4 Natural heritage

Introduction

4.1 This chapter provides an ecological impact assessment of the proposed increase in housing numbers at the development on land south west of Bicester. The legal and policy framework for the assessment is summarised. A baseline description of the ecological interest is provided from interpretation of data that supported the 2006 environmental statement (the consented outline application) and further surveys undertaken in the period between 2006 and 2012. An evaluation is made of the ecological interest of the habitats and species on the site. Significant effects on these features are identified, mitigation and enhancement described and the residual effects quantified.

4.2 Since planning permission was granted for the scheme, Terence O'Rourke Ltd has undertaken a number of surveys at the site in relation to section 106 commitments and other planning applications such as Whitelands Farm. Given the changes in the site since the original surveys (commissioned in 2005), an update of the phase 1 and badger survey has also been undertaken to inform this assessment.

Legislation and policy

International designations and policy

4.3 In 1992 the European Union adopted Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, known as the Habitats Directive. The UK government-approved statutory regulations to implement the requirements of the Directive are The Conservation of Habitats and Species Regulations 2010 (the 'Habitats Regulations').

4.4 One purpose of the Habitats Regulations is (Regulation 41) to give special protection to a number of species, listed in Schedule 2 of the regulations, for which it is an offence to "*disturb"* the animals or "*damage or destroy* [a] *breeding site or resting place*". The exception is for the conservation of a Schedule 2 species, but only (Regulation 53) "*if there is no satisfactory alternative*" to the development proposal and the action "*will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range*".

4.5 The Habitats Directive and the European Union's Birds Directive (79/409/EEC) require member states to create a network of key sites for the conservation of certain habitats, plant species, bird species and other fauna. These sites, jointly known as European sites, comprise Special Protection Areas (SPA) for birds and Special Areas of Conservation (SAC) for plants, vegetation types and fauna other than birds.

National legislation and policy

4.6 The Wildlife and Countryside Act 1981 (as amended), or WCA, sets out the legal protection afforded to wild animals and plants in Great Britain, and requires the government to select sites of special scientific interest (SSSI) and protect them against potentially damaging operations. Most bird species are protected at all times from intentional killing and against intentional damage or destruction to the nest or eggs. All native reptile species are protected against intentional killing. Selected rare, vulnerable or declining animals listed on schedule 1 (birds) and schedule 5 (other animals) are additionally protected against disturbance at the nest (birds) or places used for shelter and protection (other animals).

4.7 The Countryside and Rights of Way Act 2000, known as the CROW Act, deals with some weaknesses in the WCA. Powers are provided to enforce appropriate management on SSSIs and provisions on 'reckless' disturbance to schedule 1 and 5 species strengthen the law against disturbance. The UK's position as a signatory to the 1992 Convention on Biological Diversity is given its first legal support through the requirement to maintain lists of priority habitats and species for biodiversity action plans (BAP), to have regard to biodiversity and for the Secretary of State to take measures to further the conservation of listed habitats and species and promote this to other authorities.

4.8 The Protection of Badgers Act 1992 is primarily animal welfare rather than nature conservation legislation, but has implications for developers. Both badgers and their occupied setts are protected, although there is a licensing procedure that enables animals to be excluded from the sett and the empty sett destroyed at certain times of the year.

4.9 *The National Planning Policy Framework (NPPF)* sets out government policy. The NPPF is accompanied by a circular: *Biodiversity and geological conservation: statutory obligations and their impact within the planning system (ODPM Circular 06/2005; DEFRA Circular 01/2005)*. Key principles include statements that*:* "*The planning system should contribute to and enhance the natural and local environment by: minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's Commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures, opportunities to incorporate biodiversity in and around developments should be encouraged and planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats*".

4.10 The circular notes that: "*The potential effects of a development on habitats or species listed as priorities in the UK BAP and by Local Biodiversity Partnerships…are capable of being a material consideration in…the making of planning decisions*".

4.11 The Cherwell Local Plan 2011 Revised Deposit Draft (July 2004) seeks to "*conserve and enhance the natural environment of the District including its ecological resource*". In addition to policy commitments to protect designated wildlife sites and legally protected species, policies EN22 and EN27 are relevant to the present development.

4.12 Policy EN22 states that: "*Development proposals will be expected to incorporate features of nature conservation value within the site. Features of value should be retained and enhanced wherever possible. The use of planning conditions and planning obligations will be sought to secure their protection and management, or the provision of compensatory measures where appropriate*".

4.13 Policy EN 27 states that: "*Development proposals should incorporate the creation of new habitats, particularly those concerning priority habitats or species, wherever possible. The Council will promote the interest of nature conservation within the context of new development and will establish or assist with the establishment of ecological and nature conservation areas, where such areas would further the opportunity for environmental education and passive recreation*".

4.14 The local plan considers hedgerows, woodlands and trees specifically in terms of their landscape character, but does "*welcome opportunities for countryside management projects where: (i) all important trees, woodland and hedgerows are retained; the ecological value of the site will be enhanced; … and (iii) new tree and hedgerow planting using species native to the area and of local provenance is encouraged and subsequently managed*" (Policy EN37).

Methodology

4.15 Current baseline conditions were established through new field surveys where works associated with the 2006 consented scheme have altered conditions on site. Information from monitoring associated with the section 106 agreement was also used to up-date the previous baseline. Institute for Ecology and Environmental Management (IEEM) guidance is used in the evaluation of features and assessment of the residual significance of effects.

4.16 The references and data sources used in the assessment are set out in table 4.1.

Biological records centres
Thames Valley Environmental Records Centre
Websites
Cherwell Biodiversity Action Plan – Species and Habitat Action Plans. www.cherwell-dc.gov.uk/leisure/biodiversity.cfm (Accessed 11/05)
English Nature – SSSI and European Site information. www.natureonthemap.org.uk (Accessed 2/8/05)
Oxfordshire Ornithological Society– Information on breeding birds. www.oos.org.uk/oxonlist.php (Accessed 29/7/05)
Oxfordshire Nature Conservation Forum – Information on Local Biodiversity Action Plan. www.oncf.org.uk (Accessed 2/8/05)
Oxfordshire amphibian and reptile group – Status of reptiles and amphibians in Oxfordshire. www.oxfordshire-arg.org.uk (Accessed 2/8/05)
Oxfordshire Wildlife and Landscape Study – Information on biodiversity and landscape types. www.owls.oxfordshire.gov.uk (Accessed 2/8/05)
Species of conservation concern- the national red, amber and green lists for birds. www.bto.org/birdtracks/bird-recording/red_list.htm (Accessed 11/05)
UK Biodiversity Action Plan – Species Action Plan information. www.ukbap.org.uk (Accessed 3/8/05)
Literature
BBOWT. 2000. Strategic Action plan for bats in Berkshire, Buckinghamshire and Oxfordshire. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust.
BBOWT. Un-dated. Water vole recovery project. Guide for landowners. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust.
Bioscan. 2004. Land at Whitelands Farm, Bicester. Ecological appraisal.
Bourn, N.A.D. & Warren, M.S. 2000. Species Action Plan. Small blue *Cupido minimus*. Butterflly Conservation.
BTO. 2002. The population status of birds in the UK: birds of conservation concern 2002-2007. British Trust for Ornithology.
Clarke, S.A. & Bourn, D. 2000. Butterfly Conservation Regional Action Plan: Thames Region. Butterfly Conservation.
English Nature. 1995. Badgers. Guidelines for developers. English Nature.
English Nature. Un-dated. The Thames and Avon Vale Natural Area Profile. English Nature
Faber Maunsell. 2004. Ecological Study. Whitelands Farm, Bicester.
HGBI. 1998. Evaluating local mitigation/translocation programmes: maintaining best practice and lawful standards. HGBI advisory notes for amphibian and reptile groups. Herpetofauna Groups of Britain and Ireland, c/o Froglife, Unpubl..
IEEM. 2005. Guidelines for Ecological Impact Assessment. Consultation Draft July 2005. Institute for Ecology and Environmental Management.
JNCC. 1989. Guidelines for the selection of biological SSSIs. Joint Nature Conservation Committee.
JNCC. 1990. Handbook for Phase 1 habitat survey: a technique for environmental audit. Joint Nature Conservation Committee.
Killick, J., Perry, R. & Woodell, S. 1998. Flora of Oxfordshire. Pisces Publications.
Mitchell-Jones A.J. 2004 Bat mitigation guidelines. Version: January 2004. English Nature
Rodwell J.S. 1991. British Plant Communities. Volume 1. Woodland and scrub. Cambridge University Press.
Rodwell J.S. 1992. British Plant Communities. Volume 3. Grasslands and montane communities. Cambridge University Press.
Rodwell, J.S. 1995. British Plant Communities. Volume 4. Aquatic communities, swamps and tall-herb fen. Cambridge University Press.
Rose F. 1999. Indicators of ancient woodland. The use of vascular plants in evaluating ancient woods for nature conservation. British Wildlife. Volume 10. No 4 pp241-251
Stace C. 1997. New flora of the British Isles. Second edition. Cambridge University Press
Wingfield Gibbons D, Reid J.B & Chapman R.A. 1993. The New Atlas of Breeding Birds in Britain and Ireland 1988-1991. 1993. T & A D Poyser

Table 4.1: References and data sources

Desktop study

4.17 No update of the previous desk-top survey was undertaken for this proposal. Given the continued monitoring of the site as part of the section 106 agreement, it was not considered necessary to repeat this search. The desk study undertaken as part of the 2006 outline planning application included a review of historic site surveys and an environmental records search, which provided information on statutory and non-statutory sites of nature conservation interest, protected and notable species within 1 km of the site.

Field surveys

Phase 1 and protected species surveys

4.18 Bioscan undertook an extended phase 1 and protected species survey in July 2004. Faber Maunsell undertook a walkover protected species survey over one day in August 2004. All habitat parcels were mapped and classified according to the phase 1 habitat classification (JNCC 1990) and target notes taken of representative habitats. Hedgerows were classified by Bioscan as species-rich if they held five or more woody species along the total length. Hedgerow features were surveyed in sufficient detail for important hedges, as defined under the 1997 Hedgerow Regulations, to be identified. Uninhabited buildings were searched from the ground in daylight hours for evidence of bat roosts. An evening transect survey was carried out for bat activity along the boundaries of one field in the west of the site. Evidence of badger *Meles meles* was searched for throughout the site and of water vole *Arvicola terrestris* and otter *Lutra lutra* along all watercourses.

4.19 Terence O'Rourke Ltd updated and supplemented the surveys over four days between April and July 2005. The phase 1 survey was repeated (figure 4.4) and habitats of interest were assigned to plant communities of the national vegetation classification (NVC; Rodwell 1991, 1992, 1995), which allows more precise evaluation of their nature conservation interest (JNCC 1989). The identification of NVC communities was made in the field and not confirmed by quadrat data. The wet fields in the north eastern corner of the site were resurveyed by Terence O'Rourke Ltd at the request of the County Ecologist during August 2006.

4.20 The phase 1 survey was updated in July 2012 to reflect the changes on site since the granting of planning permission (figure 4.5). Farming activity has ceased within the red line of the consented application and the creation of balancing ponds and new landscape planting has changed the baseline conditions on site. Vegetation monitoring of new habitats and established woodland on site was undertaken in 2011 as part of the monitoring associated with the section 106 agreement. The survey reports are included in technical appendix D.

Badger, otter and water vole

4.21 Badger and water vole surveys were carried out, with a concurrent survey for evidence of otter during the latter. Badger surveys have been carried out in 2007 and 2012 to monitor the status of the animals on site.

4.22 No evidence of water vole or otter was found during surveys in undertaken in 2005 or 2010. The 2010 survey took place prior to engineering work on the Pingle Brook. Given the lack of records from the site, no further survey work was undertaken in 2012.

Bats

4.23 Transect surveys across the site were made to record bat activity in July 2005 and hedgerow trees assessed for their potential to hold bat roosts. Whiteland Cottages (now demolished) were surveyed for signs of bat activity by ECOSA in November 2005. Following recommendations made after the first survey, emergence surveys were undertaken at the cottages in September 2006.

4.24 The buildings at Whitelands Farm were surveyed for evidence of bat roosts in 2011 as part of a separate planning application. Bat transect surveys within the red line of the consented scheme were undertaken in summer 2011 as part of monitoring associated with the section 106 agreement. No further survey work was undertaken in 2012, given the availability of recent field surveys.

Wall whorl snail

4.25 A survey for wall whorl snail *Vetigo pasilla* was carried out in August 2005. *Vetigo pusilla* has been recorded from the boundary wall of Bignell Park, which is immediately to the north west of the site. No evidence of wall whorl snail was recorded during the survey work. Given the absence of records of this species on site, no further survey work was undertaken in 2012.

Crayfish

4.26 A crayfish survey was carried out along Pingle Brook at the request of the Environment Agency in October 2005. The Pingle Brook was resurveyed for signs of crayfish activity in September 2006. The Environment Agency noted recent records of the alien signal crayfish *Pacifastacus leniusculus*, but none of the native Atlantic stream (white-clawed) crayfish *Austropotamobius pallipes*.

4.27 Surveys undertaken in 2006 confirmed the presence of signal crayfish in the Pingle Brook. Given the presence of this species in the watercourse, it is highly unlikely white-clawed crayfish will be present and no further survey work has been undertaken in 2012.

Birds

4.28 Birds were incidentally recorded during other surveys and assigned to categories of breeding evidence (Wingfield Gibbons *et al.* 1992).

4.29 A breeding bird survey was undertaken in the spring of 2011 as part of the ecological monitoring programme.

Butterflies

4.30 Butterflies, dragonflies and damselflies were also incidentally recorded during the 2005 survey work.

4.31 Butterfly monitoring transects were undertaken in the summer of 2011 as part of the monitoring commitment agreed through the section 106 of the outline planning application.

Great crested newts

4.32 Bicester has many great crested newt *Triturus cristatus* breeding ponds, but there are no ponds on the site. The provisions of the Habitats Directive have been interpreted as giving protection to habitats used in the terrestrial phase of great crested newts' life cycle, which can include land up to 500 m from breeding ponds. There was therefore the potential for great crested newt to be present on the site.

4.33 Between July 2005 and May 2006 ECOSA undertook a survey to assess the potential of the site to support great crested newts during the terrestrial phase of their lifecycle and identify those habitats most suitable for the species (figure 4.6). This assessment was reported in more detail in the Natural Heritage Technical Appendix to the 2006 ES and is summarised in this ES chapter. From July 2005 to May 2006 a total of 645 m of Animex great crested newt drift fencing with pit-fall traps was placed across suitable habitats. A total of 78 terrestrial trapping nights were completed at the site. No great crested newts were recorded during this survey work. All details of the survey work undertaken can be found in technical appendix 6 to the 2006 ES (included on CD in technical appendix B of this ES). Due to the absence of records during previous surveys, no updated survey was undertaken in 2012.

Assessment of significance

4.34 The IEEM guidance is followed in assigning value to a feature and in the assessment of the significance of effects. The value of a feature is assigned by IEEM to seven levels, from international to "*within the immediate zone of the proposal only*". For the purpose of this assessment, international, national, county, district and local levels are considered. The levels correspond to administrative units except for local level, which is applied more subjectively. In this assessment, local applies to an area mapped as a discrete block of a landscape character type in the Oxfordshire Wildlife and Landscape Strategy (OWLS). The blocks relevant to the proposal cover several parishes, although they do not follow parish boundaries. The justification for selecting the level of value is given for each feature in the assessment, but some comments on what is a comparatively recent and unfamiliar method of assessment are given here.

4.35 A nature conservation designation does not necessarily imply a level of significance. For example, if a county wildlife site is cited for the population of a particular species of bird, that population is of county importance, but other features of the site may be less important. Similarly, legal protection at a national level, or the presence of a priority species or habitat in the UK Biodiversity Action Plan, does not imply national importance. The mitigation required to meet legal obligations is provided as separate advice for protected species.

4.36 For each feature of value, the effects of proposed activities during and after construction are assessed and the type of impact characterised according to its extent, magnitude, duration, reversibility, timing, frequency and cumulative effects. The effect of the impact on the function of the ecosystem ('integrity'), the quality and extent of the habitat or the population size of the species is predicted and an estimate made of the degree of uncertainty in the prediction. Mitigation and enhancement measures, if applicable, are described and the residual impact after these measures have been taken into account is quantified as accurately as possible.

4.37 Significance is defined as significant or not, at the level of value of the feature, then quantified, rather than given a value such as high or medium. For example, a proposal that would have affected a bird population for which a county wildlife site was cited, but which was fully mitigated, would be described as an impact on a feature of county value that was not significant.

4.38 In order to provide an assessment of impacts that is in harmony with the other chapters of this environmental statement, a level of significance is also given to each impact, following protocols developed by Terence O'Rourke Ltd. Where there is uncertainty over the level of significance, for example when there is considerable uncertainty about the full extent of the local resource (habitat area or population size), this is stated and as a precaution the higher level of significance of the impact is applied.

4.39 Significance has been derived from two measures, the sensitivity of receptors and the magnitude of change. In determining whether an effect on a receptor is significant, reference is made to a wide range of criteria relating to species and communities. The two sets of criteria (magnitude and sensitivity) fed into the significance matrix generate the generic definitions of the significance of potential effects. This process is set out in figures 4.1-4.3.

Baseline

Context

4.40 The site lies within Natural England's Thames and Avon Valleys natural area. The dominant geology of this lowland natural area is Jurassic clays, with occasional Portland and Purbeck limestone outcrops. Woodland cover in most of the area is low, with hazel coppice with oak (NVC W10), now often abandoned to high forest, the main woodland structure. On more calcareous soils, ash woodland with abundant dog's mercury (NVC W8) occurs.

4.41 The main land uses of the natural area are beef and dairy pasture, arable and gravel extraction. The farmland is characterised by dense hedges and, where there is livestock grazing, a high density of ponds supporting good populations of great crested newt, which are notably common in the natural area. Much of the grassland is intensively managed and has lost its botanical interest, but in a national context the key feature of this natural area is the relatively large number of fields of unimproved neutral dry (NVC MG5) and

seasonally wet (NVC MG4) pasture and hay meadows. Typical examples within 5 km of the site are Wendlebury Meadows and Mansmoor Closes SSSI and Arncott Bridge Meadows SSSI.

4.42 River and ditch systems are an important resource in the natural area, which includes much of the Upper Thames catchment. There are diverse fish and freshwater invertebrate faunas in places and a small and declining population of the native Atlantic stream crayfish.

4.43 The OWLS divides the site and surrounding countryside into two broad landscape types, not readily separable on the site itself; Wooded Estatelands and Clay Vales. These landscape types are classified as very high and high respectively for biodiversity in a county context. The classification is based on the range of habitats within the whole landscape type. Of relevance to the site and its vicinity, the OWLS identifies species-rich hedgerows, ancient semi-natural woodland, watercourses, unimproved and neutral grassland as priority habitats in one or both landscape types.

Desktop survey

European sites

4.44 There is one European site within 10 km of the site. The Oxford Meadows SAC falls just within 10 km. This is one of five SACs in the UK classified for the Annex I habitat of the Habitats Directive lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*). This equates to the NVC's MG4 grassland, a lowland grassland community characteristic of areas where traditional hay meadow treatment has been applied to seasonally flooded land with alluvial soils. The Oxford Meadows is one of the largest examples in the best conservation condition in UK. The SAC is also the only one in the UK classified for the Annex II species creeping marshwort *Apium repens*. The SAC has the largest population in the UK of this species, a floodplain grassland species that is known from only two other UK locations.

Sites of special scientific interest

4.45 There are no SSSIs within 2 km of the study area. The nearest SSSI, Ardley Cutting and Quarry, is to the north east of Bicester. This is a limestone railway cutting and quarry, notified for its geological interest. The citation also notes the limestone flora, rare in Oxfordshire, associated invertebrate fauna and a large population of great crested newts.

4.46 Three SSSIs lie within 4 km of the site; Wendlebury Meads and Mansmoor Closes, Arncott Bridge Meadows and Stratton Audley Quarries. Wendlebury Meads and Mansmoor Closes and Arncott Bridge Meadows are both unimproved neutral or calcareous grasslands with a diverse flora. The nationally rare narrow-leaved water-dropwort (*Oenanthe silaifolia*) occurs at Arncott Bridges Meadows. Over 160 vascular plants have been recorded at Wendlebury Meads and Mansmoor Closes. Stratton Audley Quarries is a geological SSSI notified due to exposed formations of Jurassic white limestone, Forest Marble and Lower Cornbrash.

County wildlife sites

4.47 One county wildlife site (CWS) occurs within 1 km of the site. Gravenhill Wood is ancient semi-natural woodland on a hill rising to 115 m to the south east of the site. The wood has 15 ancient woodland indicator species and both historic map and earthworks evidence support its ancient origin, that is prior to 1600, a modified relict of the UK's woodland cover after the last ice age. The species list and description in the citation suggest the wood is a mix of the NVC W8 and W10 plant communities, typical of lowland woodland on a mix of neutral and more calcareous clays.

Protected species

4.48 The Thames Valley Environmental Records Centre (TVERC) holds pre-2006 records of grass snake *Natrix natrix* from the boundary of the site at Oxford Road (A41) and old records of common pipistrelle bats *Pipistrellus pipistrellus* (prior to this species' split into two species) from the 1 km square that includes the north east corner of the site. Badgers or evidence of the species' presence are recorded from the 1 km square that includes the south west of the site. Water vole was recorded in 2003 at Bucknell in Bicester, some 800-900 m north of the site. There were no records of schedule I bird species.

Other notable species

4.49 There is a record from TVERC of the butterfly white letter hairstreak *Satyrium w-album* in the 1 km square that includes Whitelands Farm in 1997, when one or two individuals were recorded. The location is noted to be Whitelands Farm, so assumed to be a hedgerow within the study area. Another butterfly, small blue *Cupido minimus*, was recorded several times in 1990, with numbers between 10 and 30, from the 1 km grid square that includes the north west of the site. It is not known whether these records refer to the site. In 2007 Butterfly Conservation highlighted the presence of brown hairstreak *Thecla betulae* on the site.

Field survey

4.50 The site description combines the surveys undertaken from 2004 and 2005 through to 2012. The study area for ecological surveys is land bounded by the A41 to the east, the A4095 and the town of Bicester to the north, the A4095 to the west and Gagle Brook to the south, plus one field to the east of the A41. This is a larger area than the site, which is defined by the red line of the proposal. The study area was defined by the likely zone of influence of the development on features of ecological value.

Vegetation and habitats

4.51 The results of the 2005 phase 1 habitat survey are shown on figure 4.4. The site was largely arable land with improved pasture and rough grassland comprising most of the remaining area. The 2012 phase 1 habitat survey is shown in figure 4.5.

Arable and improved grassland

4.52 In 2005 Whitelands Farm was largely arable, parts of which were under set-aside. Most fields had crops of barley *Hordeum disticon sens. Lat.* and wheat *Triticum aestivum*, with a smaller extent of rape *Brassica napus*. In the centre of the study area were four smaller fields used as sheep pasture, with improved grassland dominated by perennial rye-grass *Lolium perenne*, red fescue *Festuca rubra*, Yorkshire fog *Holcus lanatus* and rough meadow-grass *Poa trivialis*, with a very low diversity of associated herbs. This vegetation could be assigned to species-poor stands of the NVC's MG6, the dominant lowland pasture derived from agricultural improvement of more botanically rich grasslands or the maturation of sown rye grass leys.

4.53 Since 2006 these fields have either been built on or left as set-aside. The livestock previously present on the farm has also been removed. In 2012 within the set-aside fields locally abundant sweet vernal grass *Anthoxanthum odoratum*, scentless mayweed *Tripleurospermum inodorum*, colt's-foot *Tussilago farfara*, cock's-foot *Dactylis glomerata* and Yorkshire fog were recorded. Other widespread species include redshank *Persicaria maculosa*, bristly-oxtongue *Picris echioides*, soft brome *Bromus hordeaceus*, groundsel *Senecio vulgaris*, creeping thistle *Cirsium arvense*, poppy *Papaver rhoeas* and common couch *Elymus repens*.

Semi-improved grassland

4.54 The field to the east of the A41 is unmanaged grassland with considerable invasion of scrub. Coarse grasses, particularly false-oat grass *Arrhenatherum elatius,* cock's foot and umbellifers including cow parsley *Anthriscus sylvestris*, hogweed *Heracleum sphondylium* and wild parsnip *Pastanica sativa,* are prominent in tall vegetation with locally abundant wild angelica *Angelica sylvestris* and sneezewort *Achillea millefolium*. In places there is a diverse understory that includes lady's bedstraw *Galium verum*, agrimony *Agrimonia eupatoria*, cowslip *Primula veris* and pepper saxifrage *Silaum silaus*.

4.55 This is a more species-rich example of the NVC's MG1 grassland, probably a mix of MG1d and MG1e. This is the community of unmanaged grassland on more nutrient rich and, in the case of MG1d, more calcareous soils. Pepper saxifrage is more typical of the more species-rich MG5 grassland and it may be that this field has derived from that community through neglect.

4.56 In 2005 the two north eastern fields on the site, bounded by the A41 and A4095, were a mix of improved grassland, semi-improved calcareous grassland and rush pasture. Two to three hectares of rush pasture extended north on level ground from the northern bank of Pingle Brook. The NVC community was MG10b, where hard rush *Jucus inflexus* is dominant in tall tussocks. Associated species are typically few, with several dock species *Rumex* sp., silverweed *Potentilla anserina*, sorrel *Rumex acetosa*, creeping buttercup *Ranunculus repens* and figwort *Scrophularia nodosa* prominent. This is characteristic vegetation of permanently moist soils, the hard rush sub-community occurring on more calcareous soils. The tips of some of the hard

rush have been grazed, but this vegetation is relatively unpalatable and is usually left by livestock.

4.57 The slopes above the rush pasture were species-poor MG6 grassland, similar in species composition to the fields at the centre of the Whitelands Farm, but with more coarse grasses such as Yorkshire fog *Holcus lanatus*, perhaps due to lower grazing pressure.

4.58 The western of the two fields had an approximate rectangle of low, fragmented, raised earth banks, enclosing between one and two hectares of the field, within which are frequent earth mounds. Much of the field was species-poor MG6 grassland, but the slopes of the banks and mounds have patchy calcareous grassland, on what is thought to be an old limestone quarry, possibly of Roman origin.

4.59 Sheep's fescue *Festuca ovina* was locally the dominant grass. Mouse-ear hawkweed *Pilosella officinarum* formed frequent large patches and other frequent species include salad burnet *Sanguisorba minor*, rough hawkbit *Leontodon hispidus*, hoary plantain *Plantago media* and burnet-saxifrage *Pimpinella saxifraga*. This calcareous grassland has few species and lacks the full set of constant species for any NVC community. It best fits CG7, a community characteristic of thin, stony, very free-draining, nutrient-poor, often disturbed calcareous soils.

4.60 The calcareous grassland was translocated to a receptor site within the South West Bicester development in the spring of 2010. The translocation exercise followed the methodology set out in the approved Kingsmere[1] Ecological Management Plan for the site. Monitoring of the translocated grassland was undertaken in 2011. The monitoring results found that species such as salad burnet, burnet saxifrage and hoary plantain were still present in the translocated grassland, but at a very low frequency. The lack of management is probably partially responsible for the reduction in the abundance of these species.

4.61 The translocated grassland included some species not previously recorded including upright brome *Bromopsis erecta*, glacous sedge *Carex flacca*, black knapweed *Centaurea nigra* and bird's–foot trefoil *Lotus corniculatus*. This is balanced by the absence of other characteristic species from the sample quadrats such as mouse-ear hawkweed, bellflower and rough hawkbit. The loss of mouse-ear hawkweed is likely to be due primarily to the lack of management of the grassland since translocation.

4.62 The remaining grassland in this area has partially been lost due to the consented development and the establishment of the balancing ponds in this area. These have been established in accordance with landscaping plans submitted with the Kingsmere Ecological Management Plan. This area was sown in March 2012 with a mix of native grasses and wild flowers, as detailed

[1] Kingsmere is the name given to the South West Bicester development in the post-submission documents, such as the ecological management plan.

in the approved Kingsmere Ecological Management Plan and is still in the very early stages of establishment.

Woodland and scrub

4.63 There are three small field corner copses within the study area. The largest of these, Foxey Leys Copse, has an area of approximately 1 ha. Foxey Leys Copse has a canopy dominated by ash *Fraxinus excelsior* and is largely semi-natural woodland. The ground flora within the woodland is species-poor, dominated by species such as common nettle *Urtica dioica* and cleavers *Galium aparine* that thrive on disturbed soils in nutrient rich conditions. A small number of species that are poor colonists of new woodland, including wood sedge *Carex sylvatica* and field maple *Acer campestre* are recorded here, but not in the other two woods. These point to its greater age, but no features support this being ancient woodland.

4.64 The other two copses are planted on ridge and furrow and the mature trees are largely alien species, of which sycamore *Acer pseudoplatanus* and horse chestnut *Aesculus hippocastanum* are prominent. Both copses are shown on the 1885 Ordnance Survey map and are likely to be nineteenth century plantations.

4.65 Foxey Leys Copse is a species-poor example of the NVC's W8. The other two copses have an alien flora that does not fit the NVC.

4.66 The woodland areas are now subject to a woodland management plan. Vegetation monitoring undertaken in 2011 within these woodland blocks confirms that there has been no significant change in vegetation since the original survey work was undertaken.

Hedgerows and hedgerow trees

4.67 The hedgerows within the farm are dominated by hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* and English elm *Ulmus glabra.* A number, with five or more woody species, are classified as species-rich. These are concentrated in the centre of the study area and along the northern, western and southern boundaries. Less frequent species in the hedges include buckthorn, *Rhamnus cathartica*, spindle *Euonymus europaeu*s, wayfaring tree *Viburnum lantana* and field maple. None of these hedges has associated banks that are species-rich in herbs. Most of the site boundary hedges, but none within the interior of the site, were classified as important, in the sense of the 1997 Hedgerow Regulations, by Bioscan in 2004. However, no justification or supporting data for the selection are provided, so the classification is considered provisional.

4.68 In the west and east of the study area, where there are larger arable fields, there is evidence of hedgerow removal and some of the remaining hedges have frequent gaps.

4.69 There are frequent mature hedgerow trees, of which pedunculate oak *Quercus robur* and ash are the most common species. These are most abundant along the boundary hedges and most often in species-rich hedges.

Watercourse and aquatic and swamp vegetation

4.70 The Pingle Brook previously flowed through two fields of pasture in the north east of the site. The banks were grazed and heavily trampled by cattle in many places and mainly a mix of hard rush *Juncus inflexus* and tufted hair-grass *Deschampsia caespitosa*. The emergent vegetation of the brook falls into the NVC's S23 *Other water-margin vegetation*. This is swamp vegetation of mesotrophic to eutrophic shallow waters that is tolerant of cutting, dredging, moderate trampling and periodic drying out of the watercourse.

4.71 The route of the Pingle Brook was modified in 2010 as part of the consented scheme. The work resulted in the loss of the bank and in-channel vegetation along the modified route. Monitoring of the new route in 2011 found that the in-channel vegetation has rapidly re-established, with water-cress *Rorippa nasturtium-aquaticum*, water forget-me-not *Myosotis scorpioides*, branched bur-reed *Sparganium erectum* and water mint *Mentha aquatica* recorded. The bankside vegetation has yet to fully re-establish, with mainly ruderal species present at the time of survey.

Fauna

Bats

4.72 An inspection of the hedgerow trees during habitat surveys in 2004 and 2005 identified that many of the mature trees had the potential to hold bat roosts. These trees are shown on figure 4.7. Of the 50 potentially suitable trees, the main clusters occur in the boundary hedges in the north east corner and to the south east of Whitelands Farm. The three blocks of woodland were not assessed for their suitability for bats as these woodland areas were retained within the application boundary.

4.73 A single evening survey in August 2004 recorded foraging common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and a bat of the genus *Myotis.* A single noctule *Nyctalis noctua* commuted over the site. A transect survey of the study area in 2005 again recorded foraging common and soprano pipistrelle, a *Myotis* species considered probably to be Natterer's bat *Myotis nattereri* and brown long-eared bats. A single noctule was again recorded commuting over the site. The foraging bats were recorded around mature trees, along hedgerows or the edge of woods and over rough grassland.

4.74 In September 2006 the surveyors undertook a brief survey of the area around Whitelands Cottages and Whitelands Farm. Only common pipistrelle and a single noctule were recorded during this survey. All the field data collected would indicate that bat activity across the site is limited. Given the lack of known roosts within the site and the extent of arable land within the survey area it is not that surprising that only limited bat activity has been recorded.

4.75 Bat transects undertaken as part of the section 106 monitoring in 2011 recorded low levels of bat activity across the site, in keeping with previous survey results. Common pipistrelle and noctule were recorded during this monitoring.

Reptiles

4.76 Reptile surveys were carried out in 2007 in the field to the east of the A41 and the rush pasture in the north east of the site. Low numbers of common lizard *Zootoca vivpara* were recorded in the field to the east of the A41 and a grass snake slough was recorded in this field during a vegetation survey.

Badger

4.77 Badger activity was recorded across the site in 2004 by Bioscan. A badger survey was undertaken in 2005 and an outlying sett was located in a hedge in the study area, but outside the site, in both years. An active main sett with several fresh latrines nearby was located outside the study area to the south of Whitelands Farm in 2004 and 2005. Latrines are used for territory marking. Assuming that territories do not cross the main A roads and M40, it is possible, though not conclusive, that the territory of the social group that forages on the site is bounded by the A41, A4095 and Gagle Brook. A map showing the findings of the 2005 survey is included as a confidential appendix (see technical appendix 6 to the 2006 ES (included on CD in technical appendix B of this ES)).

4.78 Patterns of badger activity recorded during a 2012 survey show activity levels have remained largely unchanged with little evidence of badger foraging or territorial activity within the boundaries of the consented scheme (technical appendix D). In March 2012 some territorial activity was recorded along the southern edge of the new perimeter road, close to Bignall Park.

Birds

4.79 Forty-eight species of bird were recorded from the study area during the spring and summer 2005 survey work, of which 38 were classified as breeding. Species are listed in technical appendix 6 to the 2006 ES (included on CD in technical appendix B of this ES). The species recorded are typical of mixed farmland in lowland England and included skylark *Alauda arvensis*, yellowhammer *Emberiza citrinella*, reed bunting *Emberiza schoeniclus*, bullfinch *Pyrrhula pyrrhula*, song thrush *Turdus philomelos*, linnet *Carduelis cannabina* and little owl *Athene noctua*. One schedule 1 (see paragraph 4.6) species was recorded; a hobby *Falco subbuteo* flying over the site in 2005. A single sighting does not constitute evidence of breeding. However, this species is elusive when not displaying or feeding young, is widespread if uncommon in Oxfordshire and nests in undisturbed farmland woods and hedgerow trees. Breeding cannot therefore be ruled out, but is considered unlikely due to the level of human activity on the borders of the site and the size and condition of the woods.

4.80 A breeding bird survey was undertaken in 2011 as part of the ecological monitoring programme. This work confirmed that the bird community is largely unchanged from the 2005 baseline, with only three species recorded in 2005 not noted in the 2011 survey; tawny owl (recorded during bat surveys), willow warbler *Phylloscopus trochilus* and bullfinch. The set-aside land appears to be benefiting farmland birds with good numbers of yellowhammer and skylark recorded, along with grey partridge *Perdix perdix*, yellow wagtail

Motacilla flava and lapwing *Vanellus vanellus* (none of the last three species were noted during previous surveys).

4.81 Other species recorded during the bird survey reflect the changes in the baseline conditions with the creation of the balancing ponds since the consent of the original application. Both common *Actitis hypoleucis* and green sandpipers *Tringa ochropus* were recorded using the balancing ponds and little ringed plover *Charadrius dubius* was recorded on site during 2011 and 2012, when breeding behaviour was recorded. Mallard *Anas platyrhynchos* also bred in the balancing ponds in 2012.

4.82 Casual observations of migrant and wintering birds were made during the terrestrial great crested newt surveys between July and November 2005. Of note were flocks totalling approximately 60 yellowhammer and 30 linnet on the study area. In early autumn these species were widespread, feeding on stubble. Later, when the arable was ploughed and re-sown, both species were concentrated around Whitelands Farm. Reed bunting was resident around Pingle Brook, where this species bred. A single record of snipe *Gallinago gallinago* in November 2005 along Pingle Brook was the only record of a wader on the site until the creation of the balancing ponds.

Invertebrates

4.83 White-letter hairstreak and small blue butterflies were not incidentally recorded during the other surveys. White letter hairstreak's larval food plant is elm *Ulmus* sp., which is abundant in the study area's hedgerows. This species is increasingly establishing colonies on young suckering elms in the Thames region (Clarke and Bourn 2000), which are less prone to Dutch Elm Disease, and it is considered likely that the species remains in the study area. The larval foodplant of small blue, kidney vetch *Anthyllis vulneraria*, was not recorded in the study area. The numbers recorded in 1990 are typical of a breeding colony (Bourne and Warren 2000). It is therefore considered that either the species breeds outside the study area, or that habitat change has removed the necessary areas of bare ground for abundant setting of kidney vetch seed and the species is locally extinct. Kidney vetch is mainly a species of calcareous grassland and was not present in the one area of this habitat on the site. Butterfly, dragonfly and damselfly species recorded on the site are listed in technical appendix 6 to the 2006 ES (included on CD in technical appendix B of this ES)).

4.84 The presence of brown hairstreak on the site was highlighted by Butterfly Conservation. The larvae of this species feeds on blackthorn, which is abundant in the hedgerows on the site. This species is unlikely to be noted during transect surveys given that adults spend much of their time in the tree canopy. Butterfly transects undertaken in 2011 as part of the ecological monitoring recorded lower numbers of butterfly species than the baseline survey in 2005, although three new species were noted including small copper and speckled wood.

4.85 The wall whorl snail *Vertico pusilla* was not recorded during the specialist survey in August 2005. It is considered that the north-facing side of the stone

wall bounding the site to the north, adjacent to the A4095, has the most suitable habitat. The wall is shaded, has a good growth of ivy and the adjacent road ditch has much dumped stone, all features favouring the presence of this species. It is possible that despite the intensive search effort, this diminutive species, which often lives in small colonies, could have been overlooked.

4.86 The other walls on the site were more exposed, with less vegetation and were all fragments separated from other wall fragments by 60 m or more, reducing the likelihood of colonisation by the snail. For these reasons, it is considered unlikely that the species was present and overlooked on these walls during the survey.

Assessment of value

4.87 The assessment of ecological value is carried out for the study area and for statutory sites within a 1 km buffer. A wider buffer would be justified if there were potential hydrological effects on off site ecologically sensitive wetlands, or indirect effects through, for example, quarrying for building material at sensitive sites. No such impacts are predicted.

Features of international and national value

4.88 Within the study area and a 1 km buffer there are no statutory sites of international or national importance and surveys found none meeting the criteria for designation of European sites or SSSIs. There are therefore no receptors of international or national importance.

Features of county value

Gravenhill Wood

4.89 The wood is approximately 1 km to the east of the site. It has strong evidence of being ancient and is classified as such in the county ancient woodland inventory. Ancient woodland is a scarce resource in Oxfordshire, accounting for 4,770 ha or 1.5% of the UK resource. The South East Plan identifies ancient woodland as irreplaceable and the woodland Habitat Action Plan for Berkshire, Buckinghamshire and Oxfordshire seeks to ensure local plan policy is adequate to safeguard all examples of the habitat. The plant communities are typical of the Thames and Avon Vales Natural Area. The county wildlife site citation notes only the botanical and plant community interest. In the absence of faunal data, these are the features of county value.

Features of local value

Semi-improved neutral grassland

4.90 MG1 grassland, often used interchangeably with rough grassland, is a nationally widespread community of neglected, or mown but not grazed land, found for example extensively along motorway verges. It is considered nationally to be a plant community of low conservation interest (JNCC 1989). However, the Cherwell BAP notes that, with so little semi- or unimproved grassland in the district, the better examples of rough grassland are of value and can have plant species that are more characteristic of semi-improved

grassland. The Cherwell BAP lists the more extensive and interesting examples of rough grassland in the district. The field east of the A41 is not included in this list, but derives its local value from the presence of less widespread plant species, including pepper saxifrage, which is classified as a local character species of unimproved neutral grassland in the Oxfordshire BAP. The field also has the potential to hold populations of three common species of reptile.

Newly established grassland

4.91 The approved Kingsmere Ecological Management Plan identifies a native seed mix of grasses and wild flowers to be sown in the area around the Pingle Brook. Once work in this area has been completed sowing of this mix will be undertaken at an appropriate time of year. A mix from the British Seed House (RE1) has been selected for much of the amenity grassland areas with patches of a calcareous grassland mix (WfG5) for discrete areas around the balancing ponds.

Translocated calcareous grassland

4.92 Calcareous grassland is a locally common habitat in Oxfordshire, with extensive examples of national importance designated as SSSIs. In Cherwell, the habitat is scarce and almost entirely restricted to quarries and railway cuttings. The Cherwell BAP notes only 14 locations, not including the field on the site. The better examples that are not within SSSIs are listed in the BAP. The district scarcity of the habitat justifies local value for this example.

Species-rich and important hedges

4.93 Species-rich hedges are estimated to account for 20% of the UK's hedgerows. The Oxfordshire hedgerow survey found only 11% of the county's hedgerows were important in the sense of the 1997 Hedgerow Regulations. There are no data to assess the extent of the local resource of species-rich hedges. The OWLS notes that species-rich hedgerows occur throughout both of the landscape types that cross the study area, but definitions of what is species-rich are variable and the phase 1 habitat manual definition is ambiguous. The ecological, as opposed to landscape, value of these hedges is a combination of their age and connectivity. Older hedges acquire more plant species by chance colonisation over a longer period of time, because they are relicts of ancient woodland or because woodland plant and animal species can colonise along hedgerow networks, but not across open fields. Species-rich hedges will tend to have more associated invertebrate species and more fruiting shrubs and therefore provide better quality foraging habitat for bat species and both frugivorous and insectivorous bird species. However, hedge structure may be more important, with bulky uncut hedges with mature trees providing more invertebrate biomass.

4.94 The provisional classification by Bioscan of most the site boundary hedges as important gives the site a greater than average concentration of such hedges, in the context of Oxfordshire. Species-rich hedges internal to the site remain well connected in the centre of the site. The absence of herb-rich banks to the hedgerows, most of which have been ploughed to their margins, justifies no more than local value.

Pingle Brook

4.95 Pingle Brook has an unexceptional aquatic and swamp flora in the length that runs through the site, characterised by a low diversity of common and widespread plant communities. The community S23 is widespread and characteristic of disturbance to the channel and periodic drying out. The work on the Pringle Brook has not affected the distribution of this community on site.

Balancing ponds

4.96 The balancing ponds have been sown with native emergent vegetation in accordance with the plans submitted with the approved Kingsmere ecological management plan. The vegetation is in the first year of establishment and will provide new habitats for birds, amphibians and invertebrates as it matures.

Reptiles

4.97 A very small population of common lizard is present in the field to the east of the A41, where evidence of grass snake has also been recorded. All three species are widespread in lowland England. Their status in Cherwell is not known. This small, relatively isolated population is considered to be of local value.

4.98 The implications for the development of the legal protection provided to the three reptile species, through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), is discussed in the assessment of potential effects, below.

White-letter hairstreak

4.99 This butterfly species is of medium conservation concern in Oxfordshire, where there are an estimated 10 to 20 main sites. The number of white-letter hairstreaks recorded in the study area suggests this is not a major colony. The number of minor colonies in Oxfordshire is not known, but the species is known to be increasing after the decline caused by Dutch Elm Disease (Clarke and Bourn 2000). The abundance of colonies in Cherwell is not known. Assuming an even distribution of main sites throughout Oxfordshire, the presence of one or two individuals is considered to be of local value.

4.100 Brown hairstreak was recently thought to be restricted to an area on the Oxfordshire / Buckinghamshire border within the county, associated with the landscape of the ancient hunting forest of Bernwood. However, evidence of breeding has been recorded in the Bicester area and it seems that this species is extending its range in the county. Given the expansion in the range of this species in recent years, the presence of breeding adults is considered to be of local value.

Features of parish value

Bats

4.101 The bat species recorded are all widespread in Oxfordshire. There is inadequate comparative information to assess the importance of the site for bat foraging, but generally foraging activity has been low during surveys. There

are a good number of hedgerow trees with potential as bat roosts and the value of intact hedges, Pingle Brook and the tall grassland and scrub of the field east of the A41 as foraging habitat give these features local value.

4.102 The implications for the development of the legal protection provided to all bat species and their places of shelter, through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Habitats Regulations, is discussed in the assessment of potential effects below.

Badger

4.103 Badger is widespread in Oxfordshire and Cherwell. The farmland in the study area may provide a large part of the foraging range of one social group. The farmland is similar in type to surrounding farmland in the parishes of Chesterton and Bicester, so is considered of no more than parish value.

Farmland birds

4.104 Farmland birds have in recent years been recognised as a group of birds of value, because of the similar factors, broadly classified as agricultural intensification, that have led to their decline and the consequent inclusion of a number of these species in the priority list for the UKBAP and the Red List of birds of conservation concern.

4.105 The site has ten breeding species that are UKBAP priority species. Two of these species, skylark and yellowhammer, breed on the site in reasonable numbers. The other red list species are grey partridge, linnet, reed bunting, yellow wagtail, dunnock, starling, song thrush and lapwing. The habitats on site are currently highly favourable for farmland birds with extensive areas of set-aside land for breeding and foraging. Whilst no numerical comparison can be made with other farmland locally, these features are considered to give the site only parish value for farmland birds.

Future baseline

4.106 In the absence of this proposal, the permitted development will continue to be built out. This will mean the areas of set aside land will gradually be lost as the consented scheme is completed and there will be a gradual reduction in the availability of farmland for breeding birds. Increases in the numbers of people using the areas of green space within the development will reduce their attractiveness to waders, as will the establishment of the emergent planting around the ponds. The loss of areas of bare and recently disturbed land will also diminish the extent of this temporary habitat for little ringed plover.

Potential effects

Introduction

Potential zones of influence of the development on ecological features of value

4.107 The zone of influence of the proposal on features of ecological interest is the red line boundary of the development for vegetation and beyond the red line

where animal territories or ecological processes overlap and extend further. Impacts beyond the red line may occur for badger, reptile species and breeding farmland birds. The zone of influence for these species is bounded by the A41, A4095 and Gagle Brook in the south. The site and adjacent farmland are surrounded on three sides by A roads, which may act as barriers.

4.108 For land east of the A41, where there may be mobile reptile populations, the zone of influence is estimated to be 500 m around the field, comprising the fields and watercourses enclosed by the A41, Oxford railway line and Bicester town.

4.109 For bat species, which may forage over larger areas, an area of 4 km radius centred on the site is the estimated zone of influence.

4.110 No other development proposals that would affect the features of ecological value were identified, therefore a cumulative impact assessment has not been carried out.

4.111 No assessment of impacts on great crested newt, crayfish, otter or water vole is made, as these species have not been found on the site. Full details of the survey work undertaken can be found in technical appendix 6 to the 2006 ES (included on CD in technical appendix B of this ES).

Potentially significant activities identified for the consented scheme

4.112 The following activities during construction and post-construction were identified during the assessment of the consented outline planning application.

4.113 During construction, the key potentially significant activities are:

- Vegetation clearance
- Soil removal
- Construction of building and hard surfaces
- Temporary offices, building compounds and storage areas
- Environmental accidents in the proximity of Pingle Brook

4.114 Post-construction, the key potentially significant activities are:

- Increased public access
- Increased traffic
- Increase in numbers of cats and dogs
- Drainage
- Implementation of the landscape design and habitat management plan

4.115 The natural heritage chapter of the 2006 environmental statement showed that most of the potentially significant effects are anticipated post-construction, on completion of the consented scheme. The construction impacts associated with the additional housing will not change significantly from those identified in the original ES, given the development areas are unchanged.

4.116 This section 73 application for additional housing does not alter the parameter plans and the additional dwellings will be constructed within the development areas identified in the original application. This application is therefore not considered to have any additional significant effects in addition to those already considered.

4.117 The assessment below is based on that undertaken for the original 2006 application, adjusted to reflect the changes that have occurred on site through the implementation of the consented permission. The interim baseline is used to reflect the current conditions on site, but is not used for assessment purposes as it only reflects a point in time relating to the implementation of the consented scheme. Any changes to the conclusions of the original ES in relation to the changes in housing numbers is assessed against the future baseline (completion of the consented scheme).

During construction

Semi-improved grassland: field east of the A41

4.118 Construction of a minor road though the field will result in the loss of a proportion of the species-rich MG1 grassland. The resulting loss will be limited to the extent of the road and surrounding verges. Without mitigation this impact is permanent and irreversible. This is a significant effect on a feature of local value. The loss is of medium magnitude (1-10% of the resource of rough grassland), so an adverse effect of slight significance. This impact is unchanged by the increase in housing numbers.

Semi-improved grassland: field in the north east of the site

4.119 As identified in the baseline, the CG7 grassland has already been translocated to an identified receptor site and monitoring of the grassland is ongoing. Any changes in numbers of dwellings within the identified development plots will not affect this habitat during construction.

Species-rich hedges

4.120 Vegetation clearance and soil stripping will result in the loss of approximately 2.5 km of the study area's hedgerows, some of which are species-rich. Without mitigation the impact is permanent and irreversible. This is a significant adverse effect on a feature of local value. The magnitude of loss for species-rich hedgerows is medium in the context of the study area, so of moderate significance. The development areas are unaffected by the proposed changes in dwelling numbers and therefore the impacts will remain as previously assessed.

Reptiles (grass snake and common lizard)

4.121 There is some loss of land used by reptiles in the field east of the A41. The road across the field east of the A41, which will become the main route into and out of Bicester onto the A41 dual carriageway, will further fragment this isolated field and is expected to result in reduced populations. The combined impacts are significant and on a feature potentially of local value. The adverse effect is at worst of small magnitude (less than 1% of each population), so of

slight significance. This impact will not change as a result of increased dwelling numbers.

Implications of the legislation

4.122 Partial protection is given to these three species through inclusion on schedule 5 of the WCA 1981 (as amended) in respects of section 9(1), which prohibits intentional killing. A presence and absence survey of suitable areas was undertaken and a small number of common lizards translocated from the route of the road across the field east of the A41. Sufficient open area is retained within the red line to allow translocated reptiles to be accommodated.

White-letter and brown hairstreak

4.123 The exact location of the recorded breeding colony within the 1 km square is not known. Almost all of the hedgerows in this 1 km square are retained, the exceptions being a length of defunct hedge north of Whitelands Farm and a short length where the new road into the site feeds into the A4095. There is an extremely low probability that any colony will be affected and the likely effect is considered not significant. New hedgerow planting is already in place as part of the consented application and includes species that the larvae of both species feed on. There will be no change in this assessment as a result of the proposed increase in dwelling numbers.

Bats

4.124 No known roosts will be destroyed. Twelve trees with the potential to hold bat roosts may be felled or require surgery. These are in the hedge running west to east from Foxey Leys Copse and in the north west corner, where the new road breaks through the hedgerows. The necessity of felling these trees is subject to detailed design of the road and an arboricultural survey.

4.125 There will be a loss of approximately 2.5 km of hedges that may be used for bat foraging. This is between 10% and 20% of the linear features (hedges, watercourses and woodland edge) in the study area that are likely bat foraging habitat. As the bat species recorded foraging over the site are likely to have foraging ranges several times larger than the site, the loss is likely to be less than 10% of foraging habitat in the range and, in the context of the study area, of lower quality habitat of defunct hedges and hedges without trees. This is a significant impact on a feature of parish interest. The magnitude of change is medium (probably 1-10% of foraging habitat and potential tree roosts within the foraging range), so the significance is slight. Recent survey information would suggest that at the present time bat foraging activity across the site is unchanged from the previous baseline.

4.126 These impacts will remain unchanged as a result of the proposed increase in dwelling numbers.

Implications of the legislation

4.127 The inclusion of all bat species on schedule 2 of the Habitats Regulations and with full protection on schedule 5 of the WCA 1981 (as amended) makes it an offence to recklessly disturb bats at their roosts or destroy a roost, except under EPS licence. Trees with the potential to hold roosts and that require

felling or tree surgery are generally not dealt with as if they were roosts, but require further checks prior to felling, to safeguard bats that may be using the cavities. Prior to treatment or felling, cavities need to be checked by ladder, cherry picker or climbing, by a licensed bat worker. If no bat use is proved, work can proceed. If bat occupation is proved, a EPS licence would be required before further work on the tree.

Badger

4.128 If the assumption of one clan with a territory confined to the study area is correct, approximately 20% of the foraging habitat will be lost under hardstanding. The impact may be food shortage for the clan and is a significant effect on a feature of parish value. The predicted magnitude of the effect is large (loss of more than 10% of apparently suitable badger foraging habitat in the study area), so of moderate significance.

4.129 The badger main sett is still located in the same place as when the 2006 application was submitted. The 2012 survey work showed activity across the site was largely unchanged with the new road seemingly now forming part of the territorial boundary. The proposed change in dwelling numbers will not affect the conclusions of this assessment.

Implications of the legislation

4.130 No badger setts will be disturbed and no work is proposed within 30 m of any sett. Therefore no licence for disturbance is required under the provisions of the Protection of Badgers Act 1992 (English Nature 1995).

Farmland birds

4.131 Development will result in the loss of approximately 20% of the farmland in the study area, comprising arable fields, hedges of less value for birds, calcareous grassland, part of a field of improved grassland and approximately 20% of the rush pasture.

4.132 Of the red list species of conservation concern, in the absence of changing farming practices elsewhere, a small parish decline would be expected for skylark (breeding), yellowhammer (breeding), song thrush (breeding) and starling (breeding and wintering), due to loss of arable and hedges. Reed bunting is confined to wetland habitats in the north east and south east of the site, which are retained. Bullfinch is more dependent on woodland and bulky hedgerows, which are retained. Linnet is nationally increasing in the short term in response to an increase in sown rape varieties with fine seeds, therefore is probably not limited by nesting sites and local loss of hedgerows. House sparrow is associated with the farm buildings, which are retained.

4.133 This is a significant impact on a feature of parish value. Parish and local breeding populations, overall for this group of birds, are predicted to have a loss of medium magnitude (1-10% of the population for the relevant species) and so the impact is of slight significance, with skylark, starling, song thrush and yellowhammer affected.

4.134 Breeding bird populations are broadly similar to those recorded during the baseline studies. Short term increases in numbers of breeding yellowhammer and skylark have been noted as they have benefited from a significant short term increase in set-aside while the consented scheme is developed. With no significant change in the design of the consented scheme as a result of the proposed increase in number of dwellings, the conclusions of the assessment remain unchanged.

Post-construction

Water vole

4.135 Two balancing ponds with a total area of approximately 0.68 ha have been created in the fields, within 20 m of the brook, as part of the sustainable drainage system. The ponds permanently hold water and have been planted with emergent vegetation in accordance with the ecological management plan. These features provide a net improvement in the habitats for water vole and so could encourage their re-colonisation, if they are still present downstream of the site

4.136 Overall the landscape and drainage scheme has provided a significant positive effect on the suitability of the Pingle Brook catchment for water vole. The magnitude of change is large in the context of the study area, so the significance is moderate.

4.137 This area of the Pingle Brook will be unaffected by the increase in dwelling numbers proposed and the conclusions of the assessment are unchanged.

Reptiles (grass snake, slow worm, common lizard)

4.138 The road that dissects the field east of the A41 will increase the probability of road casualties if reptiles are present in this land parcel. As populations are expected to be small in this isolated area of suitable habitat, the significance of effect is slight. The proposed increase in dwelling numbers will not affect this area.

Bats

4.139 There should be at least an equivalent amount of foraging habitat for bats in the long term to that lost through hedge removal. This will develop as the landscape plantings and trees in gardens and along roads and rough grassland in the north east and around the balancing ponds mature. This will be a significant positive effect of moderate magnitude in the context of the study area (1-10% increase in bat foraging and potential roosts) so of slight significance. The landscaping plans remain unchanged as a result of the proposed increase in dwelling numbers.

Badger

4.140 The perimeter road will dissect at least one badger social group's territory. The 50 mph speed limit will reduce the number of road kills of badgers, but it is likely that there will be some, as the road may be crossed daily. As road kills are a major cause of badger death, and social groups typically number fewer than 12 individuals, road deaths may have an effect of large magnitude

(loss of more than 10% of the social group population) so be of moderate significance. The increase in dwelling numbers will not affect the location of the new road, which is now operational. The potential impacts on badgers will be unchanged.

Farmland birds

Landscape and drainage strategies

4.141 Effects are considered for the Red List species. More habitat for breeding reed bunting may develop around the three permanently wet balancing ponds. This species is generally associated with tall vegetation and scrub adjacent to open water. In the short term, the new woodland landscape plantings will provide good breeding and foraging habitat for linnet and yellowhammer, whilst the trees are at scrub height and have an under-storey of tall herb vegetation. This interest will be lost as the woodland canopies close, but bullfinch and song thrush may then nest and forage in these habitats.

Residential development

4.142 Bullfinch, a species that does not feed far from hedgerows and woodland, can benefit from the seeds, buds and berries provided in suburban gardens. Breeding song thrush may benefit after several years from the development of lawns and playing fields, which will provide good foraging habitat. Suburban song thrush populations nationally have not declined to the extent of farmland populations for this reason. Whilst the new dwellings may provide breeding habitat for starling and house sparrow, the national decline of starling is mainly a consequence of changes in agricultural practices and the reasons for the decline of house sparrow are uncertain. The increased number of dwellings will not necessarily benefit these species. The other Red List species are not regularly found in residential areas.

4.143 The increased number of cats associated with the new dwellings is likely to result in increased mortality to ground nesting birds near to the dwellings. This should not affect the Red List species, which are either not ground nesting or, in the case of skylark, have most of their habitat separated from the residential land by the formal open space, playing fields and the new road.

4.144 Overall, the effects of the proposal, post-construction, on farmland birds are predicted to be positive. The magnitude of the effect will be large in the short term (more than 10% increase in the study area populations of reed bunting and yellowhammer), so of moderate significance. In the longer term the large change will be sustained for reed bunting and will also occur for song thrush and bullfinch, so be of moderate significance for these species.

4.145 Impacts on breeding birds are likely to remain unchanged as a result of the increase in the number of dwellings proposed.

Mitigation

4.146 No additional significant effects above those already assessed have been identified from the application to increase the number of dwellings within the consented scheme. Therefore further mitigation is not required above that already identified in the 2006 ES.

Residual effects

4.147 The residual effects remain the same as those assessed in the 2006 ES (table 4.2). The 100 additional dwellings will not lead to any further significant residual effects and the significant residual effects set out in table 4.2 all arise as a result of the consented development.

Topic	Residual effects	Importance of receptor	Magnitude of change	Duration	Nature	Significance	Level of certainty
Natural heritage	Species-rich hedgerows lost under footprint	Medium	Medium	Short term	Adverse	Moderate	Absolute
	Replacement hedgerow planting and planting of new hedgerows*	Medium	Medium	Long term	Beneficial	Moderate	Absolute
	Replanting and management of woodland north of service area*	Low	Medium	Long term	Beneficial	Moderate	Absolute
	Water vole habitat created along Pingle Brook and balancing ponds	Medium	Large	Long term	Beneficial	Moderate	Absolute
	Reptiles (grass snake, slowworm, common lizard) translocated and habitat improvement in informal open space*	Medium	Small	Long term	Beneficial	Slight	Absolute
	Net increase in bat foraging habitat and potential roosts	Medium	Small	Long term	Beneficial	Slight	Reasonable
	Loss of badger foraging habitat under footprint and new road casualties	Medium	Medium	Long term	Adverse	Moderate	Reasonable
	Loss of foraging and nesting habitat for farmland birds (skylark, yellowhammer and starling) under footprint	Medium	Small	Long term	Adverse	Slight	Reasonable
	Increase in foraging and nesting habitat for farmland birds (song thrush, bullfinch and reed bunting)	Medium	Medium	Long term	Beneficial	Moderate	Reasonable

Table 4.2: Natural heritage residual effects (all arising as a result of the consented development)
*These effects have already occurred as a result of the implementation of the consented development, so are not specifically discussed in the impact assessment section above