ecological services

ESL (Ecological Services) Ltd, 1 Otago House, Allenby Business Village, Crofton Road, Lincoln LN3 4NL
Tel: 01522 539325 **Fax:** 01522 539782 **Email:** enquiries@esl-lincoln.co.uk **Web:** www.ecologicalservicesltd.com

APPENDIX E

ECOLOGICAL IMPACT ASSESSMENT, FINMERE QUARRY, OXFORDSHIRE

Final

February 2019

ecological services

ESL (Ecological Services) Ltd, 1 Otago House, Allenby Business Village, Crofton Road, Lincoln LN3 4NL

Tel: 01522 539325 **Fax:** 01522 539782 **Email:** enquiries@esl-lincoln.co.uk **Web:** www.ecologicalserviceslt d.com

DOCUMENT CONTROL

TITLE:	Ecological Impact Assessment, Finmere Quarry, Oxfordshire
VERSION:	Final
DATE:	February 2019
ISSUED BY:	Dave Hughes MCIEEM
AUTHORS:	Dave Hughes MCIEEM, Brian Hedley MCIEEM CEnv, Grant Berky ACIEEM, Anne Goodall, MSc, CBiol, MRSB
CHECKED BY:	John Pover
APPROVED BY:	Dave Hughes MCIEEM

ISSUED TO: John Hollister BA (Dual Hons) MA MRTPI MCIWM CEnv
Head of Planning (Minerals and Waste)
AECOM
Royal Court
Basil Close
Chesterfield
Derbyshire
S41 7SL

Contents **Page**

1 INTRODUCTION

1.1 This Appendix to the Environmental Statement (ES) assesses the potential for ecological effects on the biodiversity and nature conservation interest of the site and its surroundings, arising either directly or indirectly as a result of the development proposals.

1.2 The purpose of the report is to:

- Establish the baseline ecological conditions at the site and identify any potentially significant ecological effects associated with the proposed development.
- Set out any ecological measures necessary to effectively avoid, minimise or mitigate likely significant effects in order to ensure compliance with nature conservation legislation and local planning policy objectives.
- Consider and advise how the proposed mitigation, compensation and enhancement measures could be secured, together with any requirements for monitoring.

1.3 Landfilling and restoration activities covering a large area of the Finmere Quarry complex are currently ongoing under five separate planning approvals. The extent to which this Ecological Impact Assessment (EcIA) considers potential impacts arising from consented works is primarily limited to compliance with protected species legislation. The main aim of the EcIA is to identify and address any impacts arising from activities in areas for which approval is being sought, although due consideration is given where there is any likely ecological overlap. A full description of the proposed scheme is given in Chapter 3 of the ES and the extent of the 'Site', for the purposes of the ES is as shown on Figure FQ/ES/001.

1.4 English names for species are used throughout the text with a full list of all species recorded from the site (with scientific names) given in Annex E1. Where names of species not recorded are referred to, the scientific name is also given in the text. Both English and scientific names for higher plants are given according to Stace (2010).

1.5 This assessment has been undertaken by ESL (Ecological Services) Limited.

2 WILDLIFE LEGISLATION. PLANNING POLICY AND GUIDANCE

2.1 WILDLIFE LEGISLATION

2.1.1 The assessment has taken into account the potential effects on sites that are:

- designated as Local Nature Reserves (LNR) under Section 21 of the National Parks and Access to the Countryside Act, 1949, by principal local authorities,
- (re-)notified as Sites/Areas of Special Scientific Interest (SSSI/ASSI) under the Wildlife and Countryside Act, 1981 (and as amended) (WCA), or,
- of international importance, comprising Special Protection Areas (SPA) for birds and Special Areas of Conservation (SAC) created under the EC Birds Directive and Habitats Directive and forming part of the European Natura 2000 network, together with sites created under the Ramsar Convention (Ramsar sites and candidate sites submitted to or adopted by the EC but not yet adopted/formally designated are afforded the same protection as designated sites).

2.1.2 The assessment has also taken into account habitats and species that are:

- listed in Schedules 1, 5 and 9 of the WCA,
- covered by the Protection of Badgers Act, 1992 (PBA),
- covered by the Hedgerows Regulations 1997,
- listed as Habitats and Species of Principal Importance by the Secretary of State in accordance with Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act, 2006, or,
- listed in the Schedules of the Conservation of Habitats and Species Regulations, 2017.

2.1.3 For statutorily-protected species recorded on or considered likely to use the Site, a summary of legal protection is given in each of the species/group annexes.

2.2 PLANNING POLICY CONTEXT

2.2.1 The assessment makes reference to the following documents:

- The National Planning Policy Framework (2018) (NPPF).
- The Cherwell Local Plan 2011-2031 Part 1, adopted 20 July 2015 (Cherwell District Council, 2015).
- The Oxfordshire Minerals and Waste Core Strategy 2017-2031 (Oxfordshire County Council, 2017).
- Biodiversity and Planning in Oxfordshire (BBOWT, OCC and TVERC, 2014).

2.2.2 The following sections of the NPPF are relevant to Biodiversity:

- Section 11 'Making effective use of land' sets out the need for strategic planning, which considers the many functions that land parcels may need to fulfil and stresses that multiple benefits, including net environmental gains, should be obtained.
- Section 15 states that planning policies should contribute to and enhance the natural and local environment. It specifies the obligations of Local Authorities and the UK Government regarding statutorily-designated sites and protected species under UK and international legislation and how this it to be delivered in the planning system.

2.2.3 Policy ESD 10 of the Cherwell Local Plan 2011-2031 'Protection and Enhancement of Biodiversity and the Natural Environment' states that *'In considering proposals for development, a net gain in biodiversity will be sought by protecting, managing, enhancing and extending existing resources and by creating new resources'.*

2.2.4 Oxfordshire Minerals and Waste Core Strategy 2017-203 has the following relevant policies:

- Policy C7 'Biodiversity and geodiversity' states that development *'should conserve and where possible deliver a net gain in biodiversity*'.
- Policy M10 'Restoration of mineral workings' states that '*mineral working should be restored to high standard and phased manner to an after use that is appropriate to the location and delivers a net gain in biodiversity'.*

Local Biodiversity Action Plans and Local Wildlife Sites

2.2.5 While local Biodiversity Action Plan (BAP) habitats and species as well as Local Wildlife Sites (LWS) have no statutory protection, local authorities are required to have regard to them in the planning process. These and other locally-important designations identified in the Local Plan are also considered in this assessment where they lie or occur within the zone of influence.

2.2.6 'Biodiversity in Oxfordshire' provides guidance for developers on important habitats and species occurring in the county, both those with statutory protection and those protected under the planning system, including 'irreplaceable habitats' such as ancient woodland and veteran trees. It also provides maps showing SACs, SPAs, SSSI, LWS, nature reserves, protected and BAP species, ancient woodland, etc.

2.2.7 The objectives of the BAP published by Cherwell District Council (2016) are stated in a series of themes; the two germane to development are:

Theme 1: Planning and Sustainable Development

- 1.1. Ensure protection, management and opportunities for enhancement and extension of biodiversity are taken into account in the preparation and implementation of the Local Plan.
- 1.2. Incorporate biodiversity management into each stage of the planning process.

- 1.3. A net gain in biodiversity will be sought when considering proposals for development by protecting, managing, enhancing and extending existing resources.

Theme 4: Green Infrastructure (GI)

- 4.1. Support the establishment and development of GI through implementation of relevant policies.
- 4.2. Support the establishment and development of ecological networks through delivery of the Conservation Target Area (CTA) project.
- 4.3. Support Oxfordshire partnership work relating to GI and strategic biodiversity issues.

2.3 RELEVANT GUIDANCE

2.3.1 The methods used for assessing the impacts on features of ecological and nature conservation interest are now those set out in the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact in the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).

2.3.2 The British Standard BS42020:2013, "Biodiversity - Code of practice for planning and development" has also been consulted in producing this document.

3 METHODOLOGY

3.1 DETERMINING THE SCOPE OF THE ASSESSMENT

Desk Study Search Area

3.1.1 This assessment considered any potential effects on internationally-designated statutory sites within 10km of the Site and to nationally- and locally-designated statutory sites, locally-designated non-statutory sites, BAP habitats and notable species within 2km of the Site. The sources used to identify the location, proximity, status and distribution of any important features requiring consideration in the assessment are given in Table 1. The results of the data search are given in Annex E2 and discussed in more detail in the relevant species/group annexes.

TABLE 1. SOURCES OF DATA.

Data Source	Data Request
Multi-Agency Geographic Information for the Countryside (MAGIC) website.	Statutorily-designated sites: SAC, SPA, Ramsar sites, NNR, SSSI and Ancient Woodland. European Protected Species licences (EPSL) issued within 2km of the site.
Thames Valley Environmental Records Centre (TVERC) and Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC).	LNR and LWS within 2km of the Site. Records of any protected or notable species within 2km of the Site including Species of Principal Importance listed in Section 41 of the NERC Act. Neither Environmental Record Centre holds any data generated by surveys undertaken to inform the Government's high-speed rail project (HS2).
ESL (Ecological Services) Limited.	Data generated during surveys undertaken at the Site from 2008 to 2016.
Bioscan.	Data generated during surveys undertaken at the Site in 2005.

Defining the Site and the Zone of Influence

3.1.2 The term 'Site' is generally used to mean the area within the boundary of the scheme as defined in Section 2 of the ES and as shown on Figure FQ/ES/001 but in some cases, this may include the wider area for context (for example, where more mobile species are being assessed).

3.1.3 The 'zone of influence' is the term given to the area over which ecologically important sites, habitats or species may be significantly affected by the changes arising because of the activities associated with the proposed scheme. The zone of influence is not a set distance and is dependent on the sensitivity of the ecological features identified, both within and outside the boundaries of the scheme. In consideration of the activities normally associated with this type of scheme, the zone of influence is unlikely to extend beyond 100m of the Site boundaries for the most mobile species.

Preliminary Ecological Appraisal (PEA)

3.1.4 A PEA was undertaken 13/14 November 2017 by David Hughes MCIEEM and Brian Hedley MCIEEM, CEnv. All habitats and plant communities in the survey area were mapped and characterised by identifying the dominant and typical species based on the Joint Nature Conservation Committee (JNCC) Phase-1 Habitat Survey Methodology (JNCC, 2010). A search was made for signs of protected species and for habitat with the potential for use by protected species; all such habitat was noted. The information from the desk study and walkover was used to design the scope for more detailed surveys. The PEA is appended to this assessment as Annex E10.

Scoping response

3.1.5 The scoping response received from Oxfordshire County Council on 26 January 2018 was in accord with the recommendations in the PEA and the following important features were identified for further investigation:

- Effects on Tingewick Meadow SSSI and Spilsmere Wood LWS.
- Habitats and Plant species.
- Invertebrates.
- Amphibians & Reptiles.
- Birds.
- Bats.
- Badgers.

3.1.6 All other protected and priority species not mentioned above were scoped out of the assessment for one or more of the following reasons:

- The desk study did not identify previous records of the species on the Site.
- The Site lies outside the known geographic range for the species.
- The habitat required to support the species is not present on or adjacent to the Site.
- Suitable habitat on the Site is too small, isolated or fragmented to support viable populations.

3.2 FIELD SURVEY

Overview

3.2.1 The ecological surveys were undertaken between December 2017 and October 2018; a summary of the survey methods is given below. Detailed methodologies and the results of these surveys are given in the relevant annexes.

Habitats and Plant Communities

3.2.2 The initial Phase-1 Habitat Survey was updated on subsequent site visits throughout the growing season. Hedgerows directly impacted by the scheme were assessed against criteria in the Hedgerow Regulations, 1997. Arable plant species were assessed against the scoring system used to determine Important Arable Plant Areas (Byfield & Wilson, 2005). Full details of these surveys are given in Annex E3.

Invertebrates

3.2.3 An invertebrate assessment was undertaken on 25 June by Conops Entomology following recommended methods (Drake et al., 2007), primarily by sweep-netting, spot sampling and beating. Full details of the invertebrate surveys are given in Annex E4.

Amphibians

3 2.4 A 1:2,500 scale Ordnance Survey map and aerial imagery were examined to identify ponds within 250m of the Site and assess their connectivity (or lack of) to the Site. Accessible waterbodies were then subjected to a great crested newt (GCN) Habitat Suitability Index (HSI) assessment (Oldham et al. 2000) and a population size class assessment over six visits from 22 March to 23 May 2018, in accordance with Natural England guidelines (English Nature, 2001). Full details of the amphibian surveys are given in Annex E5.

Reptiles

3.2.5 The Site was assessed for its potential to support reptiles, following which, artificial refugia were set out in suitable habitat (Gent and Gibson, 2003). Direct observation was also carried out on each visit (HGBI, 1998). Full details of the reptile surveys are given in Annex E6.

Birds

3.2.6 Six visits were made to the Site between mid-March and early July to record and map all birds seen or heard, using Common Bird Census (CBC) species codes and activity symbols (Marchant, 1983). Six visits were made to the Site (December 2017 to March, 2018 and September and October 2018) to determine whether the site was used by specific wintering bird species (waders, wildfowl and notable passerine flocks). Birds seen or heard during other surveys on site were also recorded, in particular, crepuscular and nocturnal species encountered during the bat and GCN surveys. Full details of the bird surveys are given in Annex E7.

Bats

3.2.7 All surveys for this group were carried out with reference to the Bat Conservation Trust guidelines (Collins, 2016). All structures and trees within the boundaries of the Site were assessed for bat roost potential, followed where necessary by dusk emergence surveys and dawn re-entry surveys. Species assemblage and habitat use were assessed by passive acoustic monitoring. Full details of the bat surveys are given in Annex E8.

Badgers

3.2.8 The Site and accessible adjacent land were searched for field signs indicating the presence of badgers, including setts, dung pits, pathways, paw prints, hairs and feeding signs such as snuffle holes and scratched logs (Harris et al., 1994). Locations of such signs, including setts, were recorded and mapped. Badger activity was updated on subsequent site visits. Full details of the badger survey are given in Annex E9.

3.3 IMPACT ASSESSMENT

Identification of Important Ecological Features

3.3.1 In accordance with CIEEM guidance (2018), the baseline conditions of the Site, obtained by consultation, desk study and field survey, are used to identify the ecological features (which may be habitats, communities, species or ecosystems and their functions or services) and to determine which are important by virtue of their scarcity, sensitivity, or legal status. This includes features that would not qualify in their own right but provide a supporting role or function to features that do, for example, an area of semi-improved grassland between two ponds that support breeding GCN. The geographical area (e.g. international, national, county or smaller area) within which the feature is important also needs to be understood.

3.3.2 The important ecological features thus identified are subjected to an assessment of potential impacts from the project. Features that are common, widespread, not threatened and considered likely to be resilient to any project impacts may not require assessment.

Characterising Ecological Effects

3.3.3 In describing impacts, consideration is given to the extent to which the important features identified could be lost, damaged, disturbed or subject to severance (such as to reduce their viability) because of the development and the proportion of each habitat, community, species or ecosystem that could be affected. Throughout the process, reference is made to the characteristics in Table 2.

TABLE 2. THE CHARACTERISTICS USED TO DETERMINE ECOLOGICAL EFFECTS.

Characteristic	Description
Positive.	A change that improves the quality of the environment, e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment.
Negative.	A change that reduces the quality of the environment, e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation or pollution.
Extent.	The extent is the spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions. A local impact on an important habitat or species may have an effect over a wider area than the immediate surroundings.
Magnitude.	The size, amount, intensity and volume, quantified if possible and expressed in absolute or relative terms, e.g. the amount of habitat lost, percentage change to habitat area and percentage decline in a species population.
Duration.	To be defined in relation to ecological characteristics (e.g. life-times or breeding cycles) as well as months/years. Duration of the impact may differ from duration of the effect. Effects (defined in months or years) may be short/medium/long term, permanent or temporary.
Frequency and Timing.	The number of times an impact/activity (e.g. walker/dog/vehicle movement) occurs and the season in which it occurs. Seasonal sensitivity will also have a bearing on the resulting effect (e.g. breeding/summering/wintering for birds).
Reversibility.	An irreversible effect is one from which recovery is not possible within a reasonable timescale (e.g. in terms of the lifetime of the species affected) or for which there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation. In some cases, the same activity can cause both reversible and irreversible effects.

Assessment of Cumulative Impacts and Effects

3.3.4 A cumulative effect can result from actions that may be individually insignificant but which taken together, produce a significant result at a specific time or place. Alternatively, a feature may already be close to a critical threshold due to exposure to a background level of some activity or pressure such that the addition of an otherwise insignificant impact of another development could produce a significant negative effect. Different impacts resulting from the same development, each individually not significant, may also combine to produce a significant negative effect.

3.3.5 In some cases, there may be a known and measurable threshold and quantitative surveys (e.g. noise level or air quality) can then provide a decision. At other times, a judgement must be made using professional experience.

Determining Significance

3.3.6 In accordance with CIEEM guidance (2018), the significance of an effect takes into account the characteristics acting on the important feature (Table 2), then attaches a weighting based on the following geographic scale at which the effect occurs:

- International.

- National.
- Regional.
- County.
- Zone of Influence or Site (to be specified).

3.3.7 The geographical scale has a direct bearing on the mitigation or compensation measures that must be achieved to reduce the effect to a level at which the proposed activity accords with nature conservation objectives, as defined by relevant legislation and planning policy.

3.3.8 This method of assessment does not use a matrix approach where, for example, magnitudes are assigned categories of low, medium or high to identify whether an effect is minor, moderate or major. For the purpose of this assessment, effects are either:

- **Significant** - An effect on an important ecological feature arising from activities associated with the project that is likely to undermine nature conservation objectives, or,
- **Not significant** - An effect arising from activities associated with the project that does not undermine biodiversity conservation objectives, or where important habitats, groups or species under consideration would be resilient to such effects were they to occur.

3.3.9 A significant effect may be positive or negative. Ideally, the judgement will be based on the best available scientific evidence. Where this is not available, a more subjective assessment will need to be used and, in such cases, the assumptions and limitations of this are stated. Under CIEEM Guidelines, no confidence levels are attributed to the certainty of an outcome, so as a precaution, the effect of an impact has not been understated and the success of mitigation has not been overstated.

Avoiding/Mitigating Identified Effects

3.3.10 Potentially significant effects arising as a result of the scheme were identified at an early stage and the scheme was designed to avoid or minimise them (embedded mitigation). The impact assessment takes into account the embedded mitigation and its likely effectiveness, with further mitigation only recommended when the embedded mitigation will not reduce residual effects to an acceptable degree. The overall aim is to achieve net biodiversity gain either as a result of mitigation alone or in combination with bespoke enhancement measures. The mitigation hierarchy used in this assessment is defined in Table 3 (from CIEEM, 2018).

TABLE 3. MITIGATION HIERARCHY.

Measure	Definition
Avoidance.	Seek options that avoid harm to ecological features (for example, by locating on an alternative site).
Mitigation.	Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed, for example, through a condition or planning obligation.
Compensation.	Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
Enhancement.	Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

4 BASELINE ENVIRONMENT

4.1 DESK STUDY

Internationally Designated Sites

4.1.1 The nearest internationally protected site is Oxford Meadows, a SAC 26km southeast of the Site designated for its Annex 1 Habitat: traditionally-managed lowland hay meadow.

Nationally Designated Sites

4.1.2 The nearest nationally important site for nature conservation is Tingewick Meadows SSSI, approximately 1.8km to the southeast. This site is one of the last remnants of old meadow in North Buckinghamshire and is important for its unimproved neutral grassland and fen communities.

4.1.3 There are no additional SSSIs, NNRs or LNRs within 5km of the Site.

Non-Statutorily Protected Sites

4.1.4 Spilsmere Woods LWS is approximately 1.1km to the southwest. This is an ancient woodland site with pedunculate oak, ash, aspen and coppiced hazel.

4.1.5 West Wood LWS is approximately 1.25km to the east, comprising two areas of broadleaved woodland of pedunculate oak and ash over hazel. The woodland is used for paintball activities and forestry.

4.1.6 Barton Hartshorn Railway Wood LWS, approximately 1.4km to the southeast, is an osier willow woodland with streams abutting a disused railway embankment.

Other Designations

4.1.7 The Site does not fall within any Oxfordshire CTA, the nearest being Tusmore and Shelswell Park CTA approximately 1.9km to the southwest.

4.1.8 The closest ancient woodland to the Site is referred on the Ordnance Survey map as Diggings Wood, 750m west of the Site at the southern end of the Mixbury Plantation/Park Thorns woodland complex.

Protected and S41 Principal Species

4.1.9 Information provided by the Environmental Record Centres or derived from previous site surveys is presented in relevant annexes where germane to the assessment.

4.2 HABITATS, PLANT COMMUNITIES AND PLANT SPECIES

4.2.1 All habitats recorded remain common and widespread within a local and national context. However, the northern woodland, Finmere Plantation, hedgerows and ponds are S41

Principal habitats. None of the hedgerows impacted by the proposed scheme qualifies as important under the Hedgerow Regulations, 1997.

4.2.2 Most of the plant communities on the Site are similarly common, unthreatened and are not important ecological features. The species assemblage found within the arable fields fell short of the required score for selection as an Important Arable Plant Area (Byfield and Wilson, 2005). The total score from the Site was 12, with a score of at least 20 needed to qualify. None of the arable field margins is specifically managed for wildlife and therefore they do not qualify as an S41 Principal habitat.

Existing Amphibian Receptor Site

4.2.3 As described in Annex E3, a European Protected Species Licence (EPSL EPSM2011-3441C) was granted by Natural England in May 2012, in order that the amphibians present on the working site could be safely removed from it. As part of the EPSL mitigation strategy, a receptor site was created in the southern part of the grassland to the west of the disused railway. At that time, six ponds holding a small and isolated population were present in this area and 11 new ponds were created and planted up with locally-native aquatic species. The whole area was surrounded by steel amphibian fencing in order to create a barrier to movement back across the disused railway onto the Site. This receptor site has been monitored regularly since then to ensure it remains suitable to receive the amphibian population remaining on the Site.

Plant Species

4.2.4 No nationally rare, nationally scarce, S41 Principal Species or Local BAP priority plant species was recorded within the Site. However, a single Red List plant species was found (common cudweed), which is classed as 'Near Threatened' (Stroh et al, 2014).

Invasive Species of Note

4.2.5 The highly invasive alien plant Japanese knotweed is present on the disused railway corridor beyond the Site's western boundary but is absent within the Site as a result of management to prevent its accidental spread. This species is listed in Schedule 9 to the WCA. Section 14 (1) of this Act makes it illegal to plant or otherwise cause to grow in the wild any plant listed in Schedule 9 to the Act. Its status on the Site will continue to be monitored.

4.3 INVERTEBRATES

4.3.1 The invertebrate interest on the Site is limited to areas that are not being worked and only two areas are of any note. Finmere Plantation generated a list of species that are all common and local and none has a formal nationally-significant status. Whilst worthy of retention, the woodland is limited in size, is isolated with poor habitat connectivity and is in proximity to activities that generate dust. The northern fields highlighted two species of conservation

value: cinnabar moth (an S41 species listed as 'research only') and the yellow-faced bee (a genuinely scarce Red Data Book 3 species). The other species recorded are widespread, common and are found in a range of similar habitats. Both areas are likely of Local (low) importance (Plant, 2009). No further survey work was considered necessary to inform the assessment.

4.4 AMPHIBIANS

4.4.1 The presence of breeding GCN was established in Pond 1 and Pond 2. The combined peak count of 33 indicates a population size class assessment of 'medium'. No GCN were found in Pond 3. GCN are common and widespread in the local area and the 2018 monitoring surveys of the mitigation ponds in the receptor area revealed that GCN are present and breeding in 15 out of 17. GCN are protected under European and domestic legislation and the population present on the Site is considered an important feature within the zone of influence.

4.4.2 Smooth newts were recorded in Pond 1 and Pond 2. This species is common, widespread and as it has no conservation designation, it is not considered an important feature. No toads (or other amphibians) were recorded on Site during the surveys.

4.5 REPTILES

4.5.1 No reptiles were recorded during any site visit. There are records of common lizard and grass snake from the disused railway cutting. Site boundary features that connect to the railway (such as hedgerows) provide suitable habitat for reptiles but as these features are not directly affected by the proposed scheme, any negative impacts are unlikely. Reptiles are not considered an important feature of the Site and any that may be present are considered resilient to any effects of the proposed scheme; this group is not considered further in the assessment.

4.6 BIRDS

4.6.1 In total, 61 bird species were recorded using the Site during the six breeding-bird survey visits. This included 11 species of Principal Importance: lapwing, skylark, yellow wagtail, dunnock, song thrush, marsh tit, starling, linnet, bullfinch, yellowhammer and reed bunting. Ten are also Red List species (Eaton et al., 2015), while 13 are included on the Amber List; there is suitable breeding habitat for most of these species within the Site.

4.6.2 Two Schedule-1 bird species (those specially protected under the WCA) were recorded during the survey: red kite and fieldfare. Red kites were frequently seen, most often over the active landfill. This species in known to breed in the local area but has never been recorded breeding on the Site. Fieldfare is a rare breeding species in the UK but occurs only as a winter visitor in this area and there is no suitable breeding habitat on the Site. An active

rookery was present within the northern area of Finmere Plantation with approximately 70 nests counted in April 2018. Tawny owl was the only nocturnal or crepuscular species noted during evening fieldwork.

4.6.3 Whilst the list of birds recorded using the Site includes many S41, Red List and Amber List species, all are relatively common, widespread and typical of the habitats in which they were found on Site, namely, water, hedgerows/farmland edge and woodland/scrub. Important species that favour open farmland/grassland habitats, such as skylark, were recorded breeding on the capped landfill grassland (seeded within the last five years) so are already making use of restored areas. The operational areas of the Site are traversed by heavy, earthmoving machinery almost daily, creating a hostile environment for most species, hence the lack of birds using these areas. The breeding bird assemblage is considered an important feature of the Site within the zone of influence but as most of these habitats are not impacted by the proposed scheme, most species are likely resilient to any effects. Wintering birds are not an important feature of the Site.

4.7 BATS

4.7.1 The roof void of the bungalow at Foxley Fields Farm supports a brown long-eared bat maternity colony. Whilst brown long-eared bats are a common and widespread species in the UK, all bats are strictly protected under European and domestic legislation. Brown long-eared bats are also an S41 species. The maternity roost at Foxley Fields Farm is considered an important feature of the Site at a County level (as defined by Wray, et al., 2010). No roosts were identified in any of the suitable trees surveyed.

4.7.2 The acoustic monitoring surveys revealed the presence of common pipistrelles, soprano pipistrelles and noctule bats. Bat activity levels in operational areas and over the arable fields away from hedgerows were very low and can be attributed to a combination of unproductive foraging opportunities (effort versus reward) and an open, exposed landscape lacking in acoustic markers for pipistrelles, both 'edge' habitat species. In contrast, the boundary features provide a network of habitat connectivity with the wider landscape and it is these features that are of primary importance for foraging and commuting bats.

4.7.3 The bat assemblage using the Site is considered an important feature within the zone of influence. However, given their mobility and the retention of boundary features and woodland, their foraging and commuting activities are likely resilient to any predicted effects of the proposed scheme so are not considered further in this regard.

4.8 BADGERS

4.8.1 The results of the badger survey are presented in Annex E9, which is to be treated as confidential and must not be released into the public domain. Badgers are fully protected by

the PBA, 1992, and are therefore considered an important feature within the zone of influence.

4.9 OTHER MAMMALS

Hedgehog

4.9.1 Hedgehogs are an S41 species. None was recorded during the survey and suitable habitats are limited to the Site boundary habitats that are not directly affected by the scheme. Hedgehogs are not considered an important feature of this Site and any present are likely resilient to any predicted effects of the proposed scheme; they are not taken forward to the impact assessment.

Brown hare

4.9.2 Brown hare is an S41 species. One animal was seen in the corner of the north-western arable field during the breeding bird survey on 30 May. There is farmland beyond all the Site boundaries and whilst brown hare may make greater use of the Site than has been recorded, it is a highly mobile species. Brown hares are not considered an important feature of this Site. Any animals that use the Site are likely resilient to any predicted effects of the proposed scheme and are not taken forward to the impact assessment.

4.10 SUMMARY OF IMPORTANT ECOLOGICAL FEATURES

4.10.1 The important ecological features identified are shown in Table 4, together with the geographical area over which they are considered important. Plant communities are assessed both in terms of their intrinsic value and as habitat for those protected species whose habitat is also specifically protected, also for species of nature conservation concern that are particularly associated with them.

TABLE 4. SUMMARY OF IMPORTANT ECOLOGICAL FEATURES.

Important Ecological Feature	Geographic Scale of Importance
Designated Sites.	National.
Local Wildlife Sites.	County.
Woodland.	Local.
Hedgerows.	Site.
Ponds.	Site.
Great crested newts.	Zone of Influence.
Birds.	Zone of Influence.
Bats - Roosting.	County.
Bats - Foraging/commuting.	Zone of Influence.
Badgers.	Zone of Influence.

4.11 DATA LIMITATIONS

4.11.1 Parts of the Site that are included in this assessment are operational so are subject to continuous change. However, with regard to the baseline conditions (and the impact assessment), with the exception of the ponds, the operational areas do not contain any important features that could be affected by the proposed scheme.

5 DEVELOPMENT PROPOSALS

5.1 SCHEME OVERVIEW

5.1.1 The proposed scheme would be undertaken as described in Chapter 3 of the ES. For clarification, the bungalow at Foxley Fields Farm is not affected by the scheme.

5.1.2 Habitat creation and enhancement measures are shown on the Overall Final Restoration Masterplan (FQ/Masterplan) and are described in detail in Section 3.9 of the ES. The measures have been designed to ensure the scheme meets the aims of the Oxfordshire Mineral & Waste Core Strategy Policy C7 Biodiversity and C10 Restoration of Mineral Workings, The Cherwell Local Plan, Policy ESD 10: Protection and Enhancement of Biodiversity and The objectives of the Cherwell District Council BAP.

Woodland

5.1.3 The scheme will result in the creation of nearly 15ha of new broadleaved woodland, together with some 1.3ha of woodland edge scrub comprising locally-native species. The woodland will have open glades to encourage ground flora and a range of invertebrates.

Hedgerows

5.1.4 Nearly 3km of hedgerow will be retained and more than 1km of hedgerow will be planted, some new and some restoring historical hedgerows once present on the Site and in all cases using locally-native species. The new plantings have been designed to connect new areas of woodland and will contain at least six woody species to maximise diversity and provide a wide range of nectar, berries and fruit. This will provide new and increased habitats for nesting birds and invertebrates and will improve commuting and foraging opportunities for bats.

Ponds

5.1.5 At least six new permanent ponds will be created as part of the restoration plan. They will range in size up to at least 400m², will be lined with clay and will be planted up with locally-native species to maximise the benefits for a broad range of species.

5.1.6 Two lagoons have been created to the east of Finmere Plantation South. Whilst the primary use of the northern lagoon is to manage surface water and the southern lagoon is for the management of silt generated by the processing plant, these lagoons will be available for use by wildlife for the duration of the scheme. The northern lagoon will be retained, re-profiled and planted up with locally-native species to improve its suitability for wildlife under the restoration plan.

5.1.7 A series of shallow pools and scrapes will be created in the restored eastern clay extraction extension area. This will deliberately comprise a range of low nutrient soils made up of

overburden, sub-soil and gravels to create a low, open sward with bare areas suitable for a range of farmland birds.

Species-rich grassland/neutral grassland

5.1.8 At least 14ha of species-rich neutral grassland will be created, in addition to some 4.5ha of grassland on the low nutrient soils with scrapes. Together, these will provide a valuable nectar source for a wide range of invertebrates that in turn will provide increased foraging opportunities for birds and bats. The grassland will also provide increased habitat for important ground-nesting species such as skylark.

Permanent set-aside for scarcer annual arable plants and invertebrates

5.1.9 The northern fields will be restored to current levels and will be returned to agricultural production. However, the restoration of the southern fields has provided a rare opportunity to create habitats specifically for scarcer annual arable plants and invertebrates. Part of the area of low-nutrient soils will be used for this purpose, with annual shallow ploughing to prevent permanent species encroaching.

Bats

5.1.10 A total of 40 Schwegler 1FF bat boxes will be fixed to suitable trees in Finmere Plantation. This will provide additional roosting habitats for local bat populations and enable them to take full advantage of the new habitats as they become established. Based on experience from other projects, this box design is suitable for all species recorded using the site to date.

5.2 TIMINGS

5.2.1 The proposed durations of the various applications are detailed in Chapter 3 of the ES. The phasing of works associated with each application should be treated as indicative within the overall proposed duration rather than absolute.

6 ASSESSMENT OF EFFECTS WITH EMBEDDED RESTORATION MITIGATION MEASURES

6.1 OVERVIEW

6.1.1 From an ecological perspective, the activities associated with quarrying and landfilling are very similar during the construction and operational phases and as the site is sequentially restored as work progresses, there is no specific decommissioning phase. The potential impacts arising from these activities are considered to be the following:

- loss of habitat arising from site clearance and preparation,
- severance of territories or connecting habitats arising from site clearance, laying down of haul routes, creation of soil bunds or stockpiles of sand/gravel, etc.,
- killing or injuring protected species,
- emissions to air affecting sensitive habitats within the zone of influence,
- disturbance to S1 (specially protected) birds nesting close to the site,
- disturbance to local hydrology resulting in de-watering of wetland sites or reduction in ground water available to local trees,
- damage or destruction of bird nests or eggs during vegetation clearance, and,
- the spread of invasive plant species as a result of vehicle movements.

6.1.2 These potential impacts are considered for each of the Important Ecological Features identified (listed in Table 4), as set out in paragraph 3.3.3 and Table 2.

6.2 DESIGNATED AND LOCALLY-IMPORTANT SITES

Potential impacts

6.2.1 Emissions to air from the proposed scheme, either directly from the Site of from vehicles transporting material to or from the Site, could result in the deposition of dust on vegetation, thereby impeding photosynthesis and overall productivity. Windblown litter from the Site could encourage scavenging species and would reduce the aesthetic appeal of important sites. The potential effect would be negative and at worse, could be long-term and irreversible at a National/County level.

Avoidance/Mitigation Measures

6.2.2 The air quality assessment (Appendix D to the ES) has confirmed that dust, particulate and odour emissions will be managed in accordance with best practice, with any residual effect considered negligible to slight adverse at all receptors considered within the assessment. The overall effect of the proposed scheme on local air quality is considered to not be significant. Industry standard measures to contain windblown material from active landfill

areas and prevent it from leaving the Site are already in place and will continue to be maintained.

Significance of Residual Effects

6.2.3 Oxford Meadows SAC is 26km southeast of the Site, Tingewick Meadows SSSI is approximately 1.8km southeast and Spilsmere Woods LWS is approximately 1.1km to the southwest. All three sites are sufficiently distant from the Site so that they are not linked to it by connecting habitats that could be damaged or by species whose territories would be severed by the proposed scheme. In addition, the SSSI and LWS are 360m and 440m respectively from the nearest road likely to be used by vehicles transporting materials to or from the Site, thus there are no predicted effects from noise or dust. As it a result, it can be safely concluded that there would be **No Significant Effect** on statutory or non-statutory sites designated for nature conservation.

6.3 WOODLAND

Potential impacts

6.3.1 The northern edge of the woodland planting that screens the Site from the A421 is already subject to a background level of dust and spray from road traffic. Similarly, until recently, the southern edge of this tree belt was subject to agricultural management including close ploughing to roots and spray drift (activities now ceased). The proposed sand and gravel extraction work in the fields adjacent to the woodland belt could affect the water supply to root systems, directly affect root systems during excavation and backfilling and increase the overall deposition of dust. The effect would be negative at a Local level over the medium term (projected to be around five years) but would be reversible.

6.3.2 Due to its location in the centre of the Site, Finmere Plantation has been exposed to potential historic changes in hydrology, damage/compaction of root systems and the deposition of dust since operations began on the Site in the 1970s. The continuation of landfilling and associated earthmoving and backfilling activities could significantly damage the integrity and conservation value of the woodland, both in terms of a habitat and for the species that use it. The effect would be negative at a Local level over the medium term (projected to be around five years) but would be reversible.

Avoidance/Mitigation Measures

6.3.3 The hydrological assessment (Appendix G) has confirmed there will be no hydrological effects on tree health. The air quality assessment (Appendix D) finds that with the embedded mitigation in place, there will be no significant air quality effects as a result of the proposed development. The regular practice of slaking site roads to suppress dust (especially during periods of dry weather) will continue.

6.3.4 A Tree Protection Plan has been designed to avoid impact to all trees during all phases of the scheme and protection measures will be put in place in accordance with the recommendations in *'BS3857: 2012 Trees in relation to design, demolition and construction'*.

Significance of Residual Effects

6.3.5 As a result of these protective measures and the substantial new tree planting to be undertaken as part of the restoration of the Site, the overall impact on woodlands will be **Significant and Positive** at the Local level.

6.4 HEDGEROWS

Potential impacts

6.4.1 The hedgerow between the two north-eastern arable fields will be removed to maximise the area for sand and gravel extraction (H1 on Figure E1 Annex E3). This hedgerow is currently species-poor and does not meet the criteria for 'important' under the Hedgerow Regulations, 1997, although it does provide habitat for nesting birds (including dunnock). The effect would be negative at the Site level over the medium term but would be reversible.

Avoidance/Mitigation Measures

6.4.2 There are approximately 3,195m of hedgerow on the Site. The hedgerow to be lost is approximately 100m long (3% of the total) but it will eventually be restored with locally-native species and will be more species-rich than it is at present.

Significance of Residual Effects

6.4.3 Together with the 1km of species-rich hedgerows to be provided as part of the restoration of the Site, the overall impact on hedgerows will be **Significant and Positive** at the Site level.

6.5 PONDS

Potential impacts

6.5.1 The loss of two ponds and a dry silt lagoon will result in the loss of breeding and foraging habitat for a range of invertebrates, amphibians and common waterbirds. It will also remove a source of clean drinking water for numerous mammal species, including badgers and bats. The effect would be negative at the Site level over the medium term (projected to be around five and a half years) but would be reversible.

Avoidance/Mitigation Measures

6.5.2 The loss of these features has already been successfully mitigated under EPSL by the creation of new ponds in the receptor site as described in Annex E3 so further mitigation is not required. However, up to six new ponds will be created as part of the restoration of the

Site, together with shallow scrapes and temporary lagoons (for water management) that will be available to wildlife throughout the operational period.

Significance of Residual Effects

6.5.3 In combination with the proposed Site restoration measures described in Section 5, the overall impact on waterbodies will be **Significant and Positive** at the Site level.

6.6 GREAT CRESTED NEWTS

Potential impacts

6.6.1 Two ponds and their associated terrestrial habitat that supports a 'medium' sized population of GCN will be lost. Amphibians could be killed or injured during work, contrary to nature conservation objectives. The effect on GCN (and other common amphibian species) would be negative within the zone of influence over the medium term (projected to be around five and half years) and could be irreversible, depending on timings.

Avoidance/Mitigation Measures

6.6.2 An amended EPSL will be sought from Natural England to enable the residual amphibian population to be safely moved to the existing receptor site (Annex E3) following which, the existing ponds on the Site will be drawn down and filled in under an ecological watching brief.

Significance of Residual Effects

6.6.3 The issuing of an amended EPSL is contingent upon meeting the requirements of The Conservation of Habitats and Species Regulations, 2017, Regulation 53(9)(b): in that that *'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'*. Thus, the issuing of an amended EPSL is recognition that the approved scheme will not result in a significant impact on GCN (or any other amphibian species, as they would be protected in the same manner). The existing programme of habitat management and monitoring would continue in accordance with the terms of the existing EPSL. The overall impact on amphibians will be **Significant and Positive** within the zone of influence.

6.7 BIRDS

Potential impacts

6.7.1 Many bird species recorded using the Site are fully expected to continue to do so whilst such habitats exist and their specific requirements for breeding and foraging are met. Site clearance work during the active breeding season (typically mid-March to late August for most species) could result in damage to or destruction of active nests (those with eggs or young). In addition, birds listed on Schedule-1 of WCA (for example red kite) are specially protected

against disturbance whilst nesting. The effect would be negative at the Site level over the medium-term (projected to be around ten years) and could be irreversible, depending on timings. Such an outcome would be contrary to nature conservation objectives.

Avoidance/Mitigation Measures

6.7.2 Habitats suitable for use by nesting birds will be cleared outside the breeding bird season. If for any reason this is not possible, the affected area will be inspected by an ecologist in advance and any active nests will be identified, cordoned off and monitored until the eggs have hatched and the young have fledged. These protective measures will also be applied to chance discoveries of active nests in operational areas.

6.7.3 The restoration plan will result in the planting of around 1km of new hedgerow, some 16ha of woodland and woodland edge scrub, the seeding of some 14ha of species-rich grassland, the creation of at least 6 ponds and 1km of marshy grassland and around 4.5ha of species-rich grassland and arable 'set aside' on nutrient-poor soils. This will provide a significant increase in the size, quality and diversity of grassland suitable for nesting and foraging by a wide range of birds, including all of those recorded using the Site.

Significance of Residual Effects

6.7.4 The overall impact on birds will be **Significant and Positive** within the zone of influence.

6.8 BATS

Potential impacts

6.8.1 Bats are a highly mobile species and are extremely adept in exploiting suitable roost features, especially in trees, which can develop quickly. Trees could be accidentally damaged by site machinery resulting in the loss of the roost site and potentially killing or injuring bats present, contrary to nature conservation objectives. The effect on bats would be negative within the zone of influence over the medium term (projected to be around ten years) and could be irreversible, depending on timings.

Avoidance/Mitigation Measures

6.8.2 The Tree Protection Plan will be in effect for the duration for the scheme so any direct impacts on trees that may be used by bats will be avoided.

6.8.3 The retention of woodland and hedgerow trees will continue to provide roost opportunities for bats in the medium to long term. The extensive woodland planting under the restoration scheme will provide replacement trees for those that are lost to old age and disease, thus providing a succession of roost opportunities for bats for decades to come.

6.8.4 The habitat creation work will result in a significant increase in the populations of invertebrate assemblages using the site, providing much improved foraging opportunities for all species of bats that use the Site.

Significance of Residual Effects

6.8.5 The overall impact on bats will be **Significant and Positive** within the zone of influence.

6.9 BADGERS

Potential impacts

6.9.1 Badgers are highly mobile animals and can create new setts overnight. The risk is lower in flat, open areas devoid of cover and subject to high disturbance such as the active landfill cells, the aggregate processing yard and the quarry floor but is higher along hedgerows/ditches and on infrequently used stockpiles and soil bunds. Badger activity on the Site could also suddenly increase as a result of perturbation (the disruption of social behaviour causing animals to move around more frequently) arising, for example, from work affecting a main sett on adjacent land.

6.9.2 The earthmoving works associated with the scheme have the potential to accidentally kill or injure badgers and destroy active setts, contrary to nature conservation objectives. Any such effect would be negative at the Site level over the medium term (projected to be ten years) and in some circumstances would be irreversible.

Avoidance/Mitigation Measures

6.9.3 Badger activity will be monitored throughout the life of the scheme to ensure legal compliance and to meet nature conservation objectives. Where necessary, active setts in operational areas would be closed-down under a Natural England Class Licence. In the unlikely event that a main sett became established on the Site and needed to be closed-down, specific advice would be sought from Natural England with regard to providing the requisite compensation.

Significance of Residual Effects

6.9.4 The approved restoration scheme will result in the creation of large areas of new grassland and woodland that will be available for foraging and the excavation of setts. The new ponds will provide a source of clean drinking water and there will also be a reduction in overall disturbance levels. The overall impact on any badgers that may make use of the Site will be **Significant and Positive** within the zone of influence.

6.10 SUMMARY OF RESIDUAL EFFECTS

6.10.1 It is considered reasonably likely that all the effects of the scheme can be avoided, minimised or mitigated. No significant negative residual effects are predicted. Table 5 below provides a summary of the proposed mitigation and the significance of the residual effects for each ecological feature.

TABLE 5. SUMMARY OF RESIDUAL EFFECTS, PROPOSED MITIGATION AND MECHANISM OF DELIVERY

Ecological Feature	Avoidance/Mitigation	Residual effect
Important Sites.	Minimise dust levels.	None.
Woodland.	Protect from damage by minimising dust levels and maintaining root protection zones. Measures set out in the Tree Protection Plan and additional planting as part of the restoration plan.	Positive.
Hedgerows.	Protect from damage by minimising dust levels and maintaining root protection zones. Additional planting as part of the restoration plan.	Positive.
Ponds.	Build new ponds at a ratio of at least 2:1.	Positive.
Great crested newts.	Obtain an amended EPSL and translocate to existing receptor area.	Positive.
Birds.	Remove nesting habitat outside the breeding season. Monitor and protect active nests.	Positive.
Bats.	Safeguard potential tree roosts.	Positive.
Badgers.	Monitor activity and manage any new setts under licence.	Positive.

7 ASSESSMENT OF CUMULATIVE EFFECTS

7.1 The need to consider any cumulative effects arising from the Government's high-speed rail project HS2 has been scoped out by Oxfordshire County Council. There are no other nearby developments that need to be considered in combination with the scheme.

8 COMPENSATION

8.1 All the predicted impacts have been avoided or mitigated within the design of the approved scheme. There is no requirement for compensation.

9 MONITORING

Overview

9.1 Since the presence of protected species is potentially subject to change and parts of the Site are operational, there is a requirement for a monitoring programme. This will ensure there has been no material change in the baseline conditions that might affect the assessment and to ensure compliance with statutory obligations, including protected species legislation and adherence to the terms of an EPSL.

Great crested newts

9.2 The requisite habitat management and monitoring regime for GCN will be undertaken as per the specific conditions attached to the Natural England EPSL.

Badgers

9.3 Badgers are a highly mobile species. A badger survey will be undertaken on a minimum quarterly basis to record and monitor activity. The data will be used to inform operational decisions and (where necessary) to enable the use of a Natural England Class licence to close new setts down within the prescribed licencing period where their presence conflicts with currently approved activities. The survey frequency will be increased in response to risk. The monitoring programme will continue throughout the construction and operational phases of the approved scheme.

10 CONCLUSIONS AND MECHANISM FOR DELIVERY

10.1 It is considered likely that the proposed scheme will result in a significant positive effect on all the important features identified in the assessment, which is in accord with national and local nature conservation objectives. The biodiversity gain resulting from the scheme can be delivered by way of an Ecological Management Plan secured through the planning process.

11 REFERENCES

Berkshire, Buckinghamshire, Oxfordshire Wildlife Trusts (BBOWT), Oxfordshire County Council (OCC) and Thames Valley Environmental Record Centre (TVERC), 2014. Biodiversity and Planning in Oxfordshire, available [Online] from https://www.wildoxfordshire.org.uk/wp-content/uploads/2018/01/Biodiversityandplanning.pdf.

Byfield, A J and Wilson, P J, 2005. *Important arable plant areas; identifying important areas for arable plant conservation in the UK.* Plantlife International, Salisbury, UK.

Cheeseman, C & Neal, E, 1998. *Badgers*. T & A D Poyser. London.

Cherwell District Council, 2015. Cherwell Local Plan 2011-2031. Part 1 Adopted 20 July 2015. Cherwell District Council, North Oxfordshire. Available [Online] at: https://www.cherwell.gov.uk/downloads/download/45/adopted-cherwell-local-plan-2011-2031-part-1-incorporating-policy-bicester-13-re-adopted-on-19-december-2016.

Cherwell District Council, 2016. Protecting and Enhancing Cherwell's Natural Environment. Corporate Biodiversity Action Plan 2016-2018. Cherwell District Council, North Oxfordshire.

CIEEM, 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Ecological Management, Winchester.

Collins J (ed.), 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3rd edition. The Bat Conservation Trust, London.

Department for Communities and Local Government (DCLG) (2012). The National Planning Policy Framework (NPPF).

Drake, C M, Lott, D A, Alexander, K N A & Webb, J, 2007. NERR005. Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation. Natural England Research Report NERR005. Natural England, Peterborough.

Eaton, M A, Aebischer, N J, Brown, A F, Hearn, R D, Lock, L, Musgrove, A J, Noble, D G, Stroud, D A & Gregory, R D, 2015. Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. In: *British Birds* **108**, 708–746.

Edgar, P, Foster, J & Baker, J, 2010. *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.

English Nature, 1994 (and as updated). *Species Conservation Handbook*. English Nature, Peterborough.

English Nature, 2001. *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

Gent, A H and Gibson, S D, 1998. *Herpetofauna Workers Manual*. JNCC Peterborough

Harris, S, Jefferies, D, Cheeseman, C & Booty, C, 1994. *Problems with Badgers?* (3rd ed). RSPCA, Sussex.

Herpetofauna Groups of Britain & Ireland (HGBI), 1998. *Evaluating local mitigation/translocation programmes: maintaining best practice and lawful standards. Advisory notes for Amphibian and Reptile Groups.* Froglife. Halesworth. Suffolk.

JNCC, 2010. *Handbook for Phase-1 Habitat Survey: A technique for environmental audit*. Joint Nature Conservation Committee, Peterborough.

Marchant, J H, 1983. *Common Bird Census Instructions*. British Trust for Ornithology, Tring.

National Planning Policy Framework, 2018. Available [Online] at https://www.gov.uk/government/publications/national-planning-policy-framework--2.

Oldham, R S, Keeble, J, Swan, M J S & Jeffcote, M, 2000. Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus). In: *Herpetological Journal* **10** (4), 143-155.

Oxfordshire County Council, 2017. Oxfordshire Minerals and Waste Local Plan. Part 1 - Core Strategy Adopted Plan September 2017. Oxfordshire County Council. Available [Online] at: https://www2.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/planning/mineralsandwaste/September2017/AdoptedMineralsWasteCoreStrategySept2017.pdf.

Plant, C, 2009. Invertebrates and Ecological Assessment. http://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/SoSM/Colin_Plant_-_Invertebrates.pdf.

Stace, C, 2010. *New Flora of the British Isles*. 3rd Edition, CUP, Cambridge.

The Conservation of Habitats and Species Regulations 2017 HMSO. Available [Online] from http://www.legislation.gov.uk/uksi/2017/1012/made.

The British Standards Institute, 2013. *BS42020:2013 Biodiversity-Code of practice for planning and development.* The British Standards Institution.

Wray, S, Wells, D, Long, E & Mitchell-Jones, T, 2010. Valuing bats in ecological impact assessment. In: In Practice **70**: pp23-25.

ANNEX E1 - FULL LIST OF SPECIES RECORDED

INCLUDING SCIENTIFIC NAMES

SPECIES RECORDED AT FINMERE QUARRY DURING ALL 2018 SURVEYS

ENGLISH NAME	SCIENTIFIC NAME	DAFOR
PLANTS		
agrimony	*Agrimonia eupatoria*	R
alder	*Alnus glutinosa*	R
American willowherb	*Epilobium ciliatum*	F
annual meadow-grass	*Poa annua*	A
annual mercury	*Mercurialis annua*	O
ash	*Fraxinus excelsior*	F
barren brome	*Anisantha sterilis*	F
beaked hawk's-beard	*Crepis vesicaria*	O
beech	*Fagus sylvatica*	R
bittersweet	*Solanum dulcamara*	R
black-bindweed	*Fallopia convolvulus*	R
black bryony	*Tamus communis*	O
black grass	*Alopecurus myosuroides*	F
black horehound	*Ballota nigra*	R
black medick	*Medicago lupulina*	A
black nightshade	*Solanum nigrum*	F
blackthorn	*Prunus spinosa*	A
bluebell	*Hyacinthoides non-scripta*	O
bracken	*Pteridium aquilinum*	O
bramble	*Rubus fruticosus*	A
bristly oxtongue	*Helminthotheca echioides*	A
broad-leaved dock	*Rumex obtusifolius*	A
broad-leaved pondweed	*Potamogeton natans*	O
broad-leaved willowherb	*Epilobium montanum*	O
broom	*Cytisus scoparius*	R
bugle	*Ajuga reptans*	F
butterfly-bush	*Buddleja davidii*	O
Canadian fleabane	*Conyza canadensis*	F
caper spurge	*Euphorbia lathyris*	R
cat's-ear	*Hypochaeris radicata*	R
celery-leaved buttercup	*Ranunculus sceleratus*	O
changing forget-me-not	*Myosotis discolor*	R
charlock	*Sinapis arvensis*	F
cherry-laurel	*Prunus laurocerasus*	R
cleavers	*Galium aparine*	A
clustered dock	*Rumex conglomeratus*	O
cock's-foot	*Dactylis glomerata*	F
colt's-foot	*Tussilago farfara*	A
common bent	*Agrostis capillaris*	R
common bird's-foot-trefoil	*Lotus corniculatus*	O
common centaury	*Centaurium erythraea*	O
common chickweed	*Stellaria media*	F
common couch	*Elytrigia repens*	F
common cudweed*	*Filago vulgaris*	R
common dog-violet	*Viola riviniana*	R
common figwort	*Scrophularia nodosa*	R
common field-speedwell	*Veronica persica*	A
common fumitory	*Fumaria officinalis*	O
common hemp-nettle	*Galeopsis tetrahit*	R
common mallow	*Malva sylvestris*	O
common mouse-ear	*Cerastium fontanum*	O
common nettle	*Urtica dioica*	A
common orache	*Atriplex patula*	O
common poppy	*Papaver rhoeas*	F

ENGLISH NAME	SCIENTIFIC NAME	DAFOR
PLANTS cont.		
common ragwort	*Senecio jacobaea*	F
common reed	*Phragmites australis*	O
common spotted-orchid	*Dactylorhiza fuchsii*	R
common swinecress	*Coronopus squamatus*	R
common vetch	*Vicia sativa*	O
common water-crowfoot	*Ranunculus aquatilis*	R
common whitebeam	*Sorbus aria*	R
cowslip	*Primula veris*	R
cow parsley	*Anthriscus sylvestris*	F
crab apple	*Malus sylvestris*	O
crack willow	*Salix fragilis*	R
creeping bent	*Agrostis stolonifera*	F
creeping buttercup	*Ranunculus repens*	A
creeping jenny	*Lysimachia nummularia*	R
creeping thistle	*Cirsium arvense*	A
cuckoo-flower	*Cardamine pratensis*	R
curled dock	*Rumex crispus*	O
cut-leaved crane's-bill	*Geranium dissectum*	O
dandelion	*Taraxacum* sp	F
dog-rose	*Rosa canina*	O
dogwood	*Cornus sanguinea*	R
dove's-foot crane's-bill	*Geranium molle*	F
downy birch	*Betula pubescens*	R
elder	*Sambucus nigra*	F
elm	*Ulmus* agg	O
enchanter's-nightshade	*Circaea lutetiana*	O
European larch	*Larix decidua*	R
false brome	*Brachypodium sylvaticum*	F
false oat-grass	*Arrhenatherum elatius*	O
fat-hen	*Chenopodium album*	O
fennel pondweed	*Potamogeton pectinatus*	R
field forget-me-not	*Myosotis arvensis*	F
field horsetail	*Equisetum arvense*	O
field madder	*Sherardia arvensis*	R
field maple	*Acer campestre*	F
field pansy	*Viola arvensis*	O
field-rose	*Rosa arvensis*	R
fool's parsley	*Aethusa cynapium*	O
garlic mustard	*Alliaria petiolata*	F
germander speedwell	*Veronica chamaedrys*	O
glaucous sedge	*Carex flacca*	R
goat willow	*Salix caprea*	F
gorse	*Ulex europaeus*	R
great horsetail	*Equisetum telmateia*	R
great lettuce	*Lactuca virosa*	O
great mullein	*Verbascum thapsus*	R
great willowherb	*Epilobium hirsutum*	F
greater burdock	*Arctium lappa*	O
greater plantain	*Plantago major*	F
greater pond-sedge	*Carex riparia*	R
grey willow	*Salix cinerea*	F
ground-ivy	*Glechoma hederacea*	F
groundsel	*Senecio vulgaris*	F
guelder-rose	*Viburnum opulus*	R
gypsywort	*Lycopus europaeus*	O
hairy bitter-cress	*Cardamine hirsuta*	O

ENGLISH NAME	SCIENTIFIC NAME	DAFOR
PLANTS cont.		
hairy tare	*Vicia hirsuta*	R
hairy wood-rush	*Luzula pilosa*	R
hard rush	*Juncus inflexus*	O
hare's-tail grass	*Lagurus ovatus*	R
hawthorn	*Crataegus monogyna*	F
hazel	*Corylus avellana*	O
heath speedwell	*Veronica officinalis*	R
hedge bindweed	*Calystegia sepium*	O
hedge mustard	*Sisymbrium officinale*	O
hedge woundwort	*Stachys sylvatica*	O
hemlock	*Conium maculatum*	O
herb-Robert	*Geranium robertianum*	O
hogweed	*Heracleum sphondylium*	F
honeysuckle	*Lonicera periclymenum*	R
hornbeam	*Carpinus betulus*	R
horse-chestnut	*Aesculus hippocastanum*	R
hybrid black-poplar	*Populus* x *canadensis*	R
ivy	*Hedera helix*	F
jointed rush	*Juncus articulatus*	R
knotgrass	*Polygonum aviculare*	O
lesser burdock	*Arctium minus*	O
lesser celandine	*Ranunculus ficaria*	O
lesser trefoil	*Trifolium dubium*	O
lime	*Tilia* x *europaea*	R
lords-and-ladies	*Arum maculatum*	O
male-fern	*Dryopteris filix-mas*	R
many-seeded goosefoot	*Chenopodium polyspermum*	O
marsh cudweed	*Gnaphalium uliginosum*	R
marsh horsetail	*Equisetum palustre*	O
marsh thistle	*Cirsium palustre*	R
michaelmas-daisy	*Aster sp*	R
mouse-ear-hawkweed	*Pilosella officinarum*	R
mugwort	*Artemisia vulgaris*	R
musk-mallow	*Malva moschata*	R
musk thistle	*Carduus nutans*	R
nipplewort	*Lapsana communis*	O
osier	*Salix viminalis*	O
oxeye daisy	*Leucanthemum vulgare*	R
parsley-piert	*Aphanes arvensis*	O
peach	*Prunus persica*	R
pedunculate oak	*Quercus robur*	F
pellitory-of-the-wall	*Parietaria judaica*	R
pendulous sedge	*Carex pendula*	R
perennial rye-grass	*Lolium perenne*	F
perforate St John's-wort	*Hypericum perforatum*	O
petty spurge	*Euphorbia peplus*	O
pineappleweed	*Matricaria discoidea*	O
prickly lettuce	*Lactuca serriola*	O
prickly sow-thistle	*Sonchus asper*	A
purple toadflax	*Linaria purpurea*	R
rape	*Brassica napus*	O
raspberry	*Rubus idaeus*	R
red campion	*Silene dioica*	O
red clover	*Trifolium pratense*	O
red dead-nettle	*Lamium purpureum*	O
redshank	*Persicaria maculosa*	F
remote sedge	*Carex remota*	R

ENGLISH NAME	SCIENTIFIC NAME	DAFOR
PLANTS cont.		
ribbed melilot	*Melilotus officinalis*	O
ribwort plantain	*Plantago lanceolata*	F
rosebay willowherb	*Chamerion angustifolium*	O
rough chervil	*Chaerophyllum temulum*	R
rough meadow-grass	*Poa trivialis*	F
scarlet pimpernel	*Anagallis arvensis*	O
scentless mayweed	*Tripleurospermum inodorum*	A
Scots pine	*Pinus sylvestris*	R
selfheal	*Prunella vulgaris*	F
shepherd's-purse	*Capsella bursa-pastoris*	F
silver birch	*Betula pendula*	O
small-leaved lime	*Tilia cordata*	R
small nettle	*Urtica urens*	O
small toadflax	*Chaenorhinum minus*	R
smooth hawk's-beard	*Crepis capillaris*	O
smooth sow-thistle	*Sonchus oleraceus*	O
smooth tare	*Vicia tetrasperma*	O
soft-brome	*Bromus hordeaceus*	F
soft-rush	*Juncus effusus*	F
spear thistle	*Cirsium vulgare*	A
spindle	*Euonymus europaeus*	R
spotted medick	*Medicago arabica*	O
square-stalked willowherb	*Epilobium tetragonum*	O
sticky mouse-ear	*Cerastium glomeratum*	R
sun spurge	*Euphorbia helioscopia*	O
sweet chestnut	*Castanea sativa*	R
sycamore	*Acer pseudoplatanus*	O
thread-leaved water-crowfoot	*Ranunculus trichophyllus*	R
three-nerved sandwort	*Moehringia trinervia*	R
thyme-leaved speedwell	*Veronica serpyllifolia*	O
toad rush	*Juncus bufonius*	R
tufted hair-grass	*Deschampsia cespitosa*	O
Turkey oak	*Quercus cerris*	R
viper’s-bugloss	*Echium vulgare*	R
wall speedwell	*Veronica arvensis*	O
walnut	*Juglans regia*	R
water figwort	*Scrophularia auriculata*	R
water mint	*Mentha aquatica*	R
water-pepper	*Persicaria hydropiper*	R
wayfaring-tree	*Viburnum lantana*	R
weld	*Reseda luteola*	O
welted thistle	*Carduus crispus*	R
white bryony	*Bryonia dioica*	R
white campion	*Silene latifolia*	O
white clover	*Trifolium repens*	F
white dead-nettle	*Lamium album*	O
white willow	*Salix alba*	O
wild cherry	*Prunus avium*	R
wild-oat	*Avena fatua*	O
wild privet	*Ligustrum vulgare*	O
wild strawberry	*Fragaria vesca*	O
wild teasel	*Dipsacus fullonum*	O
winter-cress	*Barbarea vulgaris*	O
wood avens	*Geum urbanum*	O
wood dock	*Rumex sanguineus*	O
wood sedge	*Carex sylvatica*	R
wood small-reed	*Calamagrostis epigejos*	O

ENGLISH NAME	SCIENTIFIC NAME	DAFOR
PLANTS cont.		
wych elm	*Ulmus glabra*	R
yarrow	*Achillea millefolium*	O
Yorkshire-fog	*Holcus lanatus*	A

KEY TO DAFOR

(An estimate of plant relative abundance at a site)

D Dominant
A Abundant
F Frequent
O Occasional
R Rare

ENGLISH NAME	SCIENTIFIC NAME	SITE	ADJACENT
BIRDS			
mute swan**	*Cygnus olor*	✓	
Canada goose	*Branta canadensis*	✓	✓
teal**	*Anas crecca*	✓	
mallard**	*Anas platyrhynchos*	✓	✓
tufted duck	*Aythya fuligula*	✓	
red-legged partridge	*Alectoris rufa*	✓	
pheasant	*Phasianus colchicus*	✓	✓
little grebe	*Tachybaptus ruficollis*	✓	
grey heron	*Ardea cinerea*	✓	
RED KITE	*Milvus*	✓	✓
sparrowhawk	*Accipiter nisus*	✓	✓
buzzard	*Buteo*	✓	✓
kestrel**	*Falco tinnunculus*	✓	✓
moorhen	*Gallinula chloropus*	✓	
coot	*Fulica atra*	✓	
lapwing*	*Vanellus*	✓	✓
snipe**	*Gallinago*	✓	
woodcock*	*Scolopax rusticola*		✓
black-headed gull**	*Larus ridibundus*		✓
lesser black-backed gull**	*Larus fuscus*	✓	✓
stock dove**	*Columba oenas*	✓	✓
woodpigeon	*Columba palumbus*	✓	✓
collared dove	*Streptopelia decaocto*		✓
tawny owl**	*Strix aluco*	✓	
swift**	*Apus*	✓	✓
green woodpecker	*Picus viridis*	✓	✓
great spotted woodpecker	*Dendrocopos major*	✓	
skylark*	*Alauda arvensis*	✓	✓
swallow	*Hirundo rustica*	✓	✓
house martin**	*Delichon urbicum*	✓	✓
yellow wagtail*	*Motacilla flava*	✓	
pied wagtail	*Motacilla alba*	✓	✓
wren	*Troglodytes*	✓	✓
dunnock**	*Prunella modularis*	✓	✓
robin	*Erithacus rubecula*	✓	✓
blackbird	*Turdus merula*	✓	✓
FIELDFARE*	*Turdus pilaris*	✓	
song thrush*	*Turdus philomelos*	✓	✓
mistle thrush*	*Turdus viscivorus*	✓	✓

ENGLISH NAME	SCIENTIFIC NAME	SITE	ADJACENT
BIRDS cont.			
reed warbler	*Acrocephalus scirpaceus*	✓	
blackcap	*Sylvia atricapilla*	✓	✓
garden warbler	*Sylvia borin*	✓	✓
lesser whitethroat	*Sylvia curruca*	✓	✓
whitethroat	*Sylvia communis*	✓	✓
chiffchaff	*Phylloscopus collybita*	✓	✓
willow warbler	*Phylloscopus trochilus*	✓	✓
long-tailed tit	*Aegithalos caudatus*	✓	✓
blue tit	*Cyanistes caeruleus*	✓	✓
great tit	*Parus major*	✓	✓
coal tit	*Periparus ater*	✓	✓
marsh tit*	*Poecile palustris*	✓	✓
nuthatch	*Sitta europaea*	✓	
treecreeper	*Certhia familiaris*	✓	✓
jay	*Garrulus glandarius*	✓	✓
magpie	*Pica pica*	✓	✓
jackdaw	*Corvus monedula*	✓	✓
rook	*Corvus frugilegus*	✓	✓
carrion crow	*Corvus corone*	✓	✓
starling	*Sturnus vulgaris*	✓	✓
chaffinch	*Fringilla coelebs*	✓	✓
greenfinch	*Carduelis chloris*	✓	✓
goldfinch	*Carduelis carduelis*	✓	✓
linnet*	*Carduelis cannabina*	✓	✓
bullfinch**	*Pyrrhula pyrrhula*	✓	✓
yellowhammer*	*Emberiza citrinella*	✓	✓
reed bunting**	*Emberiza schoeniclus*	✓	✓
AMPHIBIANS AND REPTILES			
great crested newt***	*Triturus cristatus*	✓	✓
smooth newt	*Lissotriton vulgaris*	✓	✓
common toad	*Bufo bufo*		✓
common frog	*Rana temporaria*		✓
grass snake******	*Natrix natrix*		✓
MAMMALS			
mole	*Talpa europaea*	✓	✓
soprano pipistrelle*/****	*Pipistrellus pygmaeus*	✓	
common pipistrelle***/****	*Pipistrellus pipistrellus*	✓	✓
brown long-eared bat*/****	*Plecotus auritus*	✓	
Noctule bat ******	*Nyctalus noctula*	✓	
rabbit	*Oryctolagus cuniculus*	✓	✓
brown hare	*Lepus europaeus*	✓	✓
grey squirrel	*Sciurus carolinensis*	✓	✓
bank vole	*Myodes glareolus*	✓	
field vole	*Microtus agrestis*	✓	
brown rat	*Rattus norvegicus*	✓	
fox	*Vulpes vulpes*	✓	✓
badger****	*Meles meles*	✓	✓
roe deer	*Capreolus capreolus*	✓	✓
muntjac deer	*Muntiacus reevesi*	✓	✓
DRAGONFLIES AND DAMSELFLIES			
azure damselfly	*Coenagrion puella*	✓	✓
common blue damselfly	*Enallagma cyathigerum*	✓	✓

ENGLISH NAME	SCIENTIFIC NAME	SITE	ADJACENT
large red damselfly	*Pyrrhosoma nymphula*	✓	✓
blue-tailed damselfly	*Ischnura elegans*	✓	✓
emerald damselfly	*Lestes sponsa*		✓
beautiful demoiselle	*Calopteryx virgo*	✓	
hairy dragonfly	*Brachytron pratense*		✓
emperor dragonfly	*Anax imperator*	✓	✓
black-tailed skimmer	*Orthetrum cancellatum*	✓	
broad-bodied chaser	*Libellula depressa*	✓	
four-spotted chaser	*Libellula quadrimaculata*	✓	✓
common darter	*Sympetrum striolatum*	✓	
BUTTERFLIES			
large skipper	*Ochlodes venata*	✓	
brimstone	*Gonepteryx rhamni*	✓	
large white	*Pieris brassicae*	✓	✓
green-veined white	*Pieris napi*	✓	✓
orange tip	*Anthocharis cardamines*	✓	✓
common blue	*Polyommatus icarus*	✓	
painted lady	*Cynthia cardui*	✓	
small tortoiseshell	*Aglais urticae*	✓	
peacock	*Inachis io*		✓
speckled wood	*Pararge aegeria*	✓	✓
marbled white	*Melanargia galathea*	✓	
meadow brown	*Maniola jurtina*	✓	✓
ringlet	*Aphantopus hyperantus*		✓
MOTHS			
silver-Y	*Autographa gamma.*	✓	✓
cinnabar	*Tyria jacobaeae*	✓	
burnet companion	*Euclidia glyphica*	✓	
silver-ground carpet	*Xanthorhoe montanata*	✓	✓
green carpet	*Colostygia pectinataria*	✓	
straw dot	*Rivula sericealis*	✓	✓
scorched wing	*Plagodis dolabraria*	✓	
green oak tortrix	*Tortrix viridana*	✓	
OTHER INVERTEBRATES			
early bumblebee	*Bombus pratorum*	✓	✓
red-tailed bumblebee	*Bombus lapidarius*	✓	
tree bumblebee	*Bombus hypnorum*	✓	✓
common carder bee	*Bombus pascuorum*	✓	✓
hornet	*Vespa crabro*	✓	
hoverfly	*Volucella bombylans*	✓	
harlequin ladybird	*Harmonia axyridis*	✓	
thigh beetle	*Oedemera nobilis*	✓	
red-headed soldier beetle	*Rhagonycha fulva*	✓	✓
red-headed cardinal beetle	*Pyrochroa serraticornis*	✓	

KEY TO NOTABLE / PROTECTED STATUS
Schedule-1 bird species = CAPITALS
S41 Species of Principal Importance = **bold**
Red List species = *
Amber List species = **
European Protected Species = ***
Badgers Act/Schedule 5 Wildlife & Countryside Act = ****

ANNEX E2

DESK STUDY RESULTS

Biodiversity Report

Site: Finmere Quarry

TVERC Ref: TVERC/17/528

Prepared for: ESL (Ecological Services) Ltd

Date: 16/11/2017

By Thames Valley Environmental Records Centre

TVERC

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 species records (2km search area)
- ☑ Species status key
- ☑ Data origin key

DESIGNATED WILDLIFE SITE INFORMATION:

- ☑ A map of designated wildlife sites (2km search area)
- ☑ Descriptions/citations for designated wildlife sites
- ☑ Designated wildlife sites guidance

HABITAT INFORMATION:

- ☑ A map of section 41 habitats of principal importance (2km search area)
- ☑ A list of habitats with area
- ☑ Habitat metadata

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		Jun-85	SP624328		Finmere Railway Cuttings	field record	LN		WACA-Sch5-s9.5a		
Birds												
Hobby	Falco subbuteo	1	15/07/1998	SP63F	1 km record	Confidential, refer to OOS for further details	field record	OOS		WACA-Sch1-p1		
Higher Plants - Flowering Plants												
Bluebell	Hyacinthoides non-scripta		Pre 1990	SP625322		Finmere Railway	field record	BBOWT		WACA-Sch8		
Mammals - Terrestrial (excl. bats)												
Eurasian Badger	Meles meles		07/03/1984	SP624328		Finmere Railway Cuttings	Sett	OBRC		Badgers-1992		
Eurasian Badger	Meles meles		Jun-85	SP624328		Finmere Railway Cuttings	field record	LN		Badgers-1992		
Eurasian Badger	Meles meles		Pre 1990	SP625322		Finmere Railway	field record	BBOWT		Badgers-1992		
Eurasian Badger	Meles meles		23/06/1983	SP628315		Finmere Railway Cuttings	Sett	OBRC		Badgers-1992		
Eurasian Badger	Meles meles		Jun-85	SP628315		Finmere Railway Cuttings	field record	LN		Badgers-1992		
Eurasian Badger	Meles meles		02/03/2003	SP633314		A421	dead on road	OBRC		Badgers-1992		
Reptiles												
Common Lizard	Zootoca vivipara		1985	SP624328		Finmere Railway Cuttings	field record	OBRC		WACA-Sch5-s9.5a	NERC-S41	
Grass Snake	Natrix natrix		1981	SP618338		Finmere Railway Cuttings	field record	LN		WACA-Sch5-s9.1k/s9.5a/s9.5b	NERC-S41	

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 JULY 2017

Data Origin Abbreviation	Origin Details
AC	Academic Researcher
AN	Abingdon Natural History Society
ANHSO	Ashmolean Natural History Society (& Rare Plant Group)
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
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
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
LBRS	Longhorn Beetle Recording Scheme
LN	Local/National Expert (known to TVERC)
LWVP	Lower Windrush Valley Project
MGLG	Moor Green Lakes Group

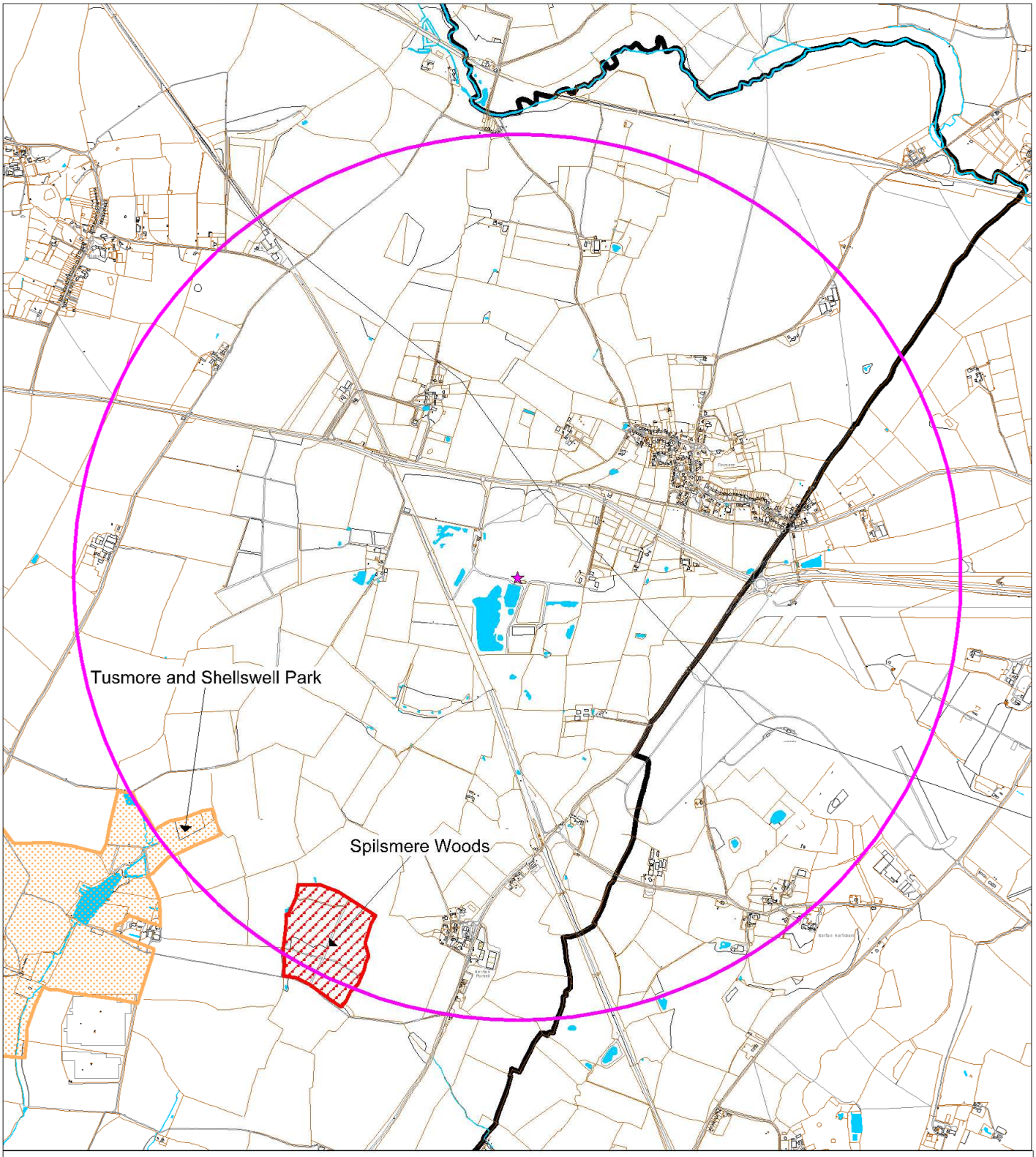
DATA ORIGIN KEY (Contd)

Data Origin Abbreviation	Origin Details
MOD	Ministry of Defence
MOP	Member of the Public
NCRS	National (Trichoptera) Caddisfly Recording Scheme
NDD	National Dormouse Database
NE	Natural England/EN/NCC
NFC	Newbury Field Club
NHM	Natural History Museum
NPD	National Ponds Database
NRG	Newbury Ringing Group
NT	National Trust
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
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
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

DATA ORIGIN KEY (Contd)

Data Origin Abbreviation	Origin Details
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
WWT	Wildfowl & Wetlands Trust
YE	Dick Greenaway, concerning land owned by Yattendon Estate

Finmere Quarry
Designated Wildlife Sites



Local Wildlife Sites

Conservation Target Area

Search Area

Search central grid reference

Scale: 1:25000

Oxfordshire Local Wildlife Site Citation

SPILSMERE WOOD

Site Code: 63A01

Grid Reference: SP619308

Area (ha): 15.9

Local Authority: Cherwell

Last Survey Date(s): 1992

Date Selected or Reconfirmed:

Site Description

Spilsmere Wood is ancient woodland which means it has been continuously wooded since at least 1600AD. It retains the composition of old woodland with native broad-leaved trees and shrubs. Such woodland is a national priority for nature conservation.

The wood has a canopy of oak, multi-stemmed ash, which would have been managed as coppice in the past, and aspen. The mixed shrub layer includes much hazel coppice as well as hawthorn and blackthorn.

Tusmore and Shelswell Parks CTA (Conservation Target Area)

This are encompasses the parks and woodlands at Tusmore and Shelswell Parks and a number of ancient woodlands near Stoke Lyne.

Joint Character Area: Cotswolds and West Anglian Plain.

Landscape Types: Wooded Estateland plus a small area of Farmland Plateau (though this area includes a large wood).

Geology: Limestone with some mudstone and limestone mixtures to the south. Extensive glacial sand and gravel deposits in the parklands with alluvium along streams.

Topography: largely flat plateau land intersected by shallow valleys.

Area of CTA: 844 hectares

Biodiversity:

- Parkland: Large parks at Tusmore and Sheslwell, though the importance of these have not been assessed, with large areas of woodland.
- Lowland Mixed Deciduous Woodland: Besides the Park woodlands there are a number of ancient woodland sites near Stoke Lyne.
- Other habitats: the parks have lakes. On the northern side of Shelswell Park, Cottisford Pond is a Local Wildlife Site along with the adjacent wet woodland.

Access: Stoke Wood is a Woodland Trust nature reserve. Otherwise access is restricted to bridleways and footpaths.

Archaeology:

Oxfordshire Biodiversity Action Plan Targets associated with this CTA:

1. Lowland mixed deciduous woodland – management[1] and creation (possibly some planting to link sites.

2. Parkland (including veteran trees) - management and restoration.

[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 sites of local importance to nature conservation (SLINCs) in oxford city and district wildlife sites in Cherwell. For SLINCs we only show sites on maps that are not local wildlife sites or proposed local wildlife sites.

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.

.

Finmere Quarry
Section 41 Habitats of Principal Importance

Eutrophic standing waters

Lowland mixed deciduous woodland

Open mosaic habitats on previously developed land

Possible priority grassland habitat

Scale: 1:25000

Search central grid reference

Search area

List of Habitats

Habitat	Total Area (Ha)
Eutrophic standing waters	2.58
Lowland mixed deciduous woodland	28.52
Open mosaic habitats on previously developed land	4.46
Possible priority grassland habitat	6.53

BERKSHIRE AND OXFORDSHIRE HABITAT AND LAND USE DATA GUIDANCE

DATA OVERVIEW

The habitat data provided is extracted from the latest GIS layers of habitats produced by Thames Valley Environmental Records Centre. These datasets are named: Berkshire Habitat and Land Use, Oxfordshire Habitat and Land Use.

DATASET DESCRIPTION

The data maps NERC Act Section 41 habitats of principal importance (previously UKBAP priority habitats) and Phase 1 habitat classification habitats. Data provided will map either just habitats of principal importance or both depending on the request.

DATA ORIGIN

Data has been mapped using a combination of survey data, when available, and aerial photograph interpretation.

DATA COVERAGE

- Berkshire: nearly the whole County has been mapped besides a few gaps. Most of the mapping took place between 2004-2006. Some updates have taken place especially to map habitats of principal importance and Local Wildlife Sites as well as a complete update to Bracknell Forest in 2010.
- Oxfordshire: most of the county has been mapped. Before 2016 there were major gaps although Cherwell District, designated sites, Conservation target Areas, traditional orchards and coastal and floodplain grazing marsh had been largely mapped. In 2016-2017 mapping of the remaining areas has been undertaken. By early 2017 the gaps had been significantly reduced. The main habitats of principal importance that are missing are the woodland habitats. Mapping is currently proceeding to complete as much of this mapping as possible.

Some recent survey data may not have been incorporated.

DATA ACCURACY

Habitat mapping started by using Ordnance Survey landline digital data to map boundaries along with aerial photographs. Since 2006 data is mapped to Ordnance Survey Mastermap polygon boundaries where applicable. This data will be more accurate although may not absolutely precisely reflect the latest version of Mastermap as it is not possible to remap all data to that version.

Depending on the data available and its age habitat polygons are mapped with the following interpretation quality:

- Definitely is this habitat
- Habitat is in polygon, but not accurately mappable
- Habitat probably in polygon, but not accurately mappable
- Not present but close to definition (this is rarely used)
- Probably is, but some uncertainty

While it is not possible to distinguish these on the maps, if further clarification of any particular polygon is required please contact TVERC.

TERMS AND CONDITIONS

Copyrights

- The data held by Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) belongs either to BMERC or to those organisations, groups and individuals from which BMERC sources information. In all respects copyrights shall remain vested in such parties notwithstanding any payments made.
- All site boundaries have been mapped using Ordnance Survey data and where Ordnance Survey material has been provided all relevant licences are in place for such production or reproduction. Persons viewing this material should contact Ordnance Survey for advice if they wish to licence Ordnance Survey data for their own use.

Data accuracy

- BMERC does not guarantee the accuracy of any information supplied and shall have no liability for any loss, damage or expense incurred as the result of reliance on any information supplied.
- BMERC can only provide information based on the data held by us. In particular, the absence of records for a species does not necessarily indicate that the species itself is absent, merely that we have not received records for it.
- Please note that this data search does NOT include Archaeological or Heritage data, please contact the Buckinghamshire Heritage Team if you require this. http://old.buckscc.gov.uk/leisure-and-culture/archaeology/historic-environment-records/

Protected Species

- We will not release records where it might be to the detriment of wildlife or where we suspect that the information will be used to interfere illegally with protected species. Some records are classified as sensitive and can only be supplied in summary form

Access and use of data

- The data in this report is only licenced for use by the applicant and for the purpose outlined in this data search. It must not be used for other commercial purposes or passed other third parties.
- When publishing information derived from this data, BMERC and the date of receipt must be acknowledged. For example: *This [document/table/map] incorporates biodiversity data supplied to [organisation/company] by Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) on [dd/mm/yyy], and is copyright to BMERC and/or its partners. For more details see:* www.bucksmkerc.org.uk.
- The data supplied in this report must not be added to a permanent database without prior permission from BMERC. E.g. Added to a GIS system. A digital data licence is needed if you want to do this.
- The data supplied is licenced for use for a maximum of six (6) months from date of issue. This is because data held by BMERC is updated regularly and will quickly become out-of-date. If you need the data for longer than this, please contact us arrange re-supply.
- Protected species records should be kept out of the public domain.

Planning applications

- BMERC does not provide planning advice and will not offer an opinions on planning applications and planning related matters.

LOCAL WILDLIFE SITE

NAME: BARTON HARTSHORN RAILWAY WOOD

REF NUMBER: 63F01 GRID REF: SP634305

DISTRICT: AVDC PARISH: Barton Hartshorn
GEOLOGY: Oxford clay / Cornbrash
EXISTING PUBLIC RIGHTS OF WAY: No
AREA: 1.75ha

DESCRIPTION

This osier willow wood south west of Barton Hartshorn abuts a disused railway embankment and has several streams running along and through it. In the past, the adjacent field hosted an interesting fen area, but this is now dry, with remnant fen remaining on the woodland edge. Although the wood itself is very dense, with little variety in the understorey, some of the streams have remote sedge (*Carex remota*) growing in tufts on their margins, and rarely pignut (*Conopodium majus*) in the wood.

The greatest interest, however a wet grassland area on the northern side, between a stream and a row of mature poplar.
Several plants occur here which, although typical of this type of habitat, are particularly unusual in Bucks. Undoubtedly the most dramatic to see is greater tussock sedge (*Carex paniculata*), of which there are two adjacent shaggy pedestals, each reaching well over a meter tall. The other interesting species both sharp flowered and blunt flowered rushes (*Juncus acutiflorus & J.subnodulosus*) with fen bedstraw (*Galium uliginosum*) the former in much greater profusion across the area.

Other species include green veined white and speckled wood, robin & blackbird.

MANAGEMENT

None at present; path cut along one side of the wood.

LOCAL WILDLIFE SITE
WEST WOOD 63K04

Aylesbury Vale County Wildlife Sites Project	**Site Name** West Wood	**File Code** 63K04	**Date surveyed** 10/06/02	**Area (ha)** 22 Hectares
Parish Tingewick	**Grid Ref**. SP 648 317	**Geology** Chalky Till	**Recorder(s)** M.Dodds AVCS	

1. Location, Topography, Boundaries and Surrounding Land Use

1.1 West Wood is one of a group of 4 large woodlands, approximately 4km to the south west of Buckingham. The geology is chalky till, with overlying slowly permeable seasonally waterlogged clayey and fine loamy over clayey soils (soil association – 712g RAGDALE). The altitude of the site is 110m and it is broadly flat. It is bordered to the north by pasture, to the east by woodland, and arable farmland to the south and west. The other 3 woodlands to the east and south east of West Wood are all potential county wildlife sites.

2. Detailed Description

Flora

2.1 West Wood is an interesting wood with a great deal of potential. It is split quite distinctly into compartments of broad-leaved woodland, mainly Oak (*Quercus robur*) and Ash (*Fraxinus excelsior*) with Hazel (*Corylus avellana*) below in some places, and conifers, mainly Scots Pine (*Pinus sylvestris*). There is a wide straight concrete road running down the centre of the wood and a large car parking area to the south of the road as you enter the site. There are several buildings scattered around on the site and one substantial open grassy area.

2.2 The wooded compartments are single aged blocks with little or no age structure within them. In fact there are very few old trees to be found in the wood. The concrete central road, the age of the trees and the layout of the wood all point towards it having been worked for timber quite extensively in the recent past.

2.3 The ground flora of the coniferous compartments is extremely poor with very little in evidence. The compartments are densely planted and so very little light reaches the ground. It is worth noting here that the wood is used by a paintball company and their actions have a considerable impact on the wood which will be discussed later.

2.4 The broad-leaved areas are more interesting. The canopy is dominated by Oak and Ash, with Field Maple (*Acer campestre*), Silver Birch (*Betula pendula*), Hornbeam (*Carpinus betulus*) and Aspen (*Populus tremula*) occurring occasionally. Some of these species are self-set e.g. Birch and Field Maple, and some have been planted e.g. Hornbeam. The ages and hence height of the broad-leaved compartments vary considerably. The understorey and the ground flora is therefore a result of the age and management system that has been applied to the particular compartment. For example to the north west there is a section of older woodland which has a well developed open coppice system of mainly Hazel beneath the canopy and to the north east of it is an area of dense newly planted shrubby growth with similar tree species occurring but at different densities and with little ground flora because of poor light levels.

2.5 The north west compartment is probably the closest to the climax vegetation potential of the wood and so it will be used as a baseline to which other younger compartments can be compared. It most closely resembles National Vegetation Classification (NVC) W8a *Fraxinus excelsior–Acer campestre-Mercurialis perennis, Primula vulgaris-Glechoma hederacea* sub community. As stated above the

understorey is largely sparse Hazel coppice but it also has several associate species which occur much less frequently. These include Midland Hawthorn (*Crataegus laevigata*), which is surprisingly much more common than Common Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Goat Willow (*Salix caprea*), Elder (*Sambucus nigra*) and Guelder Rose (*Viburnum opulus*), with Honeysuckle (*Lonicera periclymenum*), Bramble (*Rubus fruiticosus* agg.) and Dog-rose (*Rosa canina*). Bluebells (*Hyacinthoides non-scripta*) and Primroses (*Primula vulgaris*) are abundant on the ground together with some large patches of Yellow Archangel (*Lamiastrum galeobdolon*). Other less frequently occurring plants include Rough Meadow-grass (*Poa trivialis),* Stinging Nettles (*Urtica dioica*), Wood Dock (*Rumex sanguineus*), Dog *Violet (Viola riviniana*), Bugle (*Ajuga reptans*), Celandine (*Ranunculus ficaria*), and Wood Anemone (*Anemone nemorosa*). There is a great deal of activity from paintball games in this area because of the open nature of the wood.

2.6 The younger compartments which occur to the north and east have a much denser understorey either due to being recently replanted or because they have not been thinned. The species are the same as above but with different relative abundance's for example there is more Midland Hawthorn here and the ground flora shows an increase in early successional species such as Celandine, Ivy (*Hedera helix*) and Rough Meadow-grass.

2.7 As can be seen the wooded areas are generally unremarkable, however the real interest of the site is centred around the central woodland glade. This is a wonderful species-rich wet grassland area approximately 0.25 Ha. in area, from which potential colonisers could spread back into the wood should the management become more suitable in the future. It is most notable for the large amounts of the county uncommon Pale Sedge (*Carex pallescens*) and Oval Sedge (*Carex ovalis*). These occur together with Wood Small-reed (*Calamagrostis epigejos*), Wood Sedge (*Carex sylvatica*), Glaucous Sedge (*Carex flacca*), Spiked Sedge (*Carex spicata*), Creeping Buttercup (*Ranunculus repens*), Meadowsweet (*Filipendula ulmaria*), Creeping Bent (*Agrostis stolonifera*), Meadow Buttercup (*Ranunculus acris*), lots of Common Spotted Orchid (*Dactylorhiza fuchsii*), Ragged Robin (*Lychnis flos-cuculi*), Yorkshire-fog (*Holcus lanatus*), Greater Bird's-foot Trefoil (*Lotus pedunculatus*), Common Marsh-bedstraw (*Galium uliginosum*), Meadow Foxtail (*Alopecurus pratensis*), Jointed rush (*Juncus articulatus*), Hard Rush (*Juncus inflexus*) and Compact Rush (*Juncus conglomerus*). Unfortunately there is a permanent paintball game set up here with straw bails and lots of activity. This area would benefit greatly from a change of management.

2.8 Other interesting features to note include an area immediately to the west of the glade which is dominated by Hairy Wood–rush (*Luzula pilosa*) and the occasional Broad-leaved Helleborine (*Epipactus heleborine*).

2.9 The woodland has 27 species associated with ancient woodland in Buckinghamshire. Of concern is the failure of the survey to find Lady Fern (*Athyrium felix-femina*) which was identified in the survey of 1981.

3. Fauna

Birds

3.1 Little time was available to perform an adequate bird survey and it is recognised that this only represents a small proportion of the birds that use this woodland.

Blackbird
Blackcap
Blue Tit
Bullfinch
Carrion Crow

Chaffinch
Cuckoo
Great Tit
Kestrel
Robin
Tawny Owl
Tree Creeper
Wren

4. Current management regime

4.1 The woodland is used for paintball and forestry.

5. Ideal management regime

5.1 These are some suggestions that could be incorporated into the management of the wood to improve its biodiversity.

5.2 Aim to remove all conifers over time and replace with natural regeneration supplemented with other species that should be present in this community such as; Beech (*Fagus sylvatica*), Yew (*Taxus baccata),* Holly (*Ilex aquifolium*), Crab Apple (*Malus sylvestris*), Cherry (*Prunus avium*), Rowan (*Sorbus aucuparia*), Small-leaved Lime (*Tilia cordata*), Dogwood (*Cornus sanguinea*) and Spindle (*Euonymus europaeus*). The trees should be of native provenance, and local provenance if possible. N.B. conifers should ideally be removed gradually to reduce the shock to the woodland ecosystem, in particular the various microclimates within the wood. Contact the Forestry Commission for information on woodland planting grants.

5.3 Move paintball activity away from species rich area to a species poor area. The open glade should be managed by cutting and clearing in July and September to enhance the floral diversity of the site. The straw bales should also be removed to avoid the possibility of bringing in invasive plant species. This is the simplest of these recommendations to achieve. If no open site is available within the wood then a suitably sized area within a coniferous compartment could be cleared as an alternative venue for this activity, and the wood sold. Other paintball activities should be focused on the least botanically rich areas i.e. the coniferous blocks.

5.4 If broad-leaved trees are to be felled select and leave the oldest trees standing to develop an age range within the wood, for the benefit of invertebrates, fungi, and hole dwelling birds/mammals. Leave some standing deadwood and create habitat piles of rotting wood (placed in shady places) with timber of no commercial value e.g. thinned material. Allow some trees to age and die naturally and use other non-desirable species to create more standing deadwood by ring-barking.

5.5 Re-establish coppicing in compartments where it has been practised before. When coppicing Hazel ensure that some uncut leaders are left on each stool to reduce possibility of subsequent stool failure. As a further safeguard do not cut back below previous cut - particularly with old stools. Avoid cutting the stool into a 'neat' cushion shape. Don't cut too much in any one year - look to work all the coppice in a 10-15 year rotation. Create a mosaic of different stool heights i.e. don’t work in blocks and avoid being too neat. It may be possible to contact a local hedgelayer who may be interested in cutting the Hazel from the wood. AVCS, and the Forestry Commission will be able to give contact numbers if required.

5.6 Further study of the wood should be encouraged to find out more about the species that use it. For example the erection of species-specific woodcrete bat boxes along the rides. There is no recorded information available about the bat population of the woods, so this will help to increase knowledge by providing an accurate way of sampling it. See below for contact details. Other recording groups can be reached via Bucks Environmental Records Centre - see below.

5.7 There is a comparative lack of tree holes in the wood because of a lack of mature trees and the presence of coniferous blocks. Putting up bird and bat boxes will provide artificial tree holes and increase their numbers.

5.8 Woodland ride creation. It would be beneficial to create a sheltered woodland ride within the woodland which emanates from the central glade and is managed in the same way. It should be at least 4m wide and shaped so that it receives direct sunlight for at least part of the day. Its proximity to the central glade will allow the species within it to spread through the wood.

Help and advice

Help is available from a number of sources to implement these recommendations.

Aylesbury Vale Countryside Service	01296 427972
Bucks Environmental Records Centre	01296 624519
Butterfly Conservation	01929 400209
Bucks Invertebrate Group	c/o 01296 696012
Countryside Stewardship	0118 939 2369
RSPB	01295 253330
FWAG	01865 845126
North Bucks Bat Group	01296 427972
Forestry Commission	01296 681181

Comparative Number of Vascular Plant Species Recorded

20/06/02 149

Notable Species

(See attached sheets)

County Uncommon Vascular Plants

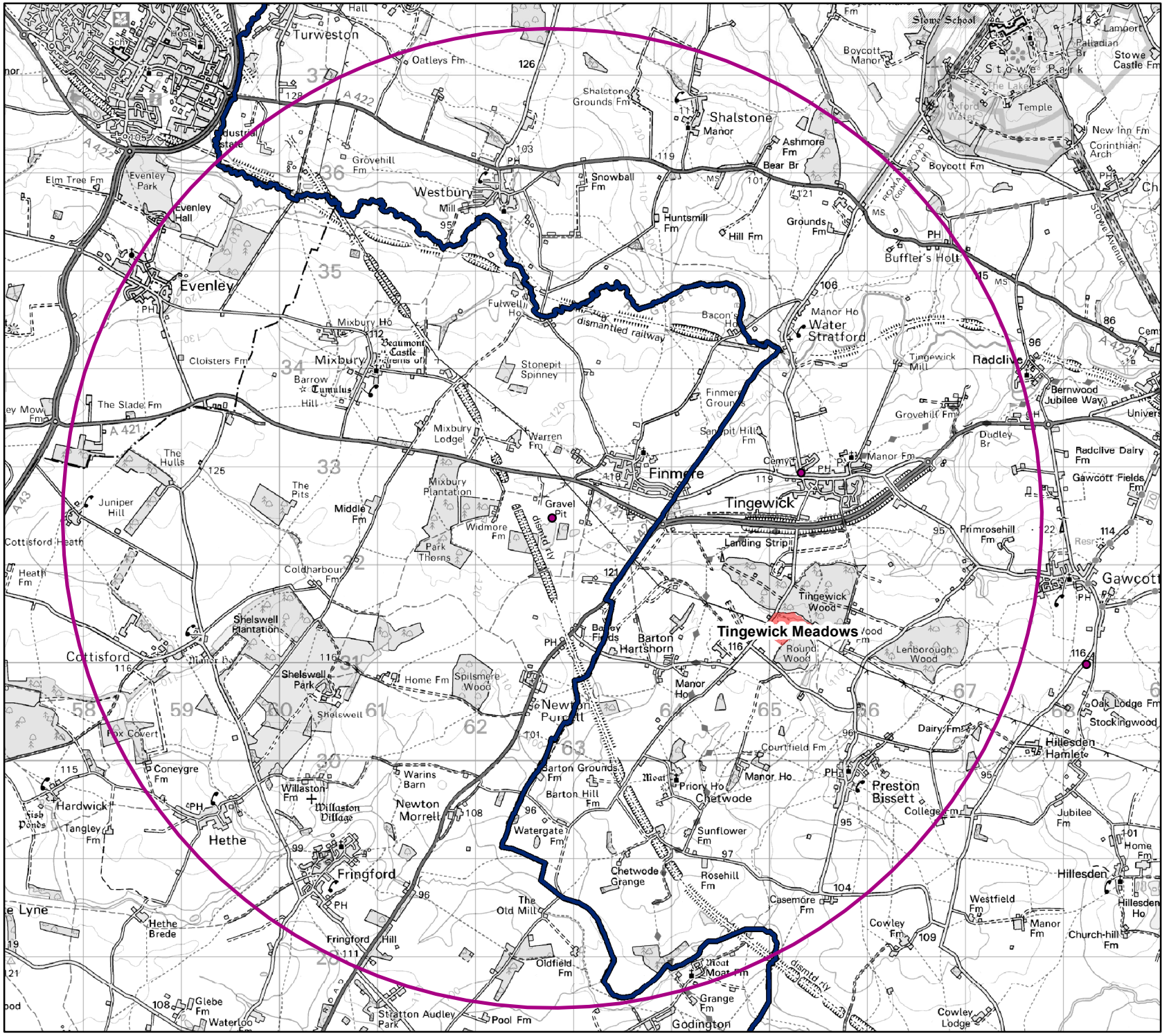
Oval Sedge (*Carex ovalis*)
Pale Sedge (*Carex pallescens*)

County Rare Vascular Plants

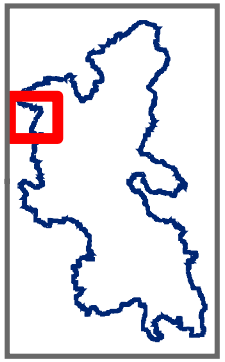
COUNTY WILDLIFE SITE REPORTS PRODUCED BY:

Aylesbury Vale Countryside Service
Haydon Mill
Rabans Lane
Aylesbury
Bucks
HP19 8RU

01296 427972
E-mail: countrysideservice@aylesburyvaledc.gov.uk



Statutory Sites within 5km to Finmere Quarry (SP 62827 32474)



Legend

- Polygons
- SSSI
- County Boundaries

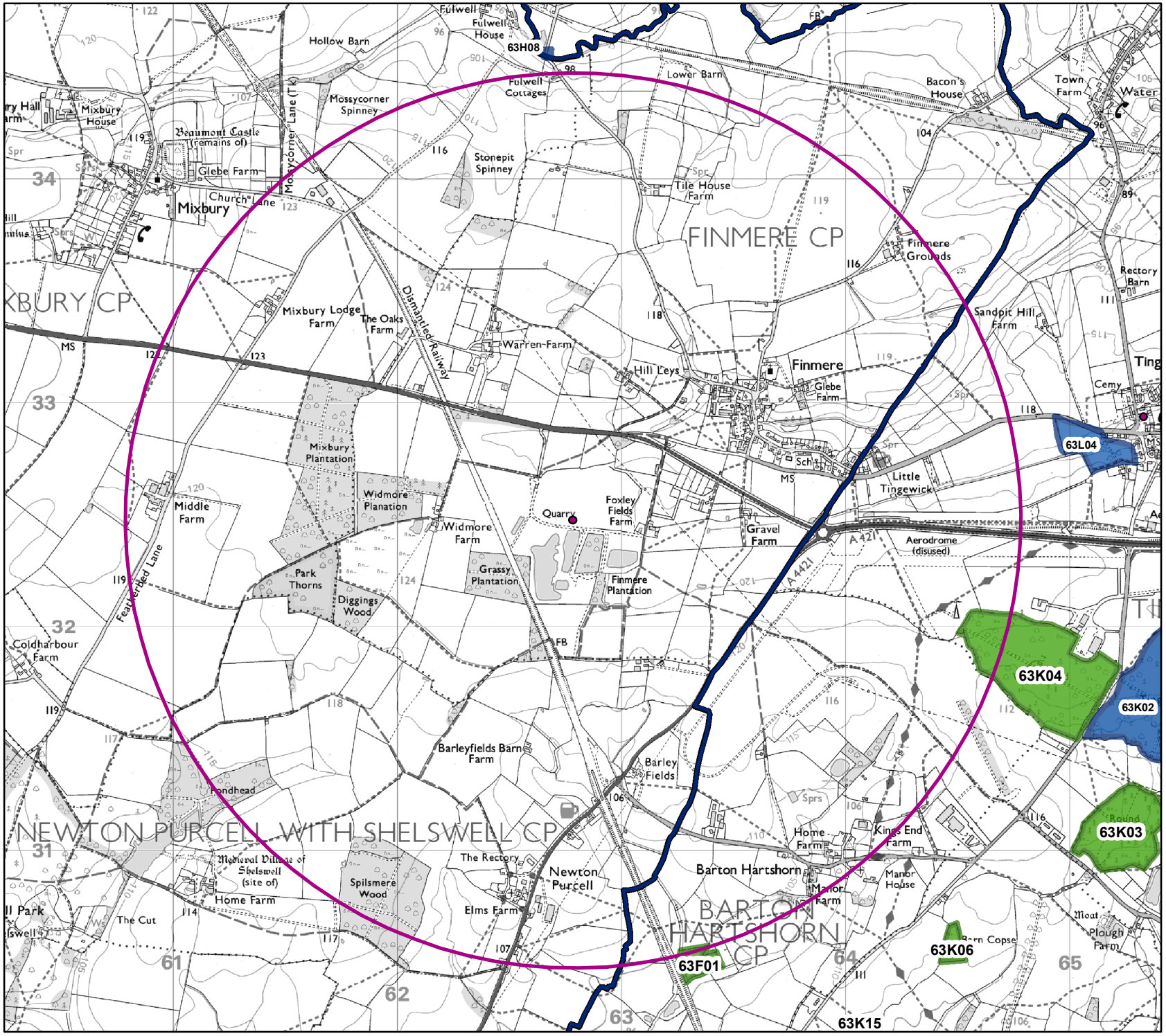
This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationary Office© Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings.

N

Date created 27/03/2018

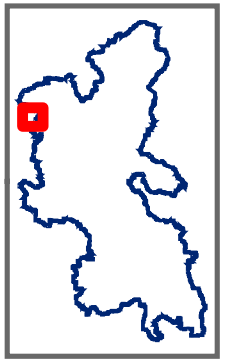
1:53,408

Please note that the layers held by the Environmental Records Centre are compiled from data that has been received from a variety of sources, including volunteers and professionals.



Buckinghamshire & Milton Keynes Environmental Records Centre

Local, Non-Statutory Sites within 2km to Finmere Quarry (SP 62827 32474)



Legend

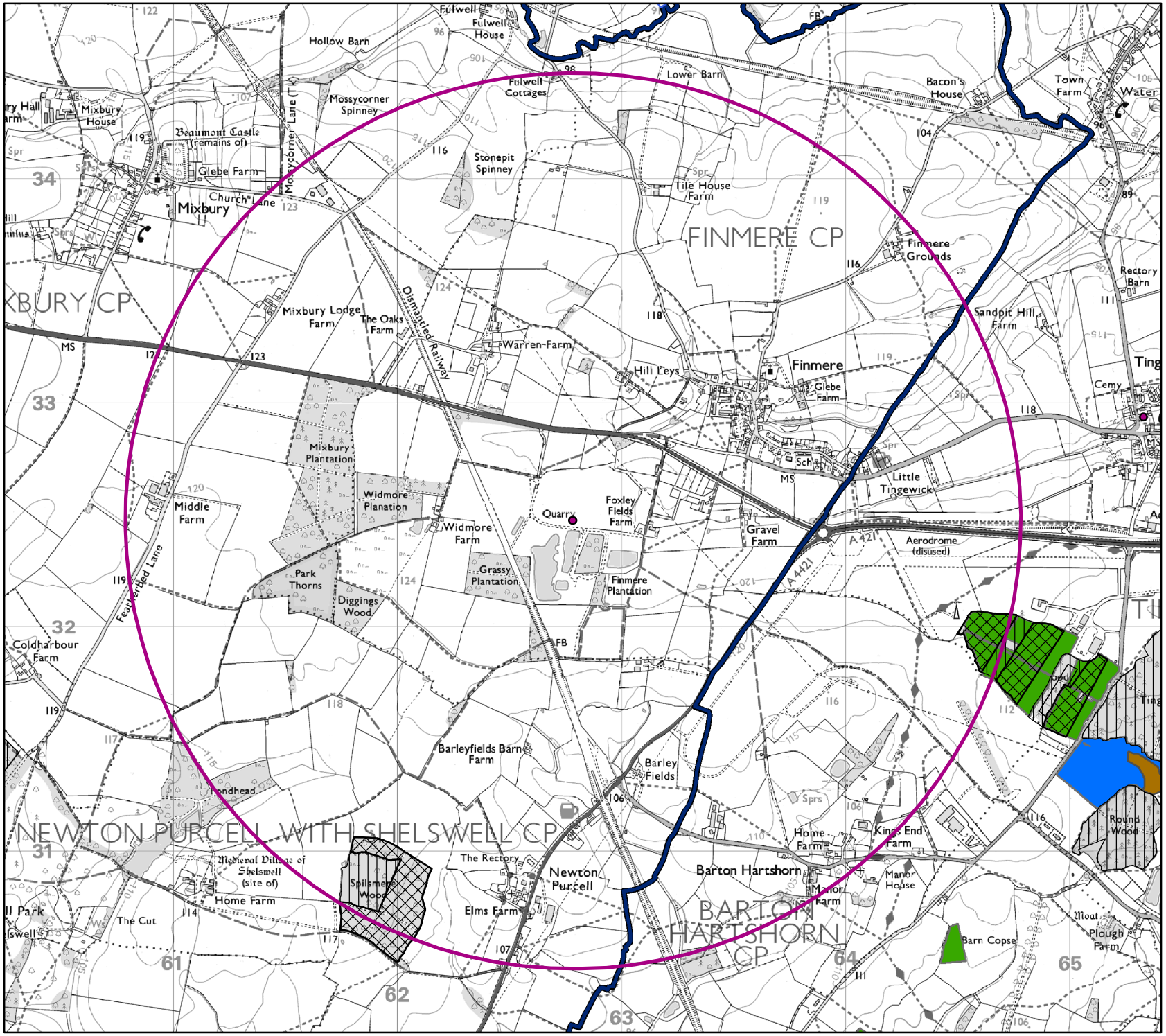
- Polygons
- Local_Wildlife_Sites
- County Boundaries

N

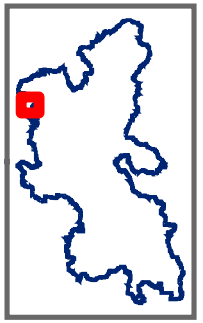
Date created 27/03/2018

1:23,366

Please note that the layers held by the Environmental Records Centre are compiled from data that has been received from a variety of sources, including volunteers and professionals.



UK Priority Habitats within 2km to Finmere Quarry (SP 62827 32474)



Legend

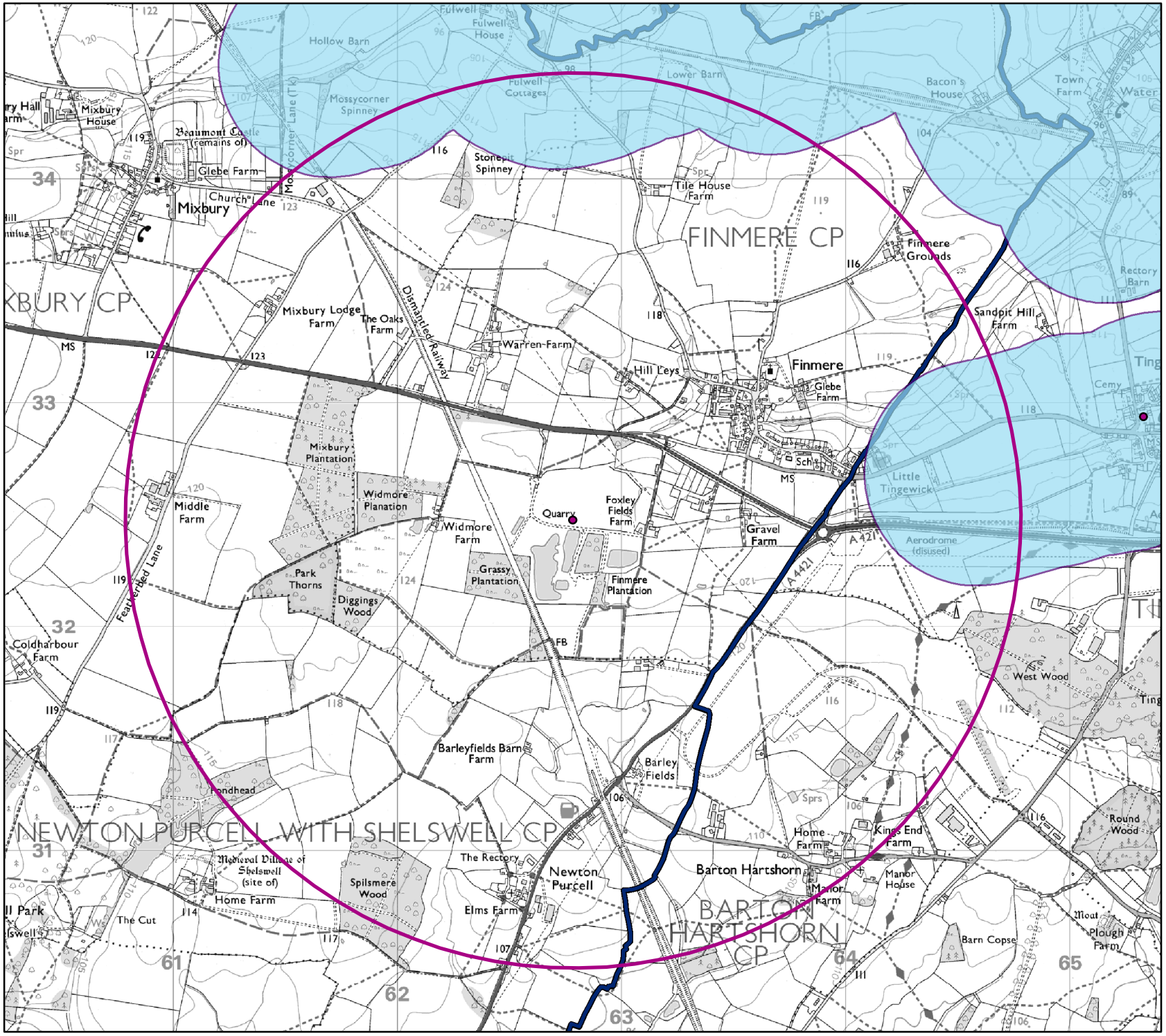
- Polygons
- Lowland mixed deciduous woodland
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland
- County Boundaries

N

Date created 27/03/2018

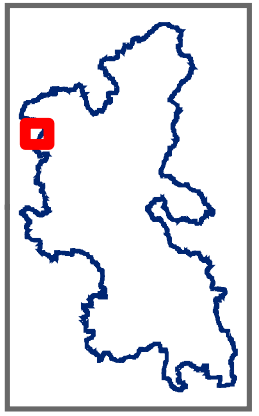
1:23,366

Please note that the layers held by the Environmental Records Centre are compiled from data that has been received from a variety of sources, including volunteers and professionals.



Buckinghamshire & Milton Keynes Environmental Records Centre

Water Vole Key Areas within 2km to Finmere Quarry (SP 62827 32474)



Legend

Polygons

Water Voles Key Areas

N

Date created 27/03/2018

1:23,366

Please note that the layers held by the Environmental Records Centre are compiled from data that has been received from a variety of sources, including volunteers and professionals.

Protected and notable species records

Taxon column:

**** = species recorded as not native (e.g. introduced plants or escaped birds)***

 # (against badger Meles meles) = record of sett

Table sorted by group and taxon

Only includes records since 1990; contact BMERC if you need records from before this

Some records may have further details (e.g. information on quantity, sex and stage), contact BMERC if you need this additional detail

Data supplied by BMERC may include data from the following organisations: Botanical Society of Britain and Ireland; Bucks Amphibian and Reptile Group; Bucks Bird Club; some National Recording Schemes; plus many individual recorders

group	species	English name	European legislation	UK legislation	Species of Principal Importance	Red List (GB unless stated)	Rare / Scarce	local status	site	grid ref	precision	latest record
Birds	Carduelis cannabina	Linnet				Bird-Red			Barton Hartshorn	SP640315	100	2011
Birds	Milvus milvus	Red Kite		WACA-Sch1_part1					Barton Hartshorn	SP640315	100	2011
Birds	Poecile palustris	Marsh Tit			England_NERC_S.41	Bird-Red			Barton Hartshorn	SP640315	100	2011
Birds	Scolopax rusticola	Woodcock				Bird-Red			Finmere	SP636330	100	2013
Birds	Vanellus vanellus	Lapwing			England_NERC_S.41 & UKBAP-2007	Bird-Red			Barton Hartshorn	SP640315	100	2011
Insects: Lepidoptera:	Thymelicus lineola	Essex Skipper						Low Priority butterflies	1km square - Newton Purcell	SP6230	1000	1999
Mammals	Myotis nattereri	Natterer's Bat	EPS-HabReg-Sch2 & HabDir-A4	WACA-Sch5_sect9.4b,WACA-					Little Tingewick House, Tingewick	SP642327	100	1992
Mammals	Nyctalus noctula	Noctule Bat	EPS-HabReg-Sch2 & HabDir-A4	WACA-Sch5_sect9.4b,WACA-	England_NERC_S.41 & UKBAP-2007				Little Tingewick House, Tingewick	SP641327	100	2007
Mammals	Pipistrellus pipistrellus	Common Pipistrelle	EPS-HabReg-Sch2 & HabDir-A4	WACA-Sch5_sect9.4b,WACA-					Little Tingewick House, Tingewick	SP640327	100	2007
Mammals	Pipistrellus pipistrellus	Common Pipistrelle	EPS-HabReg-Sch2 & HabDir-A4	WACA-Sch5_sect9.4b,WACA-					Little Tingewick House, Tingewick	SP641327	100	2007
Mammals	Pipistrellus sp.	Pipistrelle species	EPS-HabReg-Sch2 & HabDir-A4	WACA-Sch5_sect9.4b,WACA-					Little Tingewick House, Tingewick	SP641327	100	2007
Mammals	Plecotus auritus	Brown Long-eared Bat	EPS-HabReg-Sch2 & HabDir-A4	WACA-Sch5_sect9.4b,WACA-	England_NERC_S.41 & UKBAP-2007				Little Tingewick House, Tingewick	SP641327	100	2007
Plants	Briza media	Quaking-grass				RedList_GB_post2001-NT (England)			Newton Purcell (SP63F)	SP63F	2000	1996
Plants	Hyacinthoides non-scripta	Bluebell		WACA-Sch8					Corner Field, Finmere	SP640325	100	1992
Plants	Potentilla erecta	Tormentil				RedList_GB_post2001-NT (England)			Newton Purcell (SP63F)	SP63F	2000	1996

Definitions

Sites of importance for wildlife and geology in Buckinghamshire and Milton Keynes

The following statutory designations are used in Buckinghamshire and Milton Keynes:

- ***Special Areas of Conservation (SAC)***

Special Areas of Conservation are sites of international nature conservation importance and are designated under the EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (the Habitats Directive).

- ***National Nature Reserves (NNR)***

National Nature Reserves are sites of national importance and are declared under section 19 of the National Parks and Access to the Countryside Act 1949 or section 35 of the Wildlife and Countryside Act 1981.

- ***Local Nature Reserves (LNR)***

Local Nature Reserves are sites of local importance and are declared under section 21 of the National Parks and Access to the Countryside Act 1949.

- ***Sites of Special Scientific Interest (SSSI)***

Sites of Special Scientific Interest are sites of national nature conservation or geological importance and are declared under section 28 of the Wildlife and Countryside Act 1981.

The following non-statutory sites have been identified in Buckinghamshire and Milton Keynes:

- ***Local Wildlife Sites (LWS)***

Local Wildlife Sites are local non-statutory nature conservation sites, formerly called County Wildlife Site and equivalent to Sites of Importance for Nature Conservation. The aim of the selection process is to identify sites that support the most important habitats and species in Buckinghamshire and Milton Keynes. A selection panel, in consultation with local authorities, designates the sites. Summary citations or survey reports are available for most, but not all, Local Wildlife Sites.

- ***Milton Keynes Wildlife Sites (MKWS)***

Sites identified as Local Wildlife Sites are referred to as Milton Keynes Wildlife Sites when they fall within the administrative area of Milton Keynes Council.

- ***Milton Keynes Wildlife Corridors***

These have been identified along the major road, rail, woodland and waterway corridors running through the Milton Keynes area. They are treated as being equivalent to Milton Keynes Wildlife Sites.

- ***Biological Notification Sites (BNS)***

Biological Notification Sites preceded Local Wildlife Sites as a local non-statutory designation. They were first designated in the late 1980s and have since been revised. There are no formal citations and for some sites we have no survey data. All Biological Notification Sites are in the process of being re-surveyed and assessed by Local Wildlife Site criteria; until this process is complete the two designations will continue to be in use. (Unfortunately, BNS within the administrative area of Milton Keynes Council have sometimes been called Local Wildlife Sites, this terminology will be phased out as soon as possible.)

- ***Local Geological Sites (LGS)***

Local Geological Sites are local non-statutory sites that recognise important earth science and landscape features. The Buckinghamshire Earth Heritage Group, in consultation with local authorities, designates the sites. They were previously known as Regionally Important Geological and Geomorphological Sites (RIGS).

- ***Key Areas for Water Vole***

Following surveys in 1997/8, the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust have labelled some waterways as Key Areas for Water Vole. The boundaries of Key Areas are taken to be 10m from the bank-top each side of a watercourse and the buffer area is taken to be 500m from each side of the watercourse. For further information contact the Wildlife Trust on 01865 775476.

Buckinghamshire & Milton Keynes Notable Species List

Records held come from myriad sources including professional consultants' surveys, volunteer recorders and recording groups, national recording schemes and members of the public. In particular, we hold records from Bucks recorders for Plants, Moths and Mammals and from BucksARG and Bucks Bird Club. We also receive records from North Bucks Bat Group although they may hold more up-to-date records for an area.

The Buckinghamshire and Milton Keynes Notable Species List has been compiled in response to data requests from ecological consultants and developers. Although records of protected species are most commonly requested, national and local BAP species records and records of other notable species are often required.

As part of our standard data search we now include records of species defined by the following legislation and criteria.

1. European legislation

This column in our reports includes species listed in Regulations 39 (European protected animal species) and 42 (European protected plant species) of *The Conservation (Natural Habitats, &c.) Regulations* 1994. These provide protection for key species and habitat types and enacts the EU Habitats Directive into UK Law. The Habitats Directive requires the formation of a network of protected areas and the direct protection of specific species. It is an offence to deliberately capture, kill or disturb a wild animal of a European protected species or to deliberately take or destroy the eggs or destroy a breeding site or resting place of such an animal. It is also an offence to deliberately pick, collect, cut, uproot or destroy a wild plant of a European protected species.

On 21 August 2007 an amendment to the Habitats Directive came into force. The *Conservation (Natural Habitats &c.) (Amendment) Regulations 2007* have a variety of consequences for the protection of European Protected Species, including the removal of many defences that were previously allowed. This includes the commonly relied upon 'incidental result defence', which previously covered acts that were the incidental result of an otherwise lawful activity and which could not reasonably have been avoided. For more details see:
http://www.naturalengland.org.uk/conservation/wildlife-management-licensing/habsregs.htm#houseguidance

2. W+C Act

This column includes species listed in The Wildlife & Countryside Act 1981 (and later amendments), plus Badger (see below). The Wildlife and Countryside Act consolidates and amends existing national legislation to implement the Bern Convention and the EU Birds Directive in Great Britain. Various amendments have been made to the Act, e.g. in the Countryside and Rights of Way (CRoW) Act 2000.

- *Schedule 1 (protected birds)* – It an offence (with exception to certain species) to intentionally kill, injure, or take any wild bird or the eggs or nests of species listed in Part 1. Part 2 lists birds protected during the closed season.
- *Schedule 5 (protected animals, other than birds)* – The intentional or reckless killing, injuring, taking, possessing, disturbing or selling, of animals listed in Schedule 5 is prohibited, along with the damaging or disturbing of the places used for their shelter or protection. Protection of some species is limited to certain sections:
    - Section 9(1) – Limited to intentional killing, injury or taking.
    - Section 9(2) – Limited to processing and controlling.
    - Section 9(4a) – Limited to damaging, destroying or obstructing access to any structure or place used by the animal for shelter or protection.
    - Section 9(4b) – Limited to disturbing an animal whilst it is occupying any structure or place used for shelter or protection.
    - Section 9(5) – Limited to selling, offering for sale, possessing or transporting for sale or advertising for sale of any live or dead animal, part of or derived from. (Not included in list)
- *Schedule 8 (protected plants and fungi)* – The intentional picking, uprooting, trade in, or possessing of any wild plant listed in Schedule 8 is prohibited. Also, all wild plants are protected from intentional uprooting by an unauthorised person.

This column also shows records for badgers, which are protected under The Protection of Badgers Act 1992. This makes it an offence to wilfully kill, injure or take, or attempt to kill, injure or take, a badger and to interfere with a badger sett either by intent or by negligence. A licence, issued by English Nature, is required for works within 30 metres of a badger sett.

3. Priority Species

This column shows species listed as Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act (2006). These were formerly called UK Biodiversity Action Plan (UK BAP) Priority Species. The UK BAP listed Priority Species for conservation in the UK and was reviewed and extended in 2007. The UK BAP has been replaced by the UK Post-2010 Biodiversity Framework. The list of Species of Principal Importance is very similar to the list of Priority Species in the UK BAP (there are some species that are BAP Priority but not Species of Principal Importance, and there is one species – Hen Harrier – that is a Species of Principal Importance but not a BAP Priority).Priority Species are referred to in paragraph 117 of the National Planning Policy Framework which states that planning policies should *'…promote the…protection and recovery of priority species populations, linked to national and local targets'*

4. National status

This column shows all species that have been listed in Red Data Books, or in reviews of Nationally Scarce species, or are red- or amber-listed birds. A number of criteria have been devised for assessing the conservation status of species. In the UK, official lists of Red Data Book species are published by the government's Joint Nature Conservation Committee (JNCC). NB that the Red Data Books use different criteria for different groups, e.g. for plants the criteria give priority to declining and threatened species, whereas those for invertebrates are based more on rarity in terms of distribution. The more recent Red Data Book lists use international criteria developed by the World Conservation Union (IUCN), and include these categories:

- Extinct (EX)
- Extinct in the wild (EW)
- Critically endangered (CR)
- Endangered (EN)
- Vulnerable (VU)
- Near threatened (NT)
- Data deficient (DD)

The CR, EN and VU categories are considered to be threatened categories. Near threatened species are close to qualifying for one of these categories. Data deficient is not a threatened category, but indicates a need for more information in order to determine the appropriate category.

In addition to IUCN criteria, there are older Red Data Book and Nationally Scarce criteria used to define nationally rare and nationally scarce species:

- Red Data Book (= Nationally Rare): Occurring in 15 or fewer 10km-squares in Great Britain
- Nationally Scarce: Occurring in 16–100 10km-squares in Great Britain. For some groups this is further subdivided:
    - Nationally Scarce/Na: Occurring in 16–30 10km-squares
    - Nationally Scarce/Nb: Occurring in 31–100 10km-squares

For birds, the following categories apply, taken from *Birds of Conservation Concern 2002–2007* (RSPB):

- *Red List* – Species that are globally threatened according to IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery.
- *Amber List* – Species with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recovery; rare breeders; and those with internationally important or localised populations.

Nationally rare plants
This column uses distribution data from the Botanical Society of the British Isles to show those plants that have restricted national distributions, i.e. equivalent to the old Red Data Book categories.

5. Local status
This column shows the local statuses that have been applied to plants, butterflies and moths. For the plants the source is the BSBI County Rare Plant List for Bucks, compiled by Roy Maycock in 2007 (NB this is a substantial change from the previous county rare/scarce plant list of the 1980s). The categories are:

- County Rare: generally confined to three or fewer tetrads (2km × 2km squares) in the county
- County Scarce: generally confined to between four and ten tetrads in the county

For butterflies and moths the source is Butterfly Conservation's Regional Action Plan for the Thames Region (Clarke and Bourn 2000). Species are given a High, Medium or Low priority based on rarity, decline and threat (NB that the "Low Priority" category does include species of conservation importance, but simply those which are considered a lower priority than the others).

- ***Bird records***

Under the EC Birds Directive and the Wildlife and Countryside Act it an offence to intentionally kill, injure, or take any wild bird or their eggs or nests (with the exception of certain species). Records of wild birds in general are not included in BMERC reports unless they are of species falling into one of the other categories listed here.

A full Notable Species list is available on request.

International and European Obligations

In the UK, species receiving protection under international legislation and agreements are protected through the Wildlife and Countryside Act, so are not shown separately in the BMERC notable species lists. For reference, the relevant categories are shown below.

- ***Bern Convention on the Conservation of European Wildlife and Natural Habitats***

The Bern Convention aims to ensure the conservation of wild flora and fauna species and their habitats.

- *Appendix 1 (strictly protected flora)* – Plants for which contracting parties will prohibit deliberate picking, collecting, cutting or uprooting.
- *Appendix 2 (strictly protected fauna)* – Animals for which contracting parties will prohibit deliberate capture, possession, killing, damage to or destruction of breeding or resting sites, disturbance or destruction or taking of eggs.
- *Appendix 3 (protected fauna)* – Animals for which contracting parties will include closed seasons and regulate their sale, keeping for sale, transport for sale or offering for sale of live and dead wild animals. (Not included in Notable Species List)

- ***Bonn Convention on Migratory Species***

The Bonn Convention aims to conserve terrestrial, marine and avian migratory species throughout their range.

- *Appendix 1 (migratory species threatened with extinction)* – Species for which contracting parties will strictly protect and endeavour to conserve or restore the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them.
- *Appendix 2 (migratory species that need or would benefit from international co-operation)* – Species for which contracting parties will be encouraged to conclude global or regional agreements for the conservation and management of individual species or, more often, of a group of species. (Not included in Notable Species List)

- ***The EC Council Directive on the Conservation of Wild Birds***

The Birds Directive provides a framework for the conservation and management of all wild birds in Europe. As well as designating important sites for birds as Special Protection Areas, birds are generally protected from deliberate killing or capture and destruction of or damage to their nests or eggs, and deliberate disturbance. Allowances are made for game birds.

ANNEX E3

HABITATS AND PLANT COMMUNITIES

1 INTRODUCTION

1.1 This section sets out in detail the assessment undertaken to identify and characterise the habitats, plant species and plant communities on the site. References cited in the text are provided in full in the main document.

2 CONSERVATION STATUS

2.1 The conservation status of plant species is defined by comparison with published guidance. Thus, species may be defined as rare or nationally scarce by Wigginton (1999) and Stewart, Pearman and Preston (1994) respectively, County rare or scarce (as defined by the County flora or County BAP) or by listing as an S41 Species of Principal Importance.

2.2 Similarly, plant communities may be defined as nationally rare or scarce, as defined by The National Vegetation Classification (NVC) system (JNCC, 2006), where they meet specific requirement for selection as a SSSI, criteria for designation as an LWS, by listing as S41 Habitat of Principal Importance or as an 'Important Arable Plant Area' as defined by Byfield and Wilson (2005).

2.3 Japanese knotweed is listed on Schedule 9 of WCA. Section 14 (1) of this Act makes it illegal to plant or otherwise cause to grow in the wild any plant listed in Schedule 9 to the Act.

3 METHODS

3.1 The initial Phase-1 Habitat Survey undertaken to inform the PEA in November 2017 was updated on subsequent site visits throughout the growing season to identify seasonal variance and any changes in composition. All habitats and plant communities in the survey area were mapped and characterised by identifying the dominant and typical species based on the JNCC Phase-1 Habitat Survey Methodology (JNCC, 2010).

3.2 Hedgerows directly impacted by the scheme were assessed against criteria in the Hedgerow Regulations, 1997.

3.3 Arable plant species were assessed against the scoring system used to determine Important Arable Plant Areas (Byfield & Wilson, 2005).

4 RESULTS

4.1 OVERVIEW

4.1.2 The Site comprises an area of approximately 63ha, approximately half of which is operational under current consents and comprises clay stockpiles, bare ground and landfill cells in use or in the process of being restored and a materials recycling facility (MRF). The remainder

comprises arable fields, small woodlands, waterbodies, a redundant silt lagoon, hedgerows (mostly to the site boundaries) and a bungalow. Those habitats designated as being important under Section 41 of NERC, 2006, are described in detail below and are shown on Figure E1. All other habitats are summarised at the end of the section. Representative photographs are given in the text.

4.2 WOODLAND

4.2.1 A strip of mixed plantation around 10-20m wide is present along the full length of the northern boundary, screening the Site from the A421. The woodland appears to be around 20-30 years old and comprises a diverse variety of trees and shrubs including pedunculate oak, ash, hybrid black poplar, sycamore, alder, beech, Scot's pine, larch, whitebeam, way-faring tree, spindle, hornbeam and wild cherry. The ground flora is poor and is dominated by common nettle, Yorkshire-fog, ground-ivy, cleavers and broad-leaved dock.

4.2.2 Finmere Plantation comprises two small areas of broadleaved woodland. The northern section is dominated by mature pedunculate oak and sycamore with silver birch, ash, horse-chestnut, hazel, elder, hawthorn plus dense patches of cherry-laurel. The ground flora is fairly diverse (where not shaded by cherry-laurel) and includes bluebell (locally abundant), bracken, lesser celandine, hairy woodrush, bugle, three-nerved sandwort, enchanter's nightshade, heath speedwell, foxglove, common dog-violet and wood dock.

4.2.3 The southern section is dominated by pedunculate oak, hawthorn, ash and sycamore with elder, field maple, blackthorn, crack willow, goat willow, wych elm and crab apple. The ground flora is similar to the northern section but also includes broad buckler-fern, false-brome, common marsh-bedstraw, creeping-jenny and wood sedge.

4.3 HEDGEROWS

4.3.1 The northern and eastern fields contain several hedgerows delineating field boundaries and different ownerships. Most are accompanied by post-and-rail fences and dry ditches. The dominant species include hawthorn, blackthorn, field maple and elder, with occasional ash and pedunculate oak standards (some mature).

4.3.2 The hedgerows within the Site tend to comprise short, remnant sections of what was probably a more extensive and complete network of hedgerows that existed when the area was farmland. These sections, whilst mature and supporting standard trees including oak and ash, lack the species diversity and continuity of those along the Site boundaries. There are two exceptions to this: the hedgerow alongside the access track to the Site offices and the hedgerow leading south from the MRF. Both of these are large hedgerows with frequent standards and contain species such as hazel, field maple, crab apple and various willows.

4.3.3 The Site boundary hedgerows are all fairly similar and are dominated by hawthorn and blackthorn with wild privet, hazel, elder, elm, field maple and dog-rose, together with occasional ash and pedunculate oak standards. Overall, continuity is good with very few gaps. The ground flora is dominated by bramble, false-brome, cleavers, common nettle, creeping thistle and barren brome. Most hedgerows are accompanied by shallow, dry ditches.

4.4 PONDS

4.4.1 Pond 1 is a steep-sided water-storage pond originally created as part of the sand and gravel washing process when the site was an active quarry. The pond comprises two circular sumps approximately 15m diameter each, which merge into a single pond when full of water. The bank-tops support osier and willow scrub plus patches of creeping bent, great willowherb, soft-rush and colt's-foot. Bulrush, gypsywort and great willowherb are present in the shallow margins and there is a large patch of common water-crowfoot in the deep central area. This pond has never been known to dry out.

4.4.2 Pond 2 was created in 2015 as a result of water being allowed to gather in a hollow between spoil heaps. The pond is approximately 20m in diameter and shallow but tends to hold water throughout the year due to run off from adjacent land. Stands of bulrush and great willowherb are present in the margins, together with common water-crowfoot, water-plantain and broad-leaved pondweed.

4.4.3 North of Ponds 1 and 2 is a redundant silt lagoon comprising a uniformly-flat basin of silt that has been colonised by self-set willow, osier and silver birch scrub. Damp areas support species such as hard rush, soft-rush, common reed, greater pond-sedge, great willowherb and bulrush. Drier areas support ruderal vegetation, with dominant species including coltsfoot, spear thistle, creeping thistle, Canadian fleabane, black medick and scentless mayweed. The primary function of this area is to provide terrestrial habitat for amphibians using Ponds 1 and 2 and for nesting birds.

4.4.4 Pond 3 is off-site beyond the north-eastern part of the capped landfill area and comprises an attenuation pond set in seeded grassland. The pond is triangular, 300mm deep with clear water. The species present are likely to have colonised naturally and include patches of bulrush, soft-rush, jointed rush, thread-leaved water crowfoot, water purslane and water forget-me-not. The pond was dry by June 2018.

4.5 ARABLE FIELD MARGINS

4.5.1 Three arable fields are present across the northern part of the Site. The fields are ploughed tight to the northern woodland but narrow margins elsewhere comprise frequent arable 'weeds' including scentless mayweed, annual meadow-grass, bristly oxtongue, spear thistle, rosebay willowherb, prickly sow-thistle and common field-speedwell. Less frequent plants

included many-seeded goosefoot, field pansy, field madder, marsh cudweed and scarlet pimpernel. A fourth arable field, present in the eastern part of the Site, was left fallow during the surveys allowing many grasses and arable weeds (including broad-leaved willowherb, ragwort, black-grass, spear thistle, prickly sow-thistle, scentless mayweed, many-seeded goosefoot, fool's-parsley and marsh cudweed) to colonise.

4.6 OTHER HABITATS

- A large area of capped and seeded landfill recently planted up with whips.
- Other landfill cells in varying stages of construction, infill and restoration.
- Haul roads, portacabins, borrow pits, stockpiles of overburden and clay in constant use, two recent, vertical sided water storage lagoons.
- A large, raised aggregates-processing plant comprising a concrete yard with gravel washing machinery.
- The MRF. A large, metal-framed industrial building standing within a large concrete storage yard, all enclosed within a high fence.

4.7 INVASIVE PLANT SPECIES

4.7.1 The highly invasive alien plant Japanese knotweed is present on the disused railway corridor beyond the western site boundary but is absent within the Site as a result of advice on how to prevent its accidental spread. Japanese knotweed is listed on Schedule 9 of WCA. Its status on the Site will continue to be monitored.

ANNEX E4 - INVERTEBRATES

1 INTRODUCTION

1.1 Conops Entomology Ltd undertook an invertebrate assessment of two parcels of land at Finmere Quarry, Oxfordshire (referred to as 'site A' and 'site B' from this point forward prior to possible development. The assessment was to appraise the key habitats and/or features of the sites through the recording of invertebrates where possible. These data were to be used to assess the value to invertebrates of those habitats or features to undertake a valuation of the sites for their importance as invertebrate resources. From the collection of data and subsequent assessment and valuation, suitable recommendations could then be put forward in the event that some or all of those features or key habitats may be impacted by a proposed development.

1.2 Site A is located at OS grid reference SP 6289 3228, Site B is located at OS grid reference SP 6264 3280.

1.3 Site A, the 'central woodland', comprises two small woodland units in the centre of the quarry (Finmere Plantation, North and South). They are dominated by pedunculate oak (trees with varying degrees of ground cover from leaf litter to ferns and elder). There is a significant amount of dust and litter within the woodland.

1.4 Site B, the 'northern fields', spans from the northeast to northwest corners of the landholding and comprises ley fields bordered by hedgerows with trees, predominantly oak species. The northwest field to the west of the landholding access track, at the time of survey, was bare, with a flowery margin and track to some of its perimeter. The north-eastern fields, to the east of the access track, are ley fields with typical ruderal and tall perennial flowers including common ragwort and thistles.

2 PREVIOUS SURVEYS

2.1 A previous survey of another area of the landholding was conducted by Conops Entomology Ltd in 2015, the results of which included 13 species with a nationally significant status, some of which no longer hold those statuses such as Roesel's bush cricket (*Metrioptera roeselii*) and others that are likely to be downgraded, including the mining bee *Lasioglossum malachurum* and *L. pauxillum*. The scarce species recorded were mainly found in association with bare ground and short turf.

3 METHODS AND TIMINGS

3.1 The methods utilized for the assessment are those recommended in the Natural England guidance document 'Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation' (Drake et al., 2007). In some instances, the method has been made bespoke for

the site assessment but still retains the overall approach to assessing features and habitats for conservation assessment.

Sweep netting

3.2 This method provides the main proportion of the survey element and is the most efficient method of cataloguing a site's invertebrate resource.

Spot sampling

3.3 Spot sampling is employed to collect large, conspicuous invertebrates such as bees and wasps from flowering plants and to supplement the sweep samples. Spot sampling is often the most effective method of recording species from high-fidelity niches.

Beating

3.4 Beetles and other invertebrates are dislodged from scrub, tree branches and foliage using a stick. The dislodged invertebrates are collected on a large, white beating tray for later examination.

Survey timing

3.5 Both sites were visited on a single date: 25 June 2018, sunny, 22–27°C.

4 RESULTS SUMMARY

Survey results

4.1 Site A – 45 species from the single visit. See Caveats.

4.2 Site B – 81 species from the single visit.

4.3 The full list of species recorded for each site is provided in Appendix IV.

TABLE 1: SPECIES OF IMPORTANCE

Scientific name	Vernacular name	National status	Habitat preferences and species notes	Location
Hylaeus dilatatus	a yellow-faced bee	Red Data Book 3	Flowery swards with structural interfaces with bramble and other pithy stemmed plants, in which they construct a nest.	Site B
Tyria jacobaeae	cinnabar	NERC Act S41 (research only)	Associated with ragwort (Senecio spp.).	Site A

4.4 The most up-to-date information and species reviews are used in the assessment. Where there is no up-to-date review, Pantheon (Webb et al., 2017) is used.

Resources for determining status

Alexander, K.N.A. and Denton, J.S. (2014) A Review of the Beetles of Great Britain: The Darkling Beetles and Their Allies. Species Status No. 18. Natural England Commissioning Reports, Number 148.

Bantock, T. (2016) A Review of the Hemiptera of Great Britain: The Shield Bugs and Their Allies. Species Status No. 26. Natural England Commissioning Reports, Number 190.

Duff, A. (2007) Identification – longhorn beetles: Part 2. British Wildlife 19: 35–43.

Falk, S.J., Ismay, J.W. and Chandler, P.J. (2016) A Provisional Assessment of the Status of Acalyptratae Flies in the UK. Natural England Commissioned Reports, Number 217.

Hubble, D.S. (2014) A Review of the Scarce and Threatened Beetles of Great Britain: The Leaf Beetles and Their Allies. Species Status No. 19. Natural England Commissioning Reports, Number 161.

Shirt, D.B. (1987) British Red Data Books: 2. Insects. Nature Conservancy Council, Peterborough.

Sutton, P. (2015) A Review of the Orthoptera (Grasshoppers and Crickets) of Great Britain: Species Status No. 21. Natural England Commissioning Reports, Number 187.

Telfer, M.G. (2016) A Review of the Beetles of Great Britain: Ground Beetles (Carabidae): Species Status No. 25. Natural England Commissioning Reports, Number 189.

Results analysis

4.5 The tables in this section have been generated using the Pantheon software package. Pantheon is an analytical tool developed by Natural England and the Centre for Ecology & Hydrology (CEH) to assist invertebrate nature conservation in England. Site data in the form of species lists can be imported into Pantheon, which then analyses the species within the lists, assigning them to habitats and resources. Pantheon also assigns the most up-to-date national status to the species where it is available.

4.6 The information obtained from Pantheon can then be used to assign quality to sites and their features, assist in management decisions and facilitate requirement for further surveys, where required and appropriate.

4.7 For more information on this new resource, see http://www.brc.ac.uk/pantheon/.

4.8 Not all species of importance are expressed in the following tables as they do not form part of the Pantheon analysis and/or their specific requirements are not yet fully understood.

TABLE 2: SITE A RESOURCE-USAGE TABLE (TAKEN FROM WEBB ET AL., 2017)

Broad biotope	Habitat	No. of species	No. of species with conservation status	Conservation status
open habitats	tall sward and scrub	17	n/a	n/a

tree-associated	decaying wood	7	n/a	n/a
tree-associated	shaded woodland floor	6	n/a	n/a
open habitats	short sward and bare ground	2	n/a	n/a
wetland	marshland	2	n/a	n/a
tree-associated	arboreal	2	n/a	n/a
wetland	peatland	2	n/a	n/a

TABLE 3: SITE B RESOURCE-USAGE TABLE (TAKEN FROM WEBB ET AL., 2017)

Broad biotope	Habitat	No. of species	No. of species with conservation status	Conservation status
open habitats	tall sward and scrub	44	2	*Tyria jacobaeae* – Section 41 Priority Species, research only; *Hylaeus dilatatus* – RDB 3
open habitats	short sward and bare ground	14	1	*Hylaeus dilatatus* – RDB 3
tree-associated	shaded woodland floor	5	n/a	n/a
tree-associated	arboreal	5	n/a	n/a
wetland	peatland	5	n/a	n/a
tree-associated	decaying wood	3	n/a	n/a
wetland	running water	3	n/a	n/a
wetland	marshland	3	n/a	n/a

5 DISCUSSION

Caveats

5.1 Owing to the location of the woodland within the busiest part of the quarry adjacent to active landfill and haul roads, there has always been a high amount of dust within it, possibly made worse by the very hot and dry weather preceding the 2018 survey. As a consequence, less material then was hoped could be collected on the day.

Assessment – habitats

Site A

5.2 Forty-five species were recorded from the woodland.

5.3 The site is represented by a limited range of habitats covering three broad biotopes: open habitat, tree-associated, and wetland. However, species associated with woodland (trees) and open habitats dominate the species list.

5.4 The habitat with the greatest number of species associations is tall sward grassland and scrub, which holds 17 species of affiliation from the limited survey effort. It includes common species with a very limited range of requirements from a site. The woodland fauna is limited owing mainly to the limited survey effort but does represent species associated with wood decay such as the longhorn beetle *Rutpela maculata* and wood-boring beetle *Anobium fulvicorne*. A range of shaded woodland floor species is also noted, including the danceflies (that broadly includes the hybotid flies) *Empis stercorea* and *Ocydromia glabricula*, demonstrating that the woodland does have some typical woodland fauna.

5.5 The site also includes a number of other species associated with bare ground and wetlands but these have been drawn into the site from surrounding habitats.

Site B

5.6 Eighty-one species were recorded from the single visit to site B.

5.7 The site is predominantly a series of ley fields with hedgerows and as such, the species list reflects this matrix, being dominated by species synonymous with tall sward and scrub and short turf and bare ground. In total, 58 species (63% of all the species recorded) belong to these two habitats.

5.8 The other species recorded are species associated with habitats further afield or those that adjoin this site. In particular, there are a few arboreal and deadwood species recorded from the boundary trees. The wetland habitat is highlighted through the presence of common flies associated with marshy or wet situations.

Assessment – species

Site A

5.9 The species recorded from the site are all common and local species. None has a formal nationally significant status. The robberfly *Choerades marginatus* is a localized species, formally nationally scarce but now more common; it is a useful indicator species of woodlands and deadwood. The longhorn beetle (*R. maculata*), wood-boring beetle (*A. fulvicorne*) and deadwood nesting wasp *Pemphredon lugubris* are all interesting species also, within the context of the overall list of species recorded, as they are deadwood specialists.

5.10 Most of the other species recorded are more generalist woodland species or those that are more commonly associated with open habitats or have very few requirements from a location.

Site B

5.11 The Pantheon output tables highlight two species of conservation value. This includes a NERC Act Section 41 species that is listed as 'research only' (the cinnabar moth). This species is included on the NERC Act owing to the eradication of its larval food plant (*Senecio spp*.), which could have an impact on the distribution or status of the moth. Currently, however, ragwort is still a common and sometimes abundant plant on waste ground and field systems.

5.12 The other significant species is the yellow-faced bee *Hylaeus dilatatus*. This Red Data Book 3 species has expanded its range in recent years and may be downgraded in the upcoming status review of bees and wasps (due 2019). The species nests in dead 'pithy' stemmed plants such as bramble and umbellifers and forages from a range of open flowers including ragwort and other yellow composites (*Asteraceae*).

5.13 The other species recorded from the surveys are widespread and common species found on a range of habitats.

6 ASSESSMENT SUMMARY

Site A assessment

6.1 Site A is a comparatively small woodland composed of two, near-connecting units in the centre of the landholding. The landholding includes industrial landfill operations and in redundant areas, post-industrial land including scrub, waterbodies and early successional mosaics have developed.

6.2 The woodland possesses deadwood (both fallen and standing) and is utilized by typical deadwood species of such features as noted from the survey. The deadwood also has the potential to possess a much broader suite of species than the single visit could sample for. The other typical woodland habitats, such as shaded woodland floor, is likely to be an inhibited fauna as the woodland does not possess a significant woodland flora or ground cover. Where flora is present, it is dominated by ferns and bracken. The shrub layer includes both non-native and native species including elder, though this is not the dominant scrub layer species, but the structural complexity of the shrub layer is limited and is reflected in the types of invertebrates recorded from the survey. These are common and ubiquitous species of woodlands and other habitat types.

6.3 There are two interlinked issues that affect the overall value and likely potential of the woodland. These are the isolation of the woodland from others and the effect that fragmentation has on species, and the result of being surrounded by industrial land. Being a small unit of woodland exposes the wood to significant edge effects, namely light penetration, disturbance and encroachment from coarse grasses.

6.4 Site A is therefore inhibited by both its limited size and the situation it is in, being influenced by the external industrial activities. As a consequence, the woodland is unlikely to be of high significance to the local area.

Site B assessment

6.5 Site B is the larger of the two sites. It is a series of fields bounded by hedgerows and trees. The field to the west of the landholding access track is mainly bare ground with a narrow wildflower margin and track around some of the perimeter. The two fields to the east of the access track are ley fields dominated by ruderals and common perennial flowers.

6.6 The species list includes a range of invertebrates typical of the local area and those of such habitats. It includes a range of ground-nesting bees and wasps that will utilize the fields for nesting and foraging. There is also a suite of plantbugs and beetles that feed on the plants within these fields.

6.7 There are two features that stand out on site B. These are the bare ground and short turf present across all fields and the extensive patches of common flowering plants, again across all fields but with greatest density across the two fields to the east of the access track.

6.8 Site B broadly possesses features similar to other areas of the landholding that were previously surveyed in 2015. These are bare ground and perennial flowers. It is therefore suggested that a number of those species recorded previously could also be present within this matrix of fields, including the beewolf (*Philanthus triagnulum*), other bees and wasps and surface-running beetles and bugs.

Site evaluation

6.9 There are few nationally significant and other high-fidelity species associated with the two surveyed sites. Only one genuinely scarce species was recorded from site B and this species, *Hylaeus dilatatus*, is likely to be downgraded owing to the frequency at which it is now being recorded. However, Site B does possess features that suggest that other, perhaps genuinely scarce species could be recorded should further survey work be undertaken.

6.10 Site A, however, is a small woodland with significant external effects pressurizing it but with some management to further increase the deadwood, it could increase in value despite the pressures exerted upon it.

6.11 The valuation of the sites takes into consideration the range of species recorded or could be recorded, including any scarce species, the overall assemblages and the importance of the habitats present at each site to each scarce species' continued existence in the local area. By using the experience of the surveyor, his knowledge of invertebrates and a site assessment, also by consulting the guidance notes prepared by Colin Plant Associates for the Chartered Institute of Environmental Managers and Ecologists (Appendix III), it is suggested that Site A and B's key features should be considered of Local (low) importance (Plant, 2009).

7 RECOMMENDATIONS

7.1 The success of any mitigation for loss of part or all of either site's key features will be dependent on incorporating the following habitats and features in juxtaposition with one another and creating features that are both extensive and optimal.

7.2 All invertebrate-related mitigation should be undertaken on low-fertility soils. Only peripheral ruderal areas can be created on nutrient-rich topsoil.

Open mosaics

7.3 The presence of an open mosaic resource within the proposed development footprint is the feature that is likely to have the most high-fidelity species associations. The creation of new, high-quality features will provide a valuable habitat for a range of species and add to the overall value of any development at the site.

7.4 It is important that all the features that comprise the mosaic be in close proximity to one another and be in an optimal state. This will be relatively easily achieved when utilizing nutrient-poor subsoils.

7.5 The open mosaics should be exposed to full sun for much of the day, including the key period between 10:00 and 16:00hrs.

7.6 The mosaic should be made up of bare ground and flowery turfs (both tall and short perennials) and should approximate to (50%) bare ground and (50%) vegetation cover. The material used can be mixed and the use of on-site materials may be appropriate. The ground surface can be uneven, with divots and shallow depressions. This varied microtopography is an important feature as it increases the value of the mitigation. Overworking of the material should be avoided as this tends to result in an even surface, which is undesirable for invertebrate mitigation.

Perennial flowering swards

7.7 Any designated mitigation or temporarily retained areas could be sown with an appropriate mix of perennial flowers to complete any bare ground mosaics created or retained as part of the ongoing development work at the site. Species such as the following, which are all present on the site or in its vicinity, would be a suitable composition in a mix:

- common bird's-foot trefoil (*Lotus corniculatus*)
- hawkweeds (*Hieracium spp*.) and other yellow composites
- meadow vetchling (*Lathyrus pratensis*)
- other trefoils (*Fabaceae*)
- red clover (*Trifolium pratense*)
- vetches (*Vicia spp*.)
- wild carrot (*Daucus carota*)

- woundworts (*Stachys spp*.)

Woodland

7.8 Owing to the external influences on the woodland, increasing its value will be problematic and always inhibited. However, to maximize the woodland's potential, a greater volume of deadwood and other senescent resources could be created. This can be done through any annual woodland management.

7.9 Retention of all felled wood should be left in as large a volume as possible within the woodland. Felling does not have to be taken to stump level; monoliths of a safe height (anything above 2 metres would be ideal) can be created to enhance the woodland's profile and potential for deadwood invertebrates.

8 REFERENCES

Alexander, K.N.A. (2014) A Review of the Beetles of Great Britain: The Soldier Beetles and Their Allies. Species Status No. 16. Natural England Commissioning Reports, Number 134.

Alexander, K.N.A. and Denton, J.S. (2014) A Review of the Beetles of Great Britain: The Darkling Beetles and Their Allies. Species Status No. 18. Natural England Commissioning Reports, Number 148.

Anon. (2008) Acalypterate Keys. Unpublished test keys. Dipterists Forum.

Ball, S. (2005) Hoverfly Recording Scheme. www.hoverfly.org.uk

Bantock, T. (2016) A Review of the Hemiptera of Great Britain: The Shield Bugs and Their Allies. Species Status No. 26. Natural England Commissioning Reports, Number 190.

d'Annis Fonseca, E.C.M. (1978) Diptera Orthorrhapha Brachyycera – dolichopodidae. Royal Entomological Society of London, London.

Drake, C.M. et al. (2007) NERR005. Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation. Natural England, Peterborough.

Falk, S. (2015) Field Guide to the Bees of Great Britain and Ireland. British Wildlife Publishing.

Hubble, D.S. (2014) A Review of the Scarce and Threatened Beetles of Great Britain: The Leaf Beetles and Their Allies. Species Status No. 19. Natural England Commissioning Reports, Number 161.

Plant, C. (2009) Invertebrates and Ecological Assessment. http://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/SoSM/Colin_Plant_-_Invertebrates.pdf

Richards, O.W. (1980) Scolioidea, Vespoidea and Sphecoidea. Hymenoptera, Aculeata. Royal Entomological Society.

Shirt, D.B. (1987) British Red Data Books: 2. Insects. Nature Conservancy Council, Peterborough.

Stubbs, A.E. (2002) British Hoverflies. British Entomological and Natural History Society.

Stubbs, A.E. and Drake, M. (2001) British Soldierflies and Their Allies. British Entomological and Natural History Society, Wokingham.

Sutton, P. (2015) A Review of the Orthoptera (Grasshoppers and Crickets) of Great Britain: Species Status No. 21. Natural England Commissioning Reports, Number 187.

Telfer, M.G. (2016) A Review of the Beetles of Great Britain: Ground Beetles (Carabidae): Species Status No. 25. Natural England Commissioning Reports, Number 189.

APPENDIX E4.I: RED DATA BOOK DEFINITIONS

Red Data Book category 1 (RDB 1) – Endangered

Species that are known or believed to occur as only a single population within one 10 km square of the National Grid.

Red Data Book category 2 (RDB 2) – Vulnerable

Species declining throughout their range or in vulnerable habitats.

Red Data Book category 3 (RDB 3) – Rare

Species that are estimated to exist in only 15 or fewer post-1970 10-km squares. This criterion may be relaxed where populations are likely to exist in over 15 10-km squares but occupy small areas of especially vulnerable habitat.

Nationally Notable (Scarce) category A (NS A) – Notable A

Taxa that do not fall within the RDB category but that are nonetheless uncommon in Great Britain and thought to occur in 30 or fewer 10 km squares of the National Grid or, for less well-recorded groups, between eight and 20 vice counties.

Nationally Notable (Scarce) category B (NS B) – Notable B

Taxa that do not fall within the RDB category but that are nonetheless uncommon in Great Britain and thought to occur in 31–100 10-km squares of the National Grid or, for less well-recorded groups, between eight and 20 vice counties.

Nationally Notable (Scarce) (N) – Notable

Species that are estimated to occur within the range of 16–100 10-km squares. The subdividing of this category into Notable A and Notable B has not been attempted for many species in this part of the review.

APPENDIX E4.II: INTERNATIONAL UNION FOR CONSERVATION NATURE (IUCN) DEFINITIONS

REGIONALLY EXTINCT (RE) A taxon is Extinct when there is no reasonable doubt that the last individual has died. In this review, the last date for a record is set at 50 years before publication.

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.

ENDANGERED (EN) A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered.

VULNERABLE (VU) A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable.

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 of 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.

APPENDIX E4.III: CRITERIA FOR DEFINING INVERTEBRATE SITES OF SIGNIFICANCE. TAKEN FROM PLANT (2009)

Importance	Description	Minimum qualifying criteria
International (high) importance	European important site (i.e. SAC)	Internationally important invertebrate populations present or containing RDB 1 (Endangered) species or containing any species protected under European legislation or containing habitats that are threatened or rare at the European level (including, but not exclusively so, habitats listed on the EU Habitats Directive).
National (high) importance	UK important site (SSSI)	Achieving SSSI invertebrate criteria (NCC, 1989) or containing RDB 2 (Vulnerable) or containing viable populations of RDB 3 (Rare) species or containing viable populations of any species protected under UK legislation or containing habitats that are threatened or rare nationally (Great Britain).
Regional (medium) importance (for border sites, both regions must be taken into account)	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in south-east England	Habitat that is scarce or threatened in the region or that has, or is reasonably expected to have, the presence of an assemblage of invertebrates including at least 10 Nationally Notable species or at least 10 species listed as Regionally Notable for the English Nature region in question in the Recorder database or elsewhere or a combination of these categories amounting to 10 species in total.
County (medium) importance (for border sites, both counties must be taken into account)	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the county in question	Habitat that is scarce or threatened in the county and/or that contains, or is reasonably expected to contain, an assemblage of invertebrates that includes viable populations of at least five Nationally Notable species or viable populations of at least five species regarded as Regionally Scarce by the county records centres and/or field club.
District (low) importance	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the administrative district	A rather vague definition of habitats falling below county significance level, but which may be of greater significance than merely Local. They include sites for which Nationally Notable species in the range from one to four examples are reasonably expected but not yet necessarily recorded and where this omission is considered likely to be partly due to under-recording.
Local (low) importance	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the affected and neighboring parishes (except Scotland, where the local area may best be defined as being within a radius of 5 km)	Habitats or species unique or of some other significance within the local area.
Importance within the context of the site only (low importance)	–	Although almost no area is completely without significance, these are the areas with nothing more than expected 'background' populations of common species and the occasional Nationally Local species.

APPENDIX E4.IV: SURVEY RESULTS

Only species with a national status have been annotated. All others are common or local species.

Site A species list

Taxon	Vernacular name	Date first recorded	Status
Abax parallelepipedus	a ground beetle	25-Jun-18	–
Andrena bicolor	Gwynne's mining bee	25-Jun-28	–
Anobium fulvicorne	a wood-boring beetle	25-Jun-18	–
Anthocoris nemorum	a plantbug	25-Jun-18	–
Aphantopus hyperantus	ringlet	25-Jun-18	–
Athous haemorrhoidalis	a click beetle	25-Jun-18	–
Bombus lapidarius	large red-tailed bumble bee	25-Jun-18	–
Bombus sylvestris	a bumblebee	25-Jun-18	–
Bombus vestalis	a bumblebee	25-Jun-18	–
Choerades marginatus	a robberfly	25-Jun-18	–
Coenagrion puella	azure damselfly	25-Jun-18	–
Deraeocoris flavilinea	a plantbug	25-Jun-18	–
Dolichopus griseipennis	a dolyfly	25-Jun-18	–
Empis livida	a dancefly	25-Jun-18	–
Empis picipes	a dancefly	25-Jun-18	–
Empis stercorea	a dancefly	25-Jun-18	–
Episyrphus balteatus	a hoverfly	25-Jun-18	–
Eristalis tenax	a hoverfly	25-Jun-18	–
Favonius quercus	purple hairstreak	25-Jun-18	–
Grypocoris stysi	a plantbug	25-Jun-18	–
Hylaeus communis	common yellow-faced bee	25-Jun-18	–
Lygocoris pabulinus	a plantbug	25-Jun-18	–
Myathropa florea	a hoverfly	25-Jun-18	–
Neoascia tenur	a hoverfly	25-Jun-18	–
Neurigona pallida	a dolyfly	25-Jun-18	–
Ocydromia glabricula	a hybotid fly	25-Jun-18	–
Opomyza germinationis	a seedfly	25-Jun-18	–
Palloptera muliebris	a picture-winged fly	25-Jun-18	–
Panorpa communis	a scorpionfly	25-Jun-18	–
Pararge aegeria	speckled wood	25-Jun-18	–
Pemphredon lugubris	mournful wasp	25-Jun-18	–
Pieris brassicae	large white	25-Jun-18	–

Pieris napi	green-veined white	25-Jun-18	–
Platycheirus albimanus	a hoverfly	25-Jun-18	–
Psylliodes chrysocephala	a leaf beetle	25-Jun-18	–
Rhagio lineola	a snipefly	25-Jun-18	–
Rhagio scolopaceus	a snipefly	25-Jun-18	–
Rutpela maculata	a longhorn beetle	25-Jun-18	–
Scolopostethus thomsoni	a plantbug	25-Jun-18	–
Stomis pumicatus	a ground beetle	25-Jun-18	–
Syrphus ribesii	a hoverfly	25-Jun-18	–
Syrphus vitripennis	a hoverfly	25-Jun-18	–
Tricholauxania praeusta	a lauxanid fly	25-Jun-18	–
Volucella pellucens	a hoverfly	25-Jun-18	–
Xylota segnis	a hoverfly	25-Jun-18	–

Site B species list

Taxon	Vernacular name	Date first recorded	Status
Aglais urticae	small tortoiseshell	25-Jun-18	–
Altica lythri	a leaf beetle	25-Jun-18	–
Altica palustris	a leaf beetle	25-Jun-18	–
Andrena bicolor	Gwynne's mining bee	25-Jun-18	–
Andrena minutula	a mining bee	25-Jun-18	–
Anthonomus pedicularius	a weevil	25-Jun-18	–
Aphantopus hyperantus	ringlet	25-Jun-18	–
Bombus hortorum	small garden bumble bee	25-Jun-18	–
Bombus hypnorum	a bumblebee	25-Jun-18	–
Bombus lapidarius	large red-tailed bumble bee	25-Jun-18	–
Cantharis nigra	a soldier beetle	25-Jun-18	–
Chaetorellia jaceae	a fruitfly	25-Jun-18	–
Cheilosia vernalis	a hoverfly	25-Jun-18	–
Cheilosia vernalis	a hoverfly	25-Jun-18	–
Chloromyia formosa	a soldierfly	25-Jun-18	–
Chorisops tibialis	a solitary bee	25-Jun-18	–
Chorthippus brunneus	common field grasshopper	25-Jun-18	–
Chrysopa perla	a lacewing	25-Jun-18	–
Chrysopilus asiliformis	a snipefly	25-Jun-18	–
Chrysops relictus	a horsefly	25-Jun-18	–

Chrysotoxum bicinctum	a hoverfly	25-Jun-18	–
Chrysotus blepharosceles	a dolyfly	25-Jun-18	–
Chrysotus gramineus	a dolyfly	25-Jun-18	–
Closterotomus norwegicus	a plantbug	25-Jun-18	–
Coccinella septempunctata	seven-spot ladybird	25-Jun-18	–
Conops quadrifasciatus	a thick-headed fly	25-Jun-18	–
Crossocerus tarsatus	a digger wasp	25-Jun-18	–
Deraeocoris flavilinea	a plantbug	25-Jun-18	–
Deraeocoris ruber	a plantbug	25-Jun-18	–
Dioctria rufipes	a robberfly	25-Jun-18	–
Dolycoris baccarum	hairy shieldbug	25-Jun-18	–
Empis livida	a dancefly	25-Jun-18	–
Epistrophe grossulariae	a hoverfly	25-Jun-18	–
Episyrphus balteatus	a hoverfly	25-Jun-18	–
Eristalis arbustorum	a hoverfly	25-Jun-18	–
Eristalis tenax	a hoverfly	25-Jun-18	–
Eupeodes corollae	a hoverfly	25-Jun-18	–
Grypocoris stysi	a bug	25-Jun-18	–
Haematopota pluvialis	a horsefly	25-Jun-18	–
Halictus tumulorum	a mining bee	25-Jun-18	–
Hercostomus germanus	a dolyfly	25-Jun-18	–
Himacerus mirmicoides	a bug	25-Jun-18	–
Hylaeus dilatatus	a solitary bee	25-Jun-18	RDB3
Lasioglossum leucopus	a mining bee	25-Jun-18	–
Leptogaster cylindrica	a robberfly	25-Jun-18	–
Leptopterna dolabrata	a grassbug	25-Jun-18	–
Liocoris tripustulatus	a plantbug	25-Jun-18	–
Maniola jurtina	meadow brown	25-Jun-18	–
Meconema thalassinum	oak bush cricket	25-Jun-18	–
Megachile versicolor	a leaf-cutter bee	25-Jun-18	–
Melanostoma scalare	a hoverfly	25-Jun-18	–
Meligethes aeneus	common pollen beetle	25-Jun-18	–
Minettia rivosa	a lauxanid fly	25-Jun-18	–
Neoascia podagrica	a hoverfly	25-Jun-18	–
Nephrotoma quadrifaria	a cranefly	25-Jun-18	–
Nephrotoma scurra	a cranefly	25-Jun-18	–

Nomada flavoguttata	a cuckoo bee	25-Jun-18	–
Ochlodes sylvanus	large skipper	25-Jun-18	–
Oedemera lurida	a flower beetle	25-Jun-18	–
Oedemera nobilis	swollen-thighed beetle	25-Jun-18	–
Opomyza florum	a seedfly	25-Jun-18	–
Orthetrum cancellatum	black-tailed skimmer	25-Jun-18	–
Orthops campestris	a plantbug	25-Jun-18	–
Oxycera rara	a soldierfly	25-Jun-18	–
Pachygaster atra	a soldierfly	25-Jun-18	–
Pentatoma rufipes	red-legged shieldbug	25-Jun-18	–
Pieris brassicae	large white	25-Jun-18	–
Pieris napi	green-veined white	25-Jun-18	–
Plagiognathus arbustorum	a plantbug	25-Jun-18	–
Rhagonycha fulva	a soldier beetle	25-Jun-18	–
Rhopalus subrufus	a plantbug	25-Jun-18	–
Rutpela maculata	a longhorn beetle	25-Jun-18	–
Sphaerophoria scripta	a hoverfly	25-Jun-18	–
Stenotus binotatus	a plantbug	25-Jun-18	–
Syritta pipiens	a hoverfly	25-Jun-18	–
Terellia ruficauda	a fruitfly	25-Jun-18	–
Thereva nobilitata	a stilettofly	25-Jun-18	–
Tyria jacobaeae	cinnabar	25-Jun-18	S41 – research only
Urophora jaceana	a fruitfly	25-Jun-18	–
Urophora stylata	a fruitfly	25-Jun-18	–
Vanessa atalanta	red admiral	25-Jun-18	–
Xylota segnis	a hoverfly	25-Jun-18	–

ANNEX E5 - AMPHIBIANS

1 INTRODUCTION

1.1 This section sets out in detail the assessment undertaken to determine the presence, species assemblage and distribution of amphibians on the Site. References cited in the text are provided in full in the main document.

2 LEGAL PROTECTION

2.1 GREAT CRESTED NEWT

2.1.1 In England, Scotland and Wales, GCN are fully protected under the WCA, as amended by the Countryside and Rights of Way (CRoW) Act 2000. They are also protected under European legislation, being included on Schedule 2 of the Conservation of Habitats & Species Regulations, 2010. Taken together, this legislation makes it illegal, inter alia, to:

- Intentionally or recklessly kill, injure or capture a GCN.
- Damage or destroy habitat that a GCN uses for shelter or protection.
- Deliberately disturb a GCN when it is occupying a place it uses for shelter and protection.

2.1.2 These provisions apply to all life-stages of protected animals and in the case of amphibians, to both their terrestrial and aquatic habitats.

3 METHODS

3.1 DESK STUDY

3.1.1 TVERC provided one amphibian record, a smooth newt from Finmere railway cutting in 1985.

3.1.2 In May 2012, EPSL EPSM2011-3441C was granted by Natural England to clear the Site of amphibians. As part of the EPSL mitigation strategy, a receptor site was created in the southern part of the grassland to the west of the disused railway. Steel amphibian fencing was installed to create a barrier to movement back across the railway onto the Site. In total, 11 new ponds were created to add to the six already present to connect two extant populations.

3.1.3 An intensive trapping programme took place over 89 days between 20 May and 16 August 2013 resulting in the capture and translocation of 983 GCN, 1,328 smooth newts, 344 frogs and 426 toads. Most of the ponds on the Site were drawn down and filled in but progress stalled due to two consecutive periods of Administration.

3.1.4 This assessment is based on the results of the monitoring surveys undertaken in 2018, which comprised five waterbodies on the site and 17 in the receptor area. Of the five site ponds,

two were negative for GCN and were drawn down and filled in under the terms of the EPSL, two (Ponds 1 and 2) were proved positive for GCN and are taken forward in this assessment. The fifth pond is just outside the scheme boundary, it was negative for GCN but was surveyed due to proximity. The locations of all the waterbodies included in the assessment are shown on Figure E2.

3.2 HABITAT SUITABILITY INDEX (HSI) ASSESSMENT FOR GREAT CRESTED NEWTS

3.2.1 A quantitative measure of each waterbody for their suitability for breeding GCN was made using the HSI (Oldham *et al.*, 2000). Data collected for ten variables were used to evaluate the aquatic habitat, the surrounding terrestrial habitat and local pond density. The results were used to formulate a score that reflects overall habitat quality.

3.3 AQUATIC SURVEYS

Refuge Search

3.3.1 Margins and adjacent terrestrial habitat up to 10m were checked for the presence of stones, bricks and other rubble, planks, logs, etc., capable of being used for cover by amphibians. Where found, all such items were carefully lifted to scan beneath. After searching, each item was carefully returned to the original footprint.

Egg Search

3.3.2 A representative sample of the aquatic plants present was carefully examined for the presence of GCN eggs on each survey visit. Where suitable vegetation was limited or absent, egg-laying strips were placed in the margins. These comprise black plastic strips approximately 15-20mm wide and 500mm long, bound to garden canes in bunches of 5-10 with plastic-covered wire. The canes were sunk into the substratum so that the strips were floating freely below the surface. To minimise disturbance, no further searching was carried out in any waterbody once a single egg has been found. Unused egg-strips were all removed on the last visit.

Bottle-trapping

3.3.3 Bottle-traps were placed around the margins of both waterbodies at a density of 1 trap per 2m of accessible shoreline. Each was anchored using a garden cane. Each bottle-trap is constructed from a 2-litre plastic bottle, the top quarter of which has been cut off and inserted upside down into the remainder. The bottles are partially filled with water and set inverted, held at an angle of 45° with an air bubble always present. When set, they form a funnel through which a newt can readily swim but once inside, it is more difficult for the animal to find the exit. The locations of all traps were mapped on each visit and the times of setting and removal were recorded.

Netting

3.3.4 Daytime pond netting was carried out on at least one occasion at each pond to assess the abundance and diversity of aquatic invertebrates and to look for any newt larvae present.

3.5 SURVEY DATES & PERSONNEL

3.5.1 The aquatic surveys were carried out between 22 March and 23 May 2018 by Grant Berky Natural England survey licence number 2015-18417-CLS-CLS and an assistant.

4 RESULTS

4.1 WATERBODIES ON THE SITE

4.1.1 The survey dates and weather conditions are given in Table 1, the HSI results in Table 2, the bottle trapping results in Table 3 and the results of the egg search and details of other amphibians recorded in Table 4.

TABLE 1. SURVEY DATES AND WEATHER CONDITIONS.

Visit No.	Date	Average overnight temp 0C	Conditions
1	22.03.18	8	8/8 cloud, dry, F1 westerly breeze
2	05.04.18	11	3/8 cloud, dry, F1 south westerly breeze
3	18.04.18	10	0/8 cloud, dry, still
4	01.05.18	10	3/8 cloud, dry, still
5	10.05.18	10	4/8 cloud, dry, F1 westerly breeze
6	23.05.18	11	8/8 cloud, dry, F2 easterly breeze

TABLE 2. HSI SUITABILITY INDICES FOR EACH WATERBODY ON THE SITE.

Pond	Loc-ation	Pond area	Perm-anence	Water quality	Shade	Fowl	Fish	Pond count	Terr-estrial	Macro-phytes	SCORE
1	1	1	0.9	1	1	0.67	1	0.7	1	0.4	0.84 (excellent)
2	1	0.1	0.9	1	1	0.67	1	0.7	1	0.9	0.72 (good)
3	1	0.4	1	0.67	1	0.67	1	0.7	1	0.5	0.76 (good)

TABLE 3. NUMBER OF GCN BOTTLE-TRAPPED ON EACH VISIT.

Pond No	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
1	0	3	5	0	18	15
2	7	9	18	3	15	8
3	0	0	0	0	0	0
Peak count	7	12	23	3	**33**	23

TABLE 4. OTHER AMPHIBIANS FOUND IN EACH WATERBODY.

Waterbody No	GCN	Smooth newt		Frog		Toad	
	Eggs recorded	Adults (totals)	Eggs recorded	Adults	Spawn	Adults	Spawn
1	Yes	6	Yes	0	No	0	No
2	Yes	25	Yes	0	No	0	No
3	No	4	No	0	No	0	No

4.2 WATERBODIES IN THE RECEPTOR AREA

4.2.1 The survey dates and weather conditions are given in Table 5, the HSI results in Table 6, the bottle trapping results in Table 7 and the results of the egg search and details of other amphibians recorded in Table 8.

TABLE 5. WEATHER CONDITIONS DURING AMPHIBIAN SURVEYS.

Visit No.	Date	Average overnight temp 0C	Conditions
1	11.04.18	10	8/8 cloud, dry, still
2	19.04.18	11	7/8 cloud, dry, still
3	25.04.18	12	5/8 cloud, dry, F1 south westerly
4	01.05.18	10	3/8 cloud, dry, still
5	10.05.18	10	4/8 cloud, dry, F1 westerly breeze
6	23.05.18	11	8/8 cloud, dry, F2 easterly breeze

TABLE 6. HSI SUITABILITY INDICES FOR EACH WATERBODY: RECEPTOR AREA.

Pond No	Loc-ation	Pond area	Perm-emence	Water quality	Shade	Fowl	Fish	Pond count	Terr-estrial	Macro-phytes	SCORE
1	1	0.05	0.1	0.33	1	0.67	1	1	1	0.4	0.46 (poor)
2	1	0.4	0.5	0.67	1	0.67	1	1	1	0.9	0.78 (good)
3	1	0.9	0.9	0.67	1	0.67	1	1	1	0.5	0.84 (excellent)
4	1	0.05	0.5	0.67	1	1	1	1	1	0.5	0.62 (average)

Pond No	Loc-ation	Pond area	Perm-emence	Water quality	Shade	Fowl	Fish	Pond count	Terr-estrial	Macro-phytes	SCORE
5	1	0.05	1	0.67	1	1	1	1	1	0.5	0.66 (average)
6	1	0.05	1	0.67	1	1	1	1	1	0.7	0.69 (average)
7	1	0.05	0.9	1	1	1	1	1	1	0.7	0.71 (good)
8	1	0.05	1	1	0.6	1	1	1	1	0.4	0.64 (average)
9	1	0.05	0.5	0.33	1	1	1	1	1	0.5	0.58 (below average)
10	1	0.05	0.5	0.33	1	1	1	1	1	0.5	0.58 (below average)
11	1	0.2	0.9	1	1	1	1	1	1	0.9	0.83 (excellent)
12	1	0.2	0.9	1	1	1	1	1	1	1	0.84 (excellent)
13	1	0.05	1	1	1	1	1	1	1	0.7	0.72 (good)
14	1	0.05	0.5	1	1	1	1	1	1	0.5	0.65 (average)
15	1	0.05	0.5	1	1	1	1	1	1	0.7	0.67 (average)
16	1	0.2	0.9	1	1	1	1	1	1	1	0.84 (excellent)
17	1	0.05	0.9	1	1	1	1	1	1	0.9	0.73 (good)

TABLE 7. NUMBER OF GCN BOTTLE-TRAPPED ON EACH VISIT.

Pond No	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
1	0	1	0	0	5	1
2	0	19	26	3	19	17
3	6	31	21	2	29	17
4	0	0	4	0	0	3
5	0	5	1	0	6	0
6	2	12	3	0	0	0
7	0	2	2	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	1	0	0
11	0	27	12	8	12	8
12	0	5	6	1	2	0
13	6	20	9	4	7	9
14	0	3	9	1	11	2
15	2	14	6	4	9	3
16	0	4	0	0	4	2
17	4	16	2	14	9	4

TABLE 8. RESULTS OF THE EGG SEARCHES AND OTHER AMPHIBIANS FOUND IN EACH WATERBODY.

Waterbody No	GCN	Smooth newt		Frog		Toad	
	Eggs recorded	Adults (totals)	Eggs recorded	Adults	Spawn/ tadpoles	Adults	Spawn/ tadpoles
1	Yes	9	Yes	0	No	0	No
2	Yes	27	Yes	0	No	0	Yes
3	Yes	13	Yes	0	No	1	Yes
4	Yes	1	Yes	0	No	0	No
5	Yes	39	Yes	0	No	0	No
6	Yes	31	Yes	0	No	0	No
7	Yes	1	Yes	0	No	0	No
8	No	1	Yes	0	No	0	No
9	No	1	Yes	0	No	0	No
10	Yes	0	Yes	0	No	0	No
11	Yes	12	Yes	0	No	0	No
12	Yes	15	Yes	0	No	0	No
13	Yes	25	Yes	0	No	0	No
14	Yes	6	Yes	0	No	0	No
15	Yes	30	Yes	0	No	0	No
16	Yes	11	Yes	1	No	0	Yes
17	Yes	31	Yes	0	No	0	Yes

4.3 SURVEY CONSTRAINTS

4.3.1 There we no constraints that could have affected the data collection and subsequent evaluation of the results.

ANNEX E6 - REPTILES

1 INTRODUCTION

1.1 This section sets out in detail the surveys undertaken to determine the presence, species assemblage and distribution of reptiles on the site. References cited in the text are provided in full in the main document.

2 LEGAL PROTECTION

2.1 All four of the more widespread species of native reptiles, that is common lizard *Zootoca vivipara*, grass snake *Natrix natrix*, slow worm *Anguis fragilis* and adder *Vipera berus* are given partial protection under the WCA, which prohibits the intentional killing, injuring or taking of any of these species. There is no provision in the Act for licensing works that could give rise to an offence but it does provide a defence where the otherwise unlawful act can be shown to be the incidental result of a lawful operation and could not reasonably have been avoided. Permitted development or a development that has received planning permission is clearly a lawful activity but the law thus requires that a reasonable effort be made to avoid killing or injuring protected animals in the course of implementing this permission.

2.2 The habitats of rare reptile species are also protected under this Act but those of the common species listed above are not; these animals are also not protected from disturbance whilst occupying their habitat.

3 METHODS

3.1 DESK STUDY

3.1.1 TVERC provided single records for grass snake and common lizard from the Finmere Railway Cutting in 1981 and 1985 respectively.

3.1.2 Reptile surveys of the current Site, disused railway corridor and western grassland were undertaken by ESL in 2010 and 2016. Grass snake and common lizard were recorded on the railway corridor but not on the Site or western grassland.

3.2 DETECTION OF REPTILES USING ARTIFICIAL REFUGIA

3.2.1 The habitats on site were assessed for their potential to support reptiles. Suitable habitat comprises structurally-diverse vegetation and topography that supports good numbers of invertebrates open areas for basking (particularly on south-facing slopes) and denser patches that provide shelter from predators (Edgar *et al.*, 2010).

3.2.2 A total of 125 artificial refugia (0.5m² black corrugated bitumen sheets) were placed in the limited areas of suitable habitat across the site in order to determine the species assemblage

and distribution of any reptiles present (Gent & Gibson, 1998). Reptiles bask on top of the sheets and shelter beneath them as part of their thermoregulatory behaviour, absorbing heat both directly from the sun and by conduction from the sheet. The sheets were set out and left to 'bed in' for four weeks before the surveys commenced. Each sheet was inspected a minimum of seven times in weather conditions when any reptiles present could reasonably be expected to be active (English Nature, 1994). Additional, casual inspections were also made during other surveys. The distribution of survey sheets is shown on Figure E3.

3.3 DETECTION OF REPTILES USING DIRECT OBSERVATION

3.3.1 The 'direct observation' survey method was also employed on all visits to the site when passing through appropriate habitat. This involved walking slowly and quietly, watching and listening for animals or movement, particularly in sunny aspects at the interface between open and dense vegetation (HGBI, 1998).

4 RESULTS

4.1 No reptiles were recorded during any Site visit. The surveys were carried out between late May and early October. In all cases, weather conditions were conducive to survey with average overnight temperatures in excess of 5°C (Table 1).

TABLE 1. WEATHER CONDITIONS DURING REPTILE SURVEYS.

Visit No.	Date	Time of survey	Conditions
0	19.04.18	N/A	artificial refugia set out
1	23.05.18	11.00-13.30	2/8 cloud, dry, F2 easterly wind, circa 20°C.
2	30.05.18	11.00-13.00	4/8 cloud, dry, F1 south westerly breeze, circa 17°C
3	14.06.18	16.00-18.15	3/8 cloud, dry, F2 south westerly wind, circa 22°C
4	16.07.18	17.00-19.15	5/8 cloud, dry, F2 south westerly wind, circa 26°C
5	19.09.18	13.00-14.30	4/8 cloud, dry, F1 south westerly breeze, circa 20°C
6	26.09.18	11.00-15.00	3/8 cloud, dry, F1 westerly breeze, circa 22°C
7	04.10.18	15.00-17.30	4/8 cloud, dry, still, circa 22°C

Survey constraints

4.2 None.

ANNEX E7- BIRDS

1 INTRODUCTION

1.1 This section sets out in detail the assessment undertaken to identify the species assemblage of birds using the Site both in winter and summer. References cited in the text are provided in full in the main document.

2 LEGAL PROTECTION

2.1 The WCA protects all wild birds and their nests and eggs. Under this Act it is an offence to:

- Kill, injure or take any wild bird.
- Take, damage or destroy the nest of any wild bird while it is in use or being built.
- Take or destroy the egg of any wild bird.

2.2 Bird nesting sites are not themselves protected when not in use and the common species are not protected from disturbance whilst occupying their nest-sites. However, certain rare breeding birds, listed on Schedule-1 of the Act (e.g. barn owls *Tyto alba*), are also protected against disturbance whilst building a nest or on or near a nest containing eggs or young.

3 METHODS

3.1 DESK STUDY

3.1.1 TVERC provided one record for hobby within the SP63F 1km square from 1998.

3.1.2 Red kite and barn owl have both been recorded by ESL outside the Site close to Widmore Farm since 2010. Nine S41 Species of Principal Importance have been recorded by ESL at various locations within the Site since 2010: starling, song thrush, dunnock, reed bunting, linnet, bullfinch, yellowhammer, skylark and lapwing.

3.2 WINTERING BIRDS

3.2.1 Six visits were made to the Site to record and map specific bird groups (waders, wildfowl, birds of prey and notable passerine flocks) using standard CBC codes. Their activity was also noted (feeding, roosting and loafing/preening). Particular attention was given to arable fields within the Site and adjacent to the Site boundaries, all of which were scanned with binoculars from field corners. Equipment comprised binoculars and a telescope where required. The dates, times and weather conditions for each visit are given in Table 1.

TABLE 1. DATES, TIMES AND WEATHER CONDITIONS DURING WINTER BIRD VISITS.

Visit No.	Date	Times	Weather Conditions
1	11.12.17	12:00-14:30	Dry, fair, c.4°C, NW breeze
2	16.01.18	12:00-14:30	Dry, fair, c.0°C, no breeze
3	15.02.18	09:00-10:30	Dry, fair, c.7°C, still
4	13.03.18	08:30-10:30	Dry, cloudy, c.5°C, no breeze
5	12.09.18	08:00-10:00	Dry, fair, c.9°C, no breeze
6	15.10.18	15:00-16:30	Dry, sunny, c.22°C no breeze

3.3 BREEDING BIRDS

3.3.1 Six visits were made to the Site between mid-March and early July to record and map all birds seen or heard, using CBC species codes and activity symbols (Marchant, 1983). The survey times, dates and weather conditions on each breeding bird survey is given in Table 2.

TABLE 2. DATES, TIMES AND WEATHER CONDITIONS DURING BREEDING BIRD SURVEYS.

Visit No.	Date	Times	Weather Conditions
1	05.04.18	06:50 – 09:00	Dry, bright, 4°C, 2/8 cloud. No breeze
2	19.04.18	06:20 – 09:00	Dry, fine warm 18°C, 0/8 cloud. No breeze
3	04.05.18	06:25 - 09:00	Dry, fine warm 16°C, 2/8 cloud. No breeze
4	22.05.18	06:30 – 08:45	Dry, sunny, 1/8 cloud, 12°C. F2-3 N wind
5	30.05.18	06:00 – 08:40	Light rain then dry, 3/8 cloud, 13-15°C, F2 NE wind
6	15.06.18	06:00 – 08:45	Dry, sunny, 1/8 cloud, 12°C, F2 SW wind

3.4 SURVEY CONSTRAINTS

3.4.1 None.

4 RESULTS

4.1 WINTERING BIRDS

4.1.1 No flocks of lapwings or golden plover were recorded using the arable fields on the Site or adjacent fields during the winter visits. Two common snipe were flushed from the area of scrub around Pond 3. Red kites were seen on most visits over the active landfill.

4.2 BREEDING BIRDS

4.2.1 In total, 61 bird species were recorded using the Site during the six breeding bird survey visits. This included 11 species of Principal Importance (S41 species): lapwing, skylark, yellow wagtail, dunnock, song thrush, marsh tit, starling and linnet, bullfinch, yellowhammer and reed bunting. Ten are also Red List species (Eaton et al, 2015), while 13 are included on the Amber List; there is suitable breeding habitat for most of these species within the Site.

4.2.2 Two Schedule-1 bird species (those specially protected under the WCA) were recorded during the survey; red kite and fieldfare. Red kites were frequently seen, most often over the active landfill. This species in known to breed in the local area but has never been recorded breeding on the Site. Fieldfare is a rare breeding species in the UK and there is no suitable habitat on the Site.

4.2.3 An active rookery was present within the northern area of Finmere Plantation with approximately 70 nests counted in April 2018.

4.2.4 Tawny owl was the only nocturnal or crepuscular species noted during evening fieldwork.

4.2.5 The results are given in Table 3. The numbers of pairs of important species considered likely to breed on the Site are given in Table 4.

TABLE 3. TOTAL COUNTS FOR THE SITE DURING BREEDING BIRD SURVEY VISITS.

SPECIES	06/04/18	19/04/18	04/05/18	23/05/18	30/05/18	15/06/18
mute swan**	2	2	0	0	0	0
greylag goose**	6	8	4	9	13	3
teal**	12	8	0	1	0	0
mallard**	0	4	4	4	13	8
tufted duck	7	0	2	0	2	6
red-legged partridge	0	2	2	2	2	0
pheasant	4	1	3	4	5	2
little grebe	0	0	0	1	3	2
grey heron	0	0	0	1	1	0
RED KITE	1	1	0	4	5	4
sparrowhawk	1	0	0	0	0	0
buzzard	1	1	1	2	0	2
kestrel**	1	0	1	2	0	2
moorhen	1	2	2	4	2	2
coot	5	3	2	1	7	6
lapwing*	1	1	0	0	0	0
lesser black-backed	0	0	0	2	0	3

SPECIES	06/04/18	19/04/18	04/05/18	23/05/18	30/05/18	15/06/18
gull**						
stock dove**	2	3	4	5	1	6
woodpigeon	24	32	18	24	72	141
swift**	0	0	0	1	4	1
green woodpecker	1	0	1	1	1	0
great spotted woodpecker	0	1	0	1	2	1
skylark*	1	0	0	1	9	5
swallow	0	0	0	1	1	1
house martin**	0	0	0	0	0	1
yellow wagtail*	0	0	0	0	1	0
pied wagtail	0	0	0	1	1	0
wren	4	2	4	13	11	8
dunnock**	11	4	3	3	3	2
robin	12	9	8	8	12	9
blackbird	13	7	9	12	18	14
FIELDFARE*	1	0	0	0	0	0
song thrush*	0	1	1	1	3	0
mistle thrush*	0	0	0	0	1	0
reed warbler	0	0	0	0	1	0
blackcap	0	2	4	6	9	2
garden warbler	0	0	0	3	5	0
lesser whitethroat	0	0	0	0	1	0
whitethroat	0	2	2	3	1	3
chiffchaff	2	1	2	0	3	3
willow warbler**	1	2	1	0	3	2
long-tailed tit	1	3	3	3	6	4
blue tit	10	13	9	3	7	17
great tit	5	3	8	14	11	16
coal tit	0	1	1	1	0	0
marsh tit*	1	1	1	1	2	4
nuthatch	0	1	0	2	0	1
treecreeper	1	0	0	0	0	2
jay	0	0	0	1	0	0
magpie	1	1	5	1	4	3
jackdaw	2	4	14	16	15	55

SPECIES	06/04/18	19/04/18	04/05/18	23/05/18	30/05/18	15/06/18
rook	40	14	55	74	121	148
carrion crow	0	0	0	9	6	4
starling*	0	0	0	2	0	0
chaffinch	8	7	3	5	7	4
greenfinch	0	0	0	0	0	1
goldfinch	5	2	2	6	3	3
linnet*	1	1	1	11	3	6
bullfinch**	2	1	1	1	0	1
yellowhammer*	6	1	2	0	2	1
reed bunting**	3	0	0	0	0	0

KEY: Schedule 1 = CAPITALS, S41 Species = bold, Red List species = *, Amber List species = **

TABLE 4. THE NUMBERS OF PAIRS OF IMPORTANT SPECIES LIKELY TO BREED ON THE SITE.

SPECIES	LIKELY NUMBER OF BREEDING PAIRS
skylark*	3-4
yellow wagtail*	0 (likely passage bird)
dunnock	4-5
song thrush*	1-2
mistle thrush*	1 (possibly)
marsh tit*	1
linnet*	3-4 (semi-colonial)
bullfinch	1-2
yellowhammer*	1-2
reed bunting	1-2

KEY: S41 Species = bold, Red List species = *

ANNEX E8 - BATS

1 INTRODUCTION

1.1 This section sets out in detail the bat surveys undertaken at the Site. References cited in the text are provided in full in the main document. The results of the bat surveys are given together on Figure E4.

2 LEGAL PROTECTION

2.1 In England, Scotland and Wales, all species of bats are fully protected under the WCA, including by the Countryside and Rights of Way (CRoW) Act, 2000. They are also protected under European legislation, being included on Schedule 2 of The Conservation of Habitats & Species Regulations, 2010. Taken together, this legislation makes it illegal, inter alia, to:

- Intentionally or recklessly kill, injure or capture a bat.
- Deliberately disturb a bat when it is occupying a roost.
- Damage, destroy or obstruct access to a bat roost.

2.2 A bat roost is defined as being any structure or place that is used for shelter or protection and since it may be in use only occasionally or at specific times of year, a roost retains such designation whether the bats are present or not.

3 DESK STUDY

3.1 No bat roosts have ever been identified within the Site but the following species were identified using static ultrasound detectors within the boundary of the current scheme:

- Common pipistrelle (2005, 2010).
- Soprano pipistrelle (2005,2010).
- Noctule (2005, 2010).
- Brown long-eared bat (2005, 2010).

3.2 In addition, the following species have been recorded on land to the west of the disused railway:

- Daubenton's bat *Myotis daubentonii* (2005).
- Serotine *Eptesicus serotinus* (2005).
- Barbastelle *Barbastella barbastellus* (2010).

4 ROOST SURVEYS

4.1 METHODS

Foxley Fields Farm

4.1.1 A PRA of the bungalow at Foxley Fields Farm was undertaken for its suitability for use by roosting bats on 14 June, using the protocol described by Collins (2016). Aided where necessary by a powerful torch, ladders and close-focusing binoculars, a visual search was made both internally and externally of the building. Where accessible, roof timbers were scanned with a torch and holes and cracks within brickwork were examined. All undisturbed surfaces were inspected for evidence of past and present occupation by bats in the form of live animals, desiccated remains, droppings and urine or fur staining.

4.1.2 A dusk emergence watch was carried out on 14 June 2018 commencing at 21:00hrs and finishing at 23:30hrs (sunset: 21:25hrs). The weather conditions were suitable for the survey, being still and dry with an ambient temperature of c.18°C.

4.1.3 A dawn re-entry survey was carried out on 17 July 2018 from 03:00hrs until 05:30hrs (sunrise 05:07hrs). The weather conditions were suitable for the survey, being dry with a light, westerly breeze and an ambient temperature of 11°C.

Trees

4.1.4 A PRA of all trees on Site was undertaken on 16 July, as per the methods in the BCT Guidelines (Collins, 2016). Each tree was examined from the ground for Potential Roost Features (PRF) using close-focusing binoculars for features such as woodpecker holes, rot holes, cavities, snag ends and delaminating bark. Each suitable tree was then categorised using the criteria in Table 1, which has been adapted from BCT guidelines (Hundt, 2012, Collins, 2016).

TABLE 1 - CATEGORISATION OF TREES FOR POTENTIAL USE BY BATS BASED ON VISUAL ASSESSMENT FROM THE GROUND

Category	Description	Determinants
1	Confirmed bat roost.	The presence of bats has been confirmed.
2a	A tree with a high potential to support roosting bats.	The presence of bats has not been confirmed, but an experienced bat ecologist would not be surprised to find significant use by bats, e.g. a maternity roost, or use by low numbers of scarcer species, e.g. Barbastelle.
2b	A tree with a moderate potential to support roosting bats.	Significant bat use would not be expected but an experienced bat ecologist would not be surprised to find low levels of use, perhaps by individuals or <5 bats of the common species.
3	No/negligible potential to support roosting bats	An experienced bat ecologist would not expect to find any use by bats.

4.1.5 A dusk emergence watch on trees 1 and 2 was carried out on 16 July 2018, from 21:00hrs until 23:15hrs (sunset 21:16hrs). The weather conditions were suitable for the survey, being dry with a light south-westerly breeze and an ambient temperature of c.20°C.

4.1.6 A dusk emergence watch on Trees 3-5 was carried out on 17 July 2018, from 21:00hrs until 23:15hrs (sunset 21:15hrs). The weather conditions were suitable for the survey, being dry and still with an ambient temperature of c.18°C.

Personnel and Equipment

4.1.7 The surveys were undertaken by Grant Berky Natural England bat survey Class Licence Number 2015-12276-CLS-CLS (CL18) and two assistants. Surveyors were equipped with a combination of Anabat Walkabout detectors and Gen 2 night-vision equipment and kept in contact with 2-way radios.

4.2 RESULTS

Foxley Fields Farm

4.2.1 The bungalow is constructed of brick and breeze blocks under pitched roofs covered in clay tiles on bituminous felt (Photograph 1). There are no soffits or fascia boards. Internally, the roof comprises modern timber trusses. Bat access into the loft space is possible through missing ridge tiles, lifted tiles around the chimneys and gaps where the timber meets the wall at eaves level.

4.2.2 Fifteen brown long-eared bats were seen roosting at a junction of the ridge beams (Photograph 2). The floor of the roof void was covered in thousands of bat droppings both fresh and historic, indicating a long history of occupation.

Photograph 1. Bungalow.

Photograph 2. Cluster of brown long-eared bats on ridge

4.2.3 Fourteen brown long-eared bats were recorded emerging from the bungalow during the dusk emergence watch. The bats emerged from beneath a lifted tile adjacent to a chimney in the

north-eastern pitch of the roof. The pattern of dispersal was south long the mature hedgerow, which runs south of the property and north along the access track hedgerow.

4.2.4 16 brown long-eared bats were recorded entering the bungalow via the same lifted tile during the pre-dawn re-entry survey. The predominant flight lines were the same as those observed during the emergence watch.

Trees

4.2.5 Five trees were considered to have significant potential for use by roosting bats and were allocated Category 2a. The results of the PRA of trees is given in Table 2.

TABLE 2. CATEGORISATION OF TREES FOR POTENTIAL USE BY BATS BASED ON VISUAL ASSESSMENT FROM THE GROUND.

Tree No	Features	Category
1	Dead tree with hollow north western stem with wood pecker hole at 7m facing east.	2a
2	Semi-mature oak with a hole in the base of a missing bough on southern trunk at 5.5m.	2a
3	Mature ash. Major rot in stem with multiple rot holes and minor wood pecker attack, lifted bark.	2a
4	Semi-mature oak. Major lateral fissures in southern bough at 6.5m.	2a
5	Mature ash with multiple rot holes in stem with a cavity behind base of missing branch.	2a

4.2.6 No bats were recorded emerging from any of these trees.

5 ACTIVITY SURVEYS

5.1 METHODS

Static detectors

5.1.1 In order to evaluate bat activity at the Site, Anabat Express automated static ultrasound recorders were left to run overnight for between four and six consecutive nights per month from May to September, a time of year when bats are most active. The detectors were programmed to switch on 20 minutes before sunset and left to run all night, switching off 10 minutes after sunrise.

Analysis of acoustic data

5.1.2 Anabat sound files were analysed using Kaleidoscope 4.1.0a software loaded with UK classifiers for species identification. Post-analysis, the datasets were screened manually by an experienced technician and calls considered most likely to have been misclassified, for example due to call convergence with closely related European species not (yet) known to

occur in the UK, were carefully re-classified based on known species distributions, habitat associations and call characteristics. *Myotis* calls were so few that they were pooled together. Noise files, unidentified single calls and call fragments were omitted from the analysis.

5.2 RESULTS

5.2.1 The passive acoustic surveys revealed use of the Site by bats of four species, which were identified confidently to species level. The most frequently encountered were common pipistrelles, followed by soprano pipistrelle, noctule and brown long-eared bat.

5.2.2 With the exception of barbastelle, which was not recorded in 2018, the species assemblage using the Site and the overall activity levels are comparable with previous surveys. Now as then, bat activity remains highest along boundary features, which, with the exception of Finmere Plantation, enclose a large area of otherwise sub-optimal habitat for bats.

5.2.3 Assigning a geographic scale of importance to individual species using the Site using data derived from acoustic sampling is problematic as the numbers of individuals present cannot be determined with any degree of accuracy. However, acoustic data can be used to estimate the proximity of potential roost sites based on the time of bat calls relative to sunset and sunrise and to evaluate bat use of a habitat type based on the number of bat calls per unit of time and take the result as a proxy for importance. The number of bats calls generated during the surveys was sufficiently low that descriptive accounts of use by each species is sufficient to assess their importance.

5.2.4 Bat activity levels in operational areas and over the arable fields away from hedgerows was very low (often <15 bat passes per night) and limited to use by common pipistrelles. The lack of activity can be attributed to a combination of unproductive foraging opportunities (effort versus reward) and an open, exposed landscape lacking in acoustic markers for echolocating favoured by 'edge' habitat species that use the Site.

Common pipistrelles

5.2.5 Common pipistrelles were the most frequently encountered species and were recorded on all nights in all habitat types. There was no pattern in the times of the calls to indicate the presence of a roost on the Site but one or more roosts are likely in the local area. Common pipistrelles are the most common bat species in the UK and are great generalists, capable of exploiting all habitat types.

Soprano pipistrelles

5.2.6 Soprano pipistrelles were the second most recorded species and activity levels were higher around Finmere Plantation and the eastern hedgerows. Again, there was no pattern in the

times of the calls to indicate the presence of a roost on the Site but one or more roosts are likely in the local area.

Noctule bats

5.2.7 Noctule bats were recorded infrequently and most often within the first 30 minutes after sunset, although often without corresponding calls before the following sunrise. This suggests bats are emerging from a roost, flying over the Site and returning another way. No feeding buzzes were recorded, indicating noctules make little if any use of the Site for foraging. Noctules are an open-habitat species and do not depend upon linear landscape features in way the edge-species like pipistrelles do.

Brown long-eared bats

5.2.8 Brown long-eared bats are a common and widespread species but are often under recorded in acoustic surveys due to their low amplitude calls. The degree to which the Site is important often has to be inferred based on known habitat preferences and whether these habitats are present on the Site. Brown long-eared bats are typically a closed-habitat species, favouring woodlands and more enclosed, cluttered habitats (for example, Finmere Plantation, which is 150m west of the roost at Foxley Fields Farm) where they prey on moths.

5.2.9 Very low numbers of *Myotis* calls were also recorded. There can probably be attributed to Daubenton's bat (recorded on previous surveys in low numbers) and/or whiskered bat *Myotis mystacinus*.

ANNEX 9 - BADGERS

NOT TO BE RELEASED INTO THE PUBLIC DOMAIN

1 INTRODUCTION

1.1 This section sets out in detail the results of the badger survey. References cited in the text are provided in full in the main document.

2 LEGAL PROTECTION

2.1 Badgers are fully protected by the PBA, which subsumed all previous legislation covering this species. This Act makes it an offence, inter alia, to:

- Wilfully kill, injure or take, or attempt to kill, injure or take, a badger.
- Interfere with a badger sett by doing any of the following things, intending to do any of these things or being reckless as to whether one's actions would have any of these consequences:
    - Damaging a badger sett or any part of it.
    - Destroying a badger sett.
    - Obstructing access to, or any entrance of, a badger sett.
    - Disturbing a badger when it is occupying a badger sett.

2.2 A badger sett is defined in the Act as any structure or place which displays 'recent' signs indicating use by a badger. The term 'recent' is not specified and although a sett may be empty at a certain time, it may be used as part of a regular cycle throughout the year and may therefore become active again at any time. Under certain conditions, activities which could otherwise give rise to an offence may be licensed by Natural England.

2.3 If a disturbance-only licence is issued, it is now common for the badgers to be left in-situ and not excluded from the sett (by gating). A sett that can be shown to be disused (by an experienced ecologist) would fall outside the Act and no licence or special precautions would then be required.

3 METHODS

3.1 DESK STUDY

3.1.1 TVERC provided five badger records, all from the Finmere Railway Cutting, spanning the period 1983 to 1990, plus what appears to be road traffic casualty on the A421 from 2003.

3.1.2 In 2005, Bioscan recorded an active main sett in the railway corridor and a disused main sett in Finmere Plantation.

3.1.3 Between 2008 and 2015, ESL has undertaken numerous surveys of the current site plus, on occasion, the railway corridor and adjacent fields to the west as far as Widmore Farm.

3.1.4 In 2008, the disused sett in Finmere Plantation was occupied by rabbits and by 2010 was partially infilled with soil and leaves (no active setts have ever been recorded in Finmere Plantation). In 2010, two four-hole setts were found 50m south of the main sett; one active annexe sett in the railway corridor and the other a disused subsidiary sett in the small block of woodland opposite. A disused one-hole sett was recorded in the eastern section of Grassy Plantation.

3.1.5 By 2015, the main sett on the railway comprised at least 14 holes, fresh spoil piles and discarded bedding. A new two-hole sett was found in a 20m x 20m trial hole that was excavated in the north western corner of the grassland to the west of the main railway sett in 2015 (the 'sandpit' sett). A clear pathway linked it back to main sett. Finally, in 2015, a badger was recorded on a trail camera 150m southwest of Widmore Farm. This is over 600m northwest of the main sett and could indicate the presence of a different social group, perhaps in Mixbury Plantation.

3.2 FIELD SURVEY

3.2.1 The Site and accessible adjacent land was searched for field signs indicating the presence of badgers, including setts, dung pits, pathways, paw prints, hairs and feeding signs such as snuffle holes and scratched logs. Sett types are categorised in Table 1 using characteristics from Harris, et al (1994). Additional field signs were recorded on subsequent site visits.

TABLE 1. CATEGORIES OF BADGER SETT.

Sett Type	Characteristics
Main	Typically used by one social group. Multiple holes, high levels of activity including large spoil heaps, obvious pathways and fresh latrines. Normally in constant use and when used for breeding, may have evidence of bedding.
Annexe	Often within 150m of a main sett and connected by well-worn pathways. Normally active with several holes (up to eight), although with some holes displaying less signs of activity.
Subsidiary	Often at least 50m from a main sett with an average of four holes. No obvious pathways and not continuously active.
Outlier	Usually consists of a single or double holes, often with little spoil and no obvious pathways linking them to other setts. Only used sporadically and often taken over by foxes and rabbits.

4 RESULTS

4.1 The main sett on the disused railway line remained very active throughout 2018 and by October, had *at least* 18 holes, fresh spoil, bedding and latrines. Well defined pathways run north and south along the railway and west through the grassland towards the 'sandpit' sett, which now has four active holes, fresh spoil and bedding.

4.2 The old main sett recorded in Finmere Plantation by Bioscan in 2005 has naturally infilled.

4.3 The three one-hole outlier setts recorded as being in current use when the Preliminary Ecological Appraisal was undertaken in November 2017 had all been abandoned by June 2018, with no further signs of activity during subsequent monthly surveys up to mid-October 2018.

4.4 The results of the badger survey are shown on Figure E5.

Survey Constraints

4.5 By late 2018, the vegetation on the disused railway close to the main sett and running south of it was almost impenetrable. As a result, the main sett may be larger than has been recorded to date and may extend further south.

Summary

4.6 Since surveys began in 2005, badger activity has been greatest on the disused railway and land to the west. Activity on the Site has always been limited to occasional 1-hole outlier setts that do not appear to be used for very long and are quickly abandoned. In most cases, these 1-hole setts can probably be attributed to immature animals from the railway corridor social group. However, the 1-hole sett in the tree belt along the A421 is a long way from the main sett and could indicate the presence of a different social group on land north of the A421. This would tie in with the record provided by TVERC for the road traffic casualty on the A421 from 2003.

4.7 The pattern of activity from 2005 to 2018 indicates that the badgers are settled and well established on the disused railway corridor with any territorial expansion westwards, where there are better opportunities for foraging and sett creation and less disturbance.

ANNEX 10 – PRELIMINARY ECOLOGICAL APPRAISAL

ecological services

ESL (Ecological Services) Ltd, 1 Otago House, Allenby Business Village, Crofton Road, Lincoln LN3 4NL

Tel: 01522 539325 **Fax:** 01522 539782 **Email:** enquiries@esl-lincoln.co.uk **Web:** www.ecologicalservicesltd.com

PRELIMINARY ECOLOGICAL APPRAISAL:

FINMERE QUARRY, OXFORDSHIRE

FINAL

NOVEMBER 2017

DOCUMENT CONTROL

TITLE:	Preliminary Ecological Appraisal: Finmere Quarry, Oxfordshire
VERSION:	Final
DATE:	November 2017
ISSUED BY:	Brian Hedley MCIEEM CEnv, Dave Hughes MCIEEM
CHECKED BY:	John Pover
APPROVED BY:	Dave Hughes

ISSUED TO:

Danny Miller
AT Contracting & Plant Hire Ltd
Colinton House
Leicester Road
Bedworth
Warwickshire
CV12 8AB

John Hollister BA (Dual Hons) MA MRTPI MCIWM CEnv
Head of Planning (Minerals and Waste)
AECOM
Royal Court
Basil Close
Chesterfield
Derbyshire
S41 7SL

.

Contents **Page**

FIGURES

PRELIMINARY ECOLOGICAL APPRAISAL: FINMERE QUARRY, OXFORDSHIRE

1 INTRODUCTION

1.1 ESL (Ecological Services) Ltd has been commissioned by AT Contracting & Plant Limited to undertake a Preliminary Ecological Appraisal (PEA) of land at Finmere Quarry, Oxfordshire, in order to enable Oxfordshire County Council to provide a screening opinion under The Town and Country Planning (Environmental Impact Assessment) Regulations, 2017.

1.2 This report provides an objective assessment as to whether proposed development at the site could result in a likely significant effect on either:

- any site with statutory or non-statutory protection for nature conservation located within or near to the proposed application area, and,
- any protected, important or sensitive species of flora or fauna that use habitats on or near the proposed application area.

1.3 Where any significant effects are considered likely, the report provides a proposed scope of work to inform the preparation of the Ecology Chapter of an Environmental Impact Assessment.

1.4 The term 'site' is used to describe the area of land to be covered by the planning applications (typically referred to as the 'red line' boundary). There are habitats within the site that will not be directly affected by development and mobile species adjacent to the site that could. The PEA will consider such situations as and when they are likely to occur.

1.5 Species recorded on the site are referred to by their English names throughout the text. Where a species mentioned in the text was recorded off-site or was not recorded during the surveys (e.g. the desk study), the scientific name is also given. English and scientific names of higher plants are given according to Stace (2010). A species list for the site is given as Appendix 1.

2 OVERVIEW

2.1 The Finmere complex has been the subject of mineral extraction, processing and landfill operations for decades. The site is dynamic and comprises a range of habitats including broadleaf woodland, hedgerows, tree-belts and arable farmland, together with active and capped landfill cells, clay borrow pits, large areas of bare ground and a minerals recovery facility. The site is bounded to the north by the A421, to the east and south by farmland, and to the west by the defunct LNER corridor, recently proposed as the route for HS2.

3 IDENTIFICATION OF IMPORTANT ECOLOGICAL FEATURES

3.1 In accordance with CIEEM guidance (2016), a combination of desk study results, previous survey information dating back 12 years and a series of recent site walkovers have been used to identify important ecological features associated with the site. These features, identified by virtue of their scarcity, sensitivity, or legal status, have then been evaluated in terms of the likelihood of them being affected by the development proposals and thus, defining the scope of work for further detailed assessment.

3.2 Species and habitats that are sufficiently widespread and those that are likely to be unaffected or are resilient to any development impacts are not classified as important ecological features and will be scoped out of the assessment.

4 DESK STUDY

4.1 METHODS

4.1.1 The Natural England 'Nature on the Map' and JNCC websites were consulted to determine the proximity of any internationally important sites, including Special Areas of Conservation (SAC) and Special Protection Areas (SPA), to the site in order to determine the potential for any likely significant effect. Thames Valley Environmental Records Centre (TVERC) was asked to provide information relating to any internationally protected sites, citations of any Sites of Special Scientific Interest (SSSI) or National Nature Reserves (NNR) within 5km of the site and details of Local Nature Reserves (LNR) and Local Wildlife Sites (LWS) within 2km of the site. Records of any protected or notable species within 2km were also requested. These include Species of Principal Importance listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006 (Formerly UK BAP species) and Oxfordshire Biodiversity Action Plan (BAP) species. The Natural England 'Magic' website was consulted in order to obtain information relating to any European Protected Species licences that have been issued within 2km of the site.

4.2 RESULTS

Statutorily Protected Sites

4.2.1 The nearest internationally protected site is Oxford Meadows, a Special Area of Conservation (SAC) 26km southeast of the site designated for its Annex 1 Habitat: a traditionally managed lowland hay meadow. The type of development being proposed will not result in a likely significant effect on this site.

4.2.2 The closest nationally important site for nature conservation is Tingewick Meadows Site of Special Scientific Interest (SSSI), approximately 1.8km to the southeast. This site is one of

the last remnants of old meadow in North Buckinghamshire and is important for its unimproved neutral grassland and fen communities. There are no additional SSSIs, NNRs or LNRs within 5km of the site.

Non-Statutorily Protected Sites

4.2.3 TVERC provided details of one LWS within 2km of the application site; Spilsmere Woods, approximately 1.1km to the southwest. This is an ancient woodland site with oak, ash, aspen *Populus tremula* and coppiced hazel. The type of development being proposed will not result in an adverse effect on this site.

4.2.4 The site does not fall within any Oxfordshire Conservation Target Area (CTA), the nearest being Tusmore and Shelswell Park CTA approximately 1.9km to the southwest.

Records of Statutorily Protected Species or those with a Nature Conservation Designation provided by TVERC

4.2.5 TVERC provided single records for grass snake *Natrix natrix* and common lizard *Zootoca vivipara* from the Finmere Railway Cutting between 1981 and 1985 respectively. Both these species are for S41 Species of Principal Importance.

4.2.6 TVERC hold no bat records for the area of search, but provided five records of badger (all from the Finmere Railway Cutting) spanning the period 1983 to 1990. Badgers are strictly protected under the Badgers Act, 1992.

4.2.7 TVERC provided a 1998 record of hobby *Falco subbuteo*, red kite and barn owl *Tyto alba* within 1km of the site. All three species are listed on Schedule-1 of the Wildlife and Countryside Act, 1981 (and as amended).

Statutorily Protected Species or those with a Nature Conservation Designation previously recorded by ESL

4.2.8 ESL has undertaken a wide range of surveys on the site and land to the west of the disused railway to inform planning applications in 2005, 2010 and 2015. The presence of great crested newt *Triturus cristatus* and common toad *Bufo bufo* was recorded outside the current application area and on land at Widmore Farm, west of the disused railway. Great crested newt is a European Protected Species under the Conservation of Habitats and Species Regulations, 2010, and both species are designated Species of Principal Importance under Section 41 of the LERC Act, 2010.

4.2.9 No bat roosts have been located within the site, but the following species have been identified using static ultrasound detectors, both within the site and on land to the west of the disused railway: Daubenton's bat *Myotis daubentonii* (2005), serotine *Eptesicus serotinus* (2005), common pipistrelle *Pipistrellus pipistrellus* (2005, 2010), noctule *Nyctalus noctula* (2005, 2010), soprano pipistrelle *Pipistrellus pygmaeus* (2005,2010), brown long-eared bat *Plecotus auritus* (2005, 2010) and barbastelle *Barbastella barbastellus* (2010). All UK bats are

European Protected Species and soprano pipistrelle, brown long-eared bat, noctule and barbastelle are also S41 Species of Principal Importance.

4.2.10 Badgers were confirmed during the 2005 surveys and a main sett was located outside the application site on the disused railway corridor (this was still active during November 2017). Due to their protected status and mobile habits, badger activity is monitored regularly. A number of other mammals were recorded, including brown hare *Lepus europaeus*, which is a Species of Principal Importance.

4.2.11 Red kite and barn owl have both been recorded by ESL outside the application site close to Widmore Farm since 2010. Nine S41 Species of Principal Importance have been recorded by ESL at various locations within the site since 2010: starling, song thrush, dunnock, reed bunting *Emberiza schoeniclus*, linnet, bullfinch, yellowhammer, skylark and lapwing *Vanellus vanellus.*

Natural England European Protected Species Licence (EPSL)

4.2.12 There have been three EPSLs issued for bats within 2km of the site; two close to Gravel Farm, 400m east of the site at the nearest point, for development affecting brown long-eared bat and Natterer's bat *Myotis nattereri* in 2011-2012, and one EPSL for common pipistrelle, brown long-eared bat and Natterer's bat in 2011-2013. In addition, an EPSL was issued to a site in Little Tingewick 1km northeast of the site for work affecting common pipistrelle and brown long-eared bat for the period 2009-2011. In 2013, an EPSL was granted for work affecting great crested newts at the Finmere site.

5 EXTENDED PHASE-1 HABITAT SURVEY

5.1 METHODS

5.1.1 The whole site and accessible adjacent land was walked over during the daytime. Plant communities were characterised by identifying the dominant and typical species within each area of the site (JNCC, 2010), taking the constraints of the time of year into account. A search was also made for invasive plant species such as Japanese knotweed. Habitats were assessed for their potential to support species of conservation interest and relevant field signs were mapped. Casual notes were also made of birds and mammals seen or heard during the walkover.

Timings and Personnel

5.1.2 The walkover was undertaken over 13/14 November 2017 by David Hughes MCIEEM and Brian Hedley MCIEEM, CEnv.

Survey Constraints

5.1.3 The walkover was undertaken in November, a time of year when species that could be present or which make use of the site might not be in evidence. The issue of seasonality is accounted for in the proposed scope of work, which also draws on fieldwork undertaken in all seasons over the previous 12 years and is therefore considered sufficiently robust.

5.2 RESULTS

5.2.1 The Finmere site comprises a mosaic of habitats often with no clear lines of delineation on the ground. For clarity, the site is described using a system of Target Notes with representative photographs, starting in the northwest and working around the site in a clockwise direction. The Target Notes are best read in conjunction with the habitat map given as Figure 1.

5.2.2 **TN1.** A strip of mixed plantation around 10-20m wide that appears to be around 20-30 years old, running the full length of the northern boundary parallel to the A421 (Photograph 1). The plantation comprises a diverse variety of trees and shrubs including oak, ash, hybrid black poplar, sycamore, alder, beech, Scot's pine, larch, whitebeam, way-faring tree, spindle, hornbeam and wild cherry. The ground flora is poor and is dominated by common nettle, Yorkshire-fog, various mosses, ground-ivy, cleavers and broad-leaved dock. The plantation provides good habitat connectivity east to west along the A421 for a range of species and is likely to provide a dark and sheltered corridor for commuting and foraging bats. Only a few trees that pre-date the planting have potential for roosting, the remainder are too young. The plantation is suitable for a range of nesting birds in season. There is an active one-hole badger sett mid-way along.

Photograph 1. Mixed plantation along the northern boundary parallel to the A421 viewed from the mid-way point looking north (TN1).

Photograph 2. Typical view across the open fields towards the northern boundary parallel to the A421 (TN2).

5.2.3 **TN2.** Three arable fields with cereal stubble at the time of survey (Photograph 2). All three comprise frequent arable 'weeds', especially to the margins, with typically dominant species including scentless mayweed, annual meadow-grass, bristly oxtongue, spear thistle, various

willowherbs, prickly sow-thistle and common field-speedwell. Less frequent plants included many-seeded goosefoot, field pansy, marsh cudweed and scarlet pimpernel. The site entrance off the A421 has a short, neatly-trimmed hedgerow of dogwood with ornamental species present either side. The road continues south towards the site office and has a narrow grassland strip present to the eastern side that supports mature ash, sycamore and pedunculate oak, some with bat roost potential.

5.2.4 **TN3.** The northern and eastern part of the site contains a number of hedgerows delineating field boundaries and different ownerships. Most are accompanied by post-and-rail fences and dry ditches, none of which has potential for use by water voles. Those close to paths are managed more frequently than those elsewhere, which are more grown out. The dominant species include hawthorn, blackthorn, field maple and elder, with occasional ash and pedunculate oak standards (some mature). In general, the hedgerows are likely to provide habitats for a range of species, including invertebrates, birds, bats and badgers. The hedgerows within the site tend to comprise shorter sections and lack the continuity of those along the site boundaries, especially to the east.

5.2.5 **TN4.** This large area comprises a landfill cell, most of which has been capped and seeded (Photograph 3). Dominant species comprise perennial rye-grass with red fescue and Yorkshire-fog. Patches of ruderal vegetation also occur, particularly along the base of the slopes where spear thistle, creeping thistle, ragwort, bristly oxtongue and prickly sow-thistle are present. The grassland is well established and is suitable for use by open habitat species such as skylark.

5.2.6 The southern part of the landfill is still operational and comprises bare earth with patches of ruderal vegetation that support a fairly species-rich mix of native, naturalised and alien species such as various willowherbs, docks, common nettle, creeping thistle, spear thistle, bristly oxtongue, coltsfoot, creeping bent, scentless mayweed and black medick. Other species included butterfly-bush, montbretia, South American verbena, great lettuce and purple loosestrife, plus occasional young trees/scrub.

Photograph 3. Seeded and capped landfill from the south (TN4).

Photograph 4. Attenuation pond (TN5).

5.2.7 **TN5.** In the north-eastern part of the capped landfill area is what appears to be a large attenuation pond set in seeded grassland (Photograph 4). The pond is triangular in shape, 400mm deep with clear water. The species present are likely to have colonised naturally and include patches of bulrush, soft rush, jointed rush, thread-leaved water crowfoot, water purslane and water forget-me-not. The pond is likely to support a range of common invertebrates and is suitable for use by amphibians.

5.2.8 **TN6.** A large landfill cell, engineering complete and ready to receive waste and of no ecological value.

5.2.9 **TN7.** A single arable field (currently with cereal stubble) with frequent arable 'weeds', mainly to the margins, that include black nightshade, wild radish, spear thistle, prickly sow-thistle, scentless mayweed, many-seeded goosefoot, fool's-parsley and marsh cudweed (Photograph 5). The field has a continuous mature hedgerow to the south, east and north. As elsewhere, the hedgerow is dominated by hawthorn and blackthorn with field maple, elder, way-faring tree, dog-rose, goat willow, gorse, elm and wild privet. Interspersed are mature pedunculate oak and ash standards, some with bat roost potential and all with nesting bird potential. Damp ditches with frequent great willowherb are present alongside all these hedgerows, although none has potential for use by water voles due to their lack of width and the shallow depth of water, the presence of which is likely temporary. There is a pond on private land 50m to the east of the eastern site boundary. The pond is totally shaded by hawthorn, blackthorn and willow scrub, but if it holds water in spring it has the potential for use by breeding amphibians.

Photograph 5. View across the open arable field west to east (TN8).

Photograph 6. The Minerals Recycling Facility (TN10).

5.2.10 **TN8.** A large active area. The northern part comprises a borrow pit from which clay was excavated prior to its use in lining and capping the landfill cells. The southern area comprises a stockpile of overburden, stored clay and a second clay borrow pit. The borrow pits and stockpiles are dynamic areas that are continually changing in response to operational requirements. Rainwater is pumped out on a regular basis and is discharged off-site under an Environment Agency permit. There is insufficient time for any species of conservation interest to become established and these areas are of no ecological value.

5.2.11 The site boundary hedgerows in this area are all fairly similar and are dominated by hawthorn and blackthorn with wild privet, hazel, elder, elm, field maple and dog-rose, together with occasional ash and pedunculate oak standards, some with bat roost potential. Shaded, dry ditches run parallel to the hedgerows, none with potential for use by water voles.

5.2.12 **TN9.** The aggregates processing plant site. A large, raised, dynamic area in a constant state of change, devoid of vegetation and of no ecological value. An active main badger sett is present outside the application area on the disused railway beyond the north-eastern boundary. The sett is buffered from the aggregate processing area by a tall embankment and will not be impacted by work.

5.2.13 **TN10.** Finmere Plantation. Two small areas of woodland dominated by mature pedunculate oak and ash over patches of rhododendron, hawthorn and elder. Ground flora was limited at the time of the survey, but the northern woodland is known to support bluebells in spring. There are numerous trees with bat roost potential and use by nesting birds can be expected in season. Rabbits now occupy an old four-hole sett not used by badgers since before 2005.

5.2.14 **TN11.** The Mineral Recovery Facility (MRF) (Photograph 5). A large, modern, metal-framed, sheeted industrial building standing within a large concrete storage yard, all enclosed within a high fence. The building was partially destroyed by fire in 2013 and has been disused since. Ruderal vegetation comprising great willowherb, great horsetail, coltsfoot and bristly oxtongue is becoming established along the fence line. The building has potential for use by a narrow range of breeding bird species in season, but has no other ecological value.

5.2.15 **TN12.** This part of the site has undergone the least amount of change in recent years and has been largely neglected. It comprises four extant waterbodies that were cleared of amphibians during a translocation under an EPSL in 2013, a mosaic of redundant silt lagoons (remnants of historic sand and gravel processing), patches of self-set willow and birch scrub, ruderal vegetation, the tarmac road to the MRF and temporary haul roads between operational areas. Seasonally wet areas support species such as hard rush, soft-rush, common reed, greater pond-sedge, great willowherb, bulrush, water mint, marsh horsetail and gypsywort. Drier areas support ruderal vegetation, with dominant species including coltsfoot, spear thistle, creeping thistle, Canadian fleabane, black medick, scentless mayweed and various mosses and lichens. Two active one-hole badger setts are present in embankments.

5.2.16 In October 2017, following a series of meetings between representatives of High Speed Two (HS2) Limited and the new site owner, a joint mitigation strategy was proposed in order to facilitate a mutually beneficial solution to address any constraints posed by great crested newts on both the proposed work on the wider Finmere Quarry site and the construction of the HS2 railway. The aim is to have resolved any issues and agreed (and possibly implemented) appropriate mitigation measures prior to the submission of the Environmental Statement. If this has not been achieved, then the standard approach will be followed and any effects on great crested newts will be evaluated during the preparation of the ES.

5.2.17 **TN13.** The western site boundary comprises the edge of a small triangular area of mature beech woodland at the southern end and an unmanaged hawthorn/bramble-dominated hedgerow running north, following the line of the disused railway until it meets the western end of the young plantation described in TN1. The entire hedgerow provides excellent habitat for a range of scrub nesting bird species.

5.2.18 **TN14.** A new landfill cell under construction and with no ecological value.

6 EVALUATION OF ECOLOGICAL FEATURES AND IDENTIFICATION OF POTENTIAL EFFECTS

6.1 POTENTIAL EFFECTS ON STATUTORY AND NON-STATUTORY SITES

6.1.1 It is considered highly unlikely that the proposed development would result in a likely significant effect on any internationally protected site, or have any adverse effect on any site with statutory or non-statutory protection for nature conservation.

6.2 POTENTIAL EFFECTS ON HABITATS OR SPECIES OF CONSERVATION INTEREST

6.2.1 The important ecological features for this site (i.e. those that are both of high significance in a stated geographical context and with potential to be affected by the proposed works) are shown in Table 1. Plant communities are assessed both in terms of their intrinsic value and as habitat for those protected species whose habitat is also specifically protected, and for species of nature conservation concern, which are particularly associated with them.

TABLE 1 - IMPORTANT ECOLOGICAL FEATURES

Ecological feature	Comments
Hedgerows	All native hedgerows qualify as S41 Habitats in recognition of their value to wildlife.
Trees	Some trees on site provide roosting opportunities for bats and nesting opportunities for breeding birds in season.
Great crested newt	Listed on Wildlife and Countryside Act. European Protected Species and S41 Species of Principal Importance.
Common toad	S41 species of Principal Importance.
Badgers	Protection of Badgers Act, 1992.
Bats	Listed on Wildlife and Countryside Act. European Protected Species and S41 Species of Principal Importance.
Birds	Listed on Wildlife and Countryside Act. S41 Species of Principal Importance.
Reptiles	Listed on Wildlife and Countryside Act. S41 Species of Principal Importance.
Invertebrates	Potential for S41 Species of Principal Importance.

7 PROPOSED SCOPE OF WORK TO INFORM THE ENVIRONMENTAL STATEMENT

7.1 The following programme of further surveys will be undertaken:

- Further botanical survey in spring and summer to accurately characterise the habitats present, evaluate the floristic diversity and conservation interest on the site, and inform the restoration plan.
- Sample suitable and accessible waterbodies for a suite of amphibian e-DNA and follow up with aquatic surveys as necessary to determine the species present and the likely populations.
- Assess all trees on site for potential use by roosting bats and undertake emergence watches as necessary to determine the species, number and status of bats present.
- Undertake bat activity surveys to determine species assemblage and identify key foraging areas and commuting routes.
- Continue the badger monitoring surveys.
- Carry out a reptile survey of key habitats using a combination of artificial cover objects (tins) and direct observation.
- Undertake a breeding bird survey using the Common Bird Census (CBC) method.
- Carry out an invertebrate assessment of the site with follow up surveys of key areas as necessary.

7.2 Unless they are recorded during the suite of surveys above or unless further information comes to light, the following protected species will be scoped out of the assessment:

- Dormice - no local records, not recorded in previous surveys, limited habitats on site.
- Water vole and otter - not recorded in previous surveys, no suitable habitats on site.

7.3 Each survey will be undertaken in the correct season for the species/group under consideration. The surveys will follow published guidelines, adopt recognised methodologies and adhere to best practice. Each survey will be carried out by trained and experienced ecologists holding relevant Natural England survey licences. The results will be analysed and interpreted in an objective manner. An assessment of effects on the important ecological features associated with the site will be undertaken in accordance with the CIEEM Guidelines for Ecological Impact Assessment (CIEEM, 2016). The subsequent Ecology Chapter will include measures to avoid, mitigate or compensate for any ecological effects and so increase and enhance the existing biodiversity value of the site.

6 REFERENCES

Beebee JC and Griffiths R 2000. *Amphibians and Reptiles*. Harper Collins, London.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2016), *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition.* CIEEM, Winchester

Collins J. (ed.) 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3rd edition.* The Bat Conservation Trust, London

Dean, M., Strachan, R., Gow, D., & Andrews, R. 2016. *The Water Vole Mitigation Handbook (The Mammal Society Guidance Series).* Eds. Fiona Matthews & Paul Chanin. The Mammal Society, London.

Edgar P, Foster J and Baker J. 2010. *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.

English Nature. 2001. *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

Harris S, Jefferies D, Cheeseman C and Booty C. 1994. *Problems with Badgers?* (3rd ed). RSPCA, Sussex.

JNCC. 2010. *Joint Nature Conservation Committee Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit (2010).* JNCC, Peterborough.

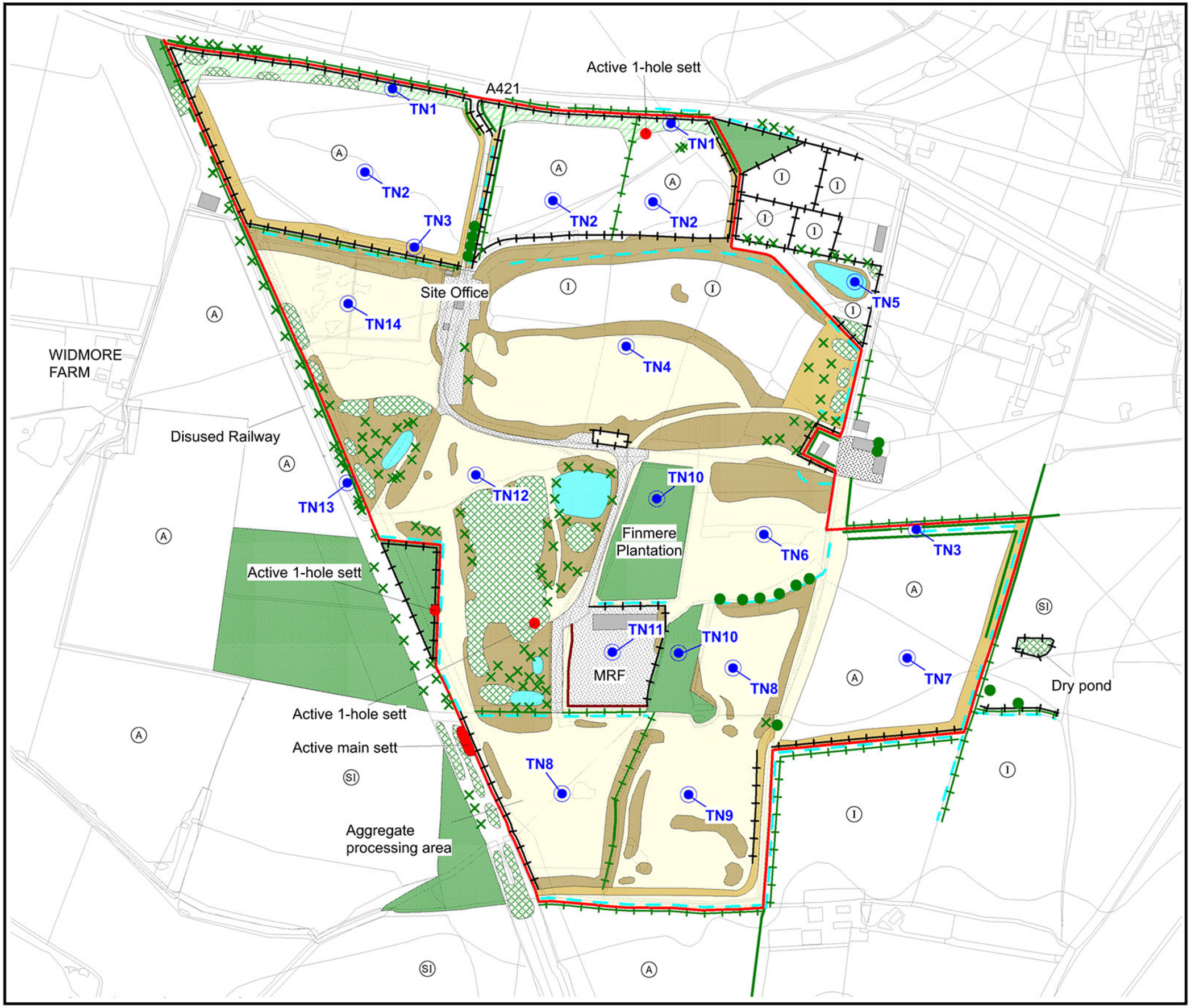
Stewart A, Pearman D A and Preston C D. 1994. *Scarce Plants in Britain*. JNCC, Peterborough.

Stroh, P. A., Leach, S. J., August, T. A., Walker, K. J., Pearman, D. A., Rumsey, F. J., Harrower, C. A., Fay, M. F., Martin, J. P., Pankhurst, T., Preston, C. D. & Taylor, I. 2014. A Vascular Plant Red List for England. Botanical Society of Britain and Ireland, Bristol.

Wigginton M J. 1999. *British Red Data Books. 1 Vascular Plants.* 3rd edition. JNCC, Peterborough.

Key

- Tree
- Scattered scrub
- Target note
- Badger sett
- (A) Arable
- (SI) Semi-improved grassland
- (I) Improved grassland
- Site boundary
- Hedgerow
- Gappy hedgerow
- Hedgerow with standards
- Gappy hedgerow with standards
- Dry/partly dry ditch
- Wall
- Fence
- Rough grassland/tall herbs
- Bare earth
- Waterbody
- Ruderal (wasteland-type) vegetation
- Older broadleaf woodland
- Mixed plantation
- Dense scrub
- Hard surface (concrete, tarmac, etc.)
- Building



SITE NAME:
Finmere Quarry.

DRAWING TITLE:
Habitat map.

Figure 1
Dwg no.: 97c-L288-002 Date: Nov 2017

esl (ecological services) limited

APPENDIX 1

SPECIES RECORDED AT FINMERE QUARRY,13-14 NOVEMBER 2017

SPECIES RECORDED AT FINMERE QUARRY, 13-14 NOVEMBER 2017

ENGLISH NAME	SCIENTIFIC NAME	DAFOR
PLANTS		
agrimony	*Agrimonia eupatoria*	R
alder	*Alnus glutinosa*	R
American willowherb	*Epilobium ciliatum*	F
annual meadow-grass	*Poa annua*	A
annual mercury	*Mercurialis annua*	O
ash	*Fraxinus excelsior*	F
barren brome	*Anisantha sterilis*	F
beaked hawk's-beard	*Crepis vesicaria*	O
beech	*Fagus sylvatica*	R
bittersweet	*Solanum dulcamara*	R
black horehound	*Ballota nigra*	R
black medick	*Medicago lupulina*	A
black nightshade	*Solanum nigrum*	F
black-bindweed	*Fallopia convolvulus*	R
blackthorn	*Prunus spinosa*	A
bracken	*Pteridium aquilinum*	O
bramble	*Rubus fruticosus*	A
bristly oxtongue	*Helminthotheca echioides*	A
broad-leaved dock	*Rumex obtusifolius*	A
broad-leaved pondweed	*Potamogeton natans*	O
broom	*Cytisus scoparius*	R
butterfly-bush	*Buddleja davidii*	O
Canadian fleabane	*Conyza canadensis*	F
caper spurge	*Euphorbia lathyris*	R
celery-leaved buttercup	*Ranunculus sceleratus*	O
charlock	*Sinapis arvensis*	F
cleavers	*Galium aparine*	A
clustered dock	*Rumex conglomeratus*	O
cock's-foot	*Dactylis glomerata*	F
cockspur	*Echinochloa crus-galli*	R
colt's-foot	*Tussilago farfara*	A
common bent	*Agrostis capillaris*	R
common centaury	*Centaurium erythraea*	O
common chickweed	*Stellaria media*	F
common couch	*Elytrigia repens*	F
common field-speedwell	*Veronica persica*	A
common fumitory	*Fumaria officinalis*	O
common mallow	*Malva sylvestris*	O
common mouse-ear	*Cerastium fontanum*	O
common nettle	*Urtica dioica*	A
common orache	*Atriplex patula*	O
common poppy	*Papaver rhoeas*	F
common ragwort	*Senecio jacobaea*	F
common reed	*Phragmites australis*	O
common vetch	*Vicia sativa*	O
common whitebeam	*Sorbus aria*	R
cow parsley	*Anthriscus sylvestris*	F
crab apple	*Malus sylvestris*	O
creeping bent	*Agrostis stolonifera*	F
creeping buttercup	*Ranunculus repens*	A
creeping thistle	*Cirsium arvense*	A
curled dock	*Rumex crispus*	O
cut-leaved crane’s-bill	*Geranium dissectum*	O

ENGLISH NAME	SCIENTIFIC NAME	DAFOR
PLANTS cont..		
dandelion	*Taraxacum* sp	F
dog-rose	*Rosa canina*	O
dogwood	*Cornus sanguinea*	R
dove's-foot crane's-bill	*Geranium molle*	F
elder	*Sambucus nigra*	F
elm	*Ulmus* agg	O
European larch	*Larix decidua*	R
false brome	*Brachypodium sylvaticum*	F
false oat-grass	*Arrhenatherum elatius*	O
fat-hen	*Chenopodium album*	O
fennel pondweed	*Potamogeton pectinatus*	R
field forget-me-not	*Myosotis arvensis*	F
field horsetail	*Equisetum arvense*	O
field maple	*Acer campestre*	F
field pansy	*Viola arvensis*	O
field-rose	*Rosa arvensis*	R
flowering currant	*Ribes sanguineum*	R
fool's parsley	*Aethusa cynapium*	O
garden lobelia	*Lobelia erinus*	O
garlic mustard	*Alliaria petiolata*	F
germander speedwell	*Veronica chamaedrys*	O
glaucous sedge	*Carex flacca*	R
goat willow	*Salix caprea*	F
gorse	*Ulex europaeus*	R
great horsetail	*Equisetum telmateia*	R
great lettuce	*Lactuca virosa*	O
great mullein	*Verbascum thapsus*	R
great willowherb	*Epilobium hirsutum*	F
greater burdock	*Arctium lappa*	O
greater plantain	*Plantago major*	F
greater pond-sedge	*Carex riparia*	R
grey willow	*Salix cinerea*	F
ground-ivy	*Glechoma hederacea*	F
groundsel	*Senecio vulgaris*	F
guelder-rose	*Viburnum opulus*	R
gypsywort	*Lycopus europaeus*	O
hairy bitter-cress	*Cardamine hirsuta*	O
hard rush	*Juncus inflexus*	O
hawthorn	*Crataegus monogyna*	F
hazel	*Corylus avellana*	O
hedge bindweed	*Calystegia sepium*	O
hedge mustard	*Sisymbrium officinale*	O
hedge woundwort	*Stachys sylvatica*	O
hemlock	*Conium maculatum*	O
herb-Robert	*Geranium robertianum*	O
hogweed	*Heracleum sphondylium*	F
honeysuckle	*Lonicera periclymenum*	R
hornbeam	*Carpinus betulus*	R
hybrid black-poplar	*Populus* x *canadensis*	R
ivy	*Hedera helix*	F
jointed rush	*Juncus articulatus*	R
knotgrass	*Polygonum aviculare*	O
lesser burdock	*Arctium minus*	O
lime	*Tilia* x *europaea*	R
male-fern	*Dryopteris filix-mas*	R
many-seeded goosefoot	*Chenopodium polyspermum*	O

ENGLISH NAME	SCIENTIFIC NAME	DAFOR
PLANTS cont..		
marsh cudweed	*Gnaphalium uliginosum*	R
marsh horsetail	*Equisetum palustre*	O
marsh thistle	*Cirsium palustre*	R
michaelmas-daisy	*Aster sp*	R
montbretia	*Crocosmia crocosmiiflora*	R
mouse-ear-hawkweed	*Pilosella officinarum*	R
mugwort	*Artemisia vulgaris*	R
musk-mallow	*Malva moschata*	R
nipplewort	*Lapsana communis*	O
osier	*Salix viminalis*	O
peach	*Prunus persica*	R
pedunculate oak	*Quercus robur*	F
pellitory-of-the-wall	*Parietaria judaica*	R
pendulous sedge	*Carex pendula*	R
perennial rye-grass	*Lolium perenne*	A
perforate St John's-wort	*Hypericum perforatum*	O
petty spurge	*Euphorbia peplus*	O
prickly sow-thistle	*Sonchus asper*	A
purple toadflax	*Linaria purpurea*	R
rape	*Brassica napus*	O
raspberry	*Rubus idaeus*	R
red campion	*Silene dioica*	O
red clover	*Trifolium pratense*	O
red dead-nettle	*Lamium purpureum*	O
red fescue	*Festuca rubra*	A
redshank	*Persicaria maculosa*	O
ribbed melilot	*Melilotus officinalis*	O
ribwort plantain	*Plantago lanceolata*	F
rosebay willowherb	*Chamerion angustifolium*	R
rough chervil	*Chaerophyllum temulum*	R
rough meadow-grass	*Poa trivialis*	F
scarlet pimpernel	*Anagallis arvensis*	O
scentless mayweed	*Tripleurospermum inodorum*	A
Scots pine	*Pinus sylvestris*	R
selfheal	*Prunella vulgaris*	F
shepherd's-purse	*Capsella bursa-pastoris*	F
silver birch	*Betula pendula*	O
small nettle	*Urtica urens*	O
smooth hawk's-beard	*Crepis capillaris*	O
smooth sow-thistle	*Sonchus oleraceus*	O
smooth tare	*Vicia tetrasperma*	O
soft-brome	*Bromus hordeaceus*	F
soft-rush	*Juncus effusus*	F
South American vervain	*Verbena bonariensis*	R
spear thistle	*Cirsium vulgare*	A
spindle	*Euonymus europaeus*	R
spotted medick	*Medicago arabica*	O
square-stalked willowherb	*Epilobium tetragonum*	O
sticky mouse-ear	*Cerastium glomeratum*	R
sun spurge	*Euphorbia helioscopia*	O
sweet chestnut	*Castanea sativa*	R
sycamore	*Acer pseudoplatanus*	O
thyme-leaved speedwell	*Veronica serpyllifolia*	O
tufted hair-grass	*Deschampsia cespitosa*	O
Turkey oak	*Quercus cerris*	R
viper’s-bugloss	*Echium vulgare*	R
wall speedwell	*Veronica arvensis*	O
walnut	*Juglans regia*	R

ENGLISH NAME PLANTS cont..	SCIENTIFIC NAME	DAFOR
water figwort	*Scrophularia auriculata*	R
water mint	*Mentha aquatica*	R
wayfaring-tree	*Viburnum lantana*	R
weld	*Reseda luteola*	O
white bryony	*Bryonia dioica*	R
white campion	*Silene latifolia*	O
white clover	*Trifolium repens*	F
white dead-nettle	*Lamium album*	O
white willow	*Salix alba*	O
wild basil	*Clinopodium vulgare*	R
wild cherry	*Prunus avium*	R
wild privet	*Ligustrum vulgare*	O
wild strawberry	*Fragaria vesca*	O
wild teasel	*Dipsacus fullonum*	O
winter-cress	*Barbarea vulgaris*	O
wood avens	*Geum urbanum*	O
wood dock	*Rumex sanguineus*	O
wood small-reed	*Calamagrostis epigejos*	O
yarrow	*Achillea millefolium*	O
Yorkshire-fog	*Holcus lanatus*	A

KEY TO DAFOR

(An estimate of plant relative abundance at a site)

D	Dominant
A	Abundant
F	Frequent
O	Occasional
R	Rare

ENGLISH NAME BIRDS	SCIENTIFIC NAME	SITE	ADJACENT
Canada goose	*Branta canadensis*	✓	
mallard	*Anas platyrhynchos*	✓	
tufted duck	*Aythya fuligula*	✓	
red-legged partridge	*Alectoris rufa*	✓	
pheasant	*Phasianus colchicus*	✓	✓
little grebe	*Tachybaptus ruficollis*	✓	
red kite	*Milvus milvus*	✓	✓
buzzard	*Buteo buteo*	✓	✓
kestrel	*Falco tinnunculus*	✓	✓
moorhen	*Gallinula chloropus*	✓	
coot	*Fulica atra*	✓	
green sandpiper	*Tringa ochropus*	✓	✓
black-headed gull	*Larus ridibundus*	✓	✓
lesser black-backed gull	*Larus fuscus*	✓	✓
woodpigeon	*Columba palumbus*	✓	✓
green woodpecker	*Picus viridis*	✓	✓
skylark	*Alauda arvensis*	✓	✓
meadow pipit	*Anthus pratensis*	✓	
grey wagtail	*Motacilla cinerea*	✓	✓

ENGLISH NAME	SCIENTIFIC NAME	SITE	ADJACENT
BIRDS cont..			
pied wagtail	*Motacilla alba*	✓	✓
wren	*Troglodytes troglodytes*	✓	✓
dunnock	*Prunella modularis*	✓	
robin	*Erithacus rubecula*	✓	✓
blackbird	*Turdus merula*	✓	✓
song thrush	*Turdus philomelos*	✓	✓
fieldfare	*Turdus pilaris*	✓	✓
redwing	*Turdus iliacus*	✓	
goldcrest	*Regulus regulus*	✓	✓
long-tailed tit	*Aegithalos caudatus*	✓	✓
blue tit	*Cyanistes caeruleus*	✓	
great tit	*Parus major*	✓	✓
treecreeper	*Certhia familiaris*	✓	
jay	*Garrulus glandarius*	✓	✓
jackdaw	*Corvus monedula*	✓	✓
rook	*Corvus frugilegus*		✓
carrion crow	*Corvus corone*	✓	✓
starling	*Sturnus vulgaris*	✓	✓
chaffinch	*Fringilla coelebs*	✓	✓
greenfinch	*Carduelis chloris*		✓
goldfinch	*Carduelis carduelis*		✓
linnet	*Carduelis cannabina*	✓	✓
lesser redpoll	*Carduelis cabaret*		✓
bullfinch	*Pyrrhula pyrrhula*	✓	
yellowhammer	*Emberiza citrinella*	✓	✓

KEY TO BIRD STATUS
Bold = Schedule 1 species.
Red = S41 Species of Principal Importance.

MAMMALS			
mole	*Talpa europaea*		✓
rabbit	*Oryctolagus cuniculus*	✓	✓
grey squirrel	*Sciurus carolinensis*	✓	
bank vole	*Myodes glareolus*	✓	
fox	*Vulpes vulpes*	✓	✓
badger	*Meles meles*	✓	✓
roe deer	*Capreolus capreolus*	✓	✓
muntjac deer	*Muntiacus reevesi*	✓	✓