habitats with bushes or trees. Widely distributed and common, at least in the south of England
Hemerobiidae				

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Hemerobius lutescens		NE		Found on and around broadleaved trees and bushes in woodland and elsewhere. The larvae are active predators amongst the foliage. It is widespread throughout Britain and generally common
Micromus variegatus		NE		Amongst low vegetation in a wide range of habitats. The larvae are active predators on foliage. Widespread in southern Britain
Psectra diptera		NE		In low dense vegetation in various habitats. Larvae are active predators. Local throughout Britain
Sialidae				
Sialis lutaria		NE		Near ponds and sluggish streams where there is an abundance of silt. Larvae are aquatic and predacious, living amongst mud and detritus. Common and widely distributed
ODONATA	**DRAGONFLIES & DAMSELFLIES**			
Aeshnidae				
Aeshna cyanea	Southern Hawker	LC		In mesotrophic lakes, ponds, canals and ditches, including gardens. Widespread in southern Britain
Aeshna mixta	Migrant Hawker	LC		In ponds and lakes with well vegetated margins, avoiding acidic water bodies. Widespread in England and Wales
Anax imperator	Emperor Dragonfly	LC		In larger ponds, lakes, flooded sand and gravel pits, dykes, canals and slow flowing rivers. Widespread in southern England and south Wales
Coenagriidae				
Coenagrion puella	Azure Damselfly	LC		A generalist; all types of still and slow flowing water with abundant emergent vegetation. Widespread in much of Britain
Coenagrion pulchellum	Variable Damselfly	NT	NS	In various slow-flowing waterbodies. Local across southern England and Wales
Enallagma cyathigerum	Common Blue Damselfly	LC		A generalist; all types of still and slow flowing water where there is abundant marginal vegetation. Widespread and common throughout Britain
Ischnura elegans	Blue-tailed Damselfly	LC		A generalist; all types of still and slow moving water. Widespread and very common in England and Wales, rather more restricted in Scotland
Lestidae				
Lestes sponsa	Emerald Damselfly	LC		In all types of still, lowland water with abundant emergent vegetation. Widespread and common in the lowlands of Britain
Libellulidae				
Libellula depressa	Broad-bodied Chaser	LC		In well-vegetated water bodies including garden ponds. It can tolerate mildly polluted conditions. Widespread throughout England and Wales
Libellula quadrimaculata	Four-spotted Chaser	LC		In various still-water habitats from grazing level ditches to bog pools and lochans in upland areas. Widespread throughout Britain
Sympetrum striolatum	Common Darter	LC		Various still to slow flowing water bodies. Widespread throughout Britain
ORTHOPTERA	**GRASSHOPPERS & BUSH CRICKETS**			
Acrididae				

Group / Species	English name	IUCN Status	GB rarity Status	Associations / Ecology
Chorthippus brunneus	Field Grasshopper	LC		Various dry grasslands. Generally common over the whole of Britain
Chorthippus parallelus	Meadow Grasshopper	LC		In all types of moderately long grassland, particularly in moister areas. Very widely distributed and common
Omocestus viridulus	Common Green Grasshopper	LC		Found in a wide range of grassland situation and generally common throughout Britain, though possibly declining
Phaneropteridae				
Leptophyes punctatissima	Speckled Bush Cricket	LC		On low vegetation in woodland edges, scrub, hedges and gardens. Widespread throughout England and Wales
Tetrigidae				
Tetrix subulata	Slender Groundhopper	LC		In damp places such as water meadows, fens, stream margins and wet woodland rides. Locally common throughout England and Wales
Tetrix undulata	Common Groundhopper	LC		Found on bare ground. Widespread throughout Britain but increasingly coastal in the north
Tettigoniidae				
Metrioptera roeselii	Roesel's Bush Cricket	LC		Usually found in long grassland. Historically scarce but now widespread in southern and central England
TRICHOPTERA	**CADDISFLIES**			
Limnephilidae				
Grammotaulius nigropunctatus		LC		Widespread and common species of grassy marshes that dry up over summer
Limnephilus luridus		LC		A widespread and common species of acidic marshes and bogs, also, woodland pools
Limnephilus marmoratus		LC		A widespread and common species of still waters of all types, usually ones that dry up to a central wet area

APPENDIX 2: INVERTEBRATE STATUS CODES

The new IUCN status codes

Many British invertebrate species have been assigned a formal status code. These codes are paramount in the definition of noteworthy species and accordingly, it is necessary to explain them here.

Natural England has recently instigated a new programme of invertebrate status reviews, in which species are assessed according to universally accepted criteria set by the International Union for the Conservation of Nature (IUCN) (IUCN 2012a, 2012b, 2014). In contrast to previous status assessments, which focussed largely on absolute rarity, the IUCN approach places each species into a threat category that also takes historic population trends into account. Species qualifying for a threat status (Critically Endangered, Endangered or Vulnerable) are those that are not only rare, but also have a history of decline or extreme population fluctuations. Species not assigned to a threat category are categorised as Near Threatened, Least Concern, Data Deficient or Not Applicable.

As of 2016, a total of almost 4000 species have been reviewed in accordance with IUCN guidelines. All of these belong to groups that have readily available identification keys, active recorders and a history of recording. Progress with the IUCN invertebrate status review programme has recently been afforded a very useful summary (Webb & Brown, 2016).

A key to the IUCN status codes is given below and summarised in Fig. 1.

REGIONALLY EXTINCT (RE)
A taxon is Extinct when there is no reasonable doubt that the last individual has died.
CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Table 1). Critically Endangered species that are likely to be Extinct, but for which confirmation is still required are reported as Critically Endangered (Possibly Extinct), abbreviated as CR(PE).
ENDANGERED (EN)
A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Table 1).
VULNERABLE (VU)
A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Table 1).
NEAR THREATENED (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
LEAST CONCERN (LC)
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
DATA DEFICIENT (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.
NOT EVALUATED (NE)
A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.
NOT APPLICABLE (NA)
This category is typically used for introduced non-native species whether this results from accidental or deliberate importation. It may also be used for recent colonists (or attempted colonists) responding to the changing conditions available in Britain as a result of human activity and/or climate change. The IUCN regard 1500 as the cut-off date after which a species is classed as 'non-native'.

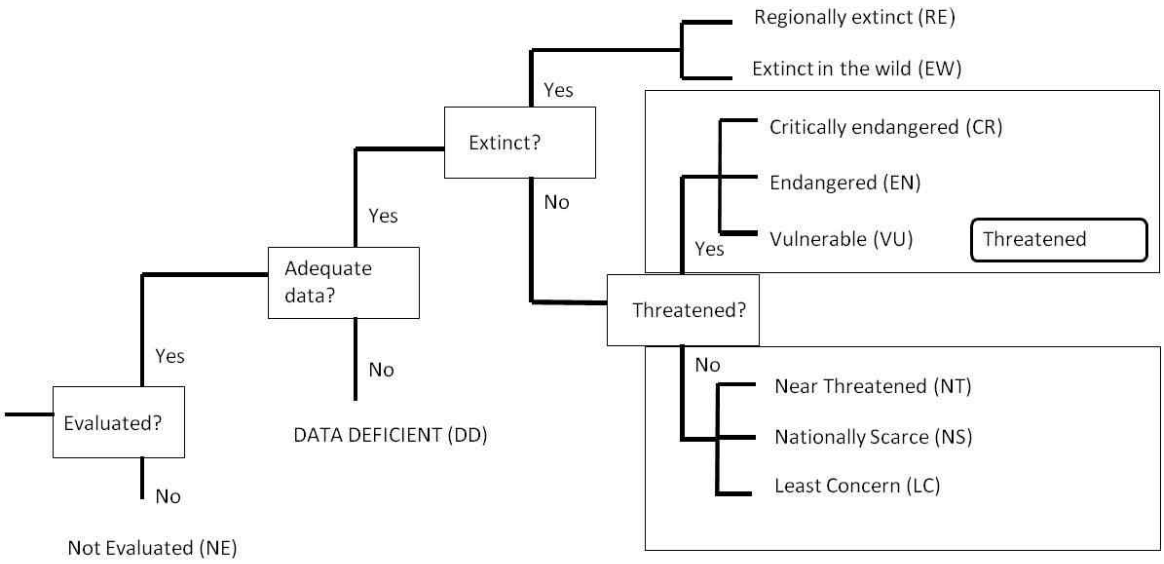


Fig. 1. Hierarchical relationships of the categories

Taxa listed as Critically Endangered, Endangered or Vulnerable are defined as Threatened (Red List) species. For each of these threat categories there is a set of five main criteria A-E, with a number of sub-criteria within A, B and C (and an additional sub-criterion in D for the Vulnerable category), and one of which qualifies a taxon for listing at that level of threat. The qualifying thresholds within the criteria A-E differ between threat categories and are summarised in Table 1.

Table 1. Summary of the thresholds for the IUCN Criteria

Criterion	Main thresholds *Critically Endangered*	*Endangered*	*Vulnerable*
A. Rapid decline	>80% over 10 years or 3 generations in past or future	>50% over 10 years or 3 generations in past or future	>30% over 10 years or 3 generations in past or future
B. Small range + fragmented, declining or fluctuating	Extent of occurrence <100 km^2 or area of occupancy <10 km^2 + two of the following: - severely fragmented or only a single location - continuing decline - extreme fluctuations	Extent of occurrence <5,000 km^2 or area of occupancy <500 km^2 + two of the following: - severely fragmented or no more than 5 locations - continuing decline - extreme fluctuations	Extent of occurrence 20,000 km^2 or area of occupancy <2,000 km^2 + two of the following: - severely fragmented or no more than 10 locations - continuing decline - extreme fluctuations
C. Small population and declining	<250 mature individuals, population declining	<2,500 mature individuals, population declining	<10,000 mature individuals, population declining
D. Very small population	<50 mature individuals	<250 mature individuals	D1. <1,000 mature individuals
D2. Very small area of occupancy			D2. <20 km^2 or 5 or fewer locations
E. Quantifiable probability of extinction	>50% within 10 years or three generations	>20% within 20 years or five generations	>10% within 100 years

Current GB rarity codes (IUCN assessed species)

The IUCN reviews also provide an assessment of rarity, based purely on the number of hectads (10km x 10km squares) in which any given species occurs. Two categories are defined:

Nationally Rare (NR)
Species recorded from between 1 and 15 hectads within a given date class when there is reasonable confidence that exhaustive recording would not find them in more hectads.

Nationally Scarce (NS)
Species recorded from between 16 and 100 hectads within a given date class when there is reasonable confidence that exhaustive recording would not find them in more hectads.

Broadly speaking, the Nationally Rare category is equivalent to the Red Data Book categories used by Shirt (1987) and Bratton (1991), namely: Endangered (RDB1), Vulnerable (RDB2), Rare (RDB3) and Insufficiently Known (RDBK). The Nationally Scarce category is directly equivalent to the combined Nationally Notable A (Na) and Nationally Notable B (Nb) categories introduced by the Nature Conservancy Council (Ball, 1986).

Current GB rarity codes (Non-IUCN assessed species)

For species not yet evaluated against the IUCN criteria, the most recent conservation status assessment is given, as specified by the Red Data Book categories (Shirt, 1987; Bratton, 1991) and Nationally Notable categories (Ball, 1986):

RDB1 (Endangered)
Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. These include:

- Species known from only a single locality since 1970.
- Species restricted to habitats that are especially vulnerable.
- Species which have shown a rapid and continuous decline in the last 20 years and are now estimated to exist in 5 or fewer localities.
- Species believed extinct but which would need protection if re-discovered.

RDB2 (Vulnerable)
Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. These include:

- Species declining throughout their range.
- Species in vulnerable habitats.
- Species whose populations are low.

RDB3 (Rare)
Taxa with small populations that are not at present endangered or vulnerable but which are at risk. These include:

- Species that are estimated to occur in 15 or fewer localities.

RDBK (Insufficiently known)
Taxa suspected to fall within the RDB categories but which are insufficiently known to enable placement.

RDBi (Indeterminate)
Taxa believed to qualify as either RDB1, RDB2 or RDB3 but which cannot be reliably placed into any category.

pRDB (Provisional)
The prefix 'p' before any Red Data Book category implies that the grading is provisional., pending the publication of a future edition of the Red Data Book.

Nationally Scarce species are those falling within the Nationally Notable categories introduced by Ball (1986). They are species that are estimated to occur within the range of 16 to 100 ten-kilometre squares of the British National Grid system since 1970. Notable species are subdivided as follows:

NS (Na)
Species estimated to occur within the range of 16 to 30 10-kilometre squares of the National Grid System, or for less well-recorded groups, within seven or fewer vice counties.

NS (Nb)
Species estimated to occur within the range 31 to 100 10-kilometre squares of the National Grid System, or for less well-recorded groups, between eight and 20 vice counties.

NS (N)
Species estimated to occur in 16 to 100 10 km squares in Great Britain. The subdividing of this category into Nationally Scarce A and Nationally Scarce B has not been attempted for some species because of either the degree of recording that has been carried out in the group to which the species belongs, or because there is some other reason why it is not possible to be so exact.

Recent provisional status assessments
Certain poorly recorded Dipteran groups have been subject to recent status assessment which is not based on comparisons of hectad data over two time periods (Falk et. al, 2016). This review uses IUCN status terminology with the added prefix 'p' (e.g. pVulnerable and pNationally Scarce) to indicate that these are provisional assessments based on data which would be insufficient for a formal IUCN status review. The category 'Data Deficient' (DD) is included.

APPENDIX 5

Ecological Baseline (wider site)

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Bicester Heritage: Site-Wide Ecological Baseline and Survey Methodologies

1. INTRODUCTION

1.1. Ecology Solutions was commissioned by Bicester Heritage in 2018 to undertake Ecological Assessment work of lands at Bicester Heritage (Bicester Airfield) and Stratton Audley Quarry, Bicester, Oxfordshire (see Plan ECO1). Together these sites are hereafter referred to as the wider site.

1.2. A suite of ecological survey work has been completed (and is ongoing) across the wider site between 2018 and 2019. The purpose of this survey work is both to inform the emerging, aspirational masterplan for the wider site and moreover to inform an appropriate, biodiversity led restoration scheme for the Stratton Audley Quarry site.

1.3. This report serves to summarise the baseline survey findings from the survey work completed in 2018 and 2019 across the wider site.

2. SURVEY METHODOLOGY

2.1. The methodology utilised for the survey work can be split into three areas, namely desk study, habitat survey and faunal survey. These are discussed in more detail below.

2.2. Desk Study

2.2.1. In order to compile background information on the Site and its immediate surroundings, Ecology Solutions contacted the Thames Valley Environmental Records Centre (TVERC).

2.2.2. Information has been provided by TVERC and is referenced within this report, where appropriate. Information regarding designated sites is also shown where appropriate on Plan ECO1.

2.2.3. Further information on designated sites from a wider search area was also obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC)[1] database. This information is reproduced where appropriate on Plan ECO1.

[1] http://magic.defra.gov.uk

2.3. **Habitat Survey Methodology**

2.3.1. Habitat surveys were carried out in May, June and August 2018 to ascertain the general ecological value of the land contained within the boundaries of the wider site and to identify the main habitats and associated plant species, with notes on fauna utilising the site.

2.3.2. The site was surveyed based around extended Phase 1 survey methodology[2], as recommended by Natural England, whereby the habitat types present are identified and mapped, together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential which require further survey. Any such areas identified can then be examined in more detail.

2.3.3. Using the above method, the site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified.

2.3.4. All of the species that occur in each habitat would not necessarily be detected during survey work carried out at any given time of the year, since different species are apparent at different seasons. However, given the habitats present, it is considered that an accurate and robust assessment of the ecological value of the habitats present within the Site has been made.

2.4. **Faunal Survey**

2.4.1. General faunal activity observed during the course of the survey was recorded, whether visually or by call. Specific attention was paid to the potential presence of any protected, rare, notable or Priority Species. In addition, specific surveys were undertaken for bats, Badgers (*Meles meles*), amphibians and reptiles.

2.4.2. **Bats**. Bat surveys were undertaken in May, June and August 2018 to assess the potential for roosting bats within trees on and adjacent to the Site. The work was undertaken by an experienced bat worker and aimed to establish the likelihood of presence / absence of bats.

2.4.3. Field surveys were undertaken with regard to best practice guidelines issued by Natural England (2004[3]), the Joint Nature Conservation Committee (2004[4]) and the Bat Conservation Trust (2016[5]).

2.4.4. The probability of a building / structure being used by bats as a summer roost site increases if it:

- is largely undisturbed;

[2] Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit*. England Field Unit, Nature Conservancy Council, reprinted JNCC, Peterborough.
[3] Mitchell-Jones, A. J. (2004). *Bat Mitigation Guidelines*. English Nature, Peterborough.
[4] Mitchell-Jones, A.J. & McLeish, A.P. (Eds.) (2004). *Bat Workers' Manual*. 3rd edition. Joint Nature Conservation Committee, Peterborough.
[5] Collins, J. (Eds.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)*. Bat Conservation Trust, London.

- dates from pre 20th Century;
- has a large roof void with unobstructed flying spaces;
- has access points for bats (though not too draughty);
- has wooden cladding or hanging tiles; and
- Is in a rural setting and close to woodland or water.

2.4.5. Conversely, the probability decreases if a building / structure is of a modern or pre-fabricated design / construction, is in an urban setting, has small or cluttered roof voids, has few gaps at the eaves or is a heavily disturbed premises.

2.4.6. The main requirements for a winter / hibernation roost site is that it maintains a stable (cool) temperature and humidity. Sites commonly utilised by bats as winter roosts include cavities / holes in trees, underground sites and parts of buildings. Whilst different species may show a preference for one of these types of roost site, none are solely dependent on a single type.

2.4.7. All trees at the wider site were assessed for their potential to support roosting bats. For a tree to be classed as having some potential for roosting bats it must usually have one or more of the following characteristics:

- obvious holes, e.g. rot holes and old woodpecker holes;
- dark staining on the tree below a hole;
- tiny scratch marks around a hole from bats' claws;
- cavities, splits and/or loose bark from broken or fallen branches, lightning strikes etc.;
- very dense covering of mature Ivy *Hedera helix* over trunk.

2.4.8. In addition, bat activity surveys and accompanying static monitoring surveys were undertaken throughout the wider site in order to establish whether there are any features of potential importance for foraging and commuting bats. Activity surveys were undertaken on a monthly basis between May and October 2018.

2.4.9. The evening activity bat surveys were conducted from sunset to approximately 2 hours after sunset. Surveyors utilised EchoMeter Touch 2 Pro (EMT 2 pro) bat detectors to aid identification of bats and record data. Surveyors walked transects in order to encompass all features of potential value to foraging and commuting bats, including hedgerows, treelines and scrub. All bat data recorded was subsequently analysed using Kaleidoscope bat sound analysis software.

2.4.10. Activity surveys undertaken between May and October 2018 were accompanied by static monitoring surveys. SongMeter SM4 bat detectors were deployed at strategic locations, as shown on Plan ECO3, for at least five consecutive nights. These surveys allowed for a longer term assessment of the use of the site by foraging and commuting bats.

2.4.11. **Badgers.** Surveys were undertaken to search for evidence of Badgers in June and August 2018 and comprised two main elements. The first of these was a thorough search for evidence of Badger setts. For any setts encountered each sett entrance would be recorded and plotted, even if the entrance appeared disused. The following information was recorded if appropriate:

2.4.12. 

2.4.13. **Amphibians.** The wider site supports a number of waterbodies, including ponds and wet ditches, which were considered to offer potential opportunities for breeding amphibian species (including Great Crested Newts *Triturus cristatus*).

2.4.14. As such, detailed aquatic surveys were undertaken by Ecology Solutions between May and June 2018 to ascertain the presence or absence of this species from the wider site. A summary of the dates of surveys and the weather conditions during these surveys is included at Table 1, below.

Date	Survey Number	Weather Conditions
10.05.18	1	11C, 30% cloud cover, dry
14.05.18	2	7C, 5% cloud cover, dry
16.05.18	3	5C, 25% cloud cover, dry
07.06.18	4	16C, 100% cloud cover, dry
19.06.18	5	19C, 95% cloud cover, dry
21.06.18	6	17C, 5% cloud cover, dry

Table 1: 2018 Great Crested Newt Survey Dates and Weather Conditions

2.4.15. All of the surveys were undertaken in suitable weather conditions in accordance with the Natural England guidelines[6] to determine the presence or absence of Great Crested Newts. Surveys undertaken by Ecology Solutions utilised three methods per visit (torch survey, bottle-trapping and egg searches), where possible.

[6] English Nature (2001) *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

2.4.16. Suitable survey weather conditions are deemed to be those nights when the night-time air temperature is more than 5°C, with little or no wind, and no rain, and surveys were conducted during such conditions.

2.4.17. Torch counting involved the use of high-powered torches to find and, if possible, count the number of adults of each amphibian species. As recommended by Natural England the entire margin of each waterbody was walked once, slowly checking for Great Crested Newts.

2.4.18. Bottle-trapping involved setting traps made from two litre plastic bottles around the margin of each waterbody, and leaving the traps set overnight before checking them the following morning. A density of at least one trap per two metres of shoreline was utilised, where possible, as recommended by Natural England.

2.4.19. In addition an egg search was undertaken of any aquatic vegetation to search for any evidence of breeding Great Crested Newts.

2.4.20. It should also be noted that a significant density of reptile tins were deployed in suitable terrestrial habitat within the wider site, which represents an additional form of survey work for amphibian species.

2.4.21. **Reptiles.** Specific surveys to identify the presence or absence of reptiles within the site were undertaken between August and October 2018.

2.4.22. Following an initial assessment to identify areas of suitable reptile habitat within the wider site, refugia surveys were undertaken. It was considered, given the size of the site, that a complete tinning exercise would be impractical, on this basis a sampling survey was utilised. A total of 700 'tins' (0.5 x 0.5 metre squares of heavy roofing felt which are often used as refuges by reptiles) were distributed in groups of between 20 and 60 within specific areas of suitable reptile habitat within the site, in order to provide a representative sample of the use of these habitats by reptiles.

2.4.23. These tins were left in place for two weeks to 'bed in' and subsequently surveyed for reptiles beneath or upon the tins during suitable weather conditions.

2.4.24. Suitable weather conditions to carry out surveys are when the air temperature is between 9 and 18°C. Heavy rain and windy conditions should be avoided.

2.4.25. The tins provide shelter and heat up quicker than the surroundings in the morning and can remain warmer than the surroundings in the late afternoon. Being ectothermic (cold blooded), reptiles use them to bask and raise their body temperature which allows them to forage earlier and later in the day.

2.4.26. **Breeding Birds.** The site supports a variety of habitats offering potential opportunities for breeding birds, including scattered scrub, dense scrub, woodland, grassland, recolonising bare ground and waterbodies.

2.4.27. As such, and in order to assess the importance of the wider site to breeding birds, three early morning surveys were conducted between May and July 2018 in order to assess breeding bird activity within the site. The weather conditions during the surveys are given in Table 2.

Date	Start Time	Weather Conditions
15th May 2018	04:45	7C, 70% cloud cover, dry
13th June 2018	04:30	7C, 30% cloud cover, dry
21st June 2018	04:30	10C, 0% cloud cover, dry

Table 2. Dates of breeding bird surveys and weather conditions.

2.4.28. On each survey, an experienced ornithologist walked a circuitous route around the site, covering all field margins, recording the locations, numbers and activity of all bird species present within the area during this time. Over the three visits this methodology should ensure that the vast majority of species present at the site are recorded, although some species that may use the site as part of a larger territory (especially nocturnal species such as owls) may be missed.

2.4.29. To ascertain the breeding status of birds using the site, the following criteria were applied following the methodology used in the 'Atlas' surveys of 1988-1991 (Gibbons et al, 1993). This accepts the following activities as denoting breeding (including those probably breeding although definite proof was lacking):

- Bird apparently holding territory.
- Courtship and display.
- Nest-building (including excavating nest-hole).
- Distraction display or feigning injury.
- Adult carrying faecal sac or food.
- Adult entering or leaving apparently occupied nest site.
- Nest with eggs or eggshells found, or bird sitting but not disturbed.
- Nest with young; or downy young of ducks, game-birds, waders and other nidifugous species.
- Recently fledged young.

2.4.30. **Wintering Birds.** The wider site was subject to wintering in January, February and March 2019. The adopted survey methodology includes for a walked transect of the wider site with stops at numerous vantage points. The dates and weather conditions for the surveys are detailed in Table 3 below.

Date	Weather Conditions
11th January 2019	50-90% high cloud cover, light air, 6C.
15th February 2019	Cloudless, light air, 14C
4th March 2019	60% Cloud, gentle breeze, 6C

Table 3. Dates of breeding bird surveys and weather conditions.

2.4.31. **Invertebrates.** Specific invertebrate surveys were undertaken at the Site by Colin Plant Associates to assess the importance of the site for a range of invertebrates. A total of 4 surveys were undertaken in 2018, with this allowing for full seasonal coverage of the Site. The dates of these surveys are as follows:

- 8th May 2018
- 9th July 2018
- 14th August 2018
- 11th September 2018

2.4.32. The sampling methodology for these surveys is detailed at Appendix 1 and is summarised below:

***Sweep-netting**. A stout hand-held net is moved vigorously through vegetation to dislodge resting insects. The technique may be used semi-quantitatively by timing the number of sweeps through vegetation of a similar type and counting selected groups of species.*

***Beating trees and bushes**. A cloth tray, held on a folding frame, is positioned below branches of trees or bushes and these are sharply tapped with a stick to dislodge insects. Black or white trays are used depending upon which group of invertebrates has been targeted for search. Insects are collected from the tray using a pooter – a mouth-operated suction device.*

***Grubbing/hand searching**. Important host plants may be searched by hand. This is particularly useful for species which live on or even below the ground surface and can be found by grubbing around and underneath basal leaf rosettes. Other invertebrate microhabitats such as loose bark, litter, fungi and various decay features associated with dead wood can also be productive when searched by hand. Turning large stones, pieces of wood and other refuse often reveal species which are nocturnally active, in particular ground beetles and rove beetles.*

***Suction Sampling** consists of using a converted leaf blower to collect samples from grass and other longer ground vegetation. The sample is then everted into a net bag and the invertebrates removed with a pooter. The advantage of suction sampling is that it catches species, which do not fly readily, or which live in deep vegetation. It is particularly productive for Coleoptera, some Diptera and Arachnida.*

***Pitfall trapping**. Vending-machine cups or similar are placed in the ground with the rim flush with, or slightly below, the surface. A fluid is added, containing ethylene glycol, sodium chloride and formalin with a little detergent to reduce surface tension. Traps may be covered or uncovered and are typically left in position for a month at a time. Holes made in the sides of the cups a couple of centimetres below the rim permit flood or rain water to drain without the traps over-flowing and the catch becoming lost. Invertebrates simply fall into the traps. This is the single most effective means of recording ground beetles (Carabidae) but is also effective for rove beetles (Staphylinidae), some other beetle groups, spiders and most non-insect soil-dwelling arthropods.*

***Pond netting**. Pond nets on wooden poles with a mesh diameter of one millimetre are used to capture invertebrates from all available aquatic habitats, including open water and amongst emergent, floating and submerged vegetation. Net samples are sorted in white trays on the bankside and stored in 50% isopropyl alcohol for subsequent identification. All three water bodies inside the Stratton Audley Quarry survey boundary were sampled in June and September, with the exception of P1, which was dry following the first visit.*

3. HABITATS

3.1. The wider site was subject to an ecological habitat survey by Ecology Solutions in May, June and August 2018. The vegetation present enabled the habitat types to be satisfactorily identified and an accurate assessment of the ecological interest of the habitats to be undertaken.

3.2. The following main habitat / vegetation types were identified:

- Species-poor Semi-Improved Neutral and Calcareous grassland;
- Semi-Improved Neutral and Calcareous Grassland Mosaic;
- Semi-Improved Calcareous Grassland;
- Broadleaved Semi-natural Woodland;
- Dense Scrub;
- Dense Scrub / Marshy Grassland Mosaic;
- Scattered Scrub;
- Reedbed;
- Marginal Vegetation / Marshy Grassland;
- Hedgerows/treelines;
- Recolonising Bare Ground;
- Hardstanding / Bare Ground;
- Recolonising Hardstanding;
- Waterbodies;
- Wet Ditches; and
- Buildings

3.3. The location of these habitats is shown on Plan ECO2.

3.4. Each habitat present is described below with an account of their representative plant species.

3.5. Where grasslands are described below, species abundance has been considered using the DAFOR scale whereby a species is assigned a category for its abundance within the sward (D = dominant, A = abundant, F = frequent, O = occasional, R = rare).

3.6. **Species-poor Semi-Improved Calcareous Grassland**

3.6.1. The wider site primarily comprises short grassland, located within the airfield itself, which due to the ongoing management regime, which involves regular mowing with the arisings left in-situ, supports a species poor sward of variable composition including species indicative of neutral and calcareous soils.

3.6.2. Species recorded within this habitat include Perennial Rye-grass *Lolium perenne* (F), Smooth meadow-grass *Poa pratensis* (A), Yorkshire Fog *Holcus lanatus* (F), Red Fescue *Festuca rubra* (A), Cock's-foot *Dactylus glomerata* (O), Upright Brome *Bromopsis erecta* (O), Meadow Fescue *Schedonorous pratensis* (O), False Oat-grass *Arrhenatherum elatius* (O), Creeping Bent *Agrostis stolonifera* (O), Common Bent *Agrostis capillaris* (O), Lady's Bedstraw *Gallium verum* (R), Yarrow *Achillea millefolium* (O), White Clover *Trifolium repens* (O), Red Clover *Trifolium pratense* (O), Dandelion *Taraxacum officinale agg.* (O), Common Knapweed *Centaurea*

nigra (R), Ribwort Plantain *Plantago lanceolata* (O), Field Bindweed *Convolvulus arvensis* (O), Creeping Thistle *Cirsium arvense* (O), Broad-leaved Dock *Rumex obustifolius* (R), Creeping Cinquefoil *Potentilla reptans* (O), Hogweed *Heracleum sphondylium* (R), Mugwort *Artemisia vularis* (R), Dove's-foot Cranesbill *Geranium molle* (O), Daisy *Bellis perennis* (O) and Bird's-foot Trefoil *Lotus corniculatus* (R).

3.7. **Semi-Improved Neutral and Calcareous Grassland Mosaic**

3.7.1. Areas of grassland within the wider site which have been largely unmanaged for a substantial period support a more rank grassland structure with a variable composition including areas which are calcareous in nature and areas which display a more neutral character. Species composition within this habitat varies somewhat across the site.

3.7.2. Areas of this habitat supported within the Stratton Audley Quarry area, in the north of the wider site, comprise largely rank grassland dominated by stands of False Oat-grass, which blends into more nutrient poor herb-rich communities where it interfaces with areas of recolonising bare ground and spoil. In addition, presumably due to historical dumping of waste material a number of ornamental species are supported. Wetter areas are also supported and comprise a number of water tolerant species.

3.7.3. Species recorded within these areas include Crested Dog's-tail *Cynosurus cristatus* (A), Yorkshire Fog (D), False Oat-grass (D), Yellow Oat-grass *Trisetium flavescens* (F), Tufted Hair-grass *Deschampsia cespitosa* (O), Red Fescue (A), Meadow Fescue (O), Tall Fescue *Schedonorous arundinaceus* (O), False Brome *Brachypodium sylvaticum* (R), Upright Brome (F), Soft Brome *Bromus hordaceus* (R), Barren Brome *Anisantha sterilis* (R), Perennial Rye-grass (O), Rough Meadow-grass *Poa trivialis* (A), Annual Meadow-grass *Poa annua* (R), Cock's-foot (O), Fern Grass *Catapodium rigidum* (R), Sweet Vernal-grass *Anthoxanthum odoratum* (O), Glaucous Sedge *Carex flacca* (O), Pendulous Sedge *Carex pendula* (O), Hairy Sedge *Carex hirta* (O), False Fox Sedge *Carex otrubae* (O), Spiked Sedge *Carex spicata* (O), Field Wood-Rush *Luzula campestris* (O), Grey Club-rush *Schoenoplectus tabernaemontani* (R), Grass Vetchling *Lathyrus nissolia* (O), Meadow Vetchling *Lathyrus pratensis* (O), Goat's Rue *Galega officinalis* (R), Broad-leaved Everlasting Pea *Lathyrus latifolius* (R), Common Vetch *Vicia sativa* (O), Tufted Vetch *Vicia cracca* (R), Bush Vetch *Vicia sepium* (R), Black Meddick *Medicago lupulina* (O), Spotted Meddick *Medicago Arabica* (R), White Clover (F), Zig-zag Clover *Trifolium medium* (R), Lesser Trefoil *Trifolium dubium* (R), Hop Trefoil *Trifolium campestre* (R), Bird's-foot Trefoil (F), Smooth Tare *Vicia tetrasperma* (O), Hairy Tare *Vicia hirsuta* (R), Ribbed Melilot *Melilotus officinalis* (O), Yellow Rattle *Rhinanthus minor* (O), Common Fleabane *Pulicaria dysenterica* (O), Blue Fleabane *Erigeron acer* (R), Eyebright *Euphrasia sp.* (O), Goats-beard *Trapopogon pratensis* (R), Germander Speedwell *Veronica chamaedrys* (R), Grey Field Speedwell *Veronica polita* (R), Common Knapweed (R), Greater Knapweed *Centaurea scabiosa* (R), Selfheal *Prunella vulgaris* (R), Bugle *Ajuga reptans* (R), Water Mint *Mentha aquatica* (R), White Dead-nettle *Lamium album* (R), Hedge Woundwort *Stachys sylvatica* (R), Hoary Willowherb *Epilobium parviflorum* (O), Short-fruited Willowherb *Epiliobium obscurum* (O), Yarrow (O), Wild Carrot *Daucus carotta* (O), Wild Parsnip *Pastinaca sativa* (R), Oxeye Daisy *Leucanthemum vulgare* (F), Daisy (O), Field Forget-me-not *Myosotis arvensis* (F), Meadow Buttercup *Ranunculus*

acris (O), Creeping Buttercup *Ranunculus repens* (O), Bulbous Buttercup *Ranunculus bulbosa* (R), Ribwort Plantain (F), Creeping Cinquefoil (F), Silverweed *Argentina anserina* (R), Creeping Thistle (R), Spear Thistle *Cirsium vulgare* (O), Prickly Sow-thistle *Sonchus asper,* Bristly Ox-tongue *Helminthothequa echoides* (R), Rough Hawksbeard *Crepis biennis* (R), Hawkweed Sp. *Hieracium sp.* (R), Mouse-ear Hawkweed *Hieracium pilosella* (O), Dandelion (R), Ploughman's Spikenard *inula conzae* (R), Field Horsetail *Equisetum arvense* (O), Cut-leaved Cranesbill *Geranium dissectum* (R), Hedgerow Cranesbill *Geranium pyrenaicum* (R), Dove's-foot Cranesbill (R), Herb Robert *Geranium robertianum* (R), French Cranesbill *Geranium endressii* (R), Common Storksbill *Erodium cicutarium* (R), Agrimony *Agrimonia eupatoria* (O), Bee Orchid *Ophrys apifera* (F), Southern Marsh Orchid *Dactylorhiza praetermissa* (O), Pyramidal Orchid *Anacamptis pyramidalis* (R), Teasel *Dipsacus fullonum* (O), Red Hot Poker *Kniphofia uvaria 'nobilis'* (R), Red Bartsia *Odontites vernus* (R), Lady's Smock *Cardamine pratensis* (R), Common Mouse-ear *Cerastium fontanum* (F), Hairy Rock-cress *Arabis hirsuta* (R), Cleavers *Galium aparine* (O), Lady's Bedstraw (R), Field Madder *Sherardia arvensis* (R), Ragwort *Senecio jacobaea* (R), Common Nettle *Urtica dioica* (O), Bramble *Rubus fruticosus* (O), Water Figwort *Scrophularia auriculata* (R), Common Figwort *Scrophularia nodosa* (R), Hairy St.Johns Wort *Hypericum hirsutum* (O), Square-stalked St. John's Wort *Hypericum tetrapterum* (R), Perforate St. John's Wort *Hypericum perforatum* (R), Lady's Mantle *Achemilla vulgaris* (R), Hoary Cress *Lepidium draba* (R), Ground Elder *Aegopodium podagraria* (O), Curled Dock *Rumex crispus* (R), Wood Dock *Rumex sanguineus* (R), Red Campion *Silene dioica* (R), Russian Comfrey *Symphytum uplandica x* (R), Hemlock *Conium maculatum* (O), Hogweed (R), Upright Hedge Parsley *Torilis japonica* (R), Cow Parsley *Anthriscus sylvestris* (O), Rough Chervil *Chaerophyllum temulum* (R), Greater Burdock *Arctium lappa* (R), Mugwort (R), Reedmace *Typha latifolia* (R), Ground Ivy *Glechoma hederacea* (R), Coltsfoot *Tussilago farfara* (R), Thyme *Thymus vulgaris* (R), Wild Marjoram *Origanum vulgare* (R), Field Bindweed (R), Lungwort *Pulmonaria officinalis* (R), Cowslip *Primula veris* (O), Sun Spurge *Euphorbia helioscopia* (R), Common Mallow *Malva sylvestris* (R), Musk Mallow *Malva moschata* (R), White Iris *Iris hollandica* (R), Purple Toadflax *Linaria purpurea* (R), Snowberry *Symphoricarpos albus* (R), Green Alkanet *Pentaglottis sempervirens* (R), Wild Strawberry *Fragaria vesca* (R), Red Valerian *Centranthus ruber* (R), Great Mullein *Verbascum thapsus* (R), Columbine *Aquilegia vulgaris* (R), Elecampane *Inula helenium* (R), Wood Small-reed *Calamagrostis epigejos* (R), Canary Reed-grass *Phalaris arundinacea* (R), Solomon's Seal *Polygonatum x hybridum* (R), Wood Avens *Geum urbanum* (R), Hybrid Bluebell *Hyacinthoides massartiana* (R), Daffodil *Narcissus pseudonarciussus* (R), Lords and Ladies *Arum maculatum* (R), Biting Stonecrop *Sedum acre* (O), White Stonecrop *Sedum album* (O), Springy Turf-moss *Rhytididelphus squarrosus* (R).

3.7.4. Wetter areas support more water tolerant species including higher densities of Reedmace, Common Fleabane, Grey Club-Rush, Water Figwort, Short-fruited Willowherb, Hard Rush *Juncus inflexus,* Soft Rush *Juncus effusus,* Common Reed *Phragmites australis,* Great Willowherb *Epilobium hirsutum,* Water Mint *Mentha aquatica* and False Fox Sedge.

3.7.5. Areas of this habitat in the southern and south-eastern parts of the wider site (north of Skimmingdish Lane) are notably less species rich than those in the north and are of a more uniform rank structure. These areas are also

subject to significant levels of scrub encroachment and additionally grade into areas of recolonising hardstanding.

3.7.6. Species recorded in these areas include False Oat-grass (D), Red Fescue (D), Meadow Fescue (A), Upright Brome (F), Tor Grass *Brachypodium pinnatum* (O), Creeping Bent (O), Common Bent (O), Soft Brome (O), Smooth Meadow-grass (O), Smaller Cat's-tail *Phleum bertolonii* (O), Yellow Oat-grass (O), Cock's-foot (F), False Brome (R), Glaucous Sedge (O), Spear Thistle (O), Wooly Thistle *Cirsium eriophorum* (R), Creeping Thistle (O), Weld *Reseda luteola* (O), Ragwort (O), Hoary Ragwort *Senecio erucifolia* (O), Hedge Mustard *Sisymbrium officinale* (O), Wintercress *Barbarea vulgaris* (R), Prickly Sow-thistle (O), Bristly Ox-tongue (O), Smooth Hawk's-beard *Crepis capillaris* (R), Blue Fleabane (R), Ploughman's Spikenard (O), Nipplewort *Lapsana communis* (O), Dandelion (O), Common Nettle (O), Common Toadflax *Linaria vulgaris* (O), Mouse-ear Hawkweed (R), Autumn Hawkbit *Scorzoneroides autumnalis* (R), Field Bindweed (F), Field Scabious *Knautia arvensis* (O), Teasel (O), Red Campion (O), White Campion *Silene latifolia* (R), Germander Speedwell (O), Broad-leaved Dock (O), Burnet Saxifrage *Pimpinella saxifraga* (R), Hogweed (O), Wild Angelica *Angelica sylvestris* (R), Hemlock (O), Upright Hedge-parsley (O), Wild Parsnip (O), Lady's Bedstraw (O), Cleavers (O), Field Madder (R), Greater Knapweed (O), Common Knapweed (O), Wild Basil *Clinopodium vulgare* (R), Apple Mint *Mentha suaveolens* (R), Black Horehound *Ballota nigra* (R), Imperforate St. John's Wort *Hypericum maculatum* (R), Perforate St. John's Wort (O), Ribwort Plantain (F), Greater Plantain *Plantago major* (R), Scarlet Pimpernel *Anagallis arvensis* (R), White Clover (O), Lesser Trefoil (R), Hop Trefoil (R), Black Meddick (R), Common Restharrow *Ononis repens* (O), Salad Burnet *Sanguisorba minor* (O), Agrimony (O), Hedgerow Cranesbill (R), Oxeye Daisy (O), Yarrow (F), Woody Nightshade *Solanum dulcamara* (O), Field Forget-me-not (R), Great Mullein (R), Common Mouse-ear (O), Common Chickweed *Stellaria media* (O), Thyme-leaved Sandwort *Arenaria serpyllifolia* (R), Fairy Flax *Linum catharticum* (O), Horse-radish *Amoracia rusticana* (O), Creeping Cinquefoil (O), Creeping Buttercup (R), Common Mallow (R), Rosebay Willowherb *Chamerion angustifolium* (O), Cowslip (O), Red Bartsia (R), Lesser Burdock *Arctium minus* (R), Mugwort (O), Russian Comfrey (R), Lesser Periwinkle *Vinca minor* (R), Parsley Piert *Aphanes arvensis* (R), Common Spotted Orchid *Dactylorhiza fushii* (R), Biting Stonecrop (O) and White Stonecrop (O).

3.8. **Semi-Improved Calcareous Grassland**

3.8.1. Areas of grassland which lie outside of the central airfield but within the wider airfield site are understood to be subject to an annual hay cut, following which the arisings are removed from the site. It is considered likely that this management has been ongoing for a significant period and this has led to the establishment of a calcareous grassland sward indicative of more nutrient poor and calcareous soils. While areas of this grassland are relatively herb-rich the majority of this grassland is dominated by grasses with a relatively low number of forb species supported, in addition a number of species indicative of improved and neutral conditions are present.

3.8.2. While the species composition of this grassland is variable across the mapped areas, several portions, including along the boundary with Stratton Audley Quarry in the north, support a relatively herb-rich structure.

3.8.3. Species recorded within this habitat include Upright Brome (D), Red Fescue (D), Meadow Fescue (F), Tall Fescue (R), Smaller Cat's-tail (O), Timothy *Phleum pratense* (R), Creeping Bent (R), Common Bent (O), Tor Grass (O), Tufted Hair-grass (O), Meadow Oat-grass *Avenula pratensis* (O), Downy Oat-grass *Avenula pubescens* (O), False Oat-grass (O), Crested Dog's-tail (R), Smooth Meadow-grass (O), Rough Meadow-grass (R), Perennial Rye-grass (O), Cock's-foot (O), Yorkshire Fog (R), Fern Grass (R), Yarrow (A), Wild Carrot (O), Oxeye Daisy (F), Daisy (O), Common Knapweed (O), Greater Knapweed (O), Field Scabious (O), Burnet Saxifrage (O), Salad Burnet (O), Bird's-foot Trefoil (O), Lesser Trefoil (R), Hop Trefoil (R), Meadow Vetchling (R), Black Meddick (R), Red Clover (R), White Clover (R), Common Vetch (O), Common Restharrow (R), Wild Mignonette *Reseda lutea* (O), Weld (R), Mouse-ear Hawkweed (O), Smooth Hawk's-beard (R), Common Sorrel *Rumex acetosa* (O), Curled Dock (R), Broad-leaved Dock (R), Field Bindweed (O), Ribwort Plantain (O), Greater Plantain (R), Hoary Plantain *Plantago media,* Selfheal (R), Wild Onion *Allium vineale* (R), White Campion (O), Cow Parsley (O), Wild Parsnip (O), Dandelion (R), Cleavers (R), Mugwort (R), Creeping Thistle (R), Spear Thistle (R), Nodding Thistle *Carduus nutans* (R), Perforate St. John's Wort (O), Wild Marjoram (R), Basil Thyme *Clinopodium acinos* (R), Ploughman's Spikenard (O), Blue Fleabane (O), Agrimony (R), Hogweed (O), Creeping Cinquefoil (O), Common Toadflax (R), Small Toadflax *Chaenorhinum minus* (R), Thyme-leaved Sandwort (O), Fairy Flax (R), Common Nettle (R), Lady's Bedstraw (F), Hoary Ragwort (R), Ragwort (O), Hedgerow Cranesbill (R), Germander Speedwell (R), Meadow Buttercup (R), Moss *Rhytidiadelphus squarrosus,* Field Forget-me-not (R), Cowslip (F), Common Centaury *Centaurium erythraea* (O), Eyebright (R), Common Mouse-ear (R), Sticky Mouse-ear *Cerastium glomeratum* (R) and Field Mouse-ear *Cerastium arvense* (O).

3.9. **Broadleaved Semi-Natural Woodland**

3.9.1. A number of areas of broad-leaved semi-natural woodland are present around the boundaries of the airfield and Stratton Audley Quarry. These habitats are typically comprised of a limited range of woody species and are considered to be relatively young and arising from the development of long established scrub in addition to areas of historical planting.

3.9.2. Areas of woodland are variable in composition however the canopy layer is typically comprised of Hawthorn *Crategus monogyna,* Field Maple *Acer campestre,* Crab Apple *Malus sylvestris,* Apple *Malus domestica,* Sycamore *Acer pseudoplatanus,* Silver Birch *Betula pendula,* Cherry *Prunus avium,* Alder *Alnus glutinosa,* Oak *Quercus robur,* Ash *Fraxinus excelsior* and Crack Willow *Salix fragilis.*

3.9.3. Understorey and shrub layers within these woodlands are of variable structure and composition but are broadly comprised of Blackthorn *Prunus spinosa,* Damson *Prunus domestica sbsp. insititia,* Dog Rose *Rosa canina,* Spindle *Euonymus europaea,* Alder Buckthorn *Rhamnus frangula,* Elder *Sambucus nigra,* Dogwood *Cornus sanguinea,* English Elm *Ulmus minor var. vulgaris,* Gorse *Ulex europaeus,* Broom *Cytisus scoparius,* Redcurrant *Ribes rubrum,* Buddleia *Budleja davidii,* Bramble and Goat Willow *Salix caprea.*

3.9.4. Ground flora is variable given the changes in light levels between more open areas and those with a more closed canopy and include dense carpets of Common Striated Feather-Moss *Eurynchium striatum,* Bramble, Ground Ivy, Lords and Ladies and Bracken *Pteridium aquilinum.* Wood Avens, Ivy *Hedera helix,* Lesser Burdock, Hogweed, False Brome, Teasel, Common Nettle and Ploughman's Spikenard.

3.9.5. The area of woodland which is present to the south of pond P12 is of differing composition from other woodlands within the site and is comprised of a canopy dominated by Aspen *Populus tremula,* Grey Poplar *Populus x canescens,* Ash and Oak. This canopy is fairly open and a sparse understorey is supported.

3.9.6. The understorey is comprised of Hawthorn, Apple, Blackthorn, Elder, English Elm, Dog Rose, Spindle, Oak, Turkey Oak *Quercus cerris* and Buckthorn *Rhamnus cathartica.* Ground flora supported includes Bramble, Lesser Burdock, Hogweed, False Brome, Teasel, Ground Ivy, Common Nettle, Butterbur *Petasites hybridus* and Twayblade *Neottia ovata.*

3.10. **Dense Scrub**

3.10.1. Areas of dense scrub are present throughout the majority of the areas of the site not subject to regular management. These areas have clearly established over pre-existing habitats including grasslands and bare ground and are frequently dominated by just one or two species.

3.10.2. Species comprising this dense scrub include Dog Rose, Hawthorn, Blackthorn, Dogwood, Goat Willow, Crack Willow, Spindle, Buddleia, Gorse, Broom, Field Maple, Damson and Elder.

3.11. **Dense Scrub / Grassland Mosaic**

3.11.1. A single area of established scrub and grassland mosaic lies in the north-west of the Stratton Audley Quarry site. This area has presumably been recolonised following its previous use as a landfill. It largely supports established scrub with pockets of grassland.

3.11.2. Scrub species are largely comprised of Alder, Hawthorn, Blackthorn, Dog Rose, Bramble, Goat Willow, Grey Willow *Salix cinerea,* Apple, Ash and Oak.

3.11.3. Grassland species largely comprise a range of species which are also present in the adjacent areas of neutral and calcareous grassland mosaic. In addition, some marshy areas are supported which are dominated by Soft and Hard Rush. These grassland areas appear to be subject to continuing succession, resulting in a gradual decline in area.

3.12. **Scattered Scrub**

3.12.1. Scattered scrub is present throughout areas of unmanaged grassland and recolonising bare ground and is supported at varying density.

3.12.2. Species comprising this scattered scrub include Hawthorn, Blackthorn, Gorse, Broom, Buddleia, Daisy Bush *Olearia macrodonta,* Field Maple, Dogwood, Dog Rose, Laburnum *Laburnum anagyroides,* Hazel *Corylus*

avellana, Whitebeam *Sorbus aria,* Cotoneaster *Cotoneaster franchetii,* Cotoneaster *Cotoneaster horizontalis,* Goat Willow, Grey Willow, Crack Willow, Flowering Currant *Ribes sanguineum,* Sycamore, Cherry, Elder and Damson.

3.13. **Reedbed**

3.13.1. Several small patches of reedbed are present within the Stratton Audley Quarry area of the wider site. These are comprised of dense stands of Common Reed and Reedmace, and grade into areas of adjacent grassland, scrub and recolonising bare ground.

3.14. **Marginal Vegetation / Marshy Grassland**

3.14.1. Small areas of marginal vegetation and marshy grassland are present within the Stratton Audley Quarry area of the site in association with a number of supported waterbodies. These areas support a range of aquatic and water tolerant species including Reedmace, Floating Sweet-grass *Gyceria fluitans,* Soft Rush, Hard Rush, Common Spike Rush *Eleocharis palustris,* Grey Club-rush, Common Club-rush *Schoenoplectus lacustris,* Great Willowherb, Jointed Rush *Juncus articulatus,* Brooklime *Veronica beccabunga,* Pink Water-speedwell *Veronica catenata,* Gypsywort *Lycopus europaeus* and Common Fleabane.

3.15. **Hedgerows/Treelines**

3.15.1. The Site supports a number of hedgerows and treelines which constitute boundaries to the airfield and also to the Stratton Audley Quarry. These are labelled on Plan ECO2 and described below. None would qualify as species rich under the Hedgerow Regulations 1997.

3.15.2. H1 is located along the western boundary of the airfield, along the A4421, and comprises a gappy unmanaged narrow treeline, up to 13m tall, and comprising English Elm, Ash, Hazel, Hawthorn, Blackthorn, Sycamore, Ivy and Field maple. Gappy areas are dominated by dense stands of Bramble.

3.15.3. H2 is located along the north-western boundary of the airfield, along Bicester Road, and is of similar composition to H1 with a number of more mature Ash and Sycamore present.

3.15.4. H3 is located along the northern boundary of the Stratton Audley Quarry area, along Bicester Road, and is comprised of a band of scrub, including Hawthorn, Blackthorn, Sycamore, Dog Rose and Bramble. It is unmanaged up to 5m in height and grades into continuous dense scrub to the south.

3.15.5. H4 is located along the northern boundary of the Stratton Audley Quarry area and is effectively a continuation of H3, separated by a gateway, however it supports a number of mature Ash.

3.15.6. H5 is located along the north-eastern boundary of the Stratton Audley Quarry area and comprises a wide (approximately 2-4m) short treeline up to 4m in height. Species present include English Elm (dominant), Elder, Hawthorn and Dog Rose.

3.15.7. H6 is located along the north-eastern boundary of the Stratton Audley Quarry area and is largely a continuation of the unmanaged treeline and associated scrub recorded as comprising H5.However a number of middle age Ash and Sycamore are supported.

3.15.8. H7 is located in the north-east of the airfield area and represents the boundary between the airfield and the eastern area of Stratton Audley Quarry. It is an unmanaged gappy line of scrub and immature trees including Hawthorn, Bramble and Blackthorn.

3.15.9. H8 is effectively a continuation of H7 comprising an unmanaged band of bramble scrub with occasional Hawthorn, up to 3m in height.

3.15.10. H9 is an unmanaged hedgerow, and associated bands of scrub, and varies in height between 2 and 4m. It comprises Blackthorn, Hawthorn, Hornbeam *Carpinus betulus,* Bramble, Dog Rose, Field Maple, Ash and Elder.

3.15.11. H10 comprises the northern boundary of the airfield and separates it from the adjacent Stratton Audley Quarry area. It is an unmanaged hedgerow up to 4m in height and is comprised of Blackthorn, Hawthorn, Hornbeam, Bramble, Dog Rose, Field Maple, Ash, Elder and Sweet Chestnut *Castanea sativa.* In its south-western extent it becomes wider and scrubbier, encroaching upon areas of adjacent grassland.

3.15.12. H11 is an unmanaged young treeline, up to 8m in height, with associated scrub below. It is comprised of Ash, Sycamore, Hornbeam, Blackthorn, Hawthorn, Dog Rose and Goat Willow.

3.15.13. H12 is located along the eastern boundary of the Site and comprises a band of unmanaged scrub up to 8m in height. It is comprised of Hawthorn, Blackthorn, Sycamore, Hazel, Elder, Ash and Dog Rose, with significant areas of Bramble also supported.

3.15.14. H13 is located along the eastern boundary of the site and comprises a narrow band of unmanaged scrub including Hawthorn, Blackthorn, Bramble and Dog Rose.

3.15.15. H14 and H15 are located along the southern boundary of the site, along Skimmingdish Lane, and are comprised of a continuous gappy treeline with a gappy line of scrub below. Species supported include Cherry, Dogwood, Silver Birch, Alder, Sycamore, Dog Rose, Blackthorn, Elder, Bramble, Apple, Goat Willow and Ivy.

3.16. **Recolonising Bare Ground**

3.16.1. Areas of bare ground including a number of spoil mounds, associated with the partially restored quarry workings in the north of the wider site have been subject to varying levels of colonisation and succession by a range of plant species. These areas are in the majority comprised of bare ground, with colonising species largely including those recorded within adjacent grasslands and scrub.

3.16.2. Species recorded within these areas include Meadow Fescue, Red Fescue, Tufted Hair-grass, False Oat-grass, Yellow Oat-grass, Rough Meadow-grass, Smooth Meadow-grass, Creeping Bent, Fern-grass, Cock's-foot,

Crested Dog's-tail, Yorkshire Fog, Soft Brome, Barren Brome, Canary Reed-grass, Common Quaking-grass *Briza media,* False Fox Sedge, Glaucous Sedge, Spiked Sedge, Hard Rush, Compact Rush *Juncus comglomeratus,* Soft Rush, Ribbed Melilot, Bird's-foot Trefoil, Narrow-leaved Bird's-foot Trefoil *Lotus tenuis,* Hop Trefoil, Lesser Trefoil, White Clover, Black Meddick, Smooth Tare, Hairy Tare, Common Vetch, Tufted Vetch, Grass Vetchling, Oxeye Daisy, Daisy, Wild Carrot, Yarrow, Ragwort, Hoary Ragwort, Groundsel *Senecio vulgaris,* Bristly Ox-tongue, Selfheal, Fairy Flax, Ribwort Plantain, Greater Plantain, Hoary Plantain, Common Knapweed, Smooth Hawk's-beard, Mouse-ear Hawkweed, Teasel, Wild Parsnip, Cowslip, Creeping Cinquefoil, Spear Thistle, Common Sorrel, Curled Dock, Perforate St. John's Wort, Bee Orchid (a large population was supported in the western areas of the Stratton Audley Quarry), Pyramidal Orchid, Southern Marsh Orchid, Lady's Bedstraw, Blue Fleabane, Common Fleabane, Common Centaury, Common Mouse-ear, Lesser Stitchwort *Stellaria graminea,* Scarlet Pimpernel, Salad Burnet, Agrimony, Wild Strawberry, Yellow Flag Iris *Iris pseudacorus,* Common Storksbill, Dove's-foot Cranesbill, Musk Mallow, Wood Avens, Meadow Buttercup, Dandelion, Goat's-beard, Biting Stonecrop and White Stonecrop.

3.17. **Hardstanding / Bare Ground**

3.17.1. Areas of hardstanding are present in various locations within the wider site including the track which encompasses the airfield and associated hardstanding tracks which provide access to other parts of the Site, which are of varying composition with some areas formed of tarmac, concrete and gravel. A car park is also present in the southern area of the Site and is constructed from gravel.

3.17.2. These areas are largely bare and subject to minimal colonisation by a limited number of species including Basil Thyme, White Stonecrop, Field Bindweed, Weld and Knotgrass *Polygonum aviculare.*

3.18. **Recolonising Hardstanding**

3.18.1. Several areas previously occupied by buildings and bare hardstanding have been subject to significant levels of colonisation by a range of plant species, these areas include the bomb stores in the east of the wider site, an area in the south of the wider site and several areas previously occupied by airfield track which have since fallen into disuse.

3.18.2. Species recorded within these areas include Basil Thyme, White Stonecrop, Field Bindweed, Prickly Sow-thistle, Perennial Rye-grass, Weld, Wintercress, Creeping Thistle, Lady's Bedstraw, Fat Hen *Chenopodium album,* Oxeye Daisy, Dove's-foot Cranesbill, Knotgrass, Blue Fleabane, Parsley Piert, Teasel, Thyme-leaved Sandwort and Bird's-foot Trefoil.

3.19. **Waterbodies**

3.19.1. The Site supports a number of waterbodies of varying sizes primarily associated with historical quarry workings at the wider site. These features are described individually below.

3.19.2. P1 is a large (around 14,000m²) and deep waterbody which was created through historical mineral extraction at the wider site. It supports little aquatic vegetation and is currently utilised as a stocked fishing lake.

3.19.3. P2 is a small (approximately 15m²) shallow waterbody supporting limited aquatic vegetation including Common Water Crowfoot *Rancunculus aquatilis.* It is considered likely that this pond dries on a regular, perhaps annual, basis.

3.19.4. P3 is a small (approximately 23m²) shallow waterbody supporting limited aquatic vegetation including Common Water Crowfoot. This pond was recorded as dry in the early summer 2018, as such it is considered likely that this feature dries on an annual basis.

3.19.5. P4 is a small (approximately 67m²) shallow waterbody supporting limited aquatic vegetation including Common Water Crowfoot and Common Spike-rush.

3.19.6. P5 is a small (approximately 12m²), but relatively deep waterbody which is the tank for a disused wheel wash associated with the quarry workings at the site. This feature supports Common Reedmace but little additional aquatic vegetation.

3.19.7. P6 is a medium sized waterbody (approximately 1,500m²), created as a result of historical quarrying works, supporting a range of aquatic and marginal vegetation including Reedmace, Curled Pondweed *Potamogeton crispus* and Opposite-leaved Pondweed *Groenlandia densa.*

3.19.8. P7 is a small (approximately 148m²) ephemeral waterbody which was recorded to dry by mid-May 2018 and supported no aquatic vegetation. It is considered that this feature is likely to dry on a yearly basis.

3.19.9. P8 is a medium sized waterbody (approximately 2000m²) which was recorded to dry up over the summer of 2018. Bicester Heritage staff report that this feature dries on a yearly basis. A limited range of aquatic species including Nuttall's Waterweed *Elodea canadensis* and Opposite-leaved Pondweed were recorded.

3.19.10. P9 is a small ephemeral waterbody (approximately 300m²) which supports no aquatic vegetation and is heavy shaded by adjacent scrub and young woodland. It is considered likely that this feature dries out on a regular if not annual basis.

3.19.11. P10 is a large (approximately 10,200m²) waterbody, created as a result of historical quarrying works, and is utilised as a stocked fishing lake. It supports a range of marginal aquatic vegetation including Opposite-leaved Pondweed, Curled Pondweed, Reedmace, Common Spike Rush, Grey Club-rush and Common Club-rush.

3.19.12. P11 is a small ephemeral waterbody (approximately 110m²) which is heavily shaded by adjacent scrub and supports no aquatic vegetation, beyond the already present grassland species. It is considered that this feature dries on a regular and perhaps annual basis.

3.19.13. P12 is a large waterbody (approximately 12,700m²) which was created as a result of historical quarrying at the site. It is utilised as a stocked fishing lake and supports a limited range of aquatic vegetation including Reedmace, Curled Pondweed and White Water-lily *Nymphaea alba.*

3.20. **Wet Ditches**

3.20.1. The wider site supports a number of wet ditches, which are of varying depth and ecological interest.

3.20.2. D1 is a narrow ditch which runs along hedgerow H9, in the north of the site and was recorded to support standing water across the summer of 2018. The ditch supports a limited range of aquatic vegetation including Reedmace.

3.20.3. D2 is a heavily shaded and narrow ditch which was not continuous along its length with numerous dry sections. It was not recorded to support any aquatic vegetation and was subject to heavy leaf litter.

3.20.4. D3 is a wet ditch of variable depth and is associated with a historical access track for the adjacent bomb stores in the south-east of the Site. It supports a limited range of aquatic vegetation including Watercress *Rorippa nasturtium-aquaticum,* Marsh Speedwell *Veronica scutelata,* Celery-leaved Buttercup *Ranunculus sceleratus,* False Fox Sedge, Reedmace and Water Figwort.

3.21. **Buildings**

3.21.1. The Site supports a number of buildings of varying structure. These are labelled on Plan ECO2 and described individually below.

3.21.2. B1 is a single storey airfield defence structure heavily constructed from red brick, with a flat concrete roof and associated surrounding earth bunds. No loft void is supported. Internal conditions are light and airy.

3.21.3. B2 is an air-raid shelter style structure constructed from curved steel beams with sheet metal walls and roof, on top of which approximately 30cm of soil has been placed. Internal conditions are light and airy.

3.21.4. B3 is a single storey airfield defence structure heavily constructed from red brick, with a flat concrete roof and associated surrounding earth bunds. No loft void is supported. Internal conditions are light and airy.

3.21.5. B4-B9 are single storey bomb stores heavily constructed from blockwork with flat concrete roofs and associated surrounding earth bunds. No loft voids are supported and each building has a single open aspect. Internal conditions are light and airy.

3.21.6. B10 is a single storey airfield defence structure heavily constructed from red brick, with a flat concrete roof and associated surrounding earth bunds. No loft void is supported. Internal conditions are light and airy.

3.21.7. B11 is an air-raid shelter style structure constructed from curved steel beams with sheet metal walls and roof, on top of which approximately 30cm of soil has been placed. Internal conditions are light and airy.

3.21.8. B12-B17 are single storey bomb stores heavily constructed from blockwork with flat concrete roofs and associated surrounding earth bunds. No loft voids are supported and each building has a single open aspect. Internal conditions are light and airy.

3.21.9. B18 is a single storey airfield defence structure constructed from blockwork, with a single open aspect and associated surrounding earth bunds. Internal conditions are light and airy.

3.21.10. B19 is an air-raid shelter style structure constructed from curved steel beams with sheet metal walls and roof, on top of which approximately 30cm of soil has been placed. Internal conditions are light and airy.

3.21.11. B20, 21 and 22 are circular and depressed airfield defence structures, with internal ceilings at ground level and flat concrete and earth roofs. Internal conditions are generally light, damp and airy.

3.21.12. B23 and B24 are disused buildings which have subsequently collapsed. They currently support no roofs, and no cracks or fissures in the brickwork were noted.

3.21.13. B25 and B26 are single storey structures constructed from red brick, with flat concrete roofs.

3.22. **Open Habitat Mosaic**

3.22.1. As is frequently the case for areas of brownfield land, the wider site supports a range of early successional habitats, many of which, in the absence of management (targeted or not) are succeeding into more mature or established vegetation.

3.22.2. This ecological succession, whilst likely to be harmful to the sites nature conservation in the longer-term, has allowed a gradation of habitats to establish, in particularly within the Stratton Audley Quarry site. Given the gradation in habitats across present, it is considered that significant areas would qualify as *Open Mosaic Habitat on Previously Developed Land*.

3.22.3. Whilst many of the early successional habitats which form a component of this mosaic are of reduced ecological interest in isolation, combined together, these habitats support a wide and varied floral community, alongside a diverse habitat structure.

3.23. **Background Information**

3.23.1. The desk study undertaken with TVERC returned a large number of local plant records, including a relatively high number from within the Site itself. Records of notable or protected plant species from within the Site include that of Basil Thyme, Hoary Plantain, Quaking Grass, Corn Mint *Mentha arvensis* and Field Scabious, all returned from 2014. Additionally Jacob's Ladder *Polemonium caeruleum,* Hairy Rock-cress *Arabis hirsuta* and Bluebell *Hyacinthoides non-scripta* were returned from within the Stratton Audley Quarry from 2009.

3.23.2. With the exception of Corn Mint, Jacob's Ladder and Bluebell, all of these species were recorded during the habitat surveys undertaken in 2018.

3.23.3. A small number of notable plants were also recorded by TVERC during updated habitat survey work undertaken within the Stratton Audley Quarry site in 2018. Additional species recorded in this survey included for Galingale and Lesser Spearwort.

4. WILDLIFE USE OF THE SITE

4.1. During the surveys that have been undertaken within the wider site, general observations have been made of any faunal use, with specific attention paid to the potential presence of protected or notable species.

4.2. Bats

4.2.1. Given the general lack of mature trees within the wider site, and the predominance of middle-aged trees with relatively immature structures, no trees were recorded with potential to offer opportunities for roosting bats, as they do not support features of potential value such as cracks or splits, dense coverings of Ivy or cavities associated with old age.

4.2.2. While a number of buildings are present within the wider site, these features were not considered to offer potential opportunities for roosting bats, given the lack of gaps, cracks or loft voids supported. Internal inspections of these buildings, where possible, did not result in the recording of any evidence of the use of these features by roosting bats.

Bat Activity Surveys

4.2.3. A bat activity surveys were undertaken at the wider site between June and October 2018 in line with the methodology outlined in Section 2 above. Table 4 below outlines the weather conditions during this survey visit.

Date	Weather Conditions
26.06.2018	23C, 0% cloud cover, dry, light breeze
19.07.2018	22C, 40% cloud cover, dry, light breeze
29.08.2018	14C, 5% cloud cover, dry, light breeze
25.09.2018	15C, 0% cloud cover,dry, light breeze
15.10.2018	11C, 100% cloud cover, occasional drizzle, light to moderate breeze

Table 4: Weather conditions during bat activity surveys

4.2.4. The activity survey undertaken in June 2018, primarily recorded Common Pipistrelle *Pipistrellus pipistrellus* (56 registrations) and Nathusius' Pipistrelle *Pipistrellus nathusii* (26 registrations) and Soprano Pipistrelle *Pipistrellus pygmaeus* (13 registrations), in addition to lower numbers of registrations of Noctule *Nyctalus noctula* (10 registrations), Brown Long-eared *Plecotus auritus* (4 registrations) and a *Myotis* species (4 registrations). This bat activity was recorded primarily in association with the hedgerows, bands of scrub and woodland, and waterbodies within the site.

4.2.5. The activity survey undertaken in July 2018 primarily recorded Common Pipistrelle (32 registrations) in addition to Soprano Pipistrelle (14 registrations) and a *Myotis* species (12 registrations) in addition to low numbers of registrations of Noctule (5 registrations) and Brown Long-eared (a single registration). This activity was largely recorded in association with linear features and waterbodies.

4.2.6. The activity survey undertaken in August 2018 primarily recorded Common Pipistrelle (36 registrations) and Soprano Pipistrelle (18 registrations) in

addition to a *Myotis* species (6 registrations). This activity was concentrated on hedgerows, scrub bands and waterbodies.

4.2.7. The activity survey undertaken in September 2018 primarily recorded Common Pipistrelle (58 registrations) in addition to Soprano Pipistrelle (9 registrations), Noctule (13 registrations), a *Myotis sp.* (3 registrations) and Brown Long-eared (2 registrations). The location and nature of this activity was consistent with previous activity surveys.

4.2.8. The activity survey undertaken in October 2018 primarily recorded Soprano Pipistrelle (38 registrations) in addition to Common Pipistrelle (19 registrations), *Myotis sp.* (6 registrations) and Noctule (9 registrations). The majority of activity was associated with the linear features and waterbodies found within the north of the site. A single Barbastelle *Barbastella barbastellus* was recorded along a hedgerow within the west of the Site (northern end of **H1**).

Automated Detector Surveys

4.2.9. Following the 26th June activity survey four static bat detectors were deployed for a period of six nights, in locations marked as D1, D2, D3 and D4 on plans ECO3A and ECO3B.

4.2.10. The detector deployed at location D1 recorded a total of 35 registrations of Common Pipistrelle and 47 registrations of Soprano Pipistrelle in addition to 7 registrations of Noctule, 5 registrations of a *Myotis* sp., 2 registrations of Serotine *Eptesicus serotinus* and single registrations of both Brown Long-eared and Nathusius' Pipistrelle across the six night period.

4.2.11. The detector deployed at location D2 recorded a total of 319 registrations of Common Pipistrelle, 84 registrations of Soprano Pipistrelle, 285 registrations of a *Myotis* species, 71 registrations of Noctule, 8 registrations of Brown Long-eared, 6 registrations of Serotine and single registrations of Nathusius' Pipistrelle and Barbastelle *Barbastellus barbastella* over the 6 night period.

4.2.12. The detector deployed at location D3 recorded a total of 353 registrations of Common Pipistrelle, 82 registrations of Soprano Pipistrelle, 27 registrations of Noctule, 17 registrations of Nathusius' Pipistrelle, 7 registrations of a *Myotis* species and 3 registrations of Brown Long-eared over the six night period.

4.2.13. The detector deployed at location D4 recorded a total of 70 registrations of Common Pipistrelle, 11 registrations of Soprano Pipistrelle, 6 registrations of Noctule and a single registration of Serotine over the six night period.

4.2.14. Following the 19th July activity survey a four static detectors were deployed for a period of six nights in locations marked as D5-D8 on Plan ECO3A and ECO3B.

4.2.15. The detector deployed at location D5 recorded a total of 248 registrations of Common Pipistrelle, 133 registrations of Soprano Pipistrelle, 53 registrations of a *Myotis* sp., 25 registrations of Noctule, 19 registrations of Brown Long-eared and a single registration of Nathusius' Pipistrelle over the six night period.

4.2.16. The detector deployed at location D6 recorded a total of 203 registrations of Common Pipistrelle, 36 registrations of Soprano Pipistrelle, 22 registrations of Noctule, 29 registrations of *Myotis* sp., 5 registrations of Brown Long-eared and a single registration of Serotine over the six night period.

4.2.17. The detector deployed at location D7 recorded a total of 681 registrations of Common Pipistrelle, 60 registrations of Soprano Pipistrelle, 149 registrations of Noctule, 42 registrations of a *Myotis* sp., 19 registrations of Brown Long-eared, 5 registrations of Nathusius' Pipistrelle, 4 registrations of Serotine and 4 registrations of Barbastelle over the six night period.

4.2.18. The detector deployed at location D8 recorded a total of 90 registrations of Common Pipistrelle, 5 registrations of Soprano Pipistrelle, 8 registrations of Noctule and 6 registrations of a *Myotis* species over the six night period.

4.2.19. Following the 29th August activity survey three static bat detectors were deployed for a period of five nights in locations marked as D9-D11 on plans ECO3A and ECO3B.

4.2.20. The detector deployed at location D9 recorded a total of 28 registrations of Common Pipistrelle, 19 registrations of Soprano Pipistrelle, 36 registrations of Noctule, 22 registrations of a *Myotis* sp., 2 registrations of Brown Long-eared and a single registration of Serotine over the five night period.

4.2.21. The detector deployed at location D10 recorded a total of 481 registrations of Common Pipistrelle, 269 registrations of Soprano Pipistrelle, 421 registrations of a *Myotis* sp., 83 registrations of Noctule, 3 registrations of Serotine and a 10 registration of Barbastelle over the five night period.

4.2.22. The detector deployed at location D11 recorded a total of 120 registrations of Common Pipistrelle, 16 registrations of Soprano Pipistrelle, 67 registrations of Noctule, 7 registrations of a *Myotis* sp., 3 registrations of Brown long-eared, 2 registrations of each Serotine and Barbastelle.

4.2.23. Following the 25th September activity survey three static bat detectors were deployed for a six night period in locations marked as D12-D14 on Plan ECO3A and ECO3B. Due to a technical malfunction the detector deployed at location D13 failed to record.

4.2.24. The detector deployed at location D12 recorded a total of 75 registrations of Common Pipistrelle, 34 registrations of Soprano Pipistrelle, 67 registrations of a *Myotis* sp., 59 registrations of Noctule, 21 registrations of Brown Long-eared, 3 registrations of Barbastelle and a single registration of Nathusius' Pipistrelle over the six night period.

4.2.25. The detector deployed at location D14 recorded a total of 140 registrations of Common Pipistrelle, 55 registrations of Noctule, 11 registrations of Soprano Pipistrelle, 12 registrations of a *Myotis* sp., 17 registrations of Brown Long-eared, 2 registrations of Nathusius' Pipistrelle and a single registration of Barbastelle over the six night period.

4.2.26. Following the 15th October activity survey four static bat detectors were deployed for a seven night period in locations marked as D15-D18 on Plan ECO3A and ECO3B.

4.2.27. The detector deployed at location D15 recorded a total of 270 registrations of Common Pipistrelle, 62 registrations of Soprano Pipistrelle, 19 registrations of *Myotis sp.*, 19 registrations of Noctule*,* 5 registrations of Brown Long-eared bat and a single registration of Nathusius' Pipistrelle over a seven night period.

4.2.28. The detector deployed at location D16 recorded a total of 470 registrations of Common Pipistrelle, 65 registrations of Soprano Pipistrelle, 9 registrations of *Myotis sp.*, 13 registrations of Brown Long-eared bat, 21 registrations of Noctule and 24 registrations of Barbastelle.

4.2.29. The detector deployed at location D17 recorded a total of 118 registrations of Common Pipistrelle, 18 registrations of Soprano Pipistrelle, 2 registrations of Nathusius' Pipistrelle, 3 registrations of Brown Long-eared bat, 26 registrations of *Myotis sp*., 56 registrations of Noctule and 3 registrations of Barbastelle.

4.2.30. The detector deployed at location D18 recorded a relatively high amount of Common Pipistrelle activity, totalling 1616 registrations over the 7 night period (1075 of which were recorded on the night of the 17th October). Other activity recorded includes; 35 registrations of Soprano Pipistrelle, 3 registrations of *Myotis sp*., 49 registrations of Noctule and a single registration of Brown Long-eared bat.

4.2.31. **Background information.** The desk study undertaken with TVERC returned a number of bat records from the local area. The closest roost records were of unidentified bat species from within the Bicester Heritage landholding in its western extent (outside of the boundary of the wider site boundary that is the subject of this masterplan). These records consisted of the presence of droppings only and were both returned from 2017. Other records from the locality include activity records of Common Pipistrelle returned from a location approximately 100m to the south-west of the Site,

4.4. **Amphibians**

4.4.1. The wider site supports a number of permanent and ephemeral waterbodies which were considered to have potential to provide breeding opportunities for Great Crested Newts.

4.4.2. As such detailed aquatic surveys were undertaken to ascertain the presence or absence of amphibian species. All surveys were undertaken in line with the methodology outlined in the methodology section above, with surveys undertaken during suitable weather conditions and during the optimal period.

4.4.3. It is noted that while the majority of waterbodies within the wider site were subject to detailed aquatic surveys a number of large waterbodies, including P1 and P12 were not subject to survey given their size and their current use as stocked fisheries. These waterbodies, in addition to P10 (which was nonetheless subject to survey), are considered to support populations of fish which would prohibit their function as Great Crested Newt breeding ponds.

4.4.4. A number of ephemeral waterbodies which were recorded within the site are also considered likely to dry on an annual basis and as such present limited opportunities for breeding Great Crested Newt in the long term (i.e. functionally unsuitable to support breeding GCN).

4.4.5. The results of the survey are summarised in Table 5 below.

Waterbody	Maximum count of Great Crested Newts	Date of Maximum Count
P1	N/A	N/A

P2	3	10/05/18
P3	0	N/A
P4	1	10/05/18
P5	14	14.05.18
P6	68	14.05.18
P7	0	N/A
P8	0	N/A
P9	3	14.05.18
P10	0	N/A
P11	2	16.05.18
P12	N/A	N/A
D1	2	14.05.18
D2	0	N/A
D3	3	07.06.18

Table 5: Maximum count for ponds surveyed for Great Crested Newts.

4.4.6. A peak count of 89 Great Crested Newts was recorded during the suite of aquatic surveys undertaken at the wider site.

4.4.7. It is noted that the single large waterbody subject to survey (P10) was not recorded to support Great Crested Newts. Additionally, many of the smaller ephemeral ponds, including P2, P3, P4, P7 and P11 were recorded to dry completely over the survey period.

4.4.8. It is also noted that D3 which was recorded to support a peak count of 3 Great Crested Newts, is isolated from other waterbodies within the Site and no further waterbodies which could potentially function as stepping stones to this waterbody are present outside of the Site boundary. As such it is considered likely that this population is likely to comprise an isolated metapopulation within the Site, with occasional input through migration of individual newts from the wider site.

4.4.9. Given the above survey results it is apparent that a number of the waterbodies present within the wider site support breeding opportunities for a “medium” class population of Great Crested Newt in line with Natural England guidelines.

4.4.10. Checks of suitable terrestrial habitats present within the site (including a significant number of artificial tins utilised as part of the reptile survey, in addition to natural refugia such as logs and brash piles) did not record the presence of any amphibian species, including Great Crested Newts, within these terrestrial habitats.

4.4.11. Aquatic surveys also recorded the presence of populations of Smooth Newt *Lissotriton vulgaris* in P3, P5, P6, P8, P9, D1 and D3.

4.4.12. **Background Information.** The desk study undertaken with TVERC returned a small number of amphibian records from the local area. The closest records of Great Crested Newt were returned from within the site boundary, within the Stratton Audley Quarry site, from 2009. Additional records from this area include: Smooth Newt *Lissotriton vulgaris* and Common Frog *Rana temporaria* also returned from within the Stratton Audley Quarry site.

4.5. **Reptiles**

4.5.1. The majority of the wider site comprises regularly mown grassland which does not provide potential opportunities for common reptile species. However, areas of annually mown semi-improved grassland around the Airfield, in addition to unmanaged rough grasslands within the Stratton Audley Quarry and in the south and south-east of the airfield within the wider site provide potential opportunities for reptile species.

4.5.2. In order to ascertain whether the site supports this group, refugia surveys were undertaken from August-October 2018, in line with the methodology section above.

4.5.3. The results of the survey are summarised in Table 6 below.

Date	Survey Number	Weather Conditions	Reptiles Recorded
24/08/18	1	90% cloud cover, 16C	70 Common Lizard
29/08/18	2	10% cloud cover, 17C	7 Common Lizard, 2 Grass Snake
06/09/18	3	60% cloud cover, 19C	11 Common Lizard, 2 Grass Snake
11/09/18	4	100% cloud cover, 18C	24 Common Lizard
17/09/18	5	1% cloud cover, 19C	5 Common Lizard
25/09/18	6	80% cloud cover, 17C	6 Common Lizard
02/10/18	7	100% cloud cover, 17C	10 Common Lizard

Table 6: 2018 Reptile Survey Results (Summary)

4.5.4. Two Grass Snake were also recorded within P6, during Great Crested Newt surveys in May 2018.

4.5.5. It is noted, given the survey methodology utilised, that these findings are reflective of a sample of the supported reptile populations associated with the habitats in question. The vast majority of reptiles recorded were returned from rough grassland habitats within the Stratton Audley Quarry site, in the vicinity of the bomb stores and in the southern areas of the Site.

4.5.6. In order to ascertain the relative importance of common reptile populations recorded within the Site, the tinning density, which varies from between 54 tins/ha and 300 tins/ha, has been taken into account in line with guidance and population size estimates set out by the Herpetofauna Groups of Britain and Ireland (HGBI). On this basis it is considered that rough and unmanaged grassland habitats within the Site support a low to medium population of Common Lizard (around 36/ha) and a low population of Grass Snake (<2/ha).

4.5.7. It is noted that areas of grassland which are subject to annual cutting, namely areas of semi-improved calcareous grassland around the airfield, do not support a rough and tussocky sward and are likely therefore to provide relatively reduced opportunities for reptiles. This was substantiated

by the results of the tinning surveys which recorded few reptiles in these areas, limited to a single Common Lizard in the southern area of the site, where this grassland closely backs onto an adjacent band of scrub.

4.5.8. **Background Information.** The desk study undertaken with TVERC returned a number of reptile records from the local area. These records include several of Grass Snake, returned from within the Site itself, from within the Stratton Audley Quarry site, from 1991. A further record of Grass Snake was returned from just outside the eastern boundary of the Site, from 2016. Several records of Common Lizard were also returned from a location approximately 100m to the south-west of the Site, from 2017.

4.6. **Birds**

Breeding Birds

4.6.1. The site offers opportunities for nesting birds in terms of the hedgerows, treelines, scrub, woodland and grassland areas in addition to waterbodies and areas of recolonising vegetation and reedbed.

4.6.2. The site was subject to three breeding bird survey visits in May and June 2018.

4.6.3. A total of 41 species of birds were recorded within the survey area during the three surveys, of which 32 species were breeding or probably breeding, and seven species possibly breeding (i.e. habitat suitable to support the species is present). The remaining two species were recorded as migrants or flying over the site or represented only by non-breeding individuals.

4.6.4. The results of the breeding bird surveys are detailed in Table 7 below, and illustrated at Plans ECO4A and ECO4B, and include: species, whether they are listed on the Birds of Conservation Concern, and the estimated number of breeding pairs present per species. Additional field notes for each species are also provided.

Bird Species and BTO Code	**RSPB listed**	**Estimated Number of Pairs**
Robin (R.) *Erithacus rubecula*	Green	9
Blue Tit (BT) *Cyanistes caeruleus*	Green	13
Great Tit (GT) *Parus major*	Green	8
Dunnock (D.) *Prunella modularis*	Amber	7
Wren (WR) *Troglodytes troglodytes*	Green	22
Goldfinch (GO) *Carduelis carduelis*	Green	11
Chaffinch (CH) *Fringilla coelebs*	Green	6
Greenfinch (GR) *Carduelis chloris*	Green	2

Bullfinch (BF) *Pyrrhula pyrrhula*	Amber	4
Song Thrush (ST) *Turdus philomelos*	Red	3
Blackbird (B.) *Turdus merula*	Green	12
Chiffchaff (CC) *Phylloscopus collybita*	Green	7
Willow Warbler (WW) *Phylloscopus trochilus*	Amber	4
Blackcap (BC) *Sylvia atricapila*	Green	5
Whitethroat (WH) *Sylvia communis*	Green	5
Lesser Whitethroat (LW) *Sylvia curruca*	Green	1
Sedge Warbler (SW) *Acrocephalus schoenobaenus*	Green	1-2
Cetti's Warbler (CW) *Cettia cetti*	Green	0-2
Reed Bunting (RB) *Emberiza schoeniclus*	Green	7
Linnet (LI) *Linaria cannabina*	Red	1
House Sparrow (HS) *Passer domesticus*	Red	1
Meadow Pipit (MP) *Anthus pratensis*	Amber	14
Skylark (S.) *Alauda arvensis*	Red	10
Wood Pigeon (WP) *Columba palumbus*	Green	10
Magpie (MG) *Pica pica*	Green	3
Carrion Crow (C.) *Corvus corone*	Green	0-4
Tawny Owl (TO) *Strix aluco*	Amber	0-1
Buzzard (BZ) *Buteo buteo*	Green	0-2
Kestrel (K.) *Falco Tinunculus*	Amber	0-2
Red Kite (KT) *Milvus milvus*	Green	0-1
Cuckoo (CK) *Cuculus canorus*	Red	1
Moorhen (MH) *Galinula chloropus*	Green	3
Coot (CO) *Fulica atra*	Green	1
Mallard (MA) *Anas platyrhynchos*	Amber	0-2

Tufted Duck (TU) *Aythya fuligula*	Green	2
Lesser Black-backed Gull (LB) *Larus fuscus*	Amber	0
Black-headed Gull (BH) *Chroicocephalus ridibundus*	Amber	0
Swift (SI) *Apus apus*	Amber	0-1
Great Spotted Woodpecker (GS) *Dendrocopos major*	Green	0-1
Lapwing (L.) *Vanellus vanellus*	Red	1

Table 7. Breeding bird survey results summary

Wintering Birds

4.6.5. The habitats present on site are generally considered to be sub-optimal to support over-wintering birds, with the waterbodies relatively small (in the context of their suitability for wintering birds) and the larger open habitats utilised as an air strip (and therefore subject to disturbance).

4.6.6. Notwithstanding this position, and on a precautionary basis, a suite of three wintering bird surveys are being undertaken at the site, with one survey being undertaken in each of January, February and March respectively.

4.6.7. A total of 47 species of birds was recorded during the surveys. For each species, the numbers recorded on each visit and a summary of observations are given in Table 8, with the northern 'Quarry area' and the main 'Airfield area' shown separately. The locations of findings are detailed on Plan ECO6.

Species (and BTO species code)	**RSPB listed**	**Quarry area**			**Airfield area**			**Notes**
		Jan	**Feb**	**Mar**	**Jan**	**Feb**	**Mar**	
Canada goose (CG) *Branta canadensis*	Feral		7					On P12
Mallard (MA) *Anas platyrhynchos*	Amber	10	6	6				Ponds 1, 6, 10 and 12.
Tufted duck (TU) *Aythya fuligula*		2	8	13				Mostly on P12 (3 on P10 in March)
Pheasant (PH) *Phasianus colchicus*	Feral		3		1		1	

Red-legged partridge (RL) *Alectoris rufa*	Feral		5			1	2	
Grey partridge (P.) *Perdix perdix*	Red				2		2	On the south-east boundary
Cormorant (CA) *Phalacrocorax carbo*			1					On P12
Grey heron (H.) *Ardea cinerea*				3		1 (over)		Three on P10 in March
Little grebe (LG) *Tachybaptus ruficollis*		2	2	1				Mostly on P10 (also P6 in March)
Buzzard (BZ) *Buteo buteo*		2			2	1	3	Widely scattered
Red kite (KT) *Milvus milvus*					1	1	2	Ranging widley
Coot (CO) *Fulica atra*		6	7	9				Ponds 1, 6, 10 and 12
Moorhen (MH) *Gallinula chloropus*		1	2	1				On P12
Lapwing (L.) *Vanellus vanellus*	Red	(150)						In adjacent farmland
Woodcock (WK) *Scolopax rusticola*	Red		1					Flushed from bush near P8
Snipe (SN) *Gallinago gallinago*	Amber		12	13				Wet areas by P3 and P12
Woodpigeon (WP) *C. palumbus*		31	50	50	15	20	38	
Green woodpecker (G.) *Picus viridis*		2	1	1	1			
Great spotted woodpecker (GS) *Dendrocopos major*		2						
Kestrel (K.) *Falco tinnunculus*	Amber					1		On the south-east boundary
Jay (J.) *Garrulus glandarius*		3	1		2			In scrub
Magpie (MG) *Pica pica*		7	2	1	2	5	4	
Jackdaw (JD) *Corvus monedula*				2	1	2	1	

Rook (RO) *Corvus frugilegus*					150	100	20	Feeding in grassland
Carrion crow (C.) *Corvus corone*		4	1		9	13	11	
Raven (RN) *Corvus corax*				1				Flying over
Blue tit (BT) *Cyanistes caeruleus*		2	6	3	5	4	6	
Great tit (GT) *Parus major*		4	3	1	4		3	
Long-tailed tit (LT) *Aegithalos caudatus*		3	1	2	2		1	
Skylark (S.) *Alauda arvensis*	Red				1	2	3	In grassland SE of airfield
Wren (WR) *T. troglodytes*		1		1	1		1	
Starling (SG) *Sturnus vulgaris*	Red				25		10	Feeding in grassland
Blackbird (B.) *Turdus merula*		11	6	2	6	2	3	
Redwing (RE) *Turdus iliacus*	Red				4			In scrub
Song thrush (ST) *Turdus philomelos*	Red	3	1	1				
Fieldfare (FF) *Turdus pilaris*	Red	3	11		2	4		
Mistle thrush (M.) *Turdus viscivorus*	Red		2			1	1	
Robin (R.) *Erithacus rubecula*		5	1	1		1	1	
Dunnock (D.) *Prunella modularis*	Amber	1		2		2	2	
Pied wagtail (PW) *Motacilla alba*					1			
Meadow pipit (MP) *Anthus pratensis*	Amber				1	1		In grassland SE of airfield
Chaffinch (CH) *Fringilla coelebs*		3						
Bullfinch (BF) *Pyrrhula pyrrhula*	Amber	9	3	4	1	1		In scrub
Linnet (LI) *Linaria cannabina*	Red				1			Flying over

Goldfinch (GO) *Carduelis carduelis*		5		3		1	1	
Greenfinch (GR) *Chloris chloris*				3				
Reed bunting (RB) *Emberiza schoeniclus*					2			In peripheral vegetation
Total no. species				**35**			**32**	

Table 8. Wintering bird survey results summary

4.6.8. The wider site supports a relatively modest wintering bird assemblage, the variety of species reflecting the variation in habitats present across the site.

4.6.9. The most significant species recorded at the site were Grey Partridge and Skylark, both of which are declining farmland species included on the RSPB Red List (along with Lapwing, which was recorded in adjacent farmland). Both were recorded in tiny numbers in peripheral grassland southeast of the main airfield, along with Kestrel, Meadow Pipit and Reed Bunting, all Amber Listed. In contrast, the grassland of the open airfield supports unremarkable numbers of foraging Rooks, Carrion Crows, Starlings and Woodpigeons, all of which are widespread and abundant species in the winter.

4.6.10. Buzzards and Red Kites were recorded ranging widely across the airfield and adjacent areas, whilst most of the other species recorded in the 'Airfield area' are associated with peripheral scrub to the south and east, with none recorded in significant numbers.

4.6.11. In the 'Quarry area', the waterbodies support a number of species typical of such habitat, including Mallard, Tufted Duck, Little Grebe, Coot and Moorhen, with occasional visits from Canada Goose, Cormorant and Grey Heron. None of these species occurred in significant numbers. Up to 13 Snipe were present in adjacent marshy areas, with a single Woodcock also adding to the overall interest. Most of the remaining species recorded in the 'Quarry area' are associated with the scattered scrub, the only one occurring in significant numbers being Bullfinch, another declining species which is included on the RSPB Amber List having undergone a moderate decline in its UK population over 25 years. It nevertheless remains very common and widespread during the winter, both locally and nationally, as are all the other species recorded during the survey.

4.6.12. The total number of species recorded in both areas of the site were similar. Whilst the most notable species were recorded in the south-eastern grassland (Grey Partridge, and Skylark), they occurred in such tiny numbers that it is the assemblage associated with the mosaic of habitats (especially wetland habitats) in the 'Quarry area' that is considered to be the more ornithologically significant..

4.6.13. **Background Information.** The desk study undertaken with TVERC returned a number of records of notable bird species from the locality. A large proportion of these records were returned from within the site, including records of Grey Partridge *Perdix perdix*, Little Ringed Plover *Charadrius dubius,* Lapwing, Common Tern *Sterna hirundo,* Black-headed

Gull, Stock Dove, Reed Bunting, Bullfinch, Starling, Skylark, House Sparrow, Yellowhammer and Linnet returned from 2009; and Common Sandpiper *Actitis hypoleucos,* Green Sandpiper *Tringa ochropus,* Redshank *Tringa totanus,* Snipe *Gallinago gallinago,* Turtle Dove *Streptopelia turtur* and Kingfisher *Alcedo atthis,* returned from 2008, all from within the Stratton Audley Quarry site. In addition a number of records were returned from within Bicester airfield including Song Thrush, Red Kite, Kestrel, Lesser Black-backed Gull, Herring Gull, Skylark and Meadow Pipit returned from between 2003 and 2016. Records which have been withheld in detail, due to their sensitive nature, returned for the locality of the Site, include Hobby *Falco subbuteo* and Peregrine *Falco peregrinus,* from 2006.

4.7. **Invertebrates**

4.7.1. The wider site has been subject to a suite of four specific invertebrate surveys by Colin Plant Associates, invertebrate survey specialists. Survey visits were undertaken on the 13th June, 9th July, 14th August and 11th September 2018.

4.7.2. These surveys encompassed habitats of potentially greater invertebrate interest across the Site, including areas of recolonising bare ground, spoil mounds, scrub, waterbodies and rough and calcareous grassland.

4.7.3. The 2018 surveys recorded a total of 556 terrestrial species, confirming that a good range of invertebrate species utilise the site, including a number of notable species (i.e. species of conservation significance). A full list of the species recorded is detailed at Appendix 1. The key findings of the surveys are detailed below.

4.7.4. No invertebrate species which are afforded direct legal protection under any UK or European legislation were recorded during the surveys.

4.7.5. Four S41 invertebrate species were recorded during the surveys. Of these four S41 species, two, the Latticed Heath *Chiasma clathrate* and the Cinnabar *Tyria jacobaeae*, are highlighted for 'Research Only'. The remaining two S41 species include:

- Grizzled Skipper *Pyrgus malvae* which is associated with unimproved calcareous grassland and open woodland rides was recorded on both the airfield and wider quarry site.

- Small Heath *Coenonympha pamphilus* which is associated with open habitats was recorded on both the airfield, and wider quarry site.

4.7.6. A total of three *Nationally Rare* or *Red Data Book* (RDB) species were recorded. These species are detailed below, within which habitat requirements and current population trends are summarised, where known.

- *Lygus pratensis* RDB3. A true bug once extremely local and confined to lowland heathland in southern England, has recently experienced a significant range and population expansion. Given its now widespread status, it no longer warrants any

conservation status. This species is often found in dry open habitats, on a range of Asteraceae.

- *Placochilus seladonicus* RDBK. A true bug thought to be introduced to Britain before 1977, however this cannot be confirmed. This species favours open habitats on calcareous soils, in particular chalk downland.

- *Cistogaster globose* RDB2. A parasitic fly of the Bishop's Mitre *Aelia acuminate* shieldbug. Much more widespread than its RDB2 designation would suggest, this species is often associated with dry grassland, upon which its host feeds.

4.7.7. In addition, a total of 34 Nationally Scare (NS) species were recorded during the surveys. These Nationally Scare species are listed below, with more details on their status, population trends and habitat requirements detailed at Appendix 1.

- The ground beetle *Acupalpus exiguous* **NS**;
- The ground beetle *Bembidion octomaculatum* **NS**;
- The ground beetle Ophonus azureus **NS**;
- The ground beetle *Pterostichus gracillis* **NS**;
- The ground beetle *Syntomus truncatellus* **NS**;
- The water beetle *Peltodytes caesus* **NS**;
- The diving beetle *Hydaticus seminiger* **NS**;
- The rove beetle *Aleochara brevipennis* **NS(Nb)**;
- The rove beetle *Dacrila fallax* **NS(Nb)**;
- The small beetle *Olibrus pygmaeus* **NS(Nb)**;
- The flea beetle *Chaetocnema confusa* **NS;**
- The weevil *Oxystoma cerdo* **NS(Nb)**;
- The weevil *Squamapion cineraceum* **NS(Na)**;
- The weevil *Catapion pubescens* **NS(Nb)**;
- The weevil *Tychius squamulatus* **NS(Nb)**;
- The weevil *Zacladus exiguous* **NS(Nb)**;
- The weevil *Notaris scirpi* **NS(Nb)**;
- The weevil *Larinus planus* **NS(Nb)**;

- The true bug *Ceraleptus lividus* **NS**;
- The true bug *Megalonotus antennatus* **NS(Nb)**;
- The water boatman *Glaenocorisa propinqua propinqua* **NS**;
- The bug *Saldula pallipes* **NS**;
- The planthopper *Scottlianella dalei* **NS(Nb)**;
- The leafhopper *Lassus scutellaris* **NS(Na)**;
- The stiletto fly *Thereva plebeja* **NSb**;
- The picture-winged fly *Orellia falcata* **NS(Nb)**;
- The solitary wasp *Tiphia minuta* **NS(Nb)**;
- The Red-backed Mining Bee *Andrena similis* **NS(Nb)**;
- The Large Yellow-face Bee *Hylaeus signatus* **NS(Nb)**;
- The Sharp-collared Flower Bee *Lasioglossum malachurum* **NS(Nb)**;
- The Lobe-spurred Furrow Bee *Lasioglossum pauxillum* **NS(Na)**;
- The Swollen-thighed Blood Bee *Sphecodes crassus* **NS(Nb)**;
- The Variable Damselfly **NT NS**.

4.7.8. The total invertebrate assemblage recorded at the wider site is notable, with just over 7% of the total species inventory being of formal conservational concern.

4.7.9. The full assemblage of invertebrates recorded on site was further assessed using Pantheon, a software tool which allowed for the relative conservation value of assemblages to be assessed and subsequently to identify those habitats of relatively greater importance to them. Through this methodology, broad habitats are then afforded a Species Quality Index (SQI).

4.7.10. As set out at Appendix 1, Pantheon analysis calculated the following SQI scores for habitats within the site (a minimum sample size of 15 species is required to calculate an SQI score for a habitat type).

- Open habitats – Tall sward & scrub (SQI score of 116);
- Wetland - Marshland (SQI score of 121);
- Open habitats – Short sward & bare ground (SQI score of 126);
- Wetland – Peatland (SQI score of 138);
- Tree associated – Arboreal (SQI score of 109);

4.7.11. The SQI scores fall below the threshold score of 150 at which point Natural England would consider a site to represent a 'good' site supporting a regionally important invertebrate assemblage.

4.7.12. Notwithstanding this output, it believed that the Pantheon analysis may have underestimated the assemblage for two reasons, these being;

1. The unusually warm, and prolonged, weather experienced over the survey period may have resulted in an absence of the usual early spring species. Some of which would have been of significant conservational importance. Secondly;

2. Some of the species recorded are extremely rare in a regional context, in particular the beetles *Hydaticus seminiger*, and *Bembidion octomaculatum*, and the water bug *Glaenocorisa propinqua*. It is unknown to what extent these species exist within other sites within the county.

4.7.13. In light of the above, further updated invertebrate survey work is proposed to be undertaken in the Spring of 2019.

4.7.14. **Background Information.** The desk study undertaken with TVERC returned a large number of invertebrate records from the local area, including from within the site. These records include the following species returned from within the Stratton Audley Quarry site: Blackthorn Mining Bee *Andrena varians,* Southern Bronze Furrow Bee *Halictus confusus,* Orange-footed Furrow Bee *Lasioglossum xanthopus,* Sharp-collared Furrow Bee *Lasioglossum malachurum,* White-footed Furrow Bee *Lasioglossum leucopus,* Swollen-thighed Blood Bee *Sphecodes crassus,* Red-tailed Mason Bee *Osmia bicolor,* Small Tiphia *Tiphia minuta,* the beetles *Microplontis campestris, Haploglossa picipennis, Brachinus crepitans*, *Bembidon clarkii, Pterostichus anthracinus, Ophonos azureus, Lebia chlorocephala, Cryptocephalus aureolus,* the butterflies Grizzled Skipper *Pyrgus malvae,* Wall *Lasiommata megera,* Small Heath *Coenonympha pamphilus,* Small Blue *Cupido minimus,* the moths Latticed Heath *Chiasmia clathrata* and Cinnabar *Tyria jacobaeae* and the true bug *Macropsis glandacea.*

4.8. Otter and Water Vole

4.8.1. The habitats present within the wider site are considered to be sub-optimal to support Otter and Water Vole, not least given the limited presence of suitable bankside habitat which would provide opportunities for burrow or holt creation.

4.8.2. Moreover, it is noted that the habitats are largely isolated from any suitable watercourses in the wider area from which these species may have colonised in the intervening period since quarrying works ceased.

4.8.3. Due regard was nonetheless had to the potential presence of Otter or Water Vole as part of the habitat survey work undertaken, as well as during the course of faunal survey work (including bat and GCN surveys) which included inspection of the waterbodies over the course of 2018.

4.8.4. No evidence of either Water Vole or Otter were recorded within the Site and it is not considered that either species would be present within the site.

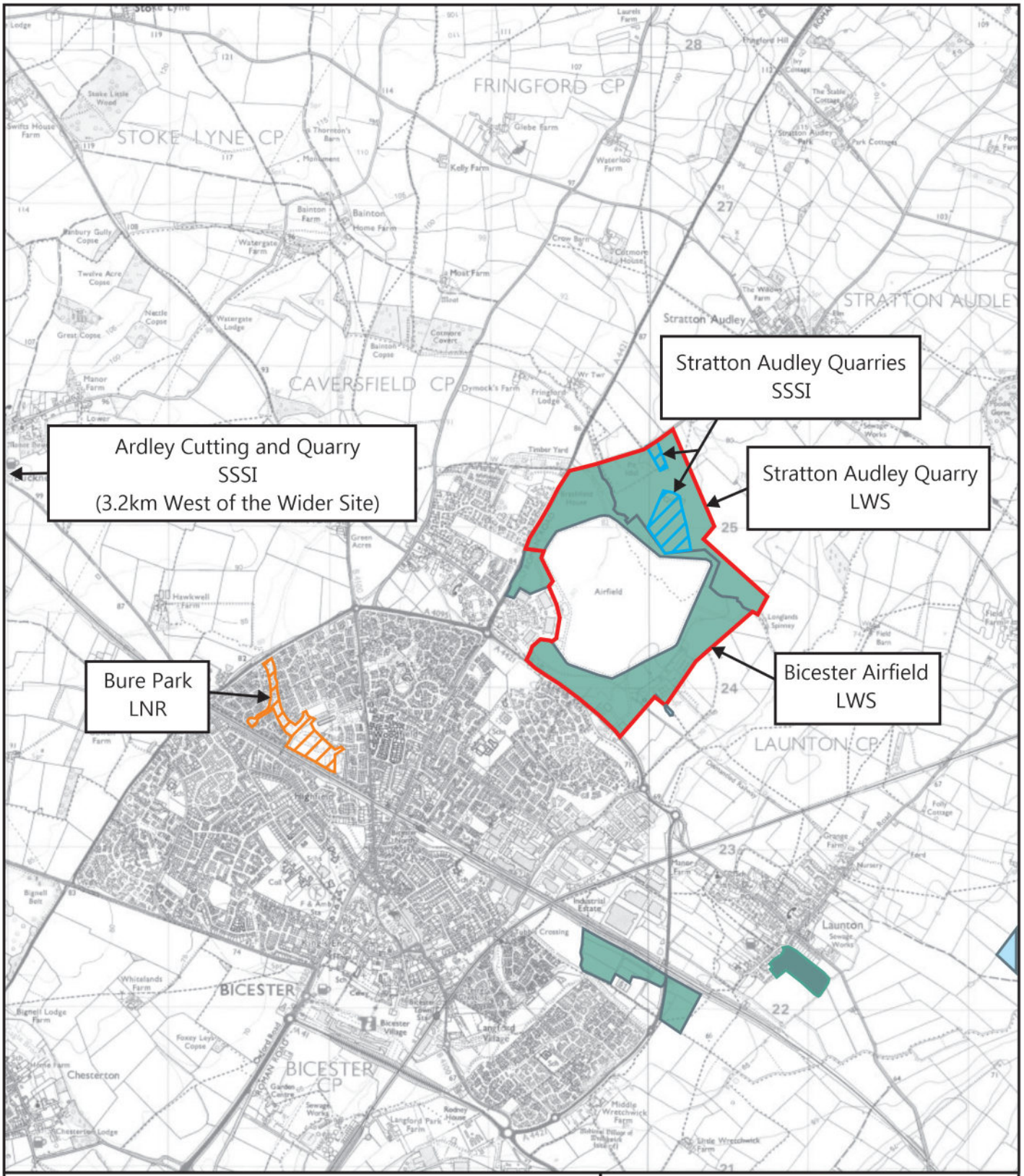
4.8.5. **Data Search**. The desk study undertaken with TVERC did not return any records of Otter in the local area. Two records of Water Vole were recorded, the closest being a record from 1.6km to the south-west of the Site and dating to 2003.

PLANS

PLAN ECO1

SITE LOCATION &

ECOLOGICAL DESIGNATIONS



KEY:

- SITE BOUNDARY
- SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)
- LOCAL NATURE RESERVE (LNR)
- LOCAL WILDLIFE SITE (LWS)
- PROPOSED LOCAL WILDLIFE SITE (pLWS)
- WOODLAND TRUST RESERVE

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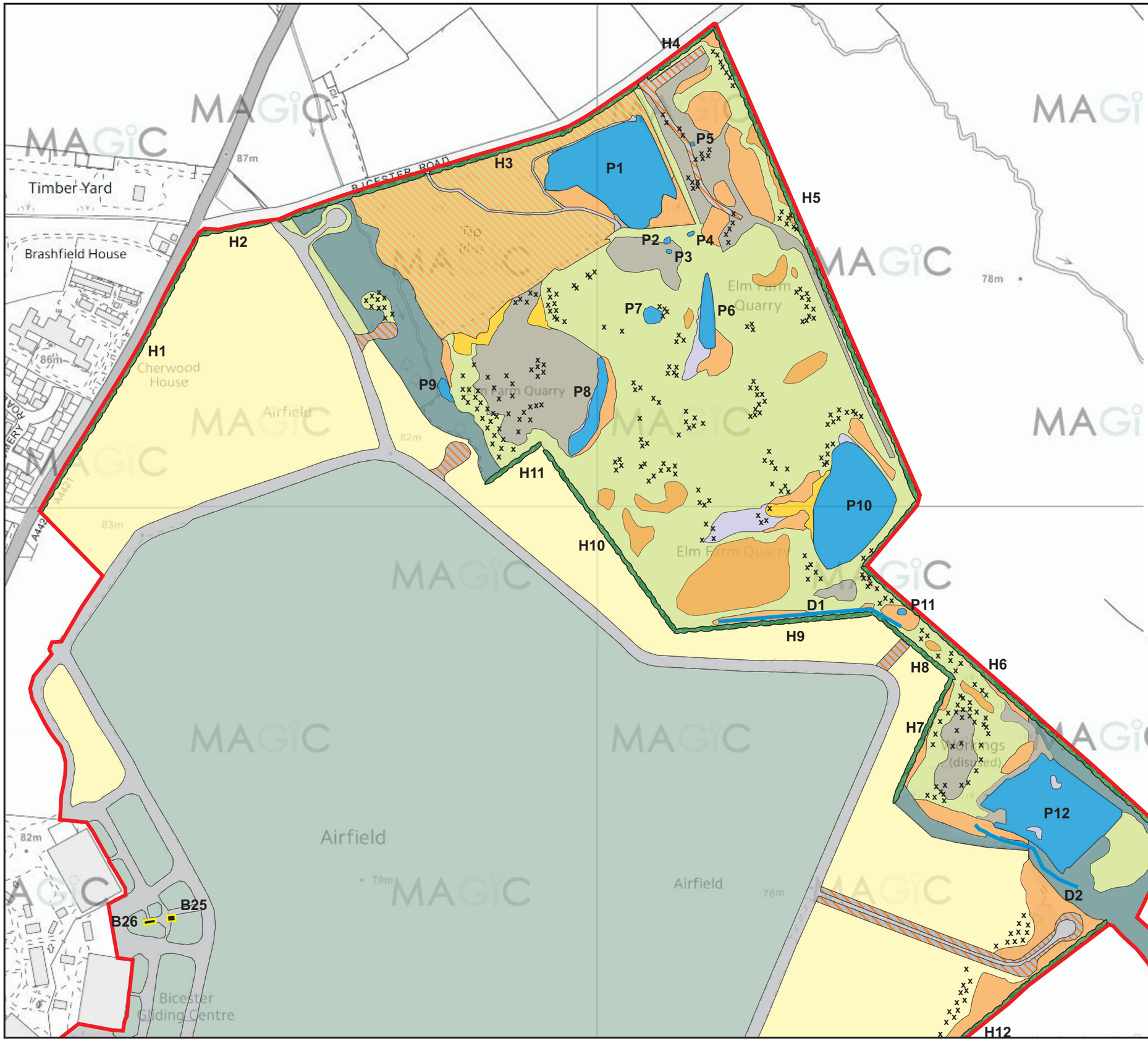
PLAN ECO1: SITE LOCATION & ECOLOGICAL DESIGNATIONS

PLANS ECO2A & ECO2B

ECOLOGICAL FEATURES



KEY:

- SITE BOUNDARY
- SEMI-IMPROVED CALCAREOUS GRASSLAND
- SPECIES POOR SEMI-IMPROVED CALCAREOUS GRASSLAND
- SEMI-IMPROVED NEUTRAL AND CALCAREOUS GRASSLAND MOSAIC
- BROAD-LEAVED SEMI-NATURAL WOODLAND
- DENSE SCRUB
- DENSE SCRUB / GRASSLAND MOSAIC
- SCATTERED SCRUB
- REEDBED
- MARGINAL VEGETATION / MARSHY GRASSLAND
- HEDGEROW / TREELINE
- RECOLONISING BARE GROUND
- HARDSTANDING / BARE GROUND
- RECOLONISING HARDSTANDING
- WATERBODIES
- WET DITCH
- BUILDINGS

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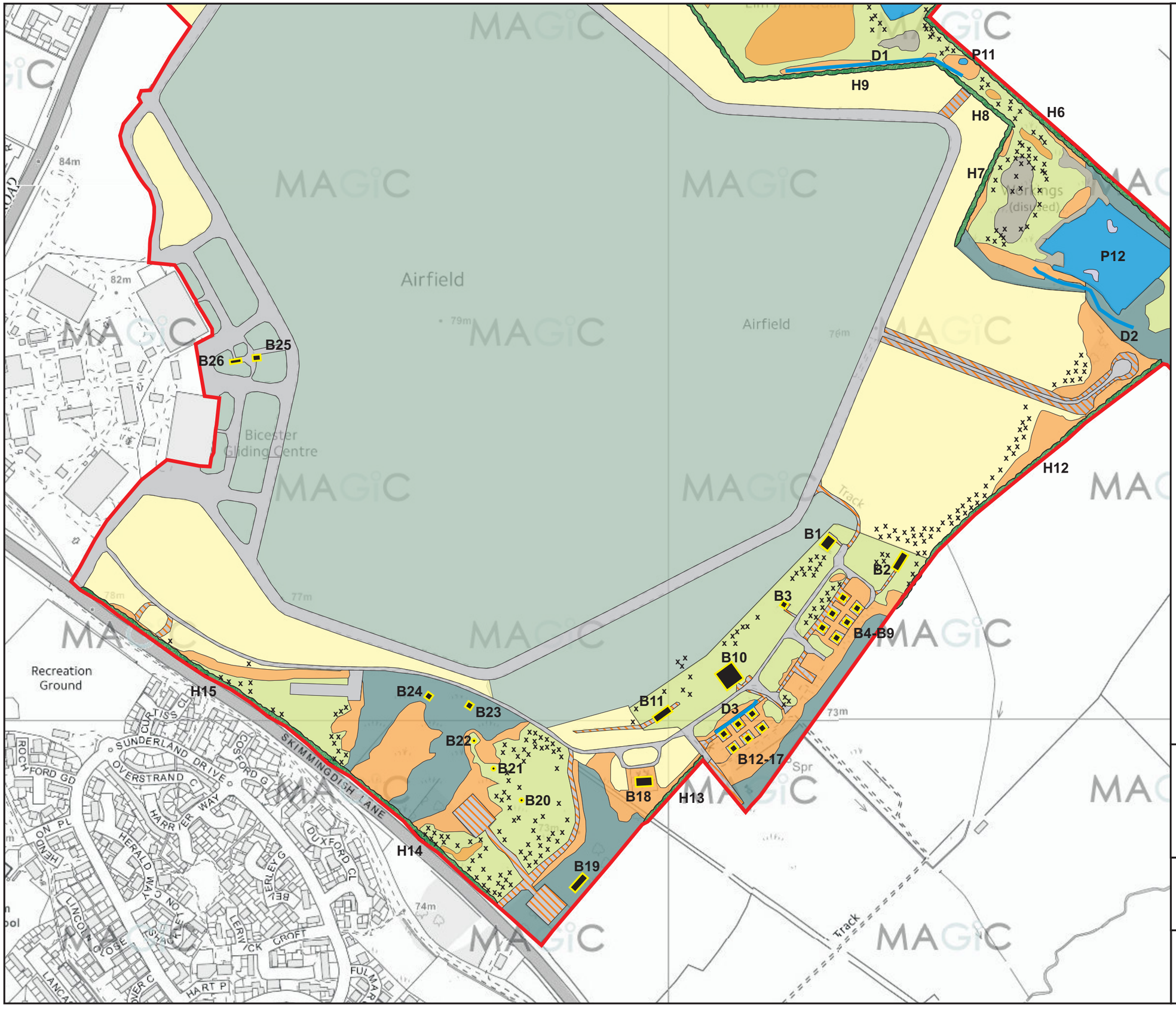
PLAN ECO2A: ECOLOGICAL FEATURES (NORTH)



KEY:

- SITE BOUNDARY
- SEMI-IMPROVED CALCAREOUS GRASSLAND
- SPECIES POOR SEMI-IMPROVED CALCAREOUS GRASSLAND
- SEMI-IMPROVED NEUTRAL AND CALCAREOUS GRASSLAND MOSAIC
- BROAD-LEAVED SEMI-NATURAL WOODLAND
- DENSE SCRUB
- DENSE SCRUB / GRASSLAND MOSAIC
- SCATTERED SCRUB
- REEDBED
- MARGINAL VEGETATION / MARSHY GRASSLAND
- HEDGEROW / TREELINE
- RECOLONISING BARE GROUND
- HARDSTANDING / BARE GROUND
- RECOLONISING HARDSTANDING
- WATERBODIES
- WET DITCH
- BUILDINGS

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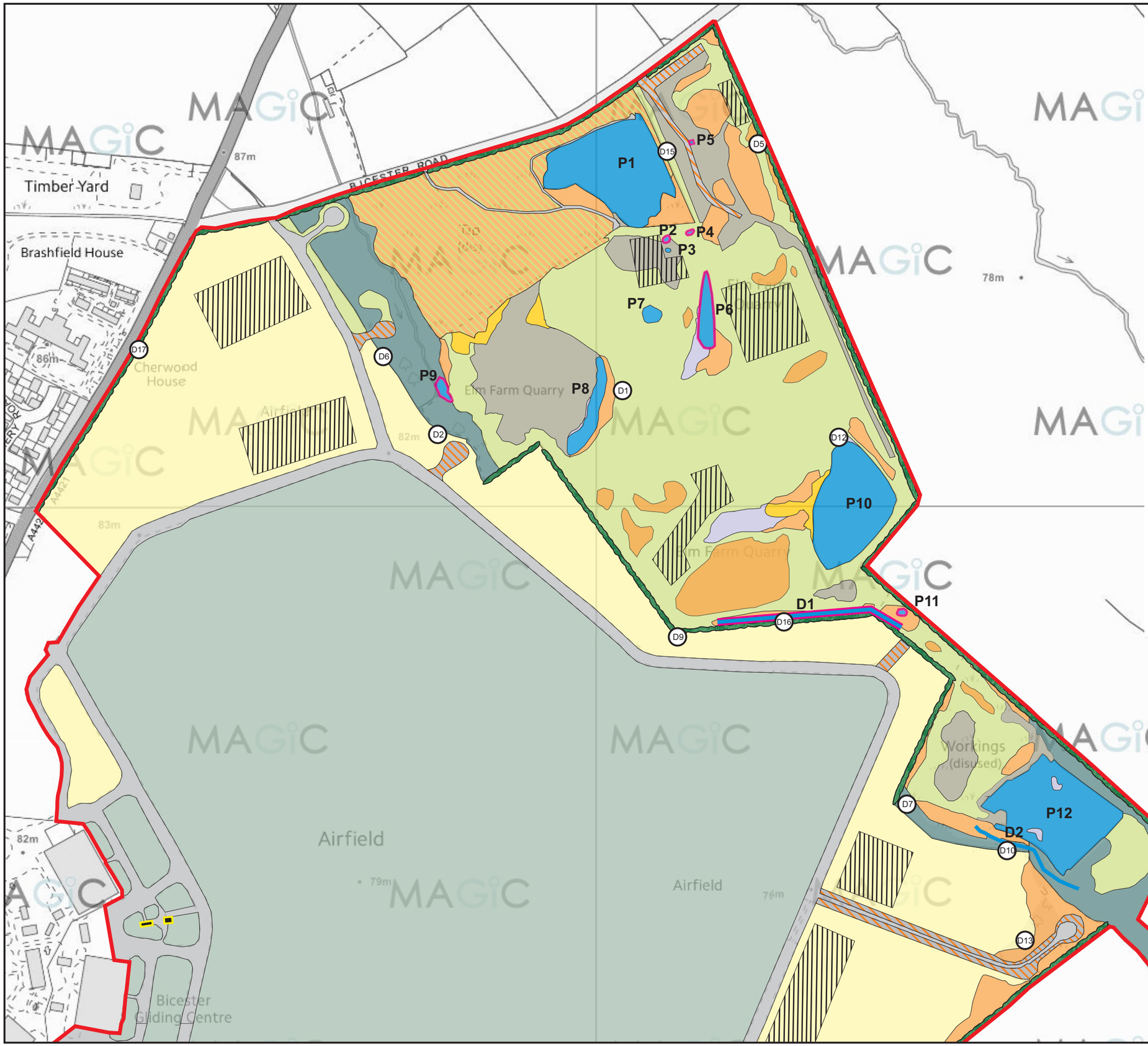
PLAN ECO2B: ECOLOGICAL FEATURES (SOUTH)

PLANS ECO3A & ECO3B

PROTECTED SPECIES



KEY:

- SITE BOUNDARY
- WATERBODY SUPPORTING GREAT CRESTED NEWTS
- AREAS TINNED FOR REPTILES
- STATIC BAT DETECTOR LOCATION (D1)

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PLAN ECO3A: PROTECTED SPECIES (NORTH)

KEY:

- SITE BOUNDARY
- WATERBODY SUPPORTING GREAT CRESTED NEWTS
- AREAS TINNED FOR REPTILES
- STATIC BAT DETECTOR LOCATION (D1)

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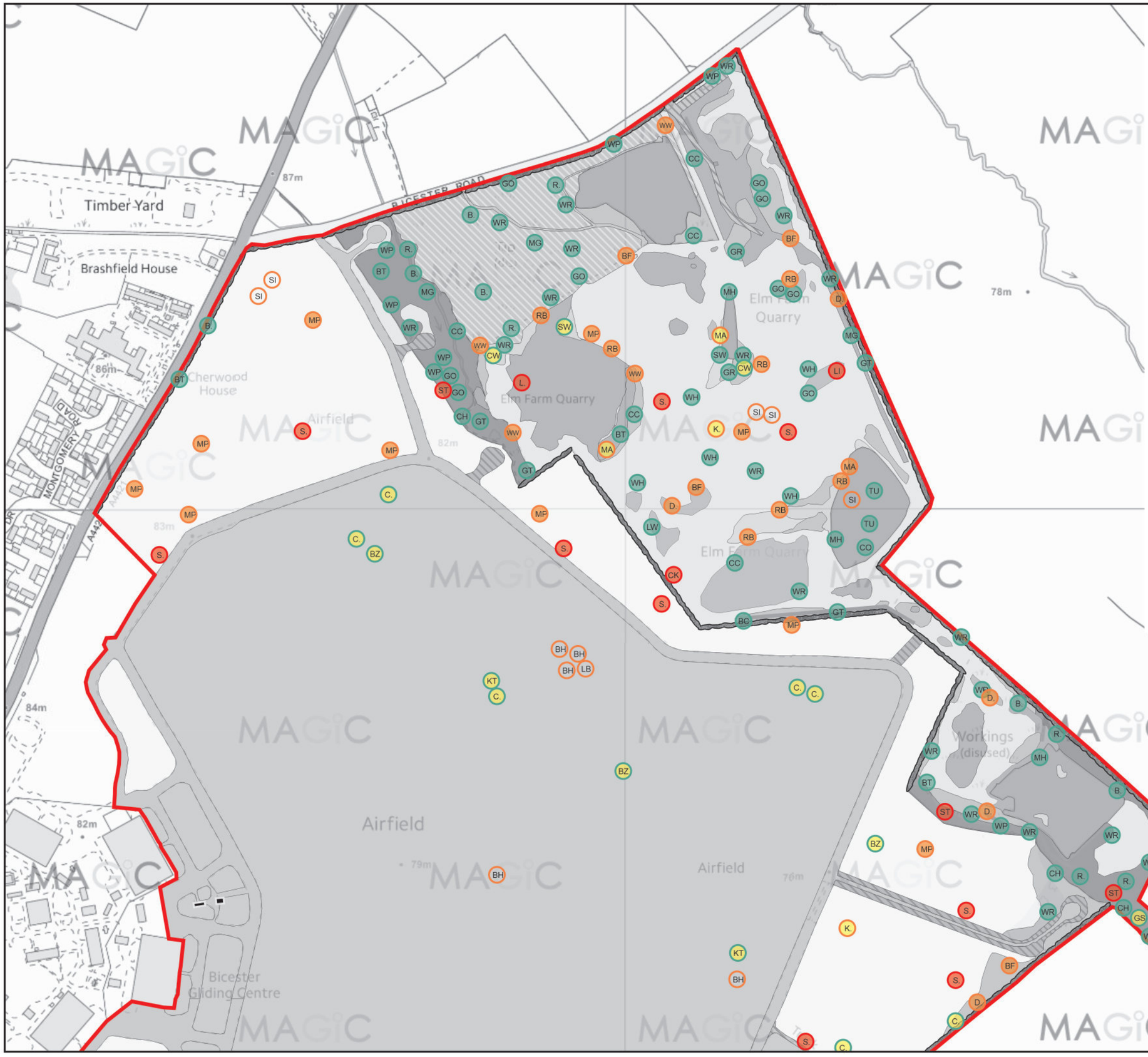
PLAN ECO3B: PROTECTED SPECIES (SOUTH)

PLANS ECO4A & ECO4B

BREEDING BIRD SURVEYS



KEY:

- SITE BOUNDARY
- ROBIN (R)
- BLUE TIT (BT)
- GREAT TIT (GT)
- DUNNOCK (D)
- WREN (WR)
- GOLDFINCH (GO)
- CHAFFINCH (CH)
- GREENFINCH (GR)
- BULLFINCH (BF)
- SONG THRUSH (ST)
- BLACKBIRD (B)
- CHIFFCHAFF (CC)
- WILLOW WARBLER (WW)
- BLACKCAP (BC)
- WHITETHROAT (WH)
- LESSER WHITETHROAT (LW)
- SEDGE WARBLER (SW)
- CETTI'S WARBLER (CW)
- REED BUNTING (RB)
- LINNET (LI)
- HOUSE SPARROW (HS)
- MEADOW PIPIT (MP)
- SKYLARK (S)
- WOOD PIGEON (WP)
- MAGPIE (MG)
- CARRION CROW (C)
- TAWNY OWL (TO)
- BUZZARD (BZ)
- KESTREL (K)
- RED KITE (KT)
- CUCKOO (CK)
- MOORHEN (MH)
- COOT (CO)
- MALLARD (MA)
- TUFTED DUCK (TU)
- BLACK-HEADED GULL (BH)
- LESSER BLACK-BACKED GULL (LB)
- SWIFT (SI)
- GREAT SPOTTED WOODPECKER (GS)
- LAPWING (L)

- RED / AMBER / GREEN LISTED SPECIES BREEDING OR PROBABLY BREEDING
- RED / AMBER / GREEN LISTED SPECIES POSSIBLY BREEDING
- RED/ AMBER / GREEN LISTED SPECIES UNLIKELY TO BE BREEDING

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PLAN ECO4A:
BREEDING BIRD
SURVEY PLAN (NORTH)

KEY:

- SITE BOUNDARY
- ROBIN (R)
- BLUE TIT (BT)
- GREAT TIT (GT)
- DUNNOCK (D)
- WREN (WR)
- GOLDFINCH (GO)
- CHAFFINCH (CH)
- GREENFINCH (GR)
- BULLFINCH (BF)
- SONG THRUSH (ST)
- BLACKBIRD (B)
- CHIFFCHAFF (CC)
- WILLOW WARBLER (WW)
- BLACKCAP (BC)
- WHITETHROAT (WH)
- LESSER WHITETHROAT (LW)
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- CETTI'S WARBLER (CW)
- REED BUNTING (RB)
- LINNET (LI)
- HOUSE SPARROW (HS)
- MEADOW PIPIT (MP)
- SKYLARK (S)
- WOOD PIGEON (WP)
- MAGPIE (MG)
- CARRION CROW (C)
- TAWNY OWL (TO)
- BUZZARD (BZ)
- KESTREL (K)
- RED KITE (KT)
- CUCKOO (CK)
- MOORHEN (MH)
- COOT (CO)
- MALLARD (MA)
- TUFTED DUCK (TU)
- BLACK-HEADED GULL (BH)
- LESSER BLACK-BACKED GULL (LB)
- SWIFT (SI)
- GREAT SPOTTED WOODPECKER (GS)
- LAPWING (L)

RED / AMBER / GREEN LISTED SPECIES BREEDING OR PROBABLY BREEDING

RED / AMBER / GREEN LISTED SPECIES POSSIBLY BREEDING

RED/ AMBER / GREEN LISTED SPECIES UNLIKELY TO BE BREEDING

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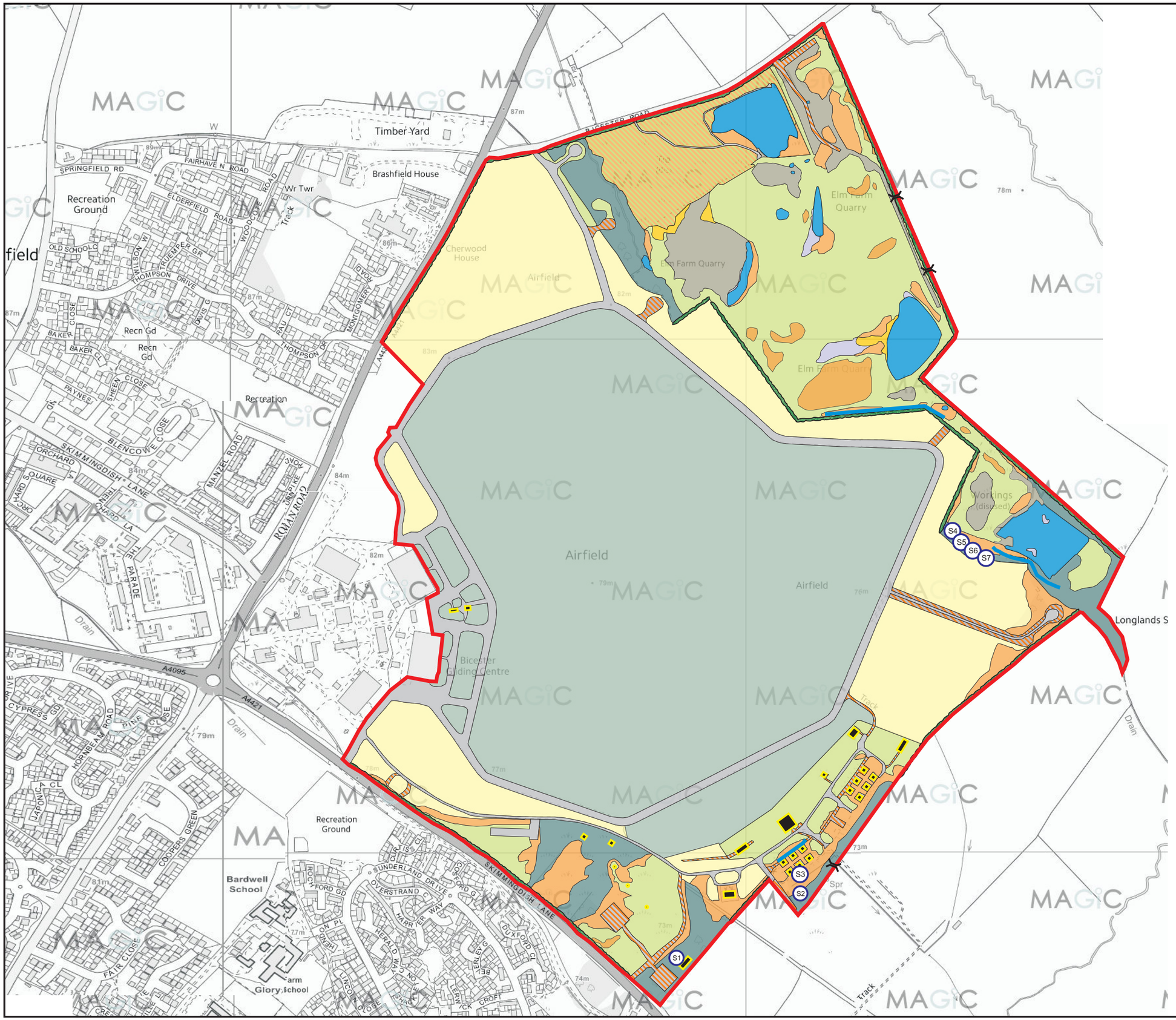
PLAN ECO4B:
BREEDING BIRD
SURVEY PLAN (SOUTH)

PLANS ECO5

PROTECTED SPECIES

(CONFIDENTIAL)



PLANS ECO6

WINTER BIRD SURVEY