CHAPTER 6

Appendices (Volume 3 – Bound Separately)

6.0 ECOLOGY AND NATURE CONSERVATION

6.1 Introduction

6.1.1 This chapter considers the impacts of the Proposed Development on flora and fauna, in accordance with the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended).

6.1.2 The legislative background, scope and methodology of the study are described below; this is followed by a description of habitats and fauna, including the occurrence of legally protected species, and invasive alien species. The nature conservation interest of the Site and its surroundings is then evaluated; any significant impacts upon interest features are assessed, including indirect impacts on interest features in the wider vicinity of the development. Proposed mitigation and ecological enhancement measures are outlined, with a summary of residual impacts following the implementation of mitigation measures.

6.1.3 The chapter summarises the results of a number of ecological surveys, presented as a series of Technical Appendices. These provide the evidence base for the assessment presented below, and should be referred to for more details of methodology and results. They comprise:

- Appendix 6.1: Preliminary Ecological Appraisal;
- Appendix 6.2: Bat Roost Survey; and
- Appendix 6.3: Breeding Bird Survey.

6.2 Methodology

Legislation and Guidance

European Legislation

6.2.1 The Habitats Directive (92/43/EEC) provides for protection of species of Community interest listed in Annex IV(a) of the Directive ('European Protected Species').

6.2.2 Article 12 of the Habitats Directive sets out the system of strict protection which Member States are required to adopt for animal species listed on Annex IV(a). Article 12(1)(b) prohibits '*deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration*'; Article 12(1)(d) prohibits '*deterioration or destruction of breeding sites or resting places*'.

6.2.3 Council Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive') provides for the conservation and management of all wild bird species naturally occurring in the European Union, their nests, eggs and habitats.

6.2.4 Article 2 of the Birds Directive provides for the maintenance of populations of wild birds '*at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or to adapt the population of these species to that level.'* Article 4(4) requires that (outside of protected sites) member states *'should strive to avoid pollution or deterioration of habitats'.*

6.2.5 The Habitats and Birds Directives are implemented in England and Wales by the Conservation of Natural Habitats and Species Regulations 2010 (as amended) (the 'Habitats Regulations'). Regulation 41 implements the system of strict protection applied to European Protected Species. Regulation 9A(8) implements provisions in Article 4 of the Birds Directive, requiring competent authorities to '*use all reasonable endeavours'* to '*avoid any pollution or deterioration of habitats of wild birds'.*

UK Legislation

6.2.6 The Wildlife and Countryside Act 1981 (as amended) provides the principal legislation for designation of nationally important conservation sites and the protection of species. Section 1 provides for protection of birds. Schedule 1 lists bird species with special protection, including protection from disturbance when nesting. Section 9 provides for protection of wild animals listed in Schedule 5.

6.2.7 Section 40 of the Natural Environment and Rural Communities Act 2006 ('NERC Act') sets out the duty of public authorities to conserve biodiversity in the exercise of their functions, through '*having regard, so far as is consistent with the proper exercise of their duties, to the purpose of conserving biodiversity*'. Biodiversity conservation is further defined as including the restoration or enhancement of a population or habitat. Section 41 of the NERC Act requires the Secretary of State to publish a list of species and habitats which are of principal importance for the conservation of biodiversity in England (i.e. 'priority species and habitats'), and to take and promote the taking of "reasonably practicable" steps to further their conservation.

Policy Framework

6.2.8 The National Planning Policy Framework (NPPF) for England sets out a number of policies for conserving and enhancing the natural environment in Section 11 (paragraphs 109-125). Of particular relevance in the present context are the following policies:

- 109: includes reference to the need to minimise risks to biodiversity and promote net gains for biodiversity where possible, including establishing coherent ecological networks;
- 110: minimising pollution, and allocating land with the least environmental or ecological value;
- 113: site protection should be commensurate with their status, giving *'appropriate weight to their importance and the contribution they make towards ecological networks'*;
- 118: addresses the conservation and enhancement of biodiversity in planning applications; and
- 125: encourages good design to limit the impact of light pollution, including impacts on nature conservation.

Assessment Methodology

Ecological Impact Assessment

6.2.9 Impact assessment methodology follows current Chartered Institute of Ecology and Environmental Management guidelines (CIEEM, 2016[1]). This is based on:

- the identification of valued ecological resources;
- the characterisation of potential impacts as a consequence of the development;
- an assessment of the likelihood of occurrence, duration, extent, magnitude, frequency and reversibility; and
- an assessment of impact significance.

6.2.10 In order to assess the effects of the development on flora and fauna, it is first necessary to identify the nature and geographical extent of likely impacts, and identify the component ecological interest features of the receiving environment. This process identifies important ecological features which should be subject to further assessment. These are features which are sufficiently important and

[1] *CIEEM (2016). Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal. Second Edition, January 2016*

potentially affected by the project; CIEEM guidelines state "*it is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*."

6.2.11 The identification of ecological effects also takes incorporated mitigation measures into account. These comprise already committed measures, which the decision maker can be confident would be included as part of the Proposed Development.

Scope of Assessment

6.2.12 The scope of assessment was determined by consideration of the results of the Preliminary Ecological Appraisal (PEA), together with responses to the formal scoping report (see Chapter 2.0), and telephone consultation with Harrogate Borough Council's ecologist.

6.2.13 The PEA was undertaken in accordance with CIEEM guidance. It included the following elements:

- Data search within a 2km radius of the centre of the Site, including screening for statutory designated sites and ancient semi-natural woodlands; a search carried out by the local biological records centre for non-statutory sites, protected and priority species;
- Review of earlier ecological surveys and assessment of the Site carried out in 2008 to inform a previous planning application;
- Extended Phase 1 Habitat Survey of the Site and adjoining habitats;
- Protected species walkover survey and preliminary appraisal of potential bat roosting habitats; and
- Preliminary evaluation of important ecological features and recommendations for further survey.

6.2.14 Additional surveys undertaken included the following:

- Bat roost survey in accordance with Bat Conservation Trust guidelines, consisting of a preliminary ground level roost assessment, and two pre-dawn back-tracking surveys;
- Breeding bird surveys, consisting of three visits between May – July.

6.2.15 Further details of survey methodology are given in the relevant Technical Appendices.

Assessment of Significance / Assessment Criteria

6.2.16 In the CIEEM (2016) guidelines a significant effect in ecological terms is defined as an effect that "*either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general*". In EIA terms, this is an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project.

6.2.17 In common with the approach taken elsewhere in this ES, CIEEM guidance does not define particular levels of significance. However, a geographic scale at which the effect is significant is applied where appropriate, in order to determine a proportionate response in developing mitigation measures, and help inform the decision-making response to any residual effects.

6.2.18 Any significant ecological effects are subject wherever feasible to additional mitigation measures, with the aim of avoidance, reduction or compensation. The significance of residual effects is then re-assessed.

Limitations

6.2.19 There were no limitations which affected the ability to assess ecological effects. Field surveys were undertaken at an appropriate season, and within weather parameters which did not impose any constraints on data gathering.

6.3 Baseline

Baseline Ecological Data

6.3.1 The following section summarises baseline ecological data relating to the Site and its surroundings. See Appendix 6.1 (PEA) for full details of the results of data searches and a summary of existing survey data. The PEA also includes a more detailed account of the Extended Phase 1 Habitat Survey, including a habitat survey plan. Appendix 6.2 (Bat roost survey) and Appendix 6.3 (Breeding bird survey) should be also be referred to for further details of relevant survey results.

Site Context

Designated Conservation Sites

6.3.2 There are no statutory or locally designated nature conservation sites, Yorkshire Wildlife Trust reserves or ancient woodlands within 2km of the Proposed Development. The nearest statutory site is Bishop Monkton Ings SSSI (Site of Special Scientific Interest), a wetland site located 4.3km to the south-west of the Site boundary.

Protected Species Records

6.3.3 The local biological records centre (NEYEDC) did not have any recent records of protected species within the 2km search radius. A previous (2008) survey had recorded three species of foraging bat – common pipistrelle (*Pipistrellus pipistrellus*), *Myotis* sp., and noctule (*Nyctalus noctula*).

Priority Species Records

6.3.4 NEYEDC records included one priority mammal species within the 2km search radius, a 2014 record of polecat (*Mustela putorius*). A number of priority bird species were recorded in the 2008 surveys, of which corn bunting (*Emberiza calandra*) and yellow wagtail (*Motacilla flava*) were most notable in terms of conservation status and scarcity.

Habitats and Vegetation

6.3.5 The spatial disposition of habitats on Site is shown on the Phase 1 Habitat Survey plan (Appendix 6.1, Figure 1), which should be referred to in order to illustrate the following summary. Further details of habitats and flora are also given in a series of target notes, appended to the PEA.

6.3.6 The Site comprises arable fields bounded by generally species-poor hedgerows on each side of the A1(M). There are two mature hedgerow oak trees on the western Site boundary, and some much younger immature hedgerow trees on the western boundary of the A1(M). All except one field supported autumn-sown crops such as winter wheat at the time of survey. The A168 Leeming Lane runs parallel to the A1(M) within the Site; an immature broadleaved plantation separates the two roads, while there are also coarse neutral grassland habitats associated with the A168.

Fauna: Mammals

Bats

6.3.7 The bat survey did not locate any roosts in trees which had been identified as supporting potential roost features. A single *Myotis* sp. bat was recorded foraging along the western boundary of the Site, leaving in a westerly direction before dawn. This was indicative of a very low level of bat activity, likely due to the relatively open and exposed nature of the surrounding landscape.

Other protected mammal species

6.3.8 The walkover survey found no evidence of use of the Site by badger (*Meles meles*). There were no habitats on or near the Site suitable for use by riparian mammals such as water vole (*Arvicola amphibia*) or otter (*Lutra lutra*).

Other species

6.3.9 Parts of the Site showed evidence of reasonably high levels of rabbit (*Oryctolagus cuniliculus*) activity. Roe deer (*Capreolus capreolus*) were noted in the arable field to the west, and were likely to utilise the Site for foraging.

Fauna: Birds

Breeding Birds

6.3.10 Breeding birds within the Site were restricted to hedgerow and plantation habitats, with none utilising arable fields within the Site. There were up to four pairs of skylark (*Alauda arvensis*) holding territory in adjoining arable fields to the east, south and west.

6.3.11 Breeding was confirmed for blue tit (*Cyanistes caeruleus*), with a nest located in one of the mature trees on the western Site boundary. Probable breeding species included several wren (*Troglodytes troglodytes*), robin (*Erithacus rubecula*) and chaffinch (*Fringilla coelebs*) territories, with single territories of whitethroat (*Sylvia communis*), great tit (*Parus major*), long-tailed tit (*Aegithalos caudatus*) and blackbird (*Turdus merula*). Possible breeding species on Site, or whose territories partially overlapped with the Site, included yellowhammer (*Emberiza citrinella*), dunnock (*Prunella modularis*), song thrush (*Turdus philomelos*) and linnet (*Linaria cannabina*).

6.3.12 There was no evidence of corn bunting or yellow wagtail within the Site or its surroundings. Both species had been recorded in 2008 (surveys undertaken for a previous planning application at the Site), but there was little suitable habitat for either species present in 2017.

Non-breeding species

6.3.13 Two species of wader were recorded in the survey, but with no evidence of breeding on or near the Site. Up to three oystercatchers (*Haematopus ostralegus*), including one probable pair, were noted overflying the western section of the Site on several occasions, with an inferred origin on land further to the south-west. They were also seen on one occasion within the site, in a young maize field to the east of the A1(M). Two lapwing (*Vanellus vanellus*) were also seen on one occasion in this field, but did not show any evidence of holding territory on Site, and flew off to the west.

Fauna: Amphibians

6.3.14 There are no suitable habitats for breeding amphibians on Site, with no standing or running water. The only water body within 500m of the Site is a largely dried-up pond located a minimum distance of 370m south of the nearest Site boundary, and separated from it by the B6265 road.

Important Ecological Features

Protected Species

6.3.15 In order to assess the level of value of protected species as important ecological features, it is important to consider the following:

- the extent to which the Site contributes to the maintenance of their conservation status in the wider area; and
- their level of legal protection, in order to address whether and how the Proposed Development could proceed in accordance with current legislation, and assess whether any operations may require a Natural England disturbance licence.

6.3.16 The only protected species' recorded in surveys were bats – a single *Myotis* species in 2008 and the present survey, together with noctule and pipistrelle in 2008. Activity levels were very low, and no roost sites were identified. The Site

can therefore be regarded as being of negligible value for bats. However, given their protected status, it is still necessary to consider them as an important ecological feature for the purposes of impact assessment.

Priority Species and Habitats

Priority Habitats

6.3.17 One priority habitat listed under Section 41 of the Natural Environment and Rural Communities Act 2006 occurs on site: hedgerows. Although hedgerows on the Site were poor in woody plant species, many were of recent origin (planted in association with highway improvements), and some were poorly structured, all native species hedgerows qualify as priority habitats.

6.3.18 A total length of around 2.47km of hedgerow lies within the Site boundary, equating to a hedgerow density of over 11.2km/km^2 (based on a 22ha Site area). This would represent a relatively high hedgerow density for an agricultural landscape with large field sizes, and reflects the relative importance of highway hedges.

6.3.19 Hedgerows should be considered important ecological features on a local scale for the purposes of assessment.

Priority and Red / Amber Listed Bird Species

6.3.20 Six priority bird species (listed pursuant to Section 41 of the NERC Act) were recorded in the 2017 surveys, and were thought to be possibly breeding on or close to the survey area:

- Skylark;
- House sparrow (*Passer domesticus*);
- Dunnock;
- Song thrush;
- Yellowhammer; and
- Reed bunting.

6.3.21 Linnets were recorded foraging and overflying the eastern part of the Site, and were recorded as possibly breeding to the south-east of the Site.

6.3.22 An additional non-breeding species, lapwing, was recorded on one occasion. Lapwing, skylark, song thrush, house sparrow, linnet and yellowhammer are also

on the BTO / RSPB Red List of birds of conservation concern[2]. Dunnock is on the Amber list, together with another non-breeding species recorded, kestrel (*Falco tinnunculus*).

6.3.23 Although having an unfavourable conservation status on a national level, all remain common and widespread. Taking into account numbers present on Site relative to regional and national populations, none can be regarded as important ecological features.

6.3.24 Skylark, linnet, yellowhammer, reed bunting and lapwing can be considered as members of the farmland breeding bird assemblage, and as such can be assessed collectively as a potentially important ecological feature. However, numbers of individuals and species diversity of the assemblage is insufficient to be considered as an important ecological feature even on a local scale of importance.

Other Potentially Important Features

6.3.25 The immature broadleaved plantations established on and adjacent to the Site, alongside the A1(M) and B6265, add to the overall species diversity of the survey area. Examples include the provision of a habitat for species of scrub and woodland edge habitats, including migratory bird species such as blackcap and chiffchaff, and invertebrates such as yellow-tail moth (*Euproctis similis*). However, their proximity to the motorway is likely to limit their potential value for breeding birds and possibly foraging bats; there is evidence for effects of traffic noise on breeding density and success of some bird species[3], and evidence for avoidance effects on some bat species[4]. Plantations are also relatively small and fragmented, and do not provide good habitat continuity with the wider, generally more open, agricultural landscape. Although their current value is of no more than site-level importance, for the purposes of ecological impact assessment they can be considered as contributors to the overall biodiversity interest of the Site.

6.3.26 Areas of grassland within the Site are species-poor, mostly comprising tall species indicative of little or no grazing or mowing pressure, such as false oat-grass (*Arrhenatherum elatius*) and associated tall herbs. The presence of bee orchid in

[2] Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708–746.

*[3] Slabbekoorn, H. & Ripmeester, E.A.P. (2007). Birdsong and anthropogenic noise: implications and application for conservation. Molecular Ecology, **17**, 1-8.*
*[4] Gerald, K, & Markus, M. (2009). Species-specific barrier effects of a motorway on the habitat use of two threatened forest-dwelling bat species. Biological Conservation, **142**, 270-279.*

one area is unusual, as a species more usually associated with species-rich swards, but cannot be considered to constitute an important ecological feature in its own right. Again, however, there is the potential for grassland habitats to contribute to the overall biodiversity interest of the Site.

Summary of important ecological features

6.3.27 The table below summarises important ecological features which should be considered in the assessment of ecological effects:

Table 6.1: Important ecological features

Feature	Legal and policy status	Level of importance on site
Hedgerows	Section 41, Natural Environment & Rural Communities Act 2006	Local scale of importance, contribute to overall biodiversity value of site and surrounds
Bats (*Myotis* sp., common pipistrelle, noctule records)	Annex IVa Habitats Directive; Habitats Regulations 2010	Negligible importance, low activity levels
Farmland bird assemblage	Wildlife & Countryside Act 1981; Regulation 9A(8), Habitats Regulations 2010; Section 41 NERC Act 2006	Within-site importance, contribute to overall biodiversity value of site
Neutral grassland	Not priority habitats	Within-site importance, contribute to overall biodiversity value of site
Broadleaved plantation		

6.4 Assessment of Effects

Potential ecological impacts

6.4.1 Potential ecological impacts of the Proposed Development include the following:

- Loss of existing habitats due to the land-take necessary for construction and operational purposes;
- Risk of downstream ecological impacts on the water environment, including construction phase risks, and changes in surface run-off rates and water quality;
- Potential air quality effects of increased vehicle traffic;
- Disturbance of bat foraging habitat around the periphery of the Proposed Development through the introduction of artificial lighting;
- Disturbance of habitats and species in the vicinity of the development from traffic noise and vehicle movements; and

- Increased human disturbance in proximal habitats.

6.4.2 The ecological effects of these potential impacts are assessed after first considering mitigation measures which will be incorporated into the Proposed Development's design, construction and operation.

Incorporated Mitigation

Avoidance or Reduction of Effects on Hedgerows and Other Habitats

6.4.3 The Indicative Landscape Masterplan provides for retention of the western boundary hedge and associated mature oak trees, together with the a large proportion of the broadleaved plantation to the east of the A1(M). These retained areas incorporate an appropriate standoff of soft landscaping to ensure protection of the tree and hedgerow rooting zone.

6.4.4 Measures to protect retained vegetation during the construction phase of the development will be set out in a Construction Environmental Management Plan (CEMP), as outlined in Chapter 4.0 (Scheme Description and Construction Methods).

Avoidance of Effects on the Water Environment

6.4.5 Measures will be incorporated into construction methods to reduce the risk of effects on the water environment to a negligible level. As outlined in Chapter 4.0, these will be implemented through the CEMP, and will include methods both to protect the water environment, and respond to any incidents with appropriate emergency procedures. As described in Chapter 10.0 Surface Water and Flood Risk, risks to the water environment in the absence of mitigation measures are low, due to the lack of watercourses on site, and drainage solutions utilising soakaways rather than point-source discharges.

6.4.6 The Indicative Landscape Masterplan provides for a number of attenuation basins, located to intercept surface water drainage from vehicle parking areas and buildings. Chapter 10.0 describes how these will function in accordance with Sustainable Urban Design principles to avoid effects of changes in run-off rates. As described in Chapter 4.0 (section 4.7), measures such as petrol interceptors, oil separators and vortex separator are proposed as measures to mitigate potentially polluted water from flowing into the infiltration basins, intercepting and containing pollutants arising from parking areas and re-fuelling facilities. These measures will

avoid risks of ecological effects on the water environment during the operational phase of the Proposed Development, and provides a greater potential for the attenuation features to provide positive biodiversity benefits.

Reduction in Potential Effects of Lighting

6.4.7 Chapter 4.0 describes the general approach adopted to lighting at the Site, which is set out in detail in Appendix 4.1. This includes reference to best practice lighting design and measures to reduce lateral and upward light spillage. The lighting design has ensured that light spillage along the western boundary is limited to less than 1 lux, ensuring that there is no effect on the use of this boundary as bat foraging habitat.

Reduction in Human Disturbance

6.4.8 The Indicative Landscape Masterplan currently places activities which may be more disturbing to wildlife, such as dog-walking and informal exercise areas, within the central parts of the Site. Peripheral areas are occupied by vehicle access and circulation routes, which are inherently less disturbing to wildlife in adjoining habitats than the movement of people and pets outside of vehicles.

Construction Phase Predicted Ecological Effects

Direct Effects on Habitats

6.4.9 The construction phase of the Proposed Development will result in the loss of 0.9km of hedgerow on the western boundary of the motorway, in order to accommodate slip roads. A short length of hedgerow (55m) within the Site will also be lost, together with a longer field boundary supporting a largely defunct hedge consisting of scattered shrubs interspersed with species-poor grassland.

6.4.10 To the east of the A1(M), re-alignment of the A168 Leeming Lane may require the loss of just over 200m of hedgerow in the north-eastern boundary of the Site, with the northernmost end including some immature trees. The western ends of two field boundary hedgerows will also be shortened by a total of up to 80m. Two further hedgerow breaches will be required to the south, including an area of adjoining immature ash trees adjoining the A168 / B6265 roundabout.

6.4.11 Other habitats affected include part of the immature broadleaved plantation on the east side of the A1(M), due to construction of slip roads onto the southbound

carriageway of the motorway, and over-bridge construction. Neutral grassland habitat will also be affected by construction of a new roundabout on the east side of the over-bridge.

6.4.12 The remainder of the Site within the Proposed Development footprint is largely composed of arable land, together with small areas of road verge grassland, and sections of existing roads and farm access tracks.

Direct Effects on Protected Species

6.4.13 There would be no direct effects on protected species during the construction phase of the Proposed Development.

Direct Effects on Birds

6.4.14 Very small magnitude effects are predicted on priority bird species. The re-aligned A168 will result in the loss of a small area of arable land (ca. 1.7ha), part of two much larger arable fields, and forming part of two skylark territories. Habitat quality for skylarks was poor at the time of survey, with the land supporting winter-sown cereal and oil-seed rape, and this small magnitude loss of territory is very unlikely to reduce the carrying capacity of the adjoining land and result in displacement of birds.

6.4.15 Road re-alignment on the eastern side of the Site may also result in disturbance and partial loss of habitat for one dunnock, song thrush and yellowhammer territory. Part of a dunnock territory may be affected within the main development area to the west of the A1(M).

6.4.16 Direct effects of habitat loss due to road re-alignment on non-priority species may affect up to 5 wren, 3 blackcap, 2 chaffinch, robin, great tit and blackbird territories, and one long-tailed tit, blue tit, and whitethroat territory. No additional direct effects are predicted on non-priority species to the west of the motorway.

Effects on Water Environment

6.4.17 Potential increased risks to the water environment during the construction phase are discussed in more detail in Chapter 10.0. Incorporated mitigation measures described above are designed to avoid or reduce risks to the water environment, and thereby result in a negligible risk of significant ecological effects.

Effects of Noise, Lighting and Human Disturbance

6.4.18 Construction of buildings, car parks and roads may result in additional short-term disturbance and temporary displacement of birds occupying adjacent habitats, and may reduce habitat quality for foraging bats on the western Site boundary.

6.4.19 Likely effects on bats are extremely small in magnitude due to the low levels of recorded activity, and would be limited to works requiring night-time lighting during the bat activity period. This may involve construction of the overbridge and slip roads.

6.4.20 In terms of priority bird species, short-term increases in human disturbance and noise may affect part of a further dunnock territory, and a yellowhammer territory on the western boundary of the Site. Non-priority species include a breeding blue tit on the western boundary, and species occupying adjoining broadleaved woodland habitat to the south – 2 wren territories, together with blackcap, blackbird, robin and great tit territories.

Operational Phase

Effects on Habitats

6.4.21 Following completion of construction, the main effect on habitats would be the establishment and maturation of the Proposed Development's soft landscape. This may vary according to detailed design, but is likely to result in:

- A small net increase in broadleaved plantation habitats relative to the current baseline, due the extension of planting to the east of the A1(M);
- An increase in grassland habitats relative to current baseline, including on land to the north-east of the MSA, and east of the A1(M) on the former route of the A168;
- Maintenance of comparable lengths of hedgerow relative to current baseline, due to new planting along the east side of the re-aligned A168, hedgerow proposed within the main MSA area, and hedgerow proposed to the north of the new northbound motorway entrance slip-road;
- Introduction of wet grassland and / or wetland habitats within attenuation ponds and basins.

6.4.22 Given the limited ecological interest of the arable habitats on Site, this represents a positive ecological effect of minor magnitude.

Effect on Birds

6.4.23 The Proposed Development will result in a permanent loss of habitat availability for members of the farmland bird assemblage which require open habitats for feeding and reproduction. These include skylark, although the displacement will be minor, with a small part of two territories on the eastern edge of the Site affected by re-alignment of the A168. Yellowhammer, linnet and lapwing (a non-breeding species) are also less likely to utilise the Site.

6.4.24 Other species are likely to maintain or increase populations in and around the Site, in response to retention and expansion of some habitats, and creation of new habitats. Of the priority species recorded, dunnock and song thrush are likely to respond positively to the expansion of woodland edge and grassland habitats. Of the Amber-listed species recorded, oystercatcher are likely to make more use of the Site than at present, due to the presence of wetland habitats with penetrable ground in the attenuation basins, as well as open grassland; oystercatchers are relatively tolerant of noise and disturbance from vehicle movements. Reed bunting, another Amber-listed and Section 41 species recorded close to the site, is also likely to utilise any wetland habitats which retain sufficient marginal cover. Non-priority species associated with hedgerow and woodland edge habitats are also likely to maintain or increase their populations.

6.4.25 Because of the higher breeding densities found in scrub, hedgerow and woodland habitats, it is a reasonable expectation that the number of territories across the Site will increase as a consequence of the Proposed Development.

Effects on the Water Environment

6.4.26 Incorporated mitigation outlined above and described in more detail in Chapter 10.0 of this ES will ensure there is no risk of adverse ecological effects on the water environment during the operational phase of the Proposed Development.

Air Quality Effects

6.4.27 As outlined in the description of the Site's ecological context above, there are no features within 2km which could be considered as sensitive receptors with respect to air quality impacts.

6.4.28 The Air Quality Assessment (AQA; Chapter 8.0) does not predict any significant changes on sensitive ecological receptors as a consequence of the Proposed Development.

Effects of Noise

6.4.29 No important ecological features with a high sensitivity to noise have been identified in the vicinity of the Proposed Development. Its location adjacent to the A1(M) means that species present are already tolerant or habituated to traffic noise.

Effects of Lighting

6.4.30 As noted in the Incorporated Mitigation section above, lighting levels of 1 lux or less along the western boundary of the Site would prevent impacts occurring on light-sensitive bat species using this boundary.

Effects of Human Disturbance

6.4.31 The design of the Site in the Illustrative Masterplan does not introduce significant new human disturbance into peripheral parts of the Site, limiting potential human disturbance to within-site habitats. There are no disturbance sensitive species in close proximity to the Proposed Development. There is therefore a very low risk of significant ecological effects.

Effect Significance

Effects on important ecological features

6.4.32 The table below summarises predicted effects on important ecological features and assesses their significance in terms of effect on conservation status in the local area.

Table 6.2: Impact significance

Interest feature	Scale of importance	Impacts	Potential impact on site integrity or conservation status
Hedgerows	Local	Partial loss of features during construction, offset by additional planting	Will not affect the conservation status of the feature in local area or affect habitat connectivity. **Negligible significance.**

Interest feature	Scale of importance	Impacts	Potential impact on site integrity or conservation status
Farmland bird assemblage	Within-site	Limited loss of potential breeding sites for small numbers of birds, minor disturbance effects	Negligible risk of affecting local conservation status of any component species. **Negligible significance.**
Broadleaved plantation woodland	Within-site	Partial loss of habitat in short – medium term, offset by additional planting	Short to medium-term effect on extent in local area, offset by additional planting. **Negligible significance**
Neutral grassland	Within-site	Partial loss of habitat in short – medium term, offset by additional habitat creation	Short-term effect on extent in local area, offset by additional habitat creation. **Negligible significance**

Effects on Protected Species

6.4.33 The Proposed Development is not predicted to contravene legislation protecting European protected species, insofar as no harm to individuals, deliberate disturbance, or damage or destruction of breeding sites or resting places is likely to occur.

6.4.34 There is a risk of contravention of bird protection legislation, if habitats used by breeding birds are cleared when occupied nests, eggs or dependent young are present. This primarily concerns hedgerow, scrub, woodland and tall herb vegetation, although some ground-nesting species of arable habitats were present around (but not on) the site, notably skylark and oystercatcher.

6.4.35 Incorporated mitigation measures, including reduction of light spill to <1 lux along the western boundary to ensure that the potential value of habitats along this boundary is maintained for foraging bats.

6.5 Mitigation

6.5.1 In terms of legislative compliance, it is necessary to restrict clearance of suitable bird breeding habitats to periods outside the bird breeding season, which for most species present on site runs from April to end-July – early August. Any clearance

works within this period should be inspected by a suitably qualified ecologist, with any areas used by nesting birds marked and avoided. Surveys did not indicate use of the Site by any Schedule 1 (Wildlife and Countryside Act) breeding birds, where it is additionally necessary to avoid disturbance.

6.5.2 As no significant effects have been identified, there are no requirements in EIA terms to undertake additional ecological mitigation. Incorporated mitigation measures include sufficient habitat creation, and control of potential ecological effects, to ensure the Proposed Development should be able to achieve no net loss of biodiversity interest.

6.5.3 There remains, however, significant scope in matters of detailed design and management to achieve a net biodiversity benefit. This should not be understated, since the location of the Site in an intensively managed arable landscape and in close proximity to a motorway, which currently imposes limitations on potential ecological value.

6.5.4 Enhancement measures, consistent with the illustrative masterplan, which would provide significant biodiversity benefits on a local scale include:

- Retaining permanent wetland habitats in at least some of the surface water attenuation basins;
- Utilising appropriate wildflower and grass mixes, locally-sourced wherever practicable, in order to establish species-rich grassland;
- Ensuring hedgerow planting utilises diverse, locally-native shrub species, and maintenance measures retain hedgerow structural diversity;
- Designing and managing areas of trees / woodland to develop understory and ground flora species; and
- Managing grassland and wildflower areas to maximise avian and invertebrate value.

6.6 Residual Effects and Conclusions

6.6.1 There would be no significant adverse residual ecological effects arising from the Proposed Development. The predicted change in habitats would see some changes in species composition of the Site, but this would not be reflected in a significant change in its biodiversity interest.

6.6.2 Implementation of the additional mitigation and enhancement described above would ensure there is no net loss of biodiversity interest. Furthermore, the scheme would have a reasonable prospect of achieving a net biodiversity benefit, measured in terms of parameters such as bat foraging activity, numbers of breeding bird territories, and species such as aquatic invertebrate flora and fauna likely to colonise new habitats on Site.

6.6.3 With respect to ecology and nature conservation, the Proposed Development would therefore not result in any significant adverse environmental effects in EIA terms and would deliver significant biodiversity benefit, on a local scale, when compared to the current situation.