

5. ECOLOGY & NATURE CONSERVATION

5.1 INTRODUCTION

- 5.1.1 This chapter describes the ecological assessment carried out to date in respect of land adjacent to Junction 15 of the M1 (referred to herein as the 'Main Site') a bypass to the west of Roade, and associated 'Highway Mitigation Measures' that includes works proposed at locations along the A508 road corridor and other minor nearby roads.
- 5.1.2 A detailed description is provided in Chapter 2 of this ES, but the highways measures can be summarised as:
- 1) Highway Mitigation Measures adjacent to the 'Main Site'
 - a. Construction of a new roundabout on the A508 Northampton Road to serve as the access to the Development, configured to require all departing HGVs to travel north to M1 Junction 15 (DCO document 2.4B);
 - b. Dualling of the A508 carriageway between the new site access roundabout and M1 Junction 15 (DCO document 2.4B);
 - c. Significant enlargement and reconfiguration of M1 Junction 15 (DCO document 2.4A and 2.4B);
 - d. Widening of the A45 to the north of M1 Junction 15 and the signalisation of the Watering Lane junction (DCO document 2.4B);
 - 2) Alterations of M1 Junction 15A to provide an additional lane and signalisation (DCO document 2.4F);
 - 3) Construction of a new Bypass to the west of Roade between the A508 Northampton Road to the north of Roade and the A508 Stratford Road to the south of Roade, including a four arm roundabout connecting the Bypass to Blisworth Road (referred to as the 'Bypass Corridor' or 'Bypass Site' (DCO documents 2.4C and 2.4D);
 - 4) Alterations at key locations along the A508 as part of an 'A508 route upgrade'; comprising:
 - a. Blisworth Road (Courteenhall Road) junction improvement (DCO document 2.4C);
 - b. Rookery Lane/Ashton Road junction improvement (DCO document 2.4F);
 - c. Pury Road junction improvement (DCO document 2.4F);
 - d. Knock Lane/Stoke Road junction improvement (although not on the A508, this is required as a result of changing traffic volumes on the A508) (DCO document 2.4F);
 - e. Provision of a pedestrian crossing at a bus stop in Grafton Regis (DCO document 2.4F).
- 5.1.3 All of the land involved in delivering the Northampton Gateway proposals as a whole – Main Site, the Bypass, and the Highways Mitigation Works – is referred to as the Proposed Development.
- 5.1.4 This Chapter assesses the likely significant environmental effects in terms of the features of ecological importance that are present within and adjacent to the Proposed Development.

Figures

- 5.1.5 The Figures referred to in this chapter are:
1. Figure 5.1: Designated Sites and Protected / Notable Species;
 2. Figure 5.2: Phase-1 Habitat Plan (Main Site); and
 3. Figure 5.3: Phase-1 Habitat Plan (Bypass Corridor)

Potential Effects

- 5.1.6 As required by legislation and best practice the potential effects occurring as a result of the Proposed Development fall into the following broad categories:
4. Direct or indirect;
 5. Short or long-term;
 6. Intermittent, periodic or permanent; and
 7. Cumulative
- 5.1.7 Potential impacts to ecological features may therefore include the following:
8. Direct loss of habitats and associated flora and fauna within the site boundaries;
 9. Decrease in the importance of ecological features through reduction in the structure and function of habitats and dependant fauna;
 10. Fragmentation of habitat connectivity;
 11. Indirect impacts on retained vegetation within and bordering the site, through increase in disturbance, such as local changes in the soil structure, nutrient status and / or hydrology;
 12. Disturbance causing displacement of protected or notable species from the site and surrounding area;
 13. Creation of new habitats; and
 14. Beneficial impacts arising as a result of the favourable long-term management of ecological features
- 5.1.8 Later sections of this Chapter set out the methodology for the assessment, including the levels of significance.

5.2 RELEVANT POLICY & LEGISLATION

Planning Policy

- 5.2.1 The current policy framework relating to ecology at national and local levels, and also the Priority Habitats and Species of the Northamptonshire Biodiversity Action Plan¹ (BAP) that are relevant to the current application, are summarised in Table 5.1.

¹ Northamptonshire Biodiversity Partnership (2016) *Northamptonshire Biodiversity Action Plan 3rd Edition (Draft 4 21/01/16)* <http://www3.northamptonshire.gov.uk/councilservices/environment-and-planning/planning/planning-policy/archaeology-biodiversity-and-landscape/documents/PDF%20Documents/Northamptonshire%20BAP%202015-2020.pdf> (Accessed 26.09.17)

Table 5.1: Policy Context Relevant to Assessment

Policy Document	Policy Issue	
National		
<p>National Policy Statement for National Networks (NN NPS), December 2014</p>	<p>Section 5 (Generic Impacts)</p>	<p><i>The NPS sets out the national vision and policy for the future development of nationally significant infrastructure projects on the national road and rail networks. Core to this is that the Government recognises that for development of the national road and rail networks to be sustainable these should be designed to minimise social and environmental impacts and improve quality of life. Section 5 sets out how impacts should be considered. Biodiversity and ecological conservation is dealt with between 5.20 – 5.38.</i></p> <p><i>“Where the project is subject to EIA the applicant should ensure that the environmental statement clearly sets out any likely significant effects on internationally, nationally and locally designated sites of ecological or geological conservation importance (including those outside England) on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity and that the statement considers the full range of potential impacts on ecosystems.”</i></p> <p><i>“The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.”</i></p> <p><i>“...development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives. The applicant may also wish to make use of biodiversity offsetting.”</i></p> <p><i>It is accepted that:</i> <i>“Sites of regional and local biodiversity and geological interest (which include Local Geological Sites, Local Nature Reserves and Local Wildlife Sites and Nature Improvement Areas) have a fundamental role to play in meeting overall national biodiversity targets..... The Secretary of State should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent. “</i></p> <p><i>“Development proposals potentially provide many opportunities for building in beneficial biodiversity or geological features as part of good design...the Secretary of State should consider whether the applicant has maximised such opportunities in and around developments.”</i></p> <p><i>“Applicants should include appropriate mitigation measures as an integral part of their proposed development, including identifying where and how these will be secured.”</i></p>

Policy Document	Policy Issue	
<p>NPPF Planning Practice Guidance¹</p>	<p>Section 11</p>	<p><i>The National Planning Policy Framework (NPPF) sets out the Government's requirements for the planning system. The key element of the NPPF is that there should be 'a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking' (paragraph 14). It is important to note however that this presumption 'does not apply where development requiring Appropriate Assessment under the Birds or Habitats Directives is being considered, planned or determined' (paragraph 119)</i></p> <p><i>The Natural Environment & Biodiversity is dealt with at Section 11 of the NPPF entitled Conserving and Enhancing the Natural Environment. The following are relevant to the proposals:</i></p> <p><i>"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".(Para 109)</i></p> <p><i>"In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment" (para 110).</i></p> <p><i>Guidance is also provided to Local Planning Authorities on planning policies and criteria for planning permission with regard to minimising impacts on biodiversity and geodiversity.</i></p> <p><i>Paragraph 118 of the NPPF comprises a number of principles which Local Authorities should apply, including encouraging opportunities to incorporate biodiversity in and around developments; provision for refusal of planning applications if significant harm cannot be avoided, mitigated or compensated for; applying the protection given to European sites to potential SPAs, possible SACs, listed or proposed Ramsar sites and sites identified (or required) in delivering compensatory measures for adverse effects on European sites; and the provision for the refusal for developments resulting in the loss or deterioration of 'irreplaceable' habitats unless the need for, and benefits of, the development in that location clearly outweigh the loss.</i></p>

Policy Document	Policy Issue	
Local		
West Northamptonshire Joint Core Strategy	BN1	<i>Green Infrastructure Connections</i> Seeks to incorporate and enhance green Infrastructure connections and secure their long term management
	BN2	<i>Biodiversity</i> Which seeks to maintain and enhance existing designations and assets or deliver a net gain in biodiversity
	BN3	<i>Woodland Enhancement & Creation</i> Which supports proposals to enhance and create new woodlands in west Northamptonshire
	BN4	<i>Upper Nene Valley Gravel Pits Special Protection Area</i> Seeks to prevent development that would have an adverse impact on the SPA and Ramsar site including the loss of supporting habitat.
South Northamptonshire Local Plan – Saved Policies	EV19	<i>Trees & Woodland</i> Seeks to prevent the felling of trees in a conservation area or subject to TPO
	EV21	<i>Hedgerows, Ponds & Other Landscape Features</i> Proposals will be expected to retain wherever possible, or failing that replace trees, hedgerows, ponds or other landscape features where they make an important contribution to the character of the area
	EV24	<i>Species Protection</i> Permission will only be granted for development where it will not lead to significant loss or harm to regionally important geological and geomorphological sites and county wildlife sites. Where permitted the retention and protection of such sites may be secured through planning conditions or obligations.
	EV25	<i>Wildlife Corridors, Rivers & Waterways</i> The council will not permit development that adversely affects the nature conservation, landscape or wildlife value of dismantled railways or waterways and watercourses.
Upper Nene Valley Gravel Pits Supplementary Planning Document	SPD	<i>This SPD was produced to assist Local Planning Authorities, developers and others in order to ensure that development has no significant effect on the Upper Nene Valley Special Protection Area / Ramsar, in accordance with the legal requirements of the Habitats & Species Regulations 2010 (as amended).</i> <i>The SPD outlines a consistent approach to consulting with Natural England, levels of survey effort and assessment to identify any potential significant effects on the qualifying features of the SPA / Ramsar.</i>
Biodiversity Supplementary Planning Document for Northamptonshire	SPD	<i>This document provides an explanation and standardised approach for the integration of biodiversity into the development process, in order to ensure that legislation and policy requirements are met and best practice standards are achieved.</i> <i>The SPD expands upon the principles set out in the NPPF and also the relevant policies of the Local Plan.</i>

Policy Document	Policy Issue	
South Northamptonshire Supplementary Planning Guidance	SPD	<i>The Nature Conservations Supplementary Planning Guidance published by South Northamptonshire outlines guidance on planning for nature conservation as part of the development process. It includes background on the districts biodiversity and information on the protection of existing ecological features and the means for creation, management and financial support of semi-natural habitats.</i>
Northamptonshire Local Biodiversity Action Plan	<p data-bbox="532 519 628 583">Priority Habitats</p> <p data-bbox="532 865 628 929">Priority Species</p>	<p data-bbox="676 519 1482 700"><i>The Northamptonshire LBAP Identifies local and national priority habitats and species, and sets targets for their conservation, outlines mechanisms for achieving these. The latest Northamptonshire Local Biodiversity Action Plan (LBAP) lists 2 Species Action Plans (SAPs) and 16 Habitat Action Plans (HAPs). Those that are relevant to this site are:</i></p> <p data-bbox="676 707 806 736"><i>Hedgerows</i></p> <p data-bbox="676 743 884 771"><i>Lowland Meadows</i></p> <p data-bbox="676 778 753 806"><i>Ponds</i></p> <p data-bbox="676 813 739 842"><i>River</i></p> <p data-bbox="676 865 782 893"><i>Barn Owl</i></p> <p data-bbox="676 900 778 929"><i>Dunnock</i></p> <p data-bbox="676 936 761 964"><i>Skylark</i></p> <p data-bbox="676 971 813 999"><i>Song thrush</i></p> <p data-bbox="676 1006 748 1034"><i>Linnet</i></p> <p data-bbox="676 1041 838 1070"><i>Yellowhammer</i></p> <p data-bbox="676 1077 830 1105"><i>Reed Bunting</i></p> <p data-bbox="676 1112 847 1140"><i>Barbastelle Bat</i></p> <p data-bbox="676 1147 813 1176"><i>Noctule Bat</i></p> <p data-bbox="676 1183 927 1211"><i>Brown Long-eared Bat</i></p> <p data-bbox="676 1218 884 1246"><i>Soprano Pipistrelle</i></p> <p data-bbox="676 1253 739 1281"><i>Otter</i></p>

Legislative Context

5.2.2 In addition to the context provided by the NPS, the nature conservation legislation that has been used to inform this assessment is as follows:

- **Natural Environment and Rural Communities (NERC) Act 2006²**

Section 41 of the Natural Environment and Rural Communities Act, 2006 requires that the Secretary of State should produce a list of ‘habitats and species of principal importance for conservation of biodiversity’. The list guides decision makers in having regard to the conservation of biodiversity when carrying out their normal functions

- **Wildlife and Countryside Act 1981 (as amended)³**

The Wildlife and Countryside Act, 1981 (as amended) is the principal mechanism for wildlife protection in the UK. It was originally aimed at consolidating and amending previous legislation to implement the requirements of the Bern Convention and the Birds Directive.

Under the Wildlife and Countryside Act, 1981 nature conservation site protection measure in the UK (i.e. the statutory designation of Sites of Special Scientific Interest (SSSI)) is established.

It provides a range of protection relating to wild birds, other animals, and plants.

- **Conservation of Habitats and Species Regulations 2017**

The Conservation of Habitats and Species Regulations 2017 consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law.

The Regulations provide for the designation and protection of ‘European sites’, the protection of ‘European protected species’, and the adaptation of planning and other controls for the protection of European Sites.

- **The Protection of Badgers Act 1992**

Under the Protection of Badgers Act 1992 the following acts relevant to the proposals are criminal offences: taking, injuring or killing badgers, cruelly ill-treating a badger and interfering with badger setts.

Licences can be obtained under the Act to carry out certain acts which would otherwise be forbidden by the Act for the following purposes. This includes for the purpose of development

- **The Hedgerow Regulation 1997⁴**

These regulations, enforced under the Environment Act 1995, restrict the removal of important agricultural hedgerows, or parts of them which are over 20m in length.

The regulations include criteria for identifying “important” hedgerows where notice must be given for their removal. Exemptions to this include the carrying out of planning permission.

2 Natural Environment and Rural Communities Act 2006 (c 16) HMSO, London

3 The Wildlife and Countryside Act 1981 (as amended) (c 69) HMSO, London

4 Hedgerow Regulations 1997 (SI 1997/1160)

5.3 ASSESSMENT METHODOLOGY & SIGNIFICANCE CRITERIA

Baseline

Desk Study

- 5.3.1 The following organisations / individuals were approached in September 2016 and / or 2017 for existing ecological data regarding the Proposed Development and surrounding area:
- The Multi-Agency Geographic Information for the Countryside (MAGIC) website;
 - Northamptonshire Biodiversity Records Centre;
 - Northamptonshire Amphibian & Reptile Recorder (September 2016 only);
 - Northamptonshire Bat Group;
 - Northamptonshire Bird Recorder (September 2016 only); and
 - North Northants Badger Group.
- 5.3.2 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence are described in Table 5.2. Where a greater distance has been considered this is indicated in the text.

Table 5.2: Search Area

Distance from DCO limits including highway mitigation works	Source of Information
10km	Sites of International Importance, e.g. Special Areas of Conservation (SAC), Special Protection Area (SPA), Ramsar Site
2km	Sites of National or Regional Importance, e.g. Sites of Special Scientific Interest (SSSI)
1km	Sites of County Importance, i.e. Local Wildlife Sites (LWSs), potential Local Wildlife Sites (pLWSs) and species records, e.g. protected, Species of Principal Importance, Biodiversity Action Plan (BAP) Priority Species or Red Data Book (RDB) species

Field Surveys

- 5.3.3 The timetable of all field surveys is provided in Table 5.3, with all surveys being undertaken during appropriate weather conditions. Further details of these surveys are provided in Appendices 5.2 to 5.11

Habitat

- 5.3.4 Habitats within the survey area have been classified using the standard Phase 1 Habitat Survey methodology (JNCC 2010). General inspection of the ecological features within the DCO limits has taken place during the lead up to the submission of the application. Target notes were used to record habitats or features considered as being of greatest nature conservation interest. Species lists were compiled for representative habitats. Hedgerows were assessed for importance under the 'wildlife and landscape' criteria as set out in the Hedgerow Regulations 1997.
- 5.3.5 Suitably qualified and experienced botanists, who are members of the Chartered Institute of Ecology and Environmental Management (CIEEM), undertook all botanical survey work. Phase II botanical survey work was conducted by Field Identification Skills Certificate (FISC) level 6 and 5 surveyors.

Table 5.3: Survey Timetable

Species	Survey	Date	
		Main Site	Highway Mitigation Measures (Bypass Corridor unless indicated)
Habitat (Appendix 5.1)	<i>Phase-1</i>	27 th October 2016 ¹ 1 st August 2017	8 th & 15 th April 2016 1 st September 2016 14 th & 15 th November 2016 1 st August 2017 21 st March 2018 (Highways Mitigation Measures 4a - e (para 5.1.2))
	<i>Phase-2</i> (Appendix 5.2)	n/a	1 st September 2016 30 th June 2017
Badger (Appendix 5.3)	<i>Badger Survey</i>	15 th November 2016 7 th December 2016	3 rd , 14 th & 15 th November 2016
	<i>Bait Marking</i>	20 th March – 1 st April 2014	n/a
Bats (Appendix 5.4)	<i>Tree Inspection (Ground)</i>	30 th June 2016 13 th & 15 th September 2016	13 th & 15 th September 2016 25 th October 2016
	<i>Tree Aerial Inspection</i>	13 th & 15 th September 2016	25 th October 2016
	<i>Tree Nocturnal</i>	22 nd September 2016	29 th & 30 th September 2016 (T205, T207, T214, T222) 15 th & 30 th August 2017 (T214)
	<i>Building Nocturnal</i>	4 th July 2016 (dusk) 21 st July 2016 (dusk) 9 th August 2016 (dawn)	n/a
	<i>Activity Transects</i>	30 th June 2016 (dusk) 11 th July 2016 (dusk) 11 th August 2016 (dusk) 12 th August 2016 (dawn) 8 th September 2016 (dusk)	23 rd June 2016 (dusk) 11 th July 2016 (dusk) 22 nd September 2016 (dusk)
	<i>Static Monitoring</i>	30 th June – 5 th July 2016 11 th – 16 th August 2016 8 th – 13 th September 2016	30 th June – 5 th July 2016 11 th - 16 th August 2016 8 th – 13 th September 2016 26 th – 31 st July 2017
Birds (Appendix 5.5)	<i>Breeding Birds Surveys</i>	29 th June 2016 20 th July 2016 10 th August 2016	21 st April 2016 19 th May 2016 30 th June 2016
	<i>Barn Owl Activity</i>	20 th July 2016	9 th August 2017 4 th September 2017

Species	Survey	Date	
		Main Site	Highway Mitigation Measures (Bypass Corridor unless indicated)
(Appendix 5.6)	<i>Wintering Bird Surveys</i>	2016-2017 Winter Season 14 th October 2016 27 th / 28 th October 2016 <u>9th November 2016</u> 28 th / 29 th November 2016 <u>12th December 2016</u> 20 th / 21 st December 2016 <u>16th January 2017</u> 30 th / 31 st January 2017 <u>15th February 2017</u> 27 th / 28 th February 2017 16 th / 17 th March 2017 29 th March 2017 2017-2018 Winter Season <u>21st November 2017</u> 27 th /28 th November 2017 6 th /7 th December 2017 15 th /16 th December 2017 18 th /19 th January 2018 4 th January 2018 6 th / 7 th February 22 th /23 th February 2018	23 rd December 2015 21 st January 2016 10 th February 2016
Great Crested Newt (Appendix 5.7)	<i>Pond Assessment</i>	n/a	8 th & 15 th April 2016
	<i>Aquatic Surveys</i>	25 th April 2016 4 th May 2016 24 th May 2016 7 th June 2016 9 th June 2016 15 th June 2016	22 nd March 2017 30 th March 2017 12 th April 2017 20 th April 2017 8 th May 2017 31 st May 2017
Invertebrate (Appendix 5.8)	<i>eDNA Survey</i>	n/a	23 rd & 27 th June 2016
	<i>Field survey</i>	5 th – 7 th August 2016	5 th – 7 th August 2016
Reptile (Appendix 5.9)	<i>Presence / Absence</i>	27 th September 2014 30 th September 2014 2 nd October 2014 4 th October 2014 5 th October 2014 6 th October 2014	15 th September 2016 20 th September 2016 22 nd September 2016 28 th September 2016 30 th September 2016 15 th May 2017 31 st May 2017

Species	Survey	Date	
		Main Site	Highway Mitigation Measures (Bypass Corridor unless indicated)
Otter & Water Vole (Appendix 5.10)	<i>Presence / absence Surveys</i>	19 th September 2016	19 th September 2016
Crayfish (Appendix 5.11)	<i>Presence / Absence</i>	n/a	27 th & 28 th October 2016

¹ Update of surveys from 5th June 2013, 28th August 2013, 19th September 2013 & 22nd July 2014

² Underlined dates represent survey of entire wintering assemblage

Assessment Methodology

- 5.3.6 Reference has been made to the Guidelines for Baseline Ecological Assessment (1995) and to the Institute of Ecology and Environmental Management (IEEM) *Guidelines for Ecological Impact Assessment (EclA) in the UK and Ireland – Terrestrial, Freshwater & Coastal (2nd Edition)* (January 2016).
- 5.3.7 The activities associated with the construction and implementation of the proposed development have been identified, together with the likely range within which their influence will be felt, given the nature of the area. The ecological features that may be affected by such activities have been evaluated within a geographical framework which is based on the ecological status of the features, but which also reflects a wide range of legislation and governmental guidance. An assessment of the nature conservation importance of features (sensitivity) has been made following the criteria suggested in CIEEM (2016) as follows; International, National, Regional, County and Local. These can be similarly expressed as high, medium, low and negligible as described in Table 5.4 for consistency between disciplines. Features with a value of Local (low) or above were considered to represent 'Important Ecological Features' (IEFs). Features not meeting the criteria for IEFs are those that have been classified as having either less than Local or Negligible ecological importance. The potential impacts of the Proposed Development are predicted; taking into account different stages and activities within the development process.
- 5.3.8 Sensitivity (also referred to as value or importance) provides an indication of the potential environmental receptors sensitivity to change as indicated in Table 5.4 below.

Table 5.4: Definition of Sensitivity

Sensitivity	Typical descriptors
International/ National (High)	High importance and rarity, international/national scale, and limited potential for substitution.
Regional/County (Medium)	High to medium importance and rarity, regional/county scale, limited potential for substitution
Local (Low)	Low importance and rarity, district/local scale.
Negligible	Very low importance and rarity, below local scale.

5.3.9 The likelihood that a change / activity will occur as predicted has a degree of confidence assigned (i.e. certain, near certain, probable, unlikely, extremely unlikely). Where there is an impact on an important ecological feature, the change / activity can result in a positive or negative impact. Other parameters used to describe an impact upon an ecological structure or function are the extent, size, duration, reversibility and frequency of the affect. The magnitude of the effect prior to and post mitigation is addressed as set out in Table 5.5 below.

Table 5.5: Definition of Magnitude of Impact

Magnitude	Typical criteria descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).

Ecological Significance

5.3.10 The ecological significance of the impacts has been assessed, based upon the likely effect on the structure, function or conservation status of each feature. The assessment of impact significance has identified the need for mitigation and residual impacts have been assessed.

5.3.11 The significance of likely effects is determined by identifying those ecological features likely to be affected. The features have been evaluated to identify the important ones, i.e. those which, if their level of importance reduced, national or local policies (or in some cases legislation) would be triggered. The nature of the individual and combined impacts have been characterised on each important feature, to determine the longevity, reversibility and consequences for the feature in terms of ecological structure and function. Where it is concluded that an effect would be likely to undermine the conservation objectives of an IEF, it will be described as significant. In accordance with CIEEM guidelines, an effect may be significant at any geographical scale, i.e. from local to international.

5.4 BASELINE CONDITIONS

Desk Study

- 5.4.1 The location of sites of nature conservation interest and historical records of protected and notable species for the Proposed Development are illustrated in Figures 5.1. The following section describes the location of records in relation to either the Main Site or Highway Mitigation Measures.

Statutory Sites of Nature Conservation Interest

Upper Nene Valley Gavel Pits SPA / Ramsar

- 5.4.2 At its closest point the Upper Nene Valley Gravel Pits SPA / Ramsar lies c.5km from the west boundary of the Main Site and c.7.5km north-east of the Bypass Corridor, respectively. The Upper Nene Valley Gravel Pits SPA / Ramsar is a discontinuous series of water bodies stretching over 35km from Clifford Hill on the edge of Northampton to the north of Thrapston. The habitats support internationally important populations of two Annex I bird species and a high proportion of the total European population of Gadwall *Anas strepera* and a nationally important numbers of breeding bird (Table 5.6 below). Integrity of the site is dependent upon maintenance of the structure and function of wet woodland in the floodplain, the varied wetland habitats, water quality and supply and suitable breeding, foraging and roosting areas for birds.
- 5.4.3 The Habitats Directive and Ramsar Convention provide the legislative framework for SPA and Ramsar designation, respectively. In the UK these statutory instruments are transposed into legislation by the Conservation of Habitats and Species Regulations 2010 (as amended). The Upper Nene Valley Gravel Pits SPA / Ramsar is considered to be of **International** importance.

Upper Nene Valley Gravel Pits SSSI

- 5.4.4 The national importance of the Upper Nene Valley Gravel Pits is recognised by their designation as a SSSI under the Wildlife and Countryside Act 1981 (as amended). The interest features of this SSSI are summarised in Table 5.6 below, and include nationally important breeding and over-wintering populations of birds and wet woodland habitat. The Upper Nene Valley Gravel Pits SSSI is considered to be of **National** importance.

Table 5.6: Designated Sites of International and National Importance

Designation	Qualifying Features*
SPA	The high proportion of the total UK population of wintering and breeding bird species listed on Annex I of the Birds Directive. These are:
	Bittern <i>Botaurus stellarsi</i> W
	Golden Plover <i>Pluvialis apricaria</i> W
	The high proportion of the total European population of Annex II bird species. These are:
SPA	Gadwall <i>Anas strepera</i> W, P
	The total numbers of wildfowl supported by the estuary; 23,821 (5 year peak mean 1999/2000 – 2003/04)
Ramsar	Criterion 1: Water bird assemblage of international importance (23,821 waterfowl)
	Criterion 6: Nationally important numbers of the following bird species:
	Mute swan <i>Cygnus olor</i> 629 individuals (1.7% national population)
	Gadwall <i>Anas strepera</i> 773 individuals (2% NW European population)
SSSI	Nationally important breeding bird assemblage of lowland waters and their margins Nationally important numbers of 11 wintering waterbird species Nationally important assemblage of wintering waterbirds Wet Woodland (Earls Barton Carr)

* W, wintering population; P, passage population

Roade Cutting SSSI

5.4.5 Roade cutting SSSI, which is a site of geological importance, overlaps with the boundary of the Bypass Corridor. The geological importance of this SSSI is not considered in this chapter.

Non-statutory Sites

Local Wildlife Sites

5.4.6 There are single non-statutorily designated LWSs located within 1km of the DCO limits (Table 5.7). The LWSs are designated because they support ecological features that are considered to be of **County** importance.

Table 5.7: Description of Local Wildlife Sites

Name	Location	Description
Collingtree Golf Course LWS	620m north of Main Site & adjacent A45 improvement works (DCO document 2.4B)	A stream and series of lakes and ponds through Collingtree Golf Course which provide a useful wildlife corridor and good wetland habitat. The complex qualifies as a Wildlife Site as 15 wetland indicator species were recorded alongside further aquatic and emergent species and areas of A11 plant communities.
Roade Quarry LWS	Adjacent to south east boundary of Bypass Corridor (DCO documents 2.4C and 2.4D)	An old, shallow limestone quarry supporting a wide range of vegetation in various stages of succession.
Grand Union Canal - Northampton Arm LWS	Adjacent to the J15a Highway Mitigation Measures (DCO document 2.4F)	A good section of canal for wildlife with good marginal vegetation and some interest in the grassland. The site qualifies as a LWS with 16 wetland and 18 neutral grassland indicator species recorded in the swamp and grassland vegetation. In addition, stonewort species and several counties rarities were also recorded (Narrow-leaved waterplantain <i>Alisma lanceolatum</i> , hemlock water-dropwort <i>Oenanthe crocata</i> , long-stalked pondweed <i>Potamogeton praelongus</i> , knotted pearlwort <i>Sagina nodosa</i>).
Hunsbury Hill Country Park LWS	c.1km north of the J15a Highway Mitigation Measures (DCO document 2.4F)	The site originally qualified as an LWS under the woodland criteria, although appear unsurveyed since 2005
Roade Quarry LWS	Adjacent to the eastern end of the bypass corridor Highway Mitigation Measures (DCO documents 2.4C and 2.4D)	An ex-quarry with an open mosaic habitat at various stages of succession and including patches of calcareous grassland. It qualifies as a LWS under the open mosaics habitat criteria.
Shelfleys Lake LWS	c.700m northeast from J15a Highway Mitigation Measures (DCO document 2.4F)	A lake with a wide marginal fringe of wetland vegetation. This site qualifies as a Wildlife Site with 11 wetland indicators recorded and supports a range of invertebrates.

Name	Location	Description
Stoke Bruerne Brickpits LWS	c.800m southwest of the Rookery Lane/Ashton Road junction improvement (DCO document 2.4F)	An area of disused brickpits that now contains grassland, marsh, reedbed and pools. The drier areas of grassland contain species such as <i>Galium verum</i> , <i>Lotus corniculatus</i> , <i>Dactylorhiza fuchsii</i> , <i>Cardamine pratensis</i> , <i>Ophioglossum vulgare</i> and <i>Primula veris</i> , with frequent anthills. Emergent species in the marshy areas and around the pools include <i>Lycopus europaeus</i> , <i>Lychnis flos-cuculi</i> , <i>Lythrum salicaria</i> and <i>Phragmites australis</i> . The surrounding hedges and scrub contain mostly <i>Acer campestre</i> and <i>Crataegus monogyna</i> . Birds on the site include barn owl, kingfisher, reed bunting, sedge and reed warbler, heron, green woodpecker, kestrel and snipe.
Stoke Park Fishponds LWS	c.700m NW of the Pury Road junction improvement (DCO document 2.4F)	Two ponds within Stoke Bruerne Park surrounded by scrub and mature trees with a variety of wetland and woodland vegetation beneath. This is an attractive and diverse site considered likely to be of importance for invertebrates.
Wootton Railway Embankments LWS	c.1km from the J15a Highway Mitigation Measures (DCO document 2.4F)	This site qualifies as a CWS because it contains a lichen listed in the Northamptonshire Red Data Book as a Northamptonshire Scarce Species. The acid grassland is currently too degraded to qualify as CWS

Potential Local Wildlife Sites

5.4.7 There is a single pLWS located within the boundary of the Main Site, which corresponds with the woodland of Highgate, and a further six pLWSs located within 1km of the Proposed Development.

Table 5.8: Description of potential Local Wildlife Sites

Name	Location	Description*
Collingtree pLWS*	400m east of Main Site	Grassland & Hedgerows*
Junction 15 Grassland pLWS	On east site boundary Main Site and within enlargement and configuration are of J15 Highway Mitigation Measures (DCO document 2.4A and 2.4B)	An area of coarse grassland and ruderal vegetation with some finer grassland maintained by rabbit grazing. This site held four indicators from the neutral grassland indicators list; although a reasonable number this is not enough to qualify as a CWS in 2005 when it was last surveyed. It was suggested [in 2005] that with appropriate management it could meet qualifying criteria.
Collingtree pLWS	400m east of A45 improvement works (DCO document 2.4B)	Grassland & hedgerows*

Name	Location	Description*
236 / Unnamed pLWS	Within southern half of Main Site	Deciduous woodland of Highgate*
Roade Cutting pLWS	Bisects central area of Bypass Corridor Highway Mitigation Measures (DCO documents 2.4C and 2.4D)	Area corresponding to the Roade Cutting SSSI* and a number of notable bryophyte records
234 / Unnamed pLWS	455m south east of Main Site	Woodland of Great Ground, Sarah's Spinney & Waltham Wood*
237 / Unnamed pLWS	Adjacent north east boundary of Bypass Corridor Highway Mitigation Measures (DCO documents 2.4C and 2.4D)	The wood pasture and parkland of the Courteenhall Estate*
239 / Unnamed pLWS	Adjacent to east boundary of J15A Highway Mitigation Measures (DCO document 2.4F)	Area of woodland, scrub and grassland associated with the Grand Union Canal
Roade Field pLWS	Within and adjacent the Bypass Corridor Highway Mitigation Measures (DCO documents 2.4C and 2.4D)	Grassland created on former arable farmland
250/ Unnamed pLWS	c.950m southwest of J15A Highway Mitigation Measures (DCO document 2.4F)	Scrub and woodland mosaic
Swan valley meadow pLWS	1km north of J15A Highway Mitigation Measures (DCO document 2.4F)	A series of open water an wetland habitats

* Description of pLWS determined from Ordnance Survey maps and publicly accessible aerial photography. No detailed information held by records centre.

Other Designations

- 5.4.8 An area of the 'Middle Nene' section of the Nene Valley Nature Improvement Area (NIA) overlaps the east boundary of the Main Site. NIAs are areas that receive targeted funding for the purposes of nature conservation, in particular the maintenance and enhancement of ecological networks.
- 5.4.9 There are no areas listed on the Ancient Woodland Inventory located within 1km of the Proposed Development.

Invasive Plants

- 5.4.10 Japanese Knotweed *Fallopia japonica*, has been recorded previously at 'Blisworth Cutting (main line)' (SP 748 531), at a location c. 300m south of the main site and 800m north of the Bypass Corridor .

Fauna

Badgers

- 5.4.11 The existing badger records should not be disclosed to the general public or other third parties and may be provided separately upon request.

Bats

- 5.4.12 Species recorded in the area surrounding the Main Site, Bypass Corridor, and Highway Mitigation Measures include barbastelle bat *Barbastella barbastellus*, brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, Daubenton's bat *Myotis daubentonii*, Natterer's bat *Myotis natterri.*, soprano pipistrelle *Pipistrellus pygmaeus*, unidentified pipistrelle *Pipistrellus* sp and whiskered/Brandt's bats.
- 5.4.13 The closest roosts to the Main Site and some of Highway Mitigation Measures are common pipistrelle and soprano pipistrelle roosts that have been recorded to the east of the M1 within the village of Collingtree (SP 75 55). The majority of the remaining records were associated with the urban areas of Blisworth (SP 72 53), Milton Masor (SP 73 55) and Northampton (SP 75 57 & SP 75 58).
- 5.4.14 The closest records to the Bypass Corridor are for *Pipistrellus* sp. roosts located in at least two locations within Roade (SP 75 51), and also at Courteenhall Church (SP 76 53). There is also a record of a brown long-eared bat roost c. 750m south of the Bypass Corridor boundary (SP 76 50).

Birds

- 5.4.15 There are numerous records for birds within the local area. The majority of records occur north of the Main Site in association with the fringe of Northampton, particularly along Wootton Brook, and so the south-west around the village of Blisworth.
- 5.4.16 The records include the following Schedule-1 bird species in the vicinity of the Proposed Development; barn owl *Tyto alba*, common kingfisher *Alcedo atthis*, fieldfare *Turdus pilaris* (non-breeding), hobby *Falco subbuteo*, merlin *Falco colombarius* and redwing *Turdus iliacus* (non-breeding).

Great Crested Newts

- 5.4.17 There is a single record for great crested newt *Triturus cristatus* (GCN) at Stoke Bruerne Brickpits LWS c.730m to the west of the Rookery Lane/Ashton Road junction improvement (DCO document 2.4F). The next closest record is a population with a peak count of 56 adult GCN located 1.6km west of the Main Site boundary and 1.3km to the north of the Knock Lane/Stoke Road junction improvement (DCO document 2.4F) within grid square SP 72 53.
- 5.4.18 Records from 1996 exist for common toad *Bufo bufo* at Collingtree Park, approximately 600m north of the Main Site boundary (SP 75 56).

Invertebrates

- 5.4.19 There are no previous records of notable invertebrate species within 1km of the boundary of the Proposed Development.
- 5.4.20 There are records of freshwater white-clawed crayfish *Austropotamobius pallipes* recorded in 2004 at the Grand Union Canal – Northampton Branch LWS, c. 2km west of the Main Site.

Reptiles

- 5.4.21 There are several records of grass snake within 1km of the DCO limits: from within Collingtree Golf Course and Courteenhall c.900m to the north and south east respectively; 500m north of the Knock Lane/Stoke Road junction improvement (; and c.700m to the northwest of the Pury Road junction improvement).
- 5.4.22 The closest records for common lizard *Lacerta vivipara* is located approximately 350m south of the Bypass Route and 1.5km west of the Main Site boundary both in association with the rail line to the southwest of the main site.

Water Vole

- 5.4.23 The closest record is 750m south of the J15A Highway Mitigation Measures (DCO document 2.4F) in association with the Grand Union Canal – Northampton Branch LWS (SP 72 56). Further records occur to the south west of the Rookery Lane/Ashton Road junction improvement (DCO document 2.4F) around the village of Stoke Bruerne. There are no records for water vole *Arvicola amphibius* within 1km of the boundaries of the Main Site or Bypass Corridor.

Otter

- 5.4.24 Records of otter *Lutra lutra* are confined to the west where records are associated with Shelfleys Lake pLWS 570m to the north of the J15A Highway Mitigation Measures (DCO document 2.4F).

Other Fauna

- 5.4.25 There are a number of records for hedgehog *Erinaceus europaeus* in the area surrounding the Main Site, and Bypass Corridor, and Highway mitigation measures. The closest are from Collingtree approximately 400m north-west of the Main Site boundary (SP 75 55).
- 5.4.26 Similarly, there are a number of records for brown hare *Lepus europaeus* c.500 m south of the boundary of the Bypass Corridor (SP 73 51) and for harvest mouse around the village of Stoke Bruerne, where a single polecat records also occurs.

Habitats

- 5.4.27 The location of the habitats and Target Notes for areas surveyed are described below and are illustrated in the following:
- Figure 5.2 – Main Site
 - Figure 5.3 – Roade Bypass Corridor
 - Figure 5.5 – Highway Mitigation Measures
- 5.4.28 Where appropriate the following assessment has also been separated into the Main Site, Highway Mitigation Works and the Bypass Corridor. For conciseness the Proposed Development's habitats are described together where there are no significant differences between them.

Target Notes

Main Site

- 1) Churchills; a wood comprising a small area of semi-natural woodland and larger area of mixed plantation;
- 2) Slade Springs; plantation woodland;
- 3) Piles of rubble and debris that have been colonised by vegetation and are located at the north edge of Highgate woodland. This feature provides potential opportunities for amphibians to shelter and hibernate;

- 4) An old tree stump with a central hollow where splashing and pellets of a type typically associated with kestrel *Falco tinnunculus* have been identified;
- 5) Semi-improved neutral grassland and scrub associated with the Junction 15 – Grassland pLWS. This area was inaccessible to direct survey;
- 6) A dry ditch with stands of marginal vegetation that were indicative of periodic inundation;
- 7) Highgate; corresponds to the deciduous woodland of Unnamed pLWS. The canopy and understory were dominated by ash *Fraxinus excelsior* and bramble *Rubus fruticosus* agg., respectively; and
- 8) The Moors; coniferous plantation woodland with poor structure and sparse ground-flora on the southern edge of the Main Site.

Highway Mitigation Works

- 1) Roade Cutting; area dominated by scrub that corresponds with the boundary of Roade Cutting SSSI and an Unnamed pLWS;
- 2) A disused railway cutting colonised by dense scrub; and
- 3) Roadside Verge with scrub and calcareous grassland flora.

Woodland

Main Site

- 5.4.29 The woodland canopy associated with Highgate (Target Note 7) corresponded with 236 / Unnamed pLWS. Highgate is dominated by mature ash and sycamore *Acer pseudoplatanus*, with a reasonably well-developed understory of bramble and hawthorn *Crataegus monogyna*. This woodland is not typical of any particular NVC community and is not considered to represent a Habitat of Principal Importance under Section 41 of the NERC Act 2006, Northamptonshire BAP Priority Habitat or LWS habitat. Based on its area and reasonable structure, this woodland, which also contributes the diversity of habitat types in the area, is considered to be of **Local** importance.
- 5.4.30 The woodland of Churchills lies in the central area of the Main Site (Target Note 1). A small area of semi-natural oak-ash woodland is located on the south edge of Churchills, and the ground flora here includes abundant wood false-brome *Brachypodium sylvaticum*. Outside this area, the remainder of this plantation woodland has a poor structure and sparse ground-flora. Highgate is not considered to represent Habitat of Principal Importance, Northamptonshire BAP Priority Habitat or LWS habitats, but does make a contribution to the diversity of habitats in the local area and is of **Local** importance.
- 5.4.31 The remaining blocks of mixed plantation woodland, including Slade Springs (Target Note 2), associated with some of the field boundaries are either limited in extent or comprise a mix of species of similar age with poorly developed ground-flora. Coniferous plantation on the east and south (The Moors; Target Note 8) boundaries also have poorly developed understories and ground-flora. As these woodlands are common and widespread habitat types with poor overall diversity and / or limited extent, they are not considered to represent IEFs.

Bypass Corridor, and Highway Mitigation Works

- 5.4.32 There is no woodland habitat within the Bypass Corridor. Small linear woodlands occur adjacent to the Highway Mitigation measures at the Rookery Lane/Ashton Road Junction and to the east of the A508 Grafton Road Bus Stop Crossing. Both are limited in extent and support abundant scrubby elm and ash in the canopy and are characterised by a ground flora dominated by ivy *Hedera helix*. Neither are considered to represent IEFs.

Trees

- 5.4.33 A number of mature oak and ash trees are associated with the field boundaries of both the Main Site, Bypass Corridor and adjacent to the Highway Mitigation Measures. These include two mature lime *Tilia europaea* planted next to a war memorial at the A508 Blisworth Road Junction and semi-mature sycamore adjacent to A508 Rookery Lane/Ashton Road Junction Improvement.
- 5.4.34 A single ash tree (T222⁵) adjacent to the route of the Bypass Corridor is of sufficient age and supports enough associated features, such as major deadwood, to be considered a Veteran tree (refer to Chapter 4, Appendix 4.3: Arboricultural Assessment). This presence of a single Veteran tree is considered to be of **Local** importance.
- 5.4.35 None of the remaining trees are of sufficient girth or support sufficient features, such as rot holes, deadwood or epiphytes, to be considered Veterans. Although the remaining trees do add to the structural diversity of the available habitats with which they are associated, in their own right they are represent a common and widespread habitat and therefore are not considered to represent IEFs.

Scrub

- 5.4.36 Scattered scrub dominated by bramble *Rubus fruticosus* agg. is present around the unmanaged margins of the Main Site and Bypass Corridor, with some areas of mature hawthorn *Crataegus monogyna* scrub located along the embankments of the existing railway line. This represents a widespread and species-poor habitat type and is therefore not considered to represent an IEF. The scrub associated with the railway embankments within the Roade Cutting pLWS contributes to the mosaic of habitats of that non-statutory site and is therefore considered to be of **County** importance.

Grassland

Main Site

- 5.4.37 The grassland area of the Junction 15 – Grassland pLWS (Target Note 5) was designated based on a survey in 2006 when it failed to meet the criteria for LWS. At that time it was described as:
- “This site holds four indicators from the neutral grassland indicators list; although a reasonable number this is not enough to qualify as a CWS. However, with appropriate management the quality of the grassland habitat may improve sufficiently to meet the CWS selection criteria.”
- 5.4.38 It is apparent that no appropriate management has been undertaken and, as a result, the grassland has unsurprisingly continued to decline and is now characterised by coarse false-oat grass dominated grassland with abundant tall ruderal species including teasel *Dipsacus fullonum*, common nettle *Urtica dioica* and thistles *Cirsium* spp. Small areas of finer grassland, maintained by rabbit grazing, occur, although these are of limited extent and of low species diversity. It is not considered to represent an IEF.
- 5.4.39 Semi-improved grassland is also located centrally within the Main Site and on the road verges of the M1, A45 & A508, and these grasslands include a reasonable diversity of forbs that are typical of neutral grasslands. None of the plant communities associated with the verges are considered to be of sufficient diversity to qualify as Habitat of Principal Importance, BAP Priority Habitat or LWS habitat, and it is likely that similar communities are also associated with the road verges in the surrounding area. Given the reasonable floral diversity associated with this habitat, the semi-improved grassland is considered to be of no more than **Local** importance.

5 Corresponds to tree T222 in the accompanying Arboricultural Assessment

- 5.4.40 Poor semi-improved grassland typical of unmanaged, mesotrophic swards and areas of more improved grassland are associated with the margins of the arable fields and temporary leys. These represent a species-poor habitat type almost ubiquitous in the surrounding landscape. It is not considered to represent IEFs.

Bypass Corridor and Highway Mitigation Works

- 5.4.41 A 16-hectare area of neutral grassland is located centrally within the Bypass Corridor and also extends beyond it. This area corresponds with the Roade Field pLWS. The sward includes common knapweed *Centaurea nigra*, common bird's-foot-trefoil *Lotus corniculatus*, ribwort plantain *Plantago lanceolata*, red clover *Trifolium pratense* and ladies bedstraw *Galium verum*, which are typical of neutral grasslands. The grassland is managed as a hay meadow and is known to have been created at least 15 years ago as part of a Higher Level Stewardship scheme (current scheme reference AG00400853) using imported seed from the region. Detailed survey has indicated that the sward composition is transitional and has some signs of improvement (i.e. affinities with the National Vegetation Classification MG6 as well as MG5 grassland communities) probably as a result of the past arable management of the field compartment. The grassland does, however, meet the criteria for selection as a LWS. Given its overall botanical diversity, it is considered that the grassland is also likely to qualify as Lowland Meadow Habitat of Principal Importance and Priority Habitat of the Northamptonshire BAP. It is considered that the neutral hay meadow of Roade Field pLWS is of **County** importance.
- 5.4.42 Small areas of unimproved calcareous grassland are located along the embankments of Roade Cutting pLWS (Target Note 9). These grasslands, which extend beyond the boundary of the Proposed Development, meet LWS selection criteria and represent Habitat of Principal Importance and Priority Habitat of the Northamptonshire BAP. The calcareous grasslands of Roade Cutting pLWS are therefore considered to be of **County** importance.
- 5.4.43 Semi-improved grassland is associated with the embankments of road verges, including those of the A508 and Blisworth Road, and around the margins of the ditch DD1. A small area with abundant greater knapweed was also located at the Rookery lane/Ashton Road Junction. Although they are of some limited botanical interest, the grasslands represent a widespread habitat type and are not considered to qualify as Habitat of Principal Importance, Priority Habitat of the Northamptonshire BAP or LWS habitat. On this basis it is considered that the semi-improved grasslands associated within the Bypass Corridor and Highway Mitigation works are of **Local** importance.
- 5.4.44 Poor semi-improved grasslands that are typical of unmanaged, mesotrophic swards and areas of more improved and amenity grasslands are associated with most of the existing highway verges affected by the Highway Mitigation Measures, the areas of pasture in the central and southern areas of the site and also the margins of the arable fields. These represent species-poor habitat types characterised by frequent to abundant ruderal herbs that are likely to be common in the surrounding landscape and are therefore not considered to represent IEFs.

Tall Ruderal

- 5.4.45 Tall ruderal vegetation had developed around the unmanaged margins of grassland and arable fields, on highway verges, and also around the margins of woodlands. This species-poor habitat is common and widespread, and is therefore not considered to represent an IEF.

Ponds

Main Site

- 5.4.46 There are three ponds within the area of the Main Site; P1, P3 & P4. All ponds qualify as Northamptonshire BAP Priority Habitat. Pond P4 was drained and infilled during 2014 and is no longer present.

- 5.4.47 The marginal vegetation of pond P1 was dominated by stands of reed mace *Typha latifolia* in the areas of open water. Due to the presence of GCN the pond P1 qualifies as Habitat of Principal Importance under Section 41 of the NERC Act 2006. Pond P1 is not of sufficient floral diversity to meet the criteria for selection as a LWS (refer below for evaluation of GCN population). Based on its size and the maturity of its aquatic and marginal habitats the pond P1 is considered to be of **Local** importance.
- 5.4.48 As a result of their low floral diversity and the lack of any records for notable species, the ponds P3 & P4 are unlikely to meet the criteria for selection as Habitat of Principal Importance or LWS habitat, but as areas of standing water they are also considered to be of **Local** importance.

Bypass Corridor and Highway Mitigation Works

- 5.4.49 There is a single pond within the Bypass Corridor; P16. This pond is of low floral and structural diversity and therefore unlikely to qualify as Habitat of Principal Importance or as LWSs. Therefore, as areas of standing water these ponds are considered to be of **Local** importance.

Running Water & Ditches

Main Site

- 5.4.50 A flowing watercourse runs along the south boundary of the Main Site; Running Water (RW) 1. The steep sided banks of RW1 are dominated by a mix of grassland, scrub and tall ruderal vegetation. A low diversity of common and widespread aquatic species are associated with the channel. Despite its low overall diversity the ecological interest of RW1 is increased by the fact that it formed a connection with a number of habitats in the wider area, including Collingtree Golf Course LWS. Therefore, although RW1 is unlikely to represent Habitat of Principal Importance, Priority Habitat of the Northamptonshire BAP or LWS habitat, it is considered to be of **Local** importance.
- 5.4.51 A number of dry agricultural ditches are present across the Main Site in association with field boundaries. These are a common and widespread habitat and are not considered to represent an IEF.

Bypass Corridor

- 5.4.52 A short stretch of running water is located at the south-east extent of the Bypass Corridor; RW2. The channel of RW2 within the Bypass Corridor comprises stone and shingle, with banks that are either over-shaded by adjacent scrub or dominated by stands of great horsetail *Equisetum telmateia*. RW2 flows through a culvert beneath the A508, and represents a tributary of the River Tove. Although RW2 is unlikely to represent Habitat of Principal Importance, Priority Habitat of the Northamptonshire BAP or LWS habitat, as it provides connectivity to similar habitat in the surrounding landscape it is considered to be of **Local** importance.
- 5.4.53 A section of dry ditch DD1 that is connected to RW1 (via the off-site pond P108) bisects the central areas of the Bypass Corridor. Although it is a feature that has been modified for agricultural purposes, this ditch is fenced off from more intensively managed field compartments and provides some ecological connectivity across the local landscape. The dry ditch is therefore considered to be of **Local** importance. A small number of dry agricultural ditches are associated with the field boundaries, which are generally over-shaded by adjacent hedgerows and of limited diversity, and are therefore not considered to represent IEFs.

Arable

- 5.4.54 Arable fields are the dominant habitat type in both the Main Site and Bypass Corridor and are the dominant land use adjacent to areas affected by Highway Mitigation Works. No rare or notable arable weeds were recorded. The majority of field margins comprised ~1m strips of improved grassland that were dominated by coarse grass species. A small number of field margins associated with the Main Site and the Bypass Corridor consisted of permanent grassland strips over 5m in width and subject to low intensity management. On this basis these margins are likely to represent Habitat of Principal Importance under Section 41 of the NERC Act 2006 and are therefore considered to be of **Local** importance. Due to their limited size and intensive management the remaining arable fields, including margins, did not meet the criteria for selection as Habitat of Principal Importance or Northamptonshire BAP Priority Habitat. Therefore, as a common and widespread habitat type the arable fields are not considered to be IEFs.

Hedgerows

Main Site

- 5.4.55 There are a total of 53 hedgerows within the area of the Main Site; H1 – H52 (including H46A and H46B). H37 is an ornamental hedge of **Negligible** conservation importance. All of the remaining hedgerows consist entirely of native species and therefore qualify as a Habitat of Principal Importance and as Priority Habitat of the Northamptonshire BAP. None of the hedgerows within the survey area are of sufficient species or structural diversity to qualify as LWS habitat. The hedgerows H3, H4, H24 & H25 are species-rich and H4, H11, H24 & H25 are considered “Important” according to the wildlife and landscape criteria of the Hedgerow Regulations 1997. Given the hedgerow resource present and available contextual information, it is considered appropriate to classify these hedgerows as being of **County** importance. All of the remaining native hedgerows, including those of comparatively low diversity and poor structure, are considered to be of **Local** importance.

Bypass Corridor and Highway Mitigation Works

- 5.4.56 There is a total of 44 hedgerows located within or adjacent to the Bypass Corridor (H101 – H144). A further 10 hedgerows occur adjacent to Highway Mitigation Measures (H201-210). All of the hedgerows are dominated by native species and therefore represent Habitats of Principal Importance and Priority Habitat of the Northamptonshire BAP. On the basis of length, diversity, assessed age and presence of notable floral species five of the hedges are considered likely to qualify as LWS habitat; H101, H104, H125, H127 & H135. Similarly, the hedges H103, H129 and H131 that do not meet LWS criteria, but which are both species-rich and Important under the Hedgerow Regulations 1997, are considered to be **County** importance. All other native hedgerows, including those of low species and structural diversity, are considered to be of **Local** importance.

Buildings & Hardstanding

- 5.4.57 There is a shooting lodge in the central area of the Main Site (building B1), a series of stone, brick or prefabricated barns in the eastern half of the Main Site (barns A, B, C) and a brick built electricity sub-station in the north of the Main Site (buildings B3). There are no buildings within the Bypass Corridor or land included within the Highway Mitigation Works. Throughout the Main Site hardstanding areas are limited to road surfaces and some farm tracks comprising crushed stone.
- 5.4.58 There is no significant flora associated with any of the buildings or hardstanding, and therefore they are not considered to be IEFs.

Fauna

- 5.4.59 The following section summarises and evaluates the ecological importance of fauna within the Site. Further survey data is provided at Appendices 5.3 to 5.11.

Badgers

- 5.4.60 The full results and assessment of the badger survey are confidential and can be provided upon request. In brief, the surveys have confirmed that badgers make use of the Main Site and Bypass Corridor and the surrounding area. No evidence of badgers was noted in association with other Highway Mitigation Measures. Badgers are a common and widespread species, and based upon the associated levels of activity the populations present are considered to be of no more than **Local** importance.

Bats

Bat Roosts – Main Site

- 5.4.61 There are five separate buildings located within the application site; building B1, barns A, B and C, and an electricity sub-station. Barn B and the electricity sub-station were considered to have negligible potential for roosting bats, and are not considered further. Previous nocturnal surveys in 2014 confirmed the presence of a single roosting common pipistrelle bat in buildings B1 and five roosting pipistrelle in barn C. No bats were observed emerging or returning to barn A in 2014. No bats have been observed entering or emerging from any of these buildings (building B1 and barns A & C) during repeat surveys in 2017. Common pipistrelle bats are a common and widespread species and the presence of a small roosts in barn A is considered to be of **Local** importance. The small, occasionally used roost in building B1 is of limited interest to the local bat population and is therefore not considered to represent an IEF.
- 5.4.62 A total of 19 mature trees with the potential to support roosting bats are located around or near the field boundaries of the Main Site. Trees TA & TC have High suitability as bat roosts and the trees TK, T43 & T200 have Moderate suitability as bat roosts, with the remaining 14 trees having Low suitability as bat roosts. All other trees in the Main Site have Negligible suitability for roosting bats. Aerial inspection of trees TC & T200 which would be affected by proposals did not identify any evidence of bats. Nocturnal survey of trees TA & TC in September 2016 also did not identify any evidence of roosting bats. The presence of a roost in these trees is likely to be of at least **Local** importance and represent an IEF.

Bat Activity – Main Site

- 5.4.63 Monitoring of foraging and commuting activity with transect and static detector surveys in 2016 identified a number of bat species within the Main Site and surrounding area. These included barbastelle bat, brown long-eared, common pipistrelle, noctule *Nyctalus noctua*, soprano pipistrelle and Nathusius pipistrelle *Pipistrellus nathusii*. A small number of *Myotis* sp., *Nyctalus* sp. and *Pipistrelle* sp. calls have not be identified to species, however, it is considered likely that these correspond to more widespread and regularly occurring species within each genus, e.g. Daubenton's bat, Natterer's bat, noctule and common pipistrelle or soprano pipistrelle.
- 5.4.64 The most frequently recorded species were common pipstrelle, with the remaining species generally recorded locally at low frequency at a small number of locations. Overall the highest levels of bat activity are associated with the western half of the site, woodland in the central areas of the Main Site and the riparian habitat at the western extent of RW1. Activity was comparatively low across the eastern half of the site.
- 5.4.65 Nathusius pipistrelle *Pipistrellus nathusii* registrations were recorded during static monitoring in July & September 2016 (and also April – June 2014). Although there are few existing records of Nathusius pipistrelle in Northamptonshire, this species is likely to be under-recorded. Nathusius pipistrelle are often associated with semi-natural wetland habitats, such as those of the nearby Nene Valley. Given the presence of a small number of passes (representing significantly less than 1% of the total bat registrations from the site over the recorded period) it is likely that the habitats within the Main Site are used on no more than an occasional basis by Nathusius pipistrelle.

- 5.4.66 Low levels of barbastelle bat use are associated with the Main Sites habitats. Barbastelle bats are rare nationally and within Northamptonshire⁶, although they have a widespread distribution in central and southern England. It is thought that they prefer pastoral landscapes with woodland and riparian habitat, such as that associated with Salcey Forest and the wider Nene valley. Barbastelle bat is listed on Annex II of the Habitats and Species Directive, are a Species of Principle Importance under the NERC Act 2006 and are also a Priority Species of the Northamptonshire BAP. Overall, the very low barbastelle bat activity is considered to be typical of the context at a regional and national level.
- 5.4.67 Brown long-eared bat, noctule and soprano pipistrelle are listed as Species of Principal Importance and are Priority Species of the Northamptonshire BAP.
- 5.4.68 Overall, the relative frequency of contacts from all of the bat species indicates that their occurrence within the Main Site is consistent with the historical records for the local area, the previous survey in 2014 and is also typical of known frequency of occurrence in Northamptonshire (Northamptonshire Biodiversity Partnership 2009). Given their unremarkable and localised activity it is considered that the regularly used habitats of the Main Site are of no more than **Local** importance for each of the individual bat species present.

Bat Roosts – Bypass Corridor and Highway Mitigation Works

- 5.4.69 There are no buildings within the boundary of the Bypass Corridor or other Highway Mitigation Works.
- 5.4.70 A total of 7 mature trees with the potential to support roosting bats are located around the field compartments of the Bypass Corridor. A total of 4 trees (T205, T207, T214 & T222) have moderate suitability as bat roosts, with the remaining 3 trees having Low suitability as bat roosts. All other trees in the Main Site and Highway Mitigation Works have negligible suitability for roosting bats. Aerial inspection of trees T205, T207 & T222 with Moderate suitability as roosts did not identify any evidence of bats. Nocturnal survey of all these trees in 2016 and repeat survey of tree T214 in 2017 also did not identify any evidence of roosting bats. It is anticipated at this stage that only tree T214 will be lost to the proposals, and all other trees with Moderate or High bat roost potential will be retained. Given the lack of any associated evidence the potential tree roosts are not considered to represent IEFs.

Bat Activity – Bypass Corridor and Highway Mitigation Works

- 5.4.71 Monitoring of foraging and commuting activity with transect and static detector surveys in 2016 identified a number of bat species within the Bypass Corridor and surrounding area. These included barbastelle bat, brown long-eared, common pipistrelle, noctule, soprano pipistrelle. As for the Main Site a small number of *Myotis* sp., *Nyctalus* sp. and *Pipistrelle* sp. calls have not been identified to species, however, it is likely that these correspond to more widespread and regularly occurring species within each genus, e.g. Daubenton's bat, Natterer's bat, noctule and common pipistrelle or soprano pipistrelle. The most frequently recorded species was common pipistrelle, and, except where indicated otherwise, the remaining species generally recorded locally at low frequency at a small number of locations.
- 5.4.72 Reasonable levels of common pipistrelle bat activity were also associated with the hedgerows H111 & H112 in summer 2016 and in both autumn periods of 2016 & 2017. Based on the context of this feature and the presence of local roost records, it is considered that these hedges are likely to serve as a regularly used commuting route for common pipistrelle from Roade. The relative frequency of contacts from this and the other bat species indicates that their occurrence within the Bypass Site is consistent with historical records for the local area and is also typical of Northamptonshire (Northamptonshire Biodiversity Partnership 2009) (additional consideration of barbastelle is provided below). Brown long-eared bat, noctule and soprano pipistrelle are listed as

⁶ www.nbn.org.uk

Species of Principal Importance and are Priority Species of the Northamptonshire BAP. Given the typical and localised activity present it is considered that the regularly used habitats of the Bypass Corridor are of no more than **Local** importance for each of these individual bat species.

- 5.4.73 Barbastelle bat were recorded within and adjacent to the Bypass Corridor in both the late summer (August) 2016 and autumn period (September) of 2016 & 2017. Although similar to the Main Site low levels of activity are present at the majority of locations across the Bypass Corridor, a reasonable level of barbastelle activity is present along hedge H111 & H112, which lies immediately adjacent to the Bypass Corridor. Barbastelle roosts are more typically associated with old, established woodland, such as that located in the surrounding landscape, e.g. Salcey Forest. The range of barbastelle bats varies depending upon the sex, time of year and context, but flight lines up to 20km from a roost are known to occur (Greenway 2004⁷ & Zeale *et al* 2014⁸). Based upon the timing and frequency of the observed barbastelle activity at this location, it is considered likely that it represents a seasonal foraging resource for the local barbastelle population. As described above barbastelle bat are considered to be of **County** importance.

Birds

Main Site – Breeding Birds

- 5.4.74 A total of 49 bird species use the Main Site during the breeding season, of which 24 are considered to be confirmed or probable breeders. The remaining birds were either possible or non-breeding species.
- 5.4.75 Arable fields and their associated field margins and hedgerows provide suitable breeding and foraging habitat for several species closely associated with farmland, comprising linnet *Carduelis cannabina*, grey partridge *Perdix perdix*, reed bunting *Emberiza schoeniclus*, skylark *Alauda arvensis*, yellowhammer *Emberiza citrinella*, kestrel *Falco tinnunclus* and yellow wagtail *Motacilla flava*. Additional species making use of these habitats in reasonable numbers included bullfinch *Pyrrhula pyrrhula* and whitethroat *Sylvia communis*. Overall the farmland birds present are widespread species that are typical of the habitats present on site and the surrounding area, and on this basis the breeding bird assemblage is considered to be of **Local** importance.
- 5.4.76 The woodland blocks across the Main Site support a typical assemblage of breeding birds, with more notable species including bullfinch, buzzard *Buteo buteo*, dunnock *Prunella modularis* and song thrush *Turdus philomelos*. As this represents a group of common and widespread breeding species the woodland assemblage is considered to be of no more than **Local** importance.
- 5.4.77 Table 6.7 summarises those notable species that are considered to use the sites habitats during the breeding season in sufficient numbers to be considered of at least **Local** importance.
- 5.4.78 Barn owl *Tyto alba* are a non-breeding species, however, a roost is located in the barns centrally within the Main Site and this species made occasional use of long grassland areas for foraging. Barn Owl are thinly distributed within county and are recognised as a Priority Species of the Northamptonshire BAP, and therefore the presence of a roost and foraging area is considered to be of **Local** importance.

7 Greenway (2004) *English Nature Research Report 657 - Advice for the management of flightlines and foraging habitats of the barbastelle bat* *Barbastella barbastellus*

8 Zeal, M. R., Davidson-Watts I, & Jones G. (2012) *Home range use and habitat selection by barbastelle bats (Barbastella barbastellus): implications for conservation* *Journal of Mammalogy* 93 (4) pp 1110 – 1118

Table 5.7: Conservation Status and Importance of Breeding Birds within Main Site

Name	Status ¹			Importance
	Breeding Status	SPI / BAP	LBAP	
Red List ¹				
Grey partridge	Possible	+		Local
Lapwing	Possible*			Local
Linnet	Confirmed	+		Local
Mistle thrush	Possible			Local
Skylark	Probable	+		Local
Song thrush	Probable	+		Local
Starling	Probable	+		Local
Yellowhammer	Possible	+		Local
Yellow wagtail	Possible	+		Local
Amber List ¹				
Barn Owl	Non-breeder		+	Local
Bullfinch	Probable	+		Local
Duncock	Confirmed	+		Local
Kestrel	Possible			Local
Reed bunting	Probable	+		Local
Stock dove	Confirmed			Local
Green List ¹				
Buzzard	Probable*			Local

¹ Red, Amber or Green, species listed as Birds of Conservation Concern; SPI / BAP, Species of Principal Importance under Section 41 of the NERC Act 2006 and former UK BAP Priority Species that occur within Northamptonshire; LBAP, Priority Species of the Northamptonshire BAP

* Breeding species recorded in 2014 survey only

Main Site – Wintering Birds

5.4.79 The majority of the site is used by common and widespread over-wintering bird species. Notable species in the assemblage included golden plover *Pluvialis apricaria*, lapwing, linnet, redwing, skylark, starling *Sturnus vulgaris* and yellowhammer. Most of the notable over-wintering species are associated with the boundary hedgerows and trees of the Main Site. The arable field compartments have sometimes been used by over-wintering linnet, skylark and yellowhammer. Based on the low overall abundance of individuals and species present the assemblage of over-wintering birds within the site is considered to be of **Local** value.

5.4.80 Use of a single field by golden plover within the Main Site has been shown to be sporadic during the three seasons of survey (i.e. over three separate winters), with only significant numbers (i.e. >1% of the SPA over-wintering population) present occasionally in 1 in 3 years. This field lies outside of the consultation zone for which Natural England expects to be consulted and represents only a very small proportion of the available habitat for this species outside of the SPA. Further, the fields do not meet LWS selection criteria (Northamptonshire Biodiversity Partnership 2014). The habitats within the Main Site that are used by this species on occasion are considered to be of importance for this species at a **Local** scale.

Bypass Corridor and Highway Mitigation Works– Breeding Birds

5.4.81 A total of 46 bird species use the habitats around and within the Bypass Corridor during the breeding season, of which 17 are considered to be confirmed or probable breeders. The remaining birds were either possible or non-breeding species. Similar to the Main Site the assemblages of farmland and woodland bird species are typical of these habitat types and both considered to be of no more than **Local** importance. Table 5.10 summarises those notable species that are considered to use these habitats during the breeding season in sufficient numbers to be considered of at least **Local** importance.

Table 5.10: Conservation Status and Importance of Breeding Birds within the Bypass Corridor

Name	Status ¹			Importance
	Breeding Status	SPI / BAP	LBAP	
Red List ¹				
House Sparrow	Possible	+		Local
Marsh tit	Possible	+		Local
Skylark	Probable	+		Local
Song thrush	Probable	+		Local
Starling	Probable	+		Local
Linnet	Confirmed	+		Local
Yellowhammer	Possible	+		Local
Amber List ¹				
Bullfinch	Probable	+		Local
Dunnock	Confirmed	+		Local
Reed bunting	Probable	+		Local
Green List ¹				
Barn Owl	Non-breeder		+	Local

¹ Red or Amber, species listed as Birds of Conservation Concern; SPI / BAP, Species of Principal Importance under Section 41 of the NERC Act 2006 and former UK BAP Priority Species that occur within Northamptonshire; LBAP, Priority Species of the Northamptonshire BAP.

5.4.82 Assessment of barn owl activity across the route of the Bypass Corridor has confirmed that the area is used on only an occasional basis by this species, with individuals flying across the area but no evidence of regular foraging activity observed. There was no evidence of roosting within the vicinity, although an occasionally used feeding perch was identified north of the Bypass Corridor in association with hedge H125. Occasional use of the Bypass Corridor by barn owl is considered to be of no more than **Local** importance.

Bypass Corridor – Wintering Birds

5.4.83 The majority of the area around the Bypass Corridor is used by common and widespread over-wintering bird species. Notable species in the assemblage include linnet, redwing, skylark, starling and yellowhammer. Overall most of the notable over-wintering species are associated with the boundary hedgerows and trees of the Bypass Corridor. The arable field compartments are also regularly used throughout by over-wintering linnet, skylark and yellowhammer. Based on the low overall abundance of individuals and species present the assemblage of over-wintering birds within the site is considered to be of **Local** value.

Great Crested Newts

Main Site

- 5.4.84 There are three ponds within the Main Site boundary (P1, P3 & P4) and a further six ponds located within 500m (P6 - P10). Dispersal barriers, including unsuitable habitat and the busy road corridors of the M1, A45 and A508, separated ponds P7 – P10 from the site boundary and they have been scoped out of further survey. Aquatic surveys of the remaining ponds confirmed the absence of GCN from the on-site ponds P2 - P4 and also the off-site ponds P5 and P6. A large breeding population (peak count 108 adults) of GCN was identified in the on-site pond P1 only. Full results are provided in Appendix 5.7.
- 5.4.85 The intensively managed arable fields dominating the Main Site are considered to represent unsuitable terrestrial habitat for GCN. Suitable GCN terrestrial habitat within the site was provided by the areas of grassland, hedgerows and woodland. Potentially suitable hibernation habitat consisted of leaf litter, log piles, scattered debris, animal holes and the root systems mature trees and shrubs. GCN are listed as a Species of Principal Importance and are considered to be widespread within Northamptonshire (Northamptonshire Biodiversity Partnership 2009). As a mean count of 58 GCN was recorded over 6 survey visits the population meets the criteria for selection as a LWS (Northamptonshire Biodiversity Partnership 2014). Therefore, the GCN population of pond P1 is considered to be of **County** importance.

Bypass Corridor and Highway Mitigation Works

- 5.4.86 There is a single pond within the boundary of the Bypass Corridor (P16) and a further 10 ponds located within 500m (P11 – P21). The busy road corridor of the A508 is considered to represent a barrier to the dispersal of GCN and separates P15 from the Bypass Corridor. Survey has confirmed the presence of a medium GCN population in pond P12 and a separate low population in pond P18. P19 despite being assessed as positive for GCN eDNA was not found to support GCN during presence absence. None of these GCN populations are of sufficient size to meet the LWS selection criteria. The intensively managed arable fields and pasture that are dominant across the Bypass Corridor are considered to be unsuitable as terrestrial habitat for GCN. Suitable terrestrial habitat for GCN is supplied by longer grassland swards, hedgerows and areas of scrub, with suitable places of shelter provided by animal holes, leaf litter, debris and the root systems of mature trees and scrub. These GCN populations are therefore considered to be of **Local** importance.
- 5.4.87 Assessment has demonstrated that due to the absence of nearby ponds and / or the presence of dispersal barriers, it is reasonable to assume that GCN are absent from all remaining areas of the Highway mitigation works.

Invertebrates

- 5.4.88 Sampling of representative habitats from the Main and Bypass Corridors has identified a total of 492 invertebrates, all of which are considered to be widespread and / or common. In brief, the intensively managed habitats that dominated the majority of both sites provides poor habitat for invertebrates. The features that do offer suitable habitat include some areas of woodland and scrub, the grassland, including the uncultivated field margins, and wetland features, particularly pond P4 on the Main Site. Deadwood associated with a small number of mature trees on each site, none of which are considered to be of Veteran status, provide some scattered potential habitat for saproxylic (deadwood) invertebrates. Overall the recorded invertebrate assemblages in these habitats types at each of the Sites are considered to be both unremarkable and typical of similar habitat in the surrounding area, and are therefore of no more than **Local** importance.

5.4.89 Only two of the recorded invertebrates are considered to be notable, although each of these currently represent widespread species whose range have expanded significantly in recent years and is of no more than **Local** importance (Table 5.11). All remaining species of invertebrates, including cinnabar moth, are both abundant and typical of the available habitats, and consequently do not represent IEFs.

Table 5.11 Notable Invertebrates from Main Site

Name	Location	Status	Importance
Large picture-winged fly	Highgate		Local
Lesser Marsh Grasshopper	Hedgerow	Northants-RDB	Local

Reptiles

5.4.90 The arable fields that dominate the Main Site, Bypass Corridor and lie adjacent to most of the Highway Mitigation Works represent a homogenous and intensively managed habitat that is completely unsuitable for reptiles. The unmanaged grassland of the road verges, including those of the M1, do provide some potential opportunities for reptiles to forage and shelter. However, as this habitat is both limited in overall extent and fragmented from any other significant areas of suitable habitat, it is considered to be sub-optimal for reptiles. As a result of the very poor quality and / or fragmented nature of habitats it is considered reasonably likely that reptiles are absent from these habitats, which do not represent IEFs for this species group.

Main Site

5.4.91 A small population of common lizard (peak count 2 adults) was recorded in the grassland and scrub located immediately south of Churchills. Common lizard is a Species of Principal Importance that are widespread. The small population at the Main Site is therefore considered to be of no more than **Local** importance.

5.4.92 The mix of grassland and scrub along the existing railway corridor provides suitable habitat for reptiles. The grassland and scrub along area, which extend beyond the Site boundary, has a diversity of vegetation structure, creating potentially suitable areas for reptiles to bask, forage and shelter. These areas remain inaccessible to direct survey and therefore the likely presence or absence of reptiles has not been determined (see below).

5.4.93 The watercourse RW1 and the amphibian populations associated with the wider area provide limited potential commuting and / or foraging habitat for grass snake *Natrix natrix*. Consistent with pre-existing records for this species in the wider area it is considered probable that grass snake may make occasional use of these habitats. Occasional use of RW1 by grass snake would not be considered to represent an IEF.

Bypass Corridor and Highway Mitigation Works

5.4.94 A small population of common lizard (peak count 1 adult) make use of habitat located immediately adjacent to the Roade Cutting pLWS. The latter was inaccessible to direct reptile survey and it is considered that the common lizard population are also likely to make use of suitable habitat along this railway cutting, which extends north and south beyond the boundary of the Bypass Corridor. This is supported by desk study data that includes records of this species along the rail lines. The presence of a common lizard population is considered to be of **Local** importance.

5.4.95 Grass snake were recorded on the banks of the ditch DD1 and also on the margins of the off-site pond P18, which is likely to represent a suitable foraging area for this species. Grass snake are a wide ranging species and its use of habitats within the vicinity Bypass Corridor is considered to be of no more than **Local** importance.

Otters

Main Site

5.4.96 Spraints have been recorded at a point where RW1 is culverted beneath the A508, and this is consistent with the occasional use of this watercourse by otter. RW 1 was considered to represent a potentially suitable commuting route for otter between areas of suitable habitat in the surrounding landscape. No other evidence of otter was recorded in the Main Site. The majority of the remaining habitats within the Main Site are open and exposed and therefore provide sub-optimal habitat for otter. Otter are listed on Annex II of the Habitats and Species Directive, represent a Species of Principal Importance under Section 41 of the NERC Act 2006 and are a Priority Species of Northamptonshire BAP. Otters are known to be widely distributed in the Nene Valley (Crawford 2010⁹), and their use of RW1 is not unexpected. Therefore, the presence of otter along RW1 is considered to be of **Local** importance.

Bypass Corridor and Highway Mitigation Works

5.4.97 No evidence of otter was recorded within the Bypass Corridor and the open and exposed habitats dominating this site and the surrounding area are considered to be largely unsuitable for this species. RW2 is however considered to represent a potentially suitable commuting route for otter between areas of suitable habitat in the surrounding landscape, including the off-site pond P108. Notwithstanding this and based on the absence of field signs and local records for otter it is considered that this species does not represent an IEF of the Bypass Corridor.

5.4.98 Suitable habitat is lacking from all other Highway Mitigation Works.

Water Vole

5.4.99 Survey and habitat assessment has confirmed the absence of water vole *Arvicola amphibious* from all areas of suitable habitat in the Main Site and Bypass Corridor. No suitable habitat is present in association with other Highway Mitigation Measures. Water vole are considered to be absent and do not represent an IEF.

White-clawed Crayfish (WCCF)

5.4.100 There are records for WCCF associated with the catchment of the River Tove c.2.5km south of the Bypass Corridor. The watercourse RW1 on the Main Site is silted along the majority of its length with very few refugia, such as stones, cobbles and submerged tree roots that might be considered suitable for white-clawed crayfish (WCCF). Areas of suitable habitat were fragmented and lacked a sufficient range of sizes of refugia to support a viable crayfish population. Therefore, based on the poor quality of available habitat and the lack of local records, it is considered reasonably likely that WCCF are absent from RW1 and this species is not considered further.

5.4.101 The channel of RW2 on the Bypass Corridor supports occasional pebbles or debris that represent a potentially suitable place of shelter for crayfish. Survey of both RW2 and the connected (off-site) pond P108 has confirmed the likely absence of WCCF from the Bypass Corridor. No further potential habitat occurs within the remaining areas affected by Highways Mitigation Measures and therefore this species is not considered to represent an IEF.

Summary

5.4.102 Table 5.12 summarises the Important Ecological Features within the Zone of Influence and localised within the Search Area.

Table 5.12: Important Ecological Features

Ecological Feature	Description	Importance
Designated Sites		
Upper Nene Valley Gravel Pits SPA / Ramsar	Internationally important wetlands supporting populations of breeding and over-wintering birds	International
Upper Nene Valley Gravel Pits SSSI	Nationally important wetland habitats and bird populations	National
Collingtree Golf Course LWS	Notable network of ponds and streams	County
Roade Quarry LWS	Limestone quarry supporting notable vegetation successions	County
Grand Union Canal - Northampton Arm LWS	Neutral grassland indicator species, in addition to stonewort species and several counties rarities.	County
Hunsbury Hill Country Park LWS	Qualified as an LWS under the woodland criteria, although unsurveyed since 2005	County
Roade Quarry LWS	An ex-quarry with an open mosaic habitat at various stages of succession	County
Shelfleys Lake LWS	A lake with a wide marginal fringe of wetland vegetation.	County
Stoke Bruerne Brickpits LWS	An area of disused brickpits that now contains grassland, marsh, reedbed and pools.	County
Collingtree pLWS	Grassland & hedgerows	Local - County
236 / Unnamed pLWS / Highgate	Deciduous woodland of Highgate (Target Note 7)	Local
Roade Cutting pLWS	Calcareous grassland and scrub associated with Roade Cutting SSSI	County
234 / Unnamed pLWS	Woodland of Great Ground, Sarah's Spinney & Waltham Wood	Local – County
237 / Unnamed pLWS	Wood pasture of Courteenhall Estate	Local – County
Roade Field pLWS	Grassland created on former arable farmland representing Habitat of Principal Importance, Priority Habitat of Northamptonshire BAP & LWS habitat	County
Junction 15 Grassland pLWS	An area of coarse grassland and ruderal vegetation with some finer grassland maintained by rabbit grazing.	Local
239 / Unnamed pLWS	Area of woodland, scrub and grassland associated with the Grand Union Canal	Local – County
250/ Unnamed pLWS	Scrub and woodland mosaic	Local – County
Swan valley meadow pLWS	A series of open water an wetland habitats	Local – County
Habitats		

Ecological Feature	Description	Importance
Woodland	Mixed plantation of Churchills at <u>Main Site</u> (Target Note 1)	Local
Veteran Tree	Tree T222 (refer Arboricultural Assessment)	Local
Semi-improved grassland	Neutral grasslands with reasonable floral diversity associated with <u>Main Site</u> , <u>Bypass Corridor</u> and <u>A508 Rookery Lane/Ashton Road Junction</u>	Local
Ponds	Pond P1 at <u>Main Site</u> representing Habitat of Principal Importance & Priority Habitat of Northamptonshire BAP	Local
	Pond P3 & P4 at <u>Main Site</u> that are Priority Habitat of Northamptonshire BAP	Local
	Pond P16 at <u>Bypass Corridor</u> that represents Priority Habitat of Northamptonshire BAP	Local
Running Water	RW1 at <u>Main Site</u> that flows into Collingtree Golf Course LWS	Local
	RW2 at <u>Bypass Corridor</u> that is a tributary of the River Tove	Local
Dry Ditch	Long dry ditch providing some ecological connectivity across <u>Bypass Corridor</u>	Local
Field Margins	Habitat of Principal Importance at <u>Main Site</u> and <u>Bypass Corridor</u>	Local
Hedges	Hedges H3, H4, H24 & H25 of <u>Main Site</u> and H103, H101, H104, H125, H127, H135, H129 & H131 of <u>Highway Mitigation Measures - Bypass Corridor</u> that are Important under the Hedgerow Regulations 1997, meet criteria for selection as LWS habitat, Habitat of Principal Importance or Priority Habitat of Northamptonshire BAP Species-rich hedges that are Habitat of Principal Importance and Priority Habitat of the Northamptonshire BAP	County
	All remaining hedges from <u>Main Site</u> (except H37) and <u>Highway Mitigation Measures</u> that are Habitat of Principal Importance and Priority Habitat of Northamptonshire BAP	Local
Fauna		
Badger	Regular use by local badger population	Local
Bats	Small occasional historic common pipistrelle roost (5 adults) (Barn C)	Local
	Tree roost (if present)	Local

Ecological Feature	Description	Importance
	Brown long-eared, common pipistrelle, soprano pipistrelle, Nathusius pipistrelle, noctule, <i>Nyctalus</i> sp. & <i>Myotis</i> sp. Regular use of foraging and commuting habitat at both <u>Main Site</u> & <u>Bypass Corridor</u> habitat, including Species of Principal Importance and Priority Species of Northamptonshire BAP	Local
	Regular use of habitats (H111 & H112) by barbastelle bat at the <u>Bypass Corridor</u> . Barbastelle are Annex II species, Species of Principal Importance and Priority Species of Northamptonshire BAP	County
Birds	Assemblages of notable breeding farmland birds at <u>Main Site</u> and <u>Bypass Corridor</u>	Local
	Assemblage of notable breeding woodland birds at <u>Main Site</u>	Local
	Barn owl, bullfinch, buzzard, dunnock, grey partridge, kestrel, lapwing, linnet, mistle thrush, reed bunting, skylark, song thrush, starling, stock dove, yellowhammer, yellow wagtail Individual breeding bird species at <u>Main Site</u> that are listed as Species of Principal Importance, Priority Species of Northamptonshire BAP and / or RSPB BoCC	Local
	Bullfinch, dunnock, house sparrow, skylark, song thrush, starling, linnet, reed bunting, yellowhammer Individual breeding bird species at the <u>Bypass Corridor</u> that are listed as Species of Principal Importance, Priority Species of Northamptonshire BAP and / or RSPB BoCC	Local
	Assemblages of over-wintering farmland birds at <u>Main Site</u> and <u>Bypass Corridor</u> including the occasional use of arable field at <u>Main Site</u> by golden plover	Local
Great Crested Newts	Large population at pond P1. Species of Principal Importance	County
	Populations present in ponds P12, P18 & P19, Species of Principal Importance	Local - County
Invertebrates	Assemblages of invertebrates at the <u>Main Site</u> and <u>Bypass Corridor</u> . Includes habitat suitable for aquatic and saproxylic species	Local
	Large picture-winged fly at Highgate woodland. This species known to be widespread.	Local

Ecological Feature	Description	Importance
	Lesser marsh grasshopper, a Northamptonshire Red Data Book species now known to be widespread.	Local
Reptiles	Common lizard populations at suitable habitat at both <u>Main Site</u> and <u>Bypass Corridor</u>	Local
	Grass snake use of DD1 & Pond P109 along route of Bypass Corridor	Local
Otter	Annex II species that makes occasional use of RW1 at <u>Main Site</u> for commuting between habitat in surrounding area	Local

5.5 LIKELY SIGNIFICANT ENVIRONMENTAL EFFECTS

- 5.5.1 The potential ecological effects arising as a result of the Proposed Development have been assessed with regard to the Parameter Plans and description of the Development and construction works set out in Chapter 2 of this ES. Regard has been given to the Illustrative Landscape Masterplan and landscape proposals outlined in Chapter 4.
- 5.5.2 Except where indicated otherwise the assessment focuses on the impacts of development of the Main Site and Bypass Site. The remaining Highway mitigation works largely take place within the limits of the existing highway, with many focused on the existing road surfaces, and are therefore considered unlikely to result in any significant adverse impacts. Relatively small-scale and localised tree or hedge loss adjacent to some parts of the existing highway is the only effect of any note and will not be significant by virtue of the limited extent of works and incorporation of replacement hedgerows in the proposals.
- 5.5.3 Throughout the potential effects below are initially based on the scenario of the Proposed Development taking place in the absence mitigation. That is followed by an assessment of residual impact having regard to the proposed mitigation.

Construction

Statutory Sites of Nature Conservation Interest

Upper Nene Valley Gravel Pits SPA / Ramsar

- 5.5.4 There will be no direct loss of the habitats of this Internationally important site as a result of the Proposed Development. Based on the proximity of the Proposed Development to the SPA / Ramsar site the potential for indirect impacts to this designated site as a result of development is considered to be limited only to the loss of supporting habitat.
- 5.5.5 It is recognised that the capacity of habitats to support the internationally important populations of overwintering wildfowl for which they are designated is often dependent upon their regularly used supporting habitats or 'functionally linked land'. Research has demonstrated that numerous fields within the wider area have the potential to support populations of golden plover (Environ 2010¹⁰), and the actual distribution of regularly used supporting habitat is likely to depend upon a range of factors (Gillings *et al* 2007¹¹).

¹⁰ Environ (2010) *Survey Work to Support the Appropriate Assessment for the west Northamptonshire Joint Core Strategy – Report of Elements 3 and 4*
A report produced on behalf of the West Northamptonshire Joint Planning Unit

¹¹ Gillings, S., R. J. Fuller & Sutherland W. J. (2007) *Winter field use and habitat selection by Eurasian Golden Plovers *Pluvialis apricaria* and Northern Lapwings *Vanellus vanellus* on arable land* Ibis 149, pp 509 – 520

5.5.6 Regular use underpins the criteria for selection of the SPA's. The same criteria have been used to assess the potential for the site to support regularly used 'functionally-linked land'. The definition of 'regular' as per Selection guidelines for Special Protection Area is:

"The Conference of the Contracting Parties to the Ramsar Convention has defined the term "regularly" as used in the Ramsar site selection criteria and this definition applies also to these Guidelines. A wetland regularly supports a population of a given size if:

- the requisite number of birds is known to have occurred in two thirds of the seasons for which adequate data are available, the total number of seasons being not less than three; or
- the mean of the maxima of those seasons in which the site is internationally important, taken over at least five years, amounts to the required level (means based on three or four years may be quoted in provisional assessments only)."

5.5.7 With only significant use in one of the three years of study where land management practices were consistent, survey has demonstrated that, at most, the habitats within the Main Site are occasionally used by golden plover. On this basis they do not represent supporting habitat for the populations of the SPA / Ramsar.

5.5.8 No other significant populations of birds that contribute to the designation of the SPA / Ramsar were recorded within the boundary of the Proposed Development. The habitat that is occasionally used by golden plover will be permanently lost during construction. It is considered that even in the absence of mitigation or compensation the loss of habitat that is only used on an occasional basis by golden plover is of negligible magnitude and unlikely to affect the conservation status of the SPA / Ramsar. Therefore, it is considered that this habitat loss is likely to result in an impact of **Negligible** significance on the Upper Nene Valley Gravel Pits SPA / Ramsar of international significance.

Road Cutting SSSI

5.5.9 Construction of the West Coast Mainline rail overbridge will result in some localised loss of habitat from within the boundary of the Road Cutting SSSI. This SSSI is a site of geological interest and there are no ecological reasons for its statutory designation. Reference should be made to Chapter 6 which considers impacts upon geology, including the special interest Road Cutting SSSI. The boundary of Road Cutting SSSI corresponds with the non-statutorily designated Unnamed pLWS (2) and the construction impacts to this site are considered separately below.

5.5.10 There will be no direct loss of habitat from any other statutorily designated sites (European Sites, SSSIs or LNRs) as a result of the development.

5.5.11 The magnitude of the distance separating the site from all other statutory sites of nature conservation interest, is considered sufficient to ameliorate the risk of any indirect impacts during construction.

Non-statutory Sites of Nature Conservation Interest

5.5.12 The following section considers the potential construction impacts upon non-statutory designated sites of nature conservation interest as a result of the Proposed Development. The potential construction impacts to these non-statutory sites include those occurring as a result of the following factors:

- Habitat Loss;
- Accidental pollution events;
- Physical damage to retained vegetation and soils; and
- Dust deposition

Collingtree Golf Course LWS

5.5.13 Accidental pollution events that increase the silt and nutrient load of adjacent watercourses during construction have the potential to impact on downstream ecological features. The consequences of these pollution events can affect habitat structure and function, which may have knock-on effects for dependant faunal species. Through the watercourse RW1, the site is connected to wetland habitats in the surrounding landscape, including the lakes and brook that contribute to the Collingtree Golf Course LWS. However, any risk to the sensitive habitats of the LWS should be balanced against the fact that it is separated from the site by a significant distance, i.e. at least 2.3km of watercourse. Therefore, in the absence of mitigation it is considered likely that accidental pollution would result in impacts of low magnitude and of no more than **Minor** significance to Locally important RW1 and Collingtree Golf Course LWS of County importance downstream.

Junction 15 – Grassland pLWS

5.5.14 The Highway mitigation works (specifically the M1 J15 & A45 Highway Improvements) will result in the loss of up to 0.32ha of the non-statutorily designated Junction 15 – Grassland pLWS, representing c. 13% of the total area of this site. It is considered that the loss of this small area of grassland, which currently lacks active management and is of local importance at best. On this basis the habitat loss from the Junction – 15 – Grassland pLWS is likely to result in long-term effects of medium magnitude adverse impact of no more than **Minor** significance.

5.5.15 Unmitigated increase in airborne dust, particularly during periods of dry weather, can damage vegetation and potentially affect associated fauna. Where severe, some species may disperse from affected areas in the short-term. The zone of influence that might be reasonably assumed to lead to these ecological effects is typically 100m from the area of construction. The Junction 15 – Grassland pLWS falls entirely within the 100m potential ecological zone of influence from increased dust emissions. The grassland does not support sensitive vegetation having suffered from a lack of active management for several years and it is reasonable to expect that unmitigated dust deposition to this pLWS would not result in significant effects.

Roade Quarry LWS

5.5.16 The habitats of Roade Quarry LWS falls partly within the 100m potential ecological zone of influence from increased dust emissions. The magnitude of the impact upon the qualifying features of this LWS are likely to be reduced by highly localised nature of any change and the presence of intervening habitats, which comprise road verge and tall hedges. It is therefore reasonable to expect that unmitigated dust deposition to this pLWS would result in a reversible, mid-term effects of low magnitude and of no more than **Minor** significance at a local scale.

236 / Unnamed pLWS / Highgate

- 5.5.17 Construction of the Main Site will result in the loss of c. 575m² woodland from the 236 / Unnamed pLWS / Highgate, representing no more than 2% of the woods area (2.87 hectares). This woodland has limited structural and botanical diversity, most likely as a result of its management as cover for game-birds. The proposed loss is therefore unlikely to affect the conservation status or ecological function of Highgate woodland, and is considered to result in an effect of low magnitude and an impact of **Minor** significance at a local scale.
- 5.5.18 Physical damage to vegetation, in particular the root systems of trees, and the compaction of soils can lead to direct mortality or alter the species and structural diversity of vegetation. Without appropriate mitigation the construction operations may result in localised disturbance impacts to the retained vegetation of Highgate Woodland pLWS, which may result in an adverse impact of low magnitude leading to an impact of up to **Minor** significance at a local scale.
- 5.5.19 The 236 / Unnamed pLWS falls entirely within the 100m potential ecological zone of influence from increased dust emissions. The site does not support any particularly sensitive species and it is anticipated that the magnitude of any impact will be ameliorated by the retardation of dust emissions by the woodland canopy and by the existing poor coverage of woodland ground flora within this site. It is therefore reasonable to expect that unmitigated dust deposition to the 236 / Unnamed pLWS would result in an impact of **Negligible** significance.

Road Cutting pLWS

- 5.5.20 Construction of the West Coast Mainline rail overbridge will result in some localised habitat losses from within the boundary of the Road Cutting pLWS. At most this will comprise the loss of areas of calcareous grassland, although it is anticipated that the majority of habitat losses will be confined to scrub. The calcareous grassland along the cutting extends well beyond the working area of proposed Rail Overbridge. On this basis, it is considered that the effect of localised habitat losses would be **low** magnitude and will not undermine the conservation status of the Road Cutting pLWS and the impact to this locally important feature will be of no more than **Minor** significance.
- 5.5.21 The Road Cutting pLWS falls entirely within the 100m potential ecological zone of influence from increased dust emissions. It is anticipated that the magnitude of any impact will be **low**; being ameliorated by both the short-term nature of works in this area and also the retardation of dust emissions by the coverage of scrub. It is therefore reasonable to expect that unmitigated dust deposition to the Road Cutting pLWS would result in an impact of **Negligible** significance.

Road Field pLWS

- 5.5.22 In the absence of mitigation, construction of the Bypass Corridor will result in the permanent loss of c.1ha neutral grassland of the hay meadow of Road Field pLWS. This loss is likely to be temporary in nature until proposed habitats develop.
- 5.5.23 The meadow extends beyond the boundary of development, covering a total of c.8.1ha and the area affected has been reduced as far as possible during the iterative design process. Survey has demonstrated that the botanical composition of the meadow is not entirely uniform perhaps as a result of differing initial treatment and ground conditions and the habitat loss is focused on an area of lesser interest; as a result of the greater cover of ruderal species. While some parts of the grassland show a reasonably high affinity to an MG5 community, the area affected does not show a good fit, with species present that are indicative of more semi-improved and possibly disturbed conditions, most likely as a consequence of historical improvement or poor management. In this context, the highly localised losses of low magnitude are unlikely to undermine the integrity of the existing hay meadow of Road Field pLWS. The loss of neutral grassland is therefore considered to result in an adverse impact of no more than **Minor** significance at a local to county scale.

Other Sites

- 5.5.24 The magnitude of the distance separating the site from all other non-statutory sites is considered sufficient to ensure that there will be no impacts to these features during construction.

Habitat Loss

Woodland & Trees

- 5.5.25 In total c.5.15ha of woodland, tree groups and structural/scrub planting will be removed (or part removed) throughout the DCO limits, these are of low magnitude being largely localised losses and, individually, of small scale and short term, as new proposed woodland, scrub and tree habitats are created and establish resulting of an impact of **Negligible** significance
- 5.5.26 Development of the Main Site will result in losses from the mixed plantation woodland of Churchills. These losses cover c.0.2 hectares of the north-east section of this woodland. The losses are confined to an area that lacks significant understory or ground flora, and as such is of limited ecological importance. The habitat losses are of low magnitude, not anticipated to affect the integrity of Churchills woodland and are likely to result in an impact of **Negligible** significance.
- 5.5.27 The Veteran tree will be retained within the Bypass Corridor and therefore there will be no impact to this features as a result of habitat loss.

Semi-improved Grassland

- 5.5.28 The semi-improved grassland located centrally within the Main Site will be retained. Losses of semi-improved grassland as part of the Proposed Development are therefore very localised, being limited to grassland associated with the margins of ditch DD1 that bisects the Bypass Corridor and road verges associated with the Highway Mitigation Works. Embedded mitigation measures would reduce these effects to the short term. The low magnitude of effects are unlikely to affect the conservation status of semi-improved grassland in any locations and are therefore considered to be of **Negligible** significance.

Ponds

- 5.5.29 The Proposed Development will result in the loss of ponds P3 & P4 from the Main Site only. The ponds are of low floral diversity, being heavily over-shaded by surrounding vegetation, and the loss of these features will result in an effect of medium magnitude on the locally important pond resource and an adverse impact of **Minor** significance until new ponds develop.

Running Water & Ditches

- 5.5.30 Construction of headwalls as part of the drainage requirements of the Main Site will result in very small losses of low magnitude to the bankside vegetation of RW1. In the context of the total length of RW1, which extends into the surrounding landscape, this loss is considered to be of **Negligible** significance.
- 5.5.31 The construction of the Bypass Corridor will result in localised losses from the stream RW2, the majority of which is already culverted beneath the A508 at the affected location. On this basis the very localised losses of low magnitude to RW2 are considered to be of **Negligible** significance.
- 5.5.32 The losses to the dry ditch DD1 as a result of the Bypass Corridor will result in very localised losses to a feature that extends into the surrounding landscape. Due to the low magnitude of loss of this feature is therefore considered to be of **Negligible** significance.

Field Margins

- 5.5.33 The Main Site will result in the unavoidable loss of all arable field margins, some of which are of local significance and representing an effect of high magnitude, is considered to represent an adverse impact of Minor significance.
- 5.5.34 Construction of the Bypass will result in more localised losses from the existing arable field compartments, with the majority of the existing margins retained. This impact to field margins, which is limited in extent, is considered to be of Negligible significance.

Hedges

- 5.5.35 In total the Proposals will lead to the loss of 7,900m of hedgerow; a loss of medium magnitude from the total hedgerow resource.
- 5.5.36 The Proposed Development will result in the complete loss of hedgerows H3, H4, H24 H25 & H103, resulting in a Moderate adverse impact on a receptor of County significance.
- 5.5.37 Construction of the Bypass Corridor will result in partial losses from the hedgerows H104, H125 H127 and H131. The losses from these hedgerows are localised and of low-medium magnitude but will sever a relatively continuous network. It is considered that these losses will result in Moderate adverse impacts of no more than County significance.
- 5.5.38 The losses from all other hedgerows as a result of the Proposed Development including the localised losses associated with Highway Mitigation measures will result in adverse impacts of no more than Minor significance given the wider hedgerow resource present locally.

Habitat Disturbance

- 5.5.39 This section considers the potential for disturbance to existing habitats as a result of the Proposed Development. The potential effects of disturbance upon ecological features are described above and include the following:
- Accidental pollution;
 - Dust deposition; and
 - Physical damage of retained vegetation;
- 5.5.40 Accidental pollution events may result in localised damage or destruction of vegetation or more diffuse effects through spillages into wetland features, such as the retained pond P1 and RW1 and RW2. A consideration of the potential effects upon downstream IEFs (i.e. Collingtree Golf Course LWS) from the surrounding landscape is provided above. The unmitigated pollution of wetland features during construction of the Proposed Development has the potential to lead to short-term localised effects of a low magnitude, resulting in an adverse impact of up to **Minor** significance.
- 5.5.41 The retained habitats that fall within the potential zone of influence of dust deposition from the Proposed Development include the woodland, hedgerows, grasslands, ponds and watercourses RW1 & RW2. Unmitigated nutrient enrichment of the hay meadow of Roade Field pLWS that lies adjacent to the Bypass Route is unlikely to lead to any significant change in the community in the long term due to its anthropogenic origin and any effect is likely to be of **negligible** significance. The potential impact to woodlands and hedges is likely to be reduced by the retardation of dust by the canopy and shrubs, and any localised effect to these features is likely to result in adverse of low magnitude such that the composition of these features is unlikely to significantly change and any impact is likely to be of **negligible** significance. Alterations in the nutrient status of the wetland habitats (ponds and watercourse RW1 & RW2) through dust deposition is unlikely to effect their status, given that they are likely to be already highly modified as a result of adjacent agricultural land uses and effect is likely to be of **negligible** significance. The temporary effects of dust resulting to all other habitats is considered to be of **Negligible** significance.

- 5.5.42 Without appropriate mitigation the construction operations could result in inadvertent damage, such as soil compaction and disturbance, to the retained vegetation and soils of IEFs, including woodland, the Veteran tree, grassland and hedges. Any such damage, which can undermine the long-term viability of these habitats, has the potential to result in adverse impacts of **Minor** significance upon woodland, of **Local – County** significance upon grasslands and of **Local - County** significance upon hedges.

Impact of Habitat Loss, Fragmentation & Disturbance on Fauna

Badgers

- 5.5.43 Construction impacts to badgers as a result of the will include the loss and disturbance of setts and the loss of foraging habitat.
- 5.5.44 Without mitigation, the loss and disturbance of setts as a result of the Proposed Development may result in an adverse impact of high magnitude leading to the loss of a significant proportion of setts from the badger social group leading to the potential for it loss and an impact in the absence of mitigation of **Major** significance on the badger social group in the locality.
- 5.5.45 The loss of the seasonal foraging resource, i.e. arable fields, within the Main Site is likely to result in the loss of a significant proportion of the badger foraging resource of medium-high magnitude. The localised losses of foraging habitat along the route of the Bypass Corridor and other Highway Mitigation Works areas are considered to be of **Negligible** significance.

Bat Roosts

- 5.5.46 Development of the Main Site will result in the loss of the confirmed common pipistrelle roost in building Barn C, albeit last seen in 2014 but not subsequently in 2016. Consistent with existing records for the local area, there are likely that there are a number of features within the surrounding area capable of providing potential roosts of similar status or greater. A small number of trees with the potential to support bats will be lost as a result of the Proposed Development, although at most these are likely to be used on an occasional basis by the local bat population and their loss is considered to lead to effects of low magnitude and is unlikely to affect the viability of status of local populations. In this context, the permanent loss of occasionally used bat roosts are considered to be of **Minor** significance at no more than a Local scale.
- 5.5.47 There is a risk that without mitigation the loss of confirmed roosts and trees with the potential to support bats may result in harm to any bat that may be present. Barn C represents a roost that is used sporadically by only a small number (5 or less) of bats and the trees are, at most, likely to be used on an occasional basis by bats. Therefore, the effect of any increased mortality or disturbance would also be considered to result in an adverse impact of no more than **Minor** significance.

Bat Foraging & Commuting Habitat - Main Site

- 5.5.48 Development of the Main Site will retain some habitats that are associated with the highest levels of bat foraging and commuting activity, including habitats along the western boundary, woodland (Churchill's and Highgate) in the central areas of the site and the riparian habitats of RW1. However, clearance of the Main Site will result in the loss of the remaining hedgerows and woodland. The magnitude of any impact is likely to be reduced by the wide availability of similar, suitable foraging habitat in the surrounding area and as such is considered to be low. On balance, the loss of woodland and hedges from the central areas of the Main Site that are regularly used by the local bat population is likely to result in an adverse impact of **Minor** significance.

5.5.49 In some situations the introduction of breaks into commuting routes that are used regularly by bats can hinder access to favoured foraging areas and / or access to roosts, resulting in fragmentation impacts. The removal of hedges and woodland from the central areas of the Main Site are likely to hinder the local bat populations ability to commute between areas of retained habitat. Despite this, retention of boundary features is considered sufficient to maintain the function of connections between any areas of off-site habitat for all species present and the magnitude of loss on local populations is considered to be low. It is also considered likely that where necessary common pipistrelle and soprano pipistrelle, which are widespread and adaptable species, and represent the largest proportion of the site's recorded population, would habituate to the alternative commuting routes and foraging areas supplied by the retained boundary features. Overall, in the absence of mitigation the fragmentation of existing foraging and commuting habitat that is regularly used by the bat species present is likely to result in an adverse impact of no more than **Minor** significance.

Foraging & Commuting Habitat –Bypass Site (and other Highway Mitigation Works)

5.5.50 The Bypass Site, and other Highway Mitigation Works, will result in some localised losses from hedges that are used by the local bat population. Given their limited extent these losses, and the low overall levels of bat activity associated with the majority of features affected, this adverse impact is considered to be of **Negligible** significance.

5.5.51 The removal of hedgerows with the Bypass Corridor will result in the unavoidable fragmentation of these features. The most sensitive feature is likely to be hedgerow H114, which is connected to hedges H111 & H112 that are regularly used by bats, with the most frequently recorded species being common pipistrelle (barbastelle is considered separately below). It is considered reasonable to assume that H114 is also used by the same bat species. The severance of hedgerow H114 and other hedges on the margins of Roade, has the potential to hinder the ability of bat colonies from this area to access their foraging and commuting habitat. The overall magnitude of this impact is likely to be limited by the wide availability of alternative foraging habitat in the area surrounding Roade and is considered to be low. On balance, the impact of fragmentation upon bats (except barbastelle) as a result of the Bypass Corridor is considered likely to be of up to **Minor** significance at a local scale.

5.5.52 Research has highlighted that, although barbastelle bats are not typically associated with urban environments, they are capable of commuting across open areas, including arable fields and roads (Zeale *et al* 2012). Therefore, although the continuity of available habitat will be interrupted by the losses from H114 it is reasonable to assume that barbastelle will continue to be able to cross the Bypass Corridor and that members of this population utilise extensive habitats in the wider countryside. On this basis it is considered that the proposed habitat fragmentation of H114 will result in an impact of no more than **Minor** significance upon the local barbastelle population.

Birds - Assemblages

5.5.53 The survey and desk study have demonstrated that the surrounding arable fields support assemblages of breeding and over-wintering farmland bird species that are similar to that found within the Proposed Development. Despite the losses of all arable farmland and some areas of woodland it is considered reasonable to expect that the surrounding area will continue to support the same assemblages. It is therefore unlikely that there will be any alteration in the assemblage of breeding or over-wintering birds occurring in either the local or surrounding areas. On this basis, it is considered that there will be **Negligible** impact of habitat loss upon the status of the assemblage of breeding and wintering birds.

Breeding Birds – Main Site

- 5.5.54 Development of the Main Site will lead to the loss of habitats used for breeding by a number of notable species listed in Table 5.9. Retention of woodland within the Main Site will limit the magnitude of impact to species that depend upon this habitat, including bullfinch, buzzard, mistle thrush, song thrush and stock dove. However, as there will also be a loss of nearby hedges and trees that are likely to represent a foraging resource for these species, the magnitude of effects is low overall leading to impact to each of these woodland species is considered to be of up to **Minor** significance.
- 5.5.55 The loss of the arable habitat and hedges from the Main Site will impact upon the notable species that are reliant upon these features for breeding, i.e. grey partridge, linnets, reed bunting, skylark, yellow wagtail and yellowhammer. The habitat loss is likely to result in the displacement of breeding territories from the site. Given the wide local availability of farmland habitats that are similar to those within the site boundary, the surrounding landscape is likely to limit the magnitude of any effect upon the conservation status of all breeding bird species within the site to a medium level. Habitat loss is likely to result in no more than a **Minor** level impact to any of breeding farmland birds of local significance.
- 5.5.56 The low magnitude and partial loss of suitable breeding habitat for starling and kestrel will result in adverse impacts to these species of up to **Minor** significance at a local scale.
- 5.5.57 Barn owls may occupy territories of 3 – 7km² in the breeding season (Shawyer 2011¹²) and are likely to make use of a number of feeding perches within the wider area. Therefore, the loss of a single, occasionally used barn owl feeding roost is considered to be of low magnitude and likely to result in no more than a **negligible-minor** impact to this species.

Wintering Birds

Main Site

- 5.5.58 As detailed above, development of the Main Site will result in the loss of arable fields that are used on an occasional basis by golden plover. The permanent loss of this over-wintering habitat will result in an adverse impact of **negligible** significance to golden plover given the abundance of suitable habitat within the wider area.
- 5.5.59 Construction of the Main Site will lead to the loss of the arable fields and hedges that are used as a winter resource by widespread species and small numbers of notable species, including lapwing, linnets, redwing, skylark, starling and yellowhammer. The loss of plantation woodland at the Main Site will also impact upon the wintering foraging resource available to some species, including dunnock and winter thrushes. As a result of the low populations that make use of the site's habitats and the extent of similar habitat that is available in the surrounding landscape, the potential effect is of low magnitude and the impact of the development upon the remaining population of over-wintering birds is considered to result in no more than a **Minor** significance at a local level.

Bypass Corridor (and Highway Mitigation Works)

- 5.5.60 Along the route of the Bypass Corridor, and other Highway mitigation works, the habitat losses are limited in overall extent, being generally confined to the removal of hedgerow sections or small areas of arable fields that extend beyond the development boundary. The low magnitude loss of hedgerow is unlikely to affect those species that depend upon this habitat type for breeding, including bullfinch, dunnock, linnets and yellowhammer, which are all widespread, and the adverse impact to these species is considered to be of **Negligible** significance.

¹² Shawyer, C. R. (2011) *Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment - Developing Best Practice in Survey and Reporting*. IEEM, Winchester

- 5.5.61 The loss of arable fields will reduce skylarks breeding resource and the magnitude of this impact is likely to be increased further as a consequence of the fragmentation of available lines of sight, which may erode the wider suitability of breeding habitat for this species. Therefore, construction of the Bypass Corridor is likely to result in an adverse impact of **Minor** significance to skylark.
- 5.5.62 The localised losses of habitat, such as scrub, hedges and arable fields, are unlikely to affect the status of any of the other over-wintering bird species present, particularly given the wide availability of similar habitat in the surrounding area. Therefore, the impact of habitat loss as a result of the Bypass Corridor, and other Highway mitigation works, is considered to be of **Negligible** significance.

Disturbance to Birds During Construction

- 5.5.63 During construction the unmitigated disturbance of breeding bird species may occur. In the absence of any mitigation this is likely to be the result of either the accidental destruction of nests or the noise associated with vegetation clearance, initial ground works and construction activities that are of low frequency but of high amplitude, such as piling. During the breeding season such disturbance may lead to reduced breeding success and, in extreme cases, through nest desertion or the avoidance of otherwise suitable habitat. As the application site supports bird assemblages that are typical of the farmland and woodland habitats present, any potential disturbance impact upon the assemblages or individual bird species present is likely to be of **Minor** significance at no more than a Local scale.

Great Crested Newts

- 5.5.64 No GCN ponds will be lost as a result of the Proposed Development.
- 5.5.65 Without mitigation the proposals will result in the loss of terrestrial habitat from the large breeding newt populations supported by pond P1 at the Main Site. The majority of GCN populations are known to be located within 100m of their breeding pond, with 250 m being towards the upper limit of this species' range of dispersal (Cresswell & Whitworth, 2004). A significant proportion of suitable habitat in close proximity to the pond will be retained. Much of the affected areas around the pond P1 consists of intensively managed arable fields that represent unsuitable terrestrial habitat for GCNs, with the suitable habitat confined to the unmanaged field margins. On this basis the impact magnitude is considered to be low and the limited loss of GCN-suitable habitat is unlikely to affect the populations conservation status and will result in an impact of no more than **Minor** significance pre-mitigation.
- 5.5.66 The medium GCN supported by pond P12 lies c. 200m from the working area of the Bypass Corridor at its closest point, i.e. at the location of the Rail Overbridge, with the majority of the working area located at a distance of over 300m from this population. It is reasonable to anticipate that this population may make occasional use of the terrestrial habitat within these working areas, but it is considered that the most regularly used habitat will fall in close proximity to pond, particularly considering the optimal nature of habitats in close proximity. Therefore, the impact magnitude is low and of the loss of terrestrial habitat used by the GCN population will at most be of minor-negligible significance.
- 5.5.67 The Bypass Corridor will result in losses of terrestrial habitat occurring within 100 – 250m of the low population supported by pond P108. The losses of suitable terrestrial habitat in this area are largely limited to sections of hedgerow and the ditch DD1. The majority of suitable habitat lies in close proximity to P108 and shall be retained. Given their highly localised nature the magnitude is low and impact of these habitat will result in impact of **Negligible** significance to the GCN population in pond P108. The working area of the Bypass Corridor lies over 350m from the pond P109, which is a distance that exceeds the limit of GCNs normal dispersal, particularly for the low population present. Therefore, it is considered that there will be no impacts to the GCN population supported by P109 during construction.

5.5.68 Without any mitigation measures there is a limited risk that the activities associated with construction could lead to the accidental killing or injury of GCNs. Given the likely presence of most GCNs in areas of retained habitat, i.e. close to the breeding pond, the risk of killing or injury is considered to be low. However, any such increases in mortality may lead to reduced breeding success of low magnitude, which over time could adversely impact on the local conservation status of GCNs. Therefore, accidental killing or injury during operation of the development is considered likely to result in an impact of no more than **Minor-Moderate** significance at a local scale.

Invertebrates

5.5.69 The majority of habitat lost to development, which comprises intensively managed arable fields, is considered to represent poor habitat for invertebrates. Clearance of the site will remove some features that represent suitable habitat for the local invertebrate assemblage, including the hedgerows, deadwood associated with mature trees and grassland habitat. Without mitigation the removal of these features would lead to a reduction in the total resource of potentially suitable habitat that is available to the invertebrate population. Although deadwood habitats such as that associated with mature trees may occur infrequently at a local level it is likely to be widespread as hedgerows and similar woodland or scrub habitats are reasonably abundant within the surrounding landscape and the magnitude of loss is considered low. Therefore, in the absence of mitigation the loss of invertebrate habitat as a result of the Proposed Development is likely to result in an adverse impact of no more than **Minor** significance. The retention of woodland and grassland is considered sufficient to ensure that impacts to large picture-winged fly and lesser marsh grasshopper are of **Negligible** significance.

Otters

5.5.70 Development of the Main Site will result in some habitat losses in the vicinity of culvert that is currently used on an occasional basis by otter to pass the A508. Construction works in this location may result in some disturbance to otter, and in the absence of mitigation this has the potential to temporarily limit this species access to habitat west of the A508. However, otter are a very wide ranging species usually active outside of normal construction site working periods and this temporary disturbance is therefore of low magnitude and unlikely to affect the conservation status of this species. Therefore, the impact of construction upon otter is considered to be of **Negligible** significance.

Reptiles

- 5.5.71 Development of the Main Site will maintain the grassland associated with Churchills that supports common lizard, and there will therefore be no impact to this population.
- 5.5.72 Construction of both the Main Site and Bypass Corridor will result in small losses from the existing rail embankment, which provides areas of suitable reptile habitat. Consistent with data from the desk study and survey it is reasonable to anticipate that these areas will also support populations of common lizard. Given that the habitat losses are highly localised leading to effects of low magnitude it is unlikely that they will affect the conservation status of any wider population that may be present and are therefore considered to result in an impact of **Negligible** significance.
- 5.5.73 Grass snake, which have been recorded within the DCO limits, are a wide-ranging species that are likely to make use of a variety of habitats within the surrounding landscape. Consequently, habitat losses during construction are therefore unlikely to significantly affect the habitat that is available to the local grass snake population and any impact is considered to be of **Negligible** significance.
- 5.5.74 In the absence of any mitigation, the site clearance operations are likely to result in an increased incidence of mortality in any reptiles that are present through accidental killing or injury leading to a reduction of range and effects of a low magnitude. An increase in mortality of any reptiles that may be present is likely to result in an impact of **Minor** significance to reptiles.

Operation

Statutory Sites of Nature Conservation Interest

Upper Nene Valley Gravel Pits SPA / Ramsar

- 5.5.75 The Upper Nene Valley Gravel Pits Special Protection Area SPD highlights a range of potential significant adverse effects to be considered when assessing development proposals:
- **Physical loss of habitats within the SPA** through conversion to other land uses
 - **Fragmentation of habitats within the SPA**, which isolates waterbirds in small habitat patches and impede waterbird movement through the site
 - **Loss of usable habitat within the SPA** in which the physical extent of habitat remains, yet factors like disturbance or visual barriers reduce the amount of habitat that is actually suitable for waterbirds
 - **Loss of supporting habitat** adjacent to or outside the SPA
 - **Increased disturbance to waterbirds** from human activity (e.g. recreational uses), domestic pets, noise, light and other factors that cause birds to spend less time feeding and more energy avoiding the disturbance, compromising long term survival
 - **Changes in ecological condition**, e.g. due to lack of management, ecological succession or deteriorating water quality, which render the habitat unsuitable for waterbirds
 - **Direct waterbird mortality**, e.g. from collision with structures.
- 5.5.76 There are no industrial processes proposed that are likely to lead to significant effects and due to the magnitude of the distance separating the development from the Upper Nene Valley Gravel Pits SPA / Ramsar, it is considered that there will be no adverse impacts to this European Site as a result of alterations in hydrology, recreational pressure or lighting.
- 5.5.77 A combination of factors, including the nature of Proposed Development and the magnitude of the intervening distance, is considered to be of sufficient to ensure that all other operational impacts to all other statutory sites of nature conservation interest will, at most, be of **Negligible** significance

Non-statutory Sites of Nature Conservation Interest

- 5.5.78 The potential operations impacts to non-statutory sites as a result of the Proposed Development include those occurring as a result of the following factors:
- Hydrological change; and
 - Altered recreational pressure

Collingtree Golf Course LWS

- 5.5.79 The local hydrological regime is likely to alter as a result of an increase in the rate of run-off from hard-standing surfaces of the Proposed Development. Significant alterations in the levels and composition of run-off may have ecological consequences through an alteration in important hydrological processes, such as deposition and erosion. These processes influence the structure and function of a range of associated habitats that are valuable for fauna, such as invertebrates. Such effects have the potential to indirectly impact upon RW1 and downstream watercourses, which include those associated with Collingtree Golf Course LWS. A long-term and permanent change to the hydrological regime i.e. water quantity and / or water quality, has the potential to alter the structure and composition of the aquatic plant communities that represent the qualifying feature of this LWS. Such a long-term change may, if not prevented through an appropriate drainage strategy, have an adverse impact of up to **Moderate** significance.

236 / Unnamed pLWS Highgate

- 5.5.80 Trampling of vegetation and the compaction of soil as a result of increases in visitor pressure can lead to the degradation of habitats. Notable effects include alterations in the diversity of plant communities and vegetation structure, and also reduced survival rates of the species that depend upon these habitats. Highgate woodland falls within the boundary of the Main Site and it is reasonable to expect that in the absence of mitigation it would be subject to some increase in recreational activity from the SRFI personnel. This may result in a reduction in the extent of existing ground flora, which has the potential to result in an adverse impact of up to **Minor-Moderate** significance.

Other Sites

- 5.5.81 A combination of factors, including the nature of Proposed Development, the lack of public access to sensitive habitats and the magnitude of the intervening distance, is considered to be of sufficient to ensure that there will be no operational impacts to any other non-statutory nature conservation sites (LWS & pLWSs).

Habitats

- 5.5.82 The following considers the potential operational impacts of the Proposed Development upon habitats that lie outside the boundary of designated sites of nature conservation interest.
- 5.5.83 Following construction, the retained vegetation, including woodland, hedgerows and trees, may be adversely impacted by the inevitable increase of human presence and any associated recreational activities. Without mitigation it is expected that these effects would be associated with regularly used footpaths or desire lines, and therefore highly localised. The adverse impact of a post-construction increase in visitor pressure upon the woodland, hedgerows and trees is likely to result in localised effects of low magnitude and be of no more than **Minor** significance.

Fauna

- 5.5.84 The following considers the proposal's operational impacts upon faunal species.
- 5.5.85 Based on the nature of the proposals it is considered that there are unlikely to be any significant impacts to invertebrates or reptiles as a result of the operation of the development.

Badgers

- 5.5.86 The layout of the Proposed Development will introduce potential barriers to movement of badgers, such as roads and industrial areas, which may limit their access to available habitat both within the site and the surrounding area. The retention of boundary features will continue to maintain some suitable corridors of movement for badgers, however, there is potential for the proposals to fragment the resident badger populations. Therefore, without mitigation the habitat fragmentation in the completed development is likely to result in an adverse impact of up to **Minor** significance.
- 5.5.87 There is a risk that the new roads serving the Main Site and the Bypass Corridor itself may lead to increased levels of badger mortality. Although badger populations are able to maintain their status despite high levels of mortality, increases in mortality may affect the integrity of the badger population through lowered survival rates, limited dispersal and / or reduce breeding success. The magnitude of any potential impact is likely to be limited by the existing badger populations habituation with the M1, A508 and Collingtree Road and as such is considered to be low. Therefore, any impact from increased mortality will, at most, result in an impact of **Minor** significance.

Bats

- 5.5.88 The severance of flight lines with roads may also lead to increases in mortality through accidental collision with vehicles. Access to the Main Site off the A508 and route of internal roads around the periphery of the development are associated with areas where relatively low levels of bat activity have been recorded. Furthermore, vehicle speeds within the Main Site will also be low, i.e. limited to below 40 mph. On this basis it is considered likely that the impact of accidental collisions to bats as a result of development of the Main Site will be of **Negligible** significance.
- 5.5.89 The Bypass Corridor is designed for a vehicle speed of 60 mph and the route of this road severs the hedgerow H114, which as described above is likely to be regularly used by reasonable numbers of bats. There is therefore a reasonable risk of an increased mortality to bats as a result of vehicle collisions. The magnitude of any impact is likely to be low as a result of either the adaptable nature of the species that are most frequently recorded along this hedge, i.e. pipistrelle bat species, or the lower frequency of use by other more wide-ranging species, such as barbastelle. It is considered that in the absence of mitigation any impact to any bat species as a result of vehicle collisions will be of no more than **Minor** significance.
- 5.5.90 The unmitigated lighting of bat roosts and inter-connecting habitat types, such as hedgerows, trees or woodland edge, may indirectly impact upon the species that are dependent on them. For example, some bat species, particularly barbastelle or *Myotis* sp., are known to avoid illuminated areas, and this may lead to reduced foraging success and survival rates (Bat Conservation Trust 2009, Jones 2000). Reasonable levels of bat activity were associated with the features located immediately adjacent to the Proposed Development, for example, around areas of woodland and hedges. Therefore, without mitigation the inappropriate lighting of the regularly used areas of the site may adversely affect the foraging behaviour of bats that depend upon these habitats. It is considered likely the effect of inappropriate lighting associated with the scheme would result in some displacement of bats but at a low magnitude such that any local populations viability is unlikely to be significantly affected. The impact is considered to be of up to **Minor** significance to all species of bats.

Birds

Main Site

- 5.5.91 The operational development at the Main Site will lead to an increase in disturbance to birds, particularly as a consequence of the physical proximity of buildings and alterations in levels of noise and light. Without mitigation these effects are likely to result in the displacement of barn owl, buzzard and kestrel from the retained habitat of the Main Site, resulting in an effect of low magnitude and an adverse impact of **Minor** significance to each of these species. The status of all other bird species that make use of the retained habitats are unlikely to be significantly affected by these impacts.

Bypass Corridor

- 5.5.92 Once operational the Bypass Corridor will result in a permanent increase in traffic. Proximity to roads is known to effect breeding bird density, although it is unclear what factors contribute to this effect. Noise is one such factor. The influence of noise disturbance on birds is poorly understood, but Raijnen *et al* (1997¹³) have provided a threshold-based model of the effects by studying the effects upon bird populations in The Netherlands. Based on the anticipated traffic load and vehicle speeds along the Bypass Corridor and the open nature of the surrounding habitats, it is anticipated that bird populations may experience a reduced density at a distance of up to 125m from the road. This disturbance effect is unlikely to alter the assemblage of breeding birds. However, it is considered that all the overall abundance of each notable breeding bird species will be reduced, resulting in an effect of medium magnitude and an adverse impact of up to **Minor** significance at a local scale.

¹³ Reijnen R, Foppen R, & Veenbaas, G. (1997) *Disturbance by traffic of breeding birds: evaluation of the effect and consideration in planning and managing road corridors* Biodiversity and Conservation 6 pp 567-781

- 5.5.93 The Bypass Corridor will introduce a physical barrier that is likely to reduce barn owls access to occasionally used roosting sites. As detailed above barn owl may occupy territories of 3 – 7km² (Shawyer 2011), and consistent with local records for this species are likely to make use of a number of feeding perches within the wider area. Given that barn owl is likely to make use of habitats in the surrounding area, reduced access to occasionally used roosting sites is likely to result in a **Negligible** adverse impact to this species.
- 5.5.94 In the absence of appropriate mitigation major roads (including modern A roads) are known to be associated with increases in barn owl mortality as a consequence of their collision with vehicles (Ramsden 2004¹⁴). Without mitigation it is likely that operation of the Bypass Corridor may result in mortality of barn owl, which may reduce the breeding success of the local population and result effects of medium magnitude and a **Minor** adverse impact of local significance.

Great Crested Newts

- 5.5.95 Without mitigation the increased activity associated with operation of the Proposed Development and the provision of features, such as raised kerbs and drainage gully pots, have the potential to increase the incidence of GCN mortality, i.e. as individuals become trapped in the gullies (English Nature 2001). This has the potential to adversely affect the integrity of the GCN newt population through a gradual reduction in adult numbers. Due to the presence of a large population in close proximity to areas of the Main Site, the effect could lead to a gradual reduction on population size and an effect of medium magnitude. This adverse impact is likely to be of up to **Moderate** significance. The impact of increased mortality upon GCN populations from ponds P102 and P108 is likely to be greatly reduced by distance and the effect of low magnitude. The impact is considered to be of up to **minor** significance. The magnitude of the distance separating the Bypass Corridor from pond P109 is considered sufficient to ensure that there will be no impact to this GCN population from increased mortality.

Otters

- 5.5.96 Otters currently cross the A508 and based on the poor suitability (i.e. small size) of the culvert beneath the A508 it is likely that when commuting along RW1 during storm events otters could abandon the watercourse in favour of crossing the road. There is therefore a risk that in the absence of mitigation an increase in vehicle traffic along this road may also increase the risk of otter mortality as a result of vehicle collisions. At a UK level, the impact of road collisions is not thought to have significantly affected the status of otters, particularly given this species more recent increase in abundance (Grogan *et al* 2013¹⁵). Given the widespread distribution of otter within the Nene Valley, the occasional use of RW1 and this species likely habituation to the existing road corridors, it is considered that the magnitude of any impact upon otters resulting from vehicle collisions will be **Negligible** significance.

14 Ramsden D J. (2004) *Barn Owls & Major Roads: results and recommendations from a 15-year research project*
A report produced by the Barn Owl Trust

15 Grogan, A., Green, R. & Rushton, S. (2013) *The Impacts of Roads on Eurasian Otter (Lutra lutra)*. IUCN Otter Spec. Group Bull. 30 (1) pp 44 - 57

5.6 MITIGATION & COMPENSATION

5.6.1 The following section covers specific mitigation and / or compensation measures aimed at reducing the level of potential adverse effects which have been identified during the EclA process as potentially significant. Detailed measures to ensure legal compliance are also provided.

Embedded Mitigation Measures

5.6.2 From the outset and following review of the ecological baseline the potential effects arising as a result of proposed development have been reviewed in order that, where possible, potential adverse effects upon IEFs can be avoided and moreover minimised. This has been achieved through a well-considered layout and other measures.

Designated Sites of Nature Conservation Interest

5.6.3 The effects upon non-statutory sites of nature conservation interest, including Junction 15 Grassland pLWS, 236 / Unnamed pLWS / Highgate, Roade field pLWS and Roade Cutting pLWS, have been minimised by limiting the overall area lost to the Proposed Development.

Habitats

5.6.4 The following avoidance measures have been built into the layout of the Proposed Development:

- Woodland, hedges and mature trees have been retained within the Proposed Development wherever possible;
- Minimising the loss of neutral grassland of the hay meadow of Roade Field pLWS that lies adjacent to the Bypass Corridor;
- Retention of semi-improved grassland adjacent Highgate at the Main Site;
- Retention of the riparian habitats of RW1 at the Main Site;
- Retention of pond P1 at the Main Site;

5.6.5 The green infrastructure of the Proposed Development will include a substantial area of informal space, comprising a range of semi-natural habitats. These areas will provide mitigation for the loss of habitat through provision of the following:

- Creation of an inter-connected mosaic of habitats, including woodland and scrub, across the proposed green infrastructure;
- Creation of species-rich grassland that are characteristic of the county, such as the MG5 *Cynosurus cristatus* – *Centaurea nigra* NVC community;
- Creation of a network of wetland features as part of the sustainable drainage scheme, with marginal plant species similar to those associated with Collingtree Golf Course LWS;
- Planting of heavy standard trees; and
- Planting of species-rich hedgerow.

5.6.6 The planting scheme shall use locally sourced native species and shall avoid the use of any known invasive species, including those listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

5.6.7 The proposed GI, encompassing the new woodland, trees, hedgerows and other planting, habitats and open space will extend to a significant proportion of the total Site area. A summary of habitat losses and gains is provided in Table 5.13 below:

Table 5.13: Summary of habitat losses and gains

Landscape/habitat/feature	Unit	Existing	Removed (or part removed)	Conserved/ Retained	Proposed	Net Gain/ Loss
Woodland/ tree groups/ structural/ scrub planting	Ha	14.60	3.90	10.70	29.05	+25.15
Hedgerows	m	11,700	7,900	3,800	13,000	+5,100
Water Features/ Wetlands/ Ponds (excl watercourse/ ditches)	Ha	0.10	0.00	0.10	3.00	+3.00
Semi improved / species rich/ meadow/ non-agricultural grassland	Ha	9.10	4.40	4.70	26.60	+22.20

Notes:

All areas and quantities are approximate.

All areas and quantities are based upon the Development Parameter Plan, with the exception of Hedgerows, which are based upon the Illustrative Landscape Plan.

Proposed Tree Groups are included within the Proposed Woodland category.

The Proposed Water Features/ Wetlands/ Ponds is based upon the Proposed Drainage Strategy and includes both permanently wet and other dry/ intermittently wet features.

5.6.8 Provision for the long-term management of habitats in the Proposed Development is described below.

Fauna

5.6.9 The following avoidance measures have been adopted within the Main Site to avoid or minimise impacts to fauna:

- Retention of pond P1, which supports a large GCN population;
- Retention of grassland adjacent Churchills, which supports a small common lizard population;
- Retaining boundary features, including woodland, hedges and RW1, within the Main Site will ensure that habitat connectivity to the surrounding area is maintained for fauna, including badgers, bats and otters.

Standard Mitigation Measures

Construction Environment Management Plan

5.6.10 A Construction Environmental Management Plan (CEMP) (see Chapter 2, Appendix 2.1) will ensure best working practices are adopted during the construction phase. The contents of the CEMP adhere to and, where necessary, provide further detail on the recommendations that are outlined below for designated sites, habitats and fauna. In brief, the CEMP identifies specific areas for the protection of ecological features and provide details of avoidance or mitigation measures. Given the time required to deliver the Proposed Development it is anticipated that, where necessary, the CEMP will be informed by updated ecological surveys that are relevant to any particular phase of development. This CEMP will apply the most recent ecological baseline to inform mitigation, the appropriate location and timing of works, the responsibilities of site workers, particularly Ecological Clerk of Works, and the use of barriers or signage. Specific measures to be contained within the CEMP are contained in the following section.

- 5.6.11 It is anticipated that the CEMP would be secured through an appropriately worded 'requirement' if DCO is granted.

Designated Sites of Nature Conservation Interest

General Measures

- 5.6.12 Best practice measures will be adopted during to avoid potential disturbance to non-statutory sites of nature conservation interest, including Nene Valley Gravel Pits SPA / Ramsar / SSSI. This will include:
- Control of accidental pollution events during construction;
 - Control of dust during construction;
 - Protection of retained vegetation through the use of stand-offs, including the implementation of BS5837:2012¹⁶;
 - Sustainable drainage to maintain water run-off at existing greenfield rate and quality; and

Recreational Pressure

- 5.6.13 The increase of recreational pressure upon designated non-statutory sites of nature conservation interest (e.g. Highgate woodland) will be managed through careful detailed design and by implementing the following management principles secured by DCO requirement, as appropriate:
- Limiting access to retained habitats through the use of fencing or strategic planting of native species;
 - Provision of waymarked and surfaced footpaths to provide clear routes of access around sensitive areas;
 - Use of interpretation to explain the importance of retained habitats; and
 - Providing litter bins.
- 5.6.14 These measures are detailed further in the Landscape and Ecological Management Plan (LEMP) (Appendix 5.12) the principles of which will be secured by DCO requirement.

Habitats

- 5.6.15 The majority of habitats to be lost to the Proposed Development are arable fields of low intrinsic nature conservation value. As a result, mitigation for the impacts associated with land-take is to largely involve the sympathetic management of retained habitats and buffer zones.
- 5.6.16 Mitigation will be planned to ensure that all retained habitats, including woodland, the Veteran tree and hedgerows, are afforded suitable protection throughout the lifetime of the proposed development, i.e. working methods will adhere to standard best practice guidance. This will include BS5837: 2012, which also applies to hedgerows with trees present.
- 5.6.17 The release of airborne dust particles during construction will be controlled through the use of best practice measures, including, where necessary, the avoidance of work during extended periods of dry weather, damping of dust and wheel washing associated particularly with the intermodal terminal activities (including any aggregates terminal and storage).
- 5.6.18 Preventing accidental spillages entering local watercourses and the appropriate design of site drainage systems will be based upon the recommendations of the Environment Agency's Guidance on Pollution Prevention series. These include measures that will ensure the safe storage of material and that silt generated by construction activities is not released to the existing systems.

¹⁶ BS5837: 2012 *Trees in Relation to Construction – Recommendations: 2005 for trees and hedges*. BSI Standards Publications

5.6.19 Implementation of the proposed sustainable drainage system within the Proposed Development will ensure that the rate and amount of water run-off are unaltered, i.e. not significantly altered above existing greenfield rates. A reduction in water quality of surface run-off is also unlikely due to the implementation of appropriate measures within the SuDS proposals.

Habitat Enhancement

5.6.20 Habitat creation and enhancement opportunities presented within the GI are driven by a number of factors including:

- a requirement to compensate for minor loss of habitat used by fauna and where possible ensure that there is a net gain in biodiversity arising as a result of the development
- a desire to benefit Local Biodiversity Action Plan targets;
- the maintenance of habitat corridors through and around the site and incorporation of habitat links to surrounding habitats of interest;
- and the presence of existing features of interest that would benefit through sympathetic management.

5.6.21 All habitat creation principles as illustrated in the Illustrative Landscape Masterplan will be carried through to the detailed design.

5.6.22 The following habitat creation and management principles have been devised with the aim of improving the existing habitat for biodiversity. The focus has been to create a more varied habitat for existing wildlife and to encourage a greater diversity of species through habitat creation and sympathetic management. Although beneficial habitat creation will occur through the development, a particular emphasis is given to those areas of strategic importance to the site GI, including:

Woodland Planting

5.6.23 Significant new woodland planting totalling approximately 29ha will be undertaken in order to augment and complement existing woodlands that exist locally such as Churchills and Highgate woods within the site and those that are present in the local area such as in association with Courteenhall. The planting mix would be representative of local woodlands. Little management would be undertaken initially to ensure that the area is as little disturbed as possible although some thinning/coppicing/pollarding may be required in time to encourage the development of structurally diverse woodland.

5.6.24 Where new tree and shrub planting within the structural landscaping and GI is to be undertaken, native species will be used to provide a habitat to a range of species-specific and phytophagous species. The mix will comprise at least c. 40-50% climax species such as oak and a range of pioneer tree and understory shrub species. The woodland planting would include under planting and edge planting of small tree shrubs species to further increase the structural diversity of the new woodland elements.

5.6.25 The planting of standard trees throughout the development would also occur, increasing structural diversity in the GI and habitats throughout the development.

Neutral Grassland

5.6.26 Approximately 26ha of non-agricultural grassland is proposed to be created. These will be located widely within the Site in association with woodland and scrub habitats on the sites peripheries and, to a lesser extent within the built development areas, where intensive use and more formal management is not proposed. This habitat type, which is currently either rare or highly localised within the site, will be significantly increased in area leading to a significant biodiversity gain for this habitat type (Chapter 4: Illustrative Landscape Masterplan Drg. Nos. 5772-L-30 & 5772-L-38).

- 5.6.27 It is also the intention to create a network of small ride/glades/scallops among areas of more developed habitat such as around and within proposed woodland planting and between proposed and existing planting as indicated in the Illustrative Landscape Masterplan (Chapter 4: Illustrative Landscape Masterplan Drg. Nos. 5772-L-30 & 5772-L-38). This will provide the structural and microhabitat diversity required by a range of species including a number of the invertebrates and herpetofauna including great crested newt, common lizard and grass snake and scrub specialist birds known to be present locally or recorded within the Site.
- 5.6.28 Grassland habitats would be created in areas currently intensively managed for agriculture. Where possible, topsoils would be removed or mixed with subsoils to provide a substrate more conducive to the development of a more species-rich sward. A variation in topography would be provided with shallow banks and undulations left to provide a high level of variation in micro-topography.
- 5.6.29 Coarse grassland areas to be created will also be allowed to develop on more developed soils to allow vigorous growth and the development of a structurally diverse habitat suitable for the colonisation of a range of species.
- 5.6.30 The seeding of grassland habitats will be undertaken in order to prevent the establishment of weed or other undesirable species. A neutral grassland seed mix of native provenance will therefore be used.
- 5.6.31 Initial management of grassland areas is likely to be up to four cuts in the first year to reduce colonisation and competition from undesirable species, followed by cutting in autumn (only a third cut in any one year), to maintain a varied sward with frequent patches of short (<50mm) grassland.
- 5.6.32 The neutral grassland of Roade Field affected by the Bypass Corridor will be strategically translocated adjacent to the bypass corridor close to the existing retained grassland resource linking it and providing a stepping stone to the calcareous grassland at Roade Cutting pLWS.

Ponds

- 5.6.33 The loss of ponds P3 and P4 at the Main Site will be mitigated through the creation of ponds constructed to maximise their benefit for wildlife and particularly amphibians. These will be created at a ratio of at least two new ponds for each pond lost excluding those associated primarily with drainage infrastructure which would further increase the number available.
- 5.6.34 These water bodies will be created to the south of Churchills to provide additional stepping stone habitat for amphibians known to the present. All ponds will be shaped to provide a range of bank angles and heights. Bank gradients will vary and will be enhanced by the excavation of small bays. The aim will be to create a diversity of pond types ranging from small field ponds to larger attenuation facilities. This will ensure a range of differing conditions of light and temperature are provided and will thus encourage diversification in the flora and associated fauna. Variations in water depth will be provided from shallows to deeper pools to enhance nature conservation value and to maximise the development of biodiversity. The shallowest areas will grade into an expanse of seasonally wet mud that may attract a variety of invertebrates and plants, which will, in turn, attract other fauna including birds and mammals. The pond will largely be supplied by rainfall and surface water run-off and thus would allow for seasonal variations in water level. It is envisaged that a range of peripheral communities including wet grassland, marsh and wet (carr) woodland will be allowed to develop and provide a gradual transition to drier habitats. The greater habitat diversity and extent of edge habitat is likely to provide good invertebrate, amphibian and bird habitat throughout the season.

- 5.6.35 The attenuation facilities and other wetland feature will include permanent open water set within a mosaic of adjacent woodland, marsh and grassland. The creation of these features scattered through the site in addition to more significant pond features in the south of the site where flood compensation/attenuation lagoons are proposed. These would significantly enhance the RW1 stream corridor in the south, which could play an important part into the sites GI proposals by maximising the potential for wildlife to disperse through the site and stream corridor both up- and down-stream of the site.
- 5.6.36 Where necessary the rapid establishment of the ponds will be promoted through the planting of native aquatic and marginal plant species.

Hedgerows

- 5.6.37 Any sections lost from hedgerows of County importance (H3, H4, H24, H25 and, in part, H103, H104, H125, H127 and H131) will be translocated together with their soil to an area of retained green infrastructure. Where practicable consideration will also be given to the translocation of sections lost from all other hedgerows. Translocation will be completed at an appropriate time of year using best practice working methods as detailed in the LEMP (Appendix 5.12).
- 5.6.38 The remaining losses from hedges that are considered to be of Local or District importance will be mitigated through the establishment of species-rich native hedges elsewhere within the green infrastructure as indicated in the Illustrative Landscape Masterplans (Refer Chapter 4: Drg. Nos. 5772-L-30 & 5772-L-38).
- 5.6.39 Both hedgerow translocation and planting will be designed to maintain the level of connectivity within the existing hedgerow network. Furthermore, the losses from any that are of County importance will be compensated by ensuring that the design maximises their associated features, including standard trees and adjacent ditches / swales.

Fauna

Badgers

- 5.6.40 Best practice measures will be adopted to avoid the risk of harm to badgers. During construction, this will include precautionary surveys in advance of site clearance, covering any large pipes, pits or trenches that are left open overnight, or where appropriate providing an adequate means of escape, such as sloping profile or plank. Badger fencing will also be used where necessary to avoid the risk of badgers entering the construction area and to guide individuals towards foraging habitat and commuting routes.
- 5.6.41 Up to date survey information will be fundamental to the success of badger mitigation, as setts can be easily excavated. Work that directly affects an active badger sett or is likely to disturb badgers occupying a sett would be completed under an appropriate Natural England licence that would be informed by a pre-commencement survey. Where appropriate this mitigation will include the provision of a replacement sett as part of the sites green infrastructure.
- 5.6.42 The Proposed Development will incorporate badger tunnels and fencing to ensure that connectivity is maintained between retained setts and foraging areas. Their location is dependent on detailed design of the built development and landscape.

Bats

- 5.6.43 The nature of the bat roost; historically comprising small numbers of common species, works would ordinarily be completed under a Bat Low Impact Class Licence (BLICL). A full draft licence application has been provided to Natural England enabling a full assessment of survey, impacts and mitigation. Ultimately, and assuming that a bat roost remains in barn C, there would be the option to complete works under a BLICL. Given the low status of roosts the mitigation will specify that a pre-demolition survey is conducted to make certain that bats are not present immediately prior to works. Demolition will then include the soft stripping of suitable roosting under the supervision of an appropriately licenced bat worker. Prior to demolition bat boxes will be sited on retained features to provide alternative roosting opportunities for the local bat population. These measures are considered sufficient to ensure that the Favourable Conservation Status (FCS) of the local bat populations is maintained.
- 5.6.44 In order to ensure legal compliance, the removal of the mature trees will be carried out according to a precautionary method statement. The statement will cover the appropriate mitigation measures to ensure that bats are adequately protected during tree works. In brief, this will include precautionary nocturnal surveys and / or aerial tree climbing inspections to ensure the sensitive removal of the trees only when it is confirmed to be unoccupied by bats. Providing that no bats are present the tree will be section felled by experienced arborists under the supervision of an appropriately licensed bat worker. In the event that bats are confirmed to be present then works will be halted until an appropriate Natural England EPS derogation licence is put in place. This licence would detail the appropriate timing and safe working practices necessary to ensure that the risk to bats is minimised and that suitable alternative roosting sites are provided. These measures would be sufficient to ensure that (should bats be present) the FCS of local bat population is not altered.
- 5.6.45 The design of lighting will minimise light-spill onto foraging or commuting habitats that are regularly used by the local bat population, including peripheral woodland, hedges and wetland habitats (RW1). This will be achieved by ensuring that the design of lighting is based upon guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers '*Bats and Lighting in the UK - Bats and Built Environment Series*' and the Bat Conservation Trust '*Statement on the impact and design of artificial light on bats*'. In general, the sensitive design of lighting with regard to bats will be achieved through a combination of the following measures:
- Avoiding unnecessary lighting;
 - The use of low-level and / or hooded lamps to minimise light-spill, where possible;
 - Application of low-intensity (sodium lamps or similar) lighting, where possible; and
 - Strategic planting or landscaping to shield sensitive areas.
- 5.6.46 Important bat commuting routes will be maintained as part of each development phase through the establishment of vegetation that maintains continuity with retained vegetation. These will be located where gaps are introduced into vegetation that has been identified as important commuting routes. This shall comprise either the planting of scrub or creation of 'hop-overs', which shall consist of heavy standard trees located either on each side of the gap or (for larger breaches) at intervals across the gap. Along the route of the Bypass Corridors these measures shall be designed to specifically link the retained sections of H114 with existing scrub vegetation associated with the embankments of Roade Cutting. All of these features will also be appropriately lit as detailed above and, where appropriate, managed to raise bat flight lines above the height of traffic.

- 5.6.47 A range of farmland birds more typical of open agricultural habitat will be displaced by the built development proposals. A range of open agricultural habitats will be provided to the south of RW1 in the Main Site. Habitats will be focused on maximising its value to farmland birds including grey partridge, skylark and yellow wagtail. Management will include the incorporation of field margins and field boundary habitats managed to provide shelter and year round foraging for typical farmland species.
- 5.6.48 To avoid disturbance to nesting birds, site clearance works, including the removal of woody vegetation or habitat suitable for ground-nesting species, will be conducted where possible outside the bird breeding season, which runs March – August inclusive. If clearance is planned for the bird breeding season then it will be preceded by a nesting bird survey conducted by an experienced ecologist. This will involve observing any vegetation to identify any wild birds exhibiting nesting behaviour and / or searching for active nests. Should active bird nests be identified then an exclusion zone would need to be retained until the chicks had fledged, as determined by the supervising ecologist.

Barn owl

- 5.6.49 The loss of occasionally used barn owl roosts at the Main Site will be mitigated through the provision of replacement nest boxes at strategic locations within the green infrastructure. The boxes will be sited on poles or retained trees in areas of the site that are free of regular disturbance.
- 5.6.50 The risk of harm to barn owl along the route of the Bypass Corridor will be mitigated through the use of strategic landscaping and planting. This should be designed to deter barn owls from flying into the road corridor, for example, by establishing screens of vegetation (hop-overs) that force barn owls and other wildlife to fly above the height of the road corridor.

Great Crested Newts

- 5.6.51 Due to the presence of GCN there is a legal requirement to ensure that newts are not harmed or disturbed during development. A strategy will therefore be put in place detailing the mitigation required to safely remove any GCNs that may be present from the working area of the Proposed Development. This strategy will be delivered through an appropriate Natural England EPS derogation licence that will be in place prior to any habitat clearance.
- 5.6.52 The strategy would require that a combination of temporary amphibian fencing and bucket traps are erected around terrestrial habitats where there is a reasonable likelihood that GCNs are present. All suitable terrestrial habitat within 500m of ponds P1 will be will trapped for a period at least 90 days, as defined by the GCNs Large population size class (English Nature 2001). Captured newts will be moved to a pre-established receptor area, comprising the existing woodland and grassland that surrounds the breeding pond P1. The receptor area will include a number of features to improve its capacity to receive GCN, including purpose-built hibernacula. Where appropriate the receptor and working area will be fenced to avoid any risk of GCN returning to cleared areas. The supervised dismantling of all suitable hibernation habitat will be conducted under licence following the completion of trapping. Wherever possible the line of amphibian fencing will be moved back at the earliest opportunity in order that newts are able to safely access any areas of newly created terrestrial habitat.

- 5.6.53 A number of ponds and suitable terrestrial habitat will be created during construction. These habitats will be constructed in areas that are not currently used by GCN, however, given sufficient time there is a risk that the creation of habitat suitable for GCN may result in its colonisation by this species. Therefore, as a precaution and only where appropriate, prior to the creation of habitat during any phase of development Temporary Amphibian Fencing (TAF) will be installed to prevent colonisation by GCN. TAF will be removed under ecological supervision following the completion of that phase of construction, thereby permitting amphibians to access the newly created habitat.
- 5.6.54 In order to ameliorate the potential effects upon GCNs that may result from either habitat fragmentation and / or individuals becoming trapped in drains, the design of roads and hardstanding areas located in close proximity to GCN ponds will incorporate the use of tunnels, permanent amphibian fencing, dropped kerbs and/or off-set gulley pots. Where necessary, these features will be located strategically to permit newts access to areas of retained or newly created aquatic and terrestrial habitat. The design and lifetime of these features will be guaranteed through the requirements of the associated Natural England EPS licence.
- 5.6.55 The proposed mitigation strategy is considered sufficient to ensure that the FCS of the local GCN population is maintained.

Reptiles

- 5.6.56 Measures will be put in place to ensure that reptiles are not harmed during any localised works around the existing railway embankments. Clearance in this area will be sensitively managed to discourage reptiles from using any areas of suitable habitat. This will involve the following measures:
- Directional strimming of vegetation towards areas of suitable retained habitat immediately prior to commencement of works
 - Strimming should only be carried out during appropriate weather conditions (i.e. ambient daytime temperatures exceeding 9°C) in the reptile active season (mid-March to mid-October, inclusive)
 - A fingertip search of the working area will be made immediately prior to any ground works to ensure that all common reptiles are absent from the area of work

Water Vole

- 5.6.57 Water vole and their habitat are fully protected by UK legislation. Water vole are also a listed as Species of Principal Importance under Section 41 of the NERC Act 2006 and are Priority Species of the Northamptonshire BAP.
- 5.6.58 Water vole were not recorded during survey, however, the habitats of RW1 are suitable for water vole and this species can rapidly colonise such suitable habitat. Therefore, in order to ensure that water voles are absent and maintain legal compliance, a precautionary survey will be undertaken in advance of works to the suitable habitat of RW1. In the event that this species is shown to be present then an agreed mitigation strategy would be put in place to safeguard water voles prior to work. This will involve the use of vegetation management to passively displace water vole or fencing and trapping of water vole from the working area. These measures would be timed to avoid periods of breeding and low activity, as appropriate.

Landscape and Ecological Management Plan (LEMP)

- 5.6.59 The Northampton Gateway Landscape and Ecological Management Plan (LEMP) (Appendix 5.12) documents a conservation-led plan detailing a set of objectives and associated management prescriptions for the proposed development that are aimed at benefiting biodiversity over the long-term. It is anticipated that the BMP would be secured as part of an appropriately worded requirement of the DCO.

- 5.6.60 The Proposed Development falls within the Bugbrooke, Rothersthorpe & Collingtree Cropped Claylands Biodiversity Character Area (BCA) that has been identified as part of an Environmental Character Assessment for the River Nene Regional Park (RNRP) project. Therefore, the BMP would focus on the effective management of all retained semi-natural and newly created habitats, including those that contribute to the aims of the RNRP Biodiversity Strategy & Guidelines.
- 5.6.61 The LEMP will also ensure that the Proposed Development contributes to the aspirations and targets of the Northamptonshire BAP, in particular the Hedgerow, Lowland Mixed Deciduous Woodland, Lowland Meadow and Ponds Habitat Action Plans.
- 5.6.62 The BMP will specify the early establishment of green infrastructure. The established habitats, in particular the wetland features and increased woodland cover, will also ensure that the Proposed Development continues to form part of both strategic and local green infrastructure networks, including the Northampton to Salcey (Milton Keynes) Link and the areas that form part of the Upper Nene Valley NIA.
- 5.6.63 The establishment and management of trees, shrubs, grassland and wetland features will benefit a number of faunal groups, including amphibians, bats and breeding birds. Consideration is also given within the LEMP to the inclusion of the following enhancements in the proposed development:
- A scheme of bat boxes within the retained woodlands (above and beyond the number required to maintain the FCS of the local bat population); and
 - Bird boxes aimed at providing additional opportunities for a range of species that occur locally, including barn owl and spotted fly-catcher.
 - The LEMP includes a programme of monitoring and feedback to ensure that the on-going management of habitats is flexible and responds to change.
 - Overall, the LEMP will secure the long-term management of the Proposed Developments ecological features, thereby ensuring that it provides effective mitigation and enhancement.

5.7 RESIDUAL EFFECTS

- 5.7.1 The residual impacts to all Importance Ecological Features during construction and operation are described below, taking into account the mitigation measures described in Section 5.8 of this Chapter.

Construction

Sites of Nature Conservation Interest

Upper Nene Valley Gravel Pits SPA / Ramsar

- 5.7.2 The Proposed Development will not result in any direct effects upon the Upper Nene Valley Gravel Pits SPA / Ramsar or its supporting habitat, and therefore any construction impact upon this European Site is considered to be of **Negligible** significance.

- 5.7.3 There will be no other construction impacts to any other statutorily designated sites of nature conservation interest (European Sites, SSSIs or LNRs) as a result of the Proposed Development.

Non-statutory Sites of Nature Conservation Interest

Collingtree Golf Course LWS

- 5.7.4 The implementation of best practice working practices during construction will ensure that there are no residual adverse impacts to Collingtree Golf Course LWS as a result of accidental pollution events.

Road Quarry LWS

- 5.7.5 The adoption of best working practices during construction, including a dust action plan, will ensure that the residual impacts to Road Quarry LWS as a result of dust emissions are of **Negligible** significance.

236 / Unnamed pLWS Highgate

- 5.7.6 The adoption of best working practices during construction, including the protection of retained vegetation and a dust action plan, will ensure that all residual impacts to 236 / Unnamed pLWS / Highgate are of **Negligible** significance.

Road Cutting pLWS

- 5.7.7 The localised losses of calcareous grassland habitat from the Unnamed pLWS (2) Road Cutting are considered unlikely to undermine its conservation status and will result in an adverse residual impact of no more than **Local** significance.
- 5.7.8 The adoption of best working practices during construction, including the protection of retained vegetation and a dust action plan, will ensure that all other residual impacts to Road Cutting pLWS are of **Negligible** significance.

Habitats

- 5.7.9 The implementation of best practice working practices during construction will ensure that there are no residual adverse impacts to any retained habitats as a result of accidental pollution events.
- 5.7.10 The adoption of best working practices during construction, including a dust action plan, will ensure that the residual impacts to all retained habitats as a result of dust emissions are of **Negligible** significance.
- 5.7.11 The adherence to BS5837:2012 will ensure that the impact of any damage to all retained vegetation, including woodland, the Veteran tree and hedgerows, is reduced to be of **Negligible** significance.

Woodland

- 5.7.12 The limited habitat losses from Churchill's woodland are not anticipated to affect the conservation status of this feature and are likely to result in an impact of **Negligible** significance.

Grassland

- 5.7.13 The loss of neutral grassland as a result of construction of the Bypass Corridor will be mitigated by the translocation of the affected areas. The design of green infrastructure ensures that the grassland will be retained as part of the same over grassland management unit. The continued long-term management of the translocated grassland will be secured as part of the Biodiversity Management Plan. These measures are considered sufficient to conclude that the residual impact upon the neutral grassland will be of **Negligible** significance.
- 5.7.14 The localised losses of semi-improved grasslands will be more than adequately mitigated through the establishment of similar habitats within the Proposed Development's green infrastructure. There will therefore be no residual adverse impacts to semi-improved grasslands.

Ponds

- 5.7.15 The loss of ponds from the Main Site will be mitigated through the provision of purpose-built wildlife ponds within the green infrastructure at a ratio of 2 new ponds for each pond lost. The ponds will be designed and managed to establish rapidly, to maximise both their structural and botanical diversity, and also to form an integral part of an overall network of wetland habitat types. It is therefore considered that the residual impact to ponds will be reversed to **beneficial** and of **Local** significance.

Running Water & Ditches

- 5.7.16 Localised habitat losses from the streams RW1 & RW2 and the ditch DD1 as a result of the Proposed Development will result in residual adverse impacts of **Negligible** significance.
- 5.7.17 The implementation of best practice working practices during construction will ensure that there are no residual adverse impacts to RW1, RW2 or DD1 as a result of accidental pollution events.

Field Margin

- 5.7.18 The unavoidable loss of all arable field margins during development of the Main Site would be compensated by the creation of significant areas of grassland and is considered to result in a residual adverse impact of **Negligible** significance.
- 5.7.19 Localised losses of arable field margins as a consequence of the Bypass Corridor are not considered to affect the status of this habitat and will lead to a residual effect of **Negligible** significance.

Hedgerows

- 5.7.20 The loss of all hedgerows from the Proposed Development will be mitigated through either the planting of native, species-rich hedgerows (for those of Local or District importance) or translocation (for those of County and, where possible, District importance). Once established and sensitively managed all of the retained and newly created hedgerows will add to the diversity of habitat structure within the proposals. Therefore, although there will be a residual, short-term adverse impact of **Local - County** significance resulting from the loss of hedgerows, in the mid-term the re-establishment of hedgerows within the green infrastructure over and above the extent lost is likely to alter this to a beneficial impact of **Local** significance as they establish.
- 5.7.21 The adoption of best working practices during construction, including a dust action plan, will ensure that the residual impacts to Roade Quarry LWS as a result of dust emissions are of **Negligible** significance.

Fauna

Badgers

- 5.7.22 The adoption of best practice during construction, which where necessary shall include the implementation of works under a Natural England licence, will ensure that badgers are adequately protected within the Proposed Developments working area. The residual impact of the loss of disturbance to setts will therefore be of **Negligible** significance.
- 5.7.23 There will be a temporary loss of foraging habitat during clearance of existing habitat at the Main Site. The establishment of new grassland, woodland and wetland habitats within the sites green infrastructure will create foraging and watering opportunities for the local badger population. Therefore, there will be a short-term, residual adverse impact of **Local** significance from the loss of foraging habitat, which in the mid-term will be reversed to a beneficial impact of up to **Local** significance for the local badger population.

Bats

Roosts

- 5.7.24 The appropriate timing of works under ecological supervision and the provision of replacement roost habitat under a Natural England EPS licence will ensure that any impact occurring as a result of the loss of roosts is of **Negligible** significance.

Foraging & Commuting Habitat – Main Site

- 5.7.25 The loss and fragmentation of regularly used foraging habitat during clearance of the Main Site is likely to lead to a short term, adverse impact of **Local** significance to the local bat population. The establishment of newly created woodland, hedgerows, wetland and grassland, shall provide a series of interconnected habitats that are linked to existing features and are likely to be used by the local bat population. It is therefore considered likely that in the mid-term any impacts resulting from the loss of foraging and commuting habitat at the Main Site will be reduced to be of **Negligible** significance.

Foraging & Commuting Habitat –Bypass Site (and other Highway Mitigation Works)

- 5.7.26 The limited extent of habitat losses at the Bypass Site, and other Highway Mitigation Works are considered to result in residual impacts of **Negligible** significance upon the local bat population.
- 5.7.27 The severance of hedgerow H114 will result in a short-term adverse impact of **Local** significance to bats, including barbastelle. The inclusion of specific planting between this hedge H114, the Bypass Corridors green infrastructure and existing vegetation along Roade Cutting will assist in the restoration of habitat connectivity. The establishment of these measures will ensure that over the short- to mid-term the residual adverse impacts resulting from the fragmentation of H114 will be reduced to **Negligible** significance for all bat species.

Birds

- 5.7.28 It is considered likely that impact of the Proposed Development upon the assemblages of breeding and wintering birds as a result of habitat loss or disturbance will be of **Negligible** significance.
- 5.7.29 Mitigation during construction of the Proposed Development involves avoiding removal of nesting habitat during the bird breeding season, and where this cannot be avoided, the use of precautionary surveys to identify active nests. These measures will ensure the residual impact of disturbance to nesting birds during site clearance is reduced **Negligible** significance.

Breeding Birds - Main Site

- 5.7.30 The loss of woodland, hedgerows and trees at the Main Site will result in a short-term, residual adverse impact of up to **Local** significance upon bullfinch, buzzard, mistle thrush, song thrush and stock dove. The establishment of extensive areas of suitable breeding and / or foraging habitat within the sites green infrastructure is likely to reverse the impact upon these species over the mid-term. Therefore, it is considered that over the mid-term the residual impact upon buzzard and stock dove will be of **Negligible** significance, while bullfinch, mistle thrush and song thrush will receive a beneficial impact of up to **Local** significance.
- 5.7.31 The losses of open agricultural habitats at the Main Site that is used as nesting habitat for farmland specialists, including grey partridge, skylark and yellow wagtail, would be mitigated through the provision of open habitats to the south of RW1 whose management will be focused at maximising opportunities for farmland birds. It is therefore considered that the residual impact upon this species as a result of development at the Main Site will be of **Negligible** significance.
- 5.7.32 The compensatory creation of habitat for breeding reed bunting will be achieved within the drainage scheme. It is therefore considered that the residual impact upon this species as a result of development at the Main Site will be of **Negligible** significance.
- 5.7.33 The provision of suitable nesting and foraging habitat within the Main Site's green infrastructure, including kestrel boxes, will ensure that the residual impacts upon starling and kestrel are of **Negligible** significance.

- 5.7.34 The provision of barn owl boxes at the Main Site will mitigate for the loss of the occasionally used barn owl feeding roost. Therefore, the residual impact upon barn owl as a result of development is likely to be negligible, which is of **Negligible** significance.

Wintering Birds – Main Site

- 5.7.35 The loss of arable fields that are occasionally used by golden plover will result in an adverse impact to this species of **Local** significance.
- 5.7.36 Habitat loss at the Main Site will result in an unavoidable impact on the suitability of wintering habitat for the farmland specialists skylark, lapwing, linnet and yellowhammer. Therefore, the residual impact to each of these farmland specialists will be of **Local** significance.
- 5.7.37 The provision of woodland, hedgerows, grassland and wetland habitats within the Main Site will create a permanent foraging resource for the local populations of wintering birds, including dunnock and winter thrushes. The establishment of these habitats are considered sufficient to ensure that the residual adverse impact to all remaining bird species in the winter period is of **Negligible** significance.

Bypass Corridor (and Highway Mitigation Works)

- 5.7.38 Habitat losses during construction of the Bypass Corridor, and other Highway Mitigation Works, will result in short-term, residual adverse impacts upon bullfinch, dunnock, linnet and yellowhammer. The establishment of habitat suitable for use by these birds within the green infrastructure will ensure that over the mid-term the residual impact to them is of **Negligible** significance.
- 5.7.39 The Bypass Corridor will result in an unavoidable residual adverse impact upon breeding skylark that is of **Local** significance.
- 5.7.40 As the habitat losses from the Bypass Corridor, and other Highway Mitigation Works, are highly localised, the residual impact to all other breeding and wintering bird species are considered to be of **Negligible** significance.

Great Crested Newts

- 5.7.41 The loss of suitable terrestrial habitat that is likely to be regularly used by the GCN population from pond P1 at the Main Site will be more than adequately compensated through the establishment of GCN-suitable semi-natural habitats within the green infrastructure, including woodland, hedgerows and grassland, which will be managed over the long-term for the benefit of GCN. Following the establishment of green infrastructure within the Main Site, the creation of suitable terrestrial habitat will result in a beneficial impact of at least **Local** significance.
- 5.7.42 The impact of the loss of existing terrestrial habitat from pond P108 to the Bypass Corridor will result in a residual adverse impact of **Negligible** significance.
- 5.7.43 The risk of increase GCN mortality during construction of the Proposed Development will be mitigated through the adoption of a strategy to protect individuals from harm within the working area, including, where appropriate, the translocation to enhanced receptor areas. Therefore, the impact from mortality of GCN during construction will be of **Negligible** significance.

Invertebrates

- 5.7.44 The creation and management of a diverse mix of new habitats, including woodland, species-rich hedgerows, grassland and wetland, will provide a variety of benefits for the local invertebrate population. This will include the provision of suitable food plants, aquatic breeding habitat and

nectar sources. Given the nature of the sites existing habitats, which are dominated by intensively managed arable habitats, it is considered likely that the provision of these habitat will result in a beneficial impact to invertebrates that is of **Local** significance.

Otters

- 5.7.45 Temporary disturbance to otter during construction of the A508 road improvements at the Main Site will result in a residual impact of **Negligible** significance.

Reptiles

- 5.7.46 The localised loss of reptile habitat from railway embankments during construction of the Main Site and Bypass will result in a residual impact of **Negligible** significance.
- 5.7.47 The loss of habitat from Junction 15 Grassland pLWS that may support reptile populations will be mitigated through the creation of replacement reptile habitat within the green infrastructure of the Main Site. There is considered to be more than sufficient scope within the layout of the Proposed Development to ensure that the residual impact of habitat loss upon reptiles will be of **Negligible** significance.
- 5.7.48 The adoption of best practice will ensure that any common reptiles that may be present are adequately protected from harm during construction of the Proposed Development by their displacement into areas of retained reptile-suitable habitat. Therefore, the adoption of these measures will ensure that the magnitude of any impact to this reptiles is negligible, which is of **Negligible** significance.

Water Vole

- 5.7.49 The pre-construction survey and adoption of best practice will ensure that water vole (if present) are adequately protected within the working area. Therefore, the magnitude of any impact to this species will continue to be of, at most, Negligible significance.

Operation

Statutory Sites of Nature Conservation Interest

- 5.7.50 It is considered that due to the magnitude of intervening distances, there will be no significant residual adverse impacts upon any statutorily designated sites of nature conservation interest, including the Upper Nene Valley Gravel Pits SPA / Ramsar.

Non-statutory Sites of Nature Conservation Interest

- 5.7.51 Implementation of the sustainable drainage system within the Proposed Development will ensure that the quality and rates of water run-off are not significantly altered, i.e. retained at existing greenfield levels. Therefore, these measures are considered to conclude that any residual adverse impacts of the Proposed Development upon the qualifying features of all non-statutory sites, including Collingtree Golf Course LWS, as a result of altered hydrology will be of **Negligible** significance.
- 5.7.52 The implementation of strategic planting, fencing, waymarked footpaths and interpretation are considered sufficient to protect sensitive habitats, including the 236 / Unnamed pLWS Highgate, from the adverse effects of increased recreational pressure. Therefore, the impact of recreational pressure upon all non-statutory sites is considered to be of **Negligible** significance.

Habitats

- 5.7.53 Operation of the site would follow best practice. This would include the use of dust suppression measures such as damping down of the aggregates terminal during periods of dry weather and the avoidance of retained/created habitats for the storage of materials. This would prevent aderse impacts on adjacent habitats/features of interest.

- 5.7.54 Implementation of the proposed SuDS will ensure that the quality and rates of water run-off are unaltered (i.e. retained at existing greenfield rates) and that any associated impacts to ecological receptors (including RW1 and RW2) during operation of the Development are therefore of Negligible significance.
- 5.7.55 The creation of clearly defined footpaths and, where appropriate, fencing and planting will minimise the extent of any informal encroachment on to retained habitats. Therefore, the magnitude of adverse impacts upon retained habitats as a result of recreational pressure will be reduced to Negligible significance.
- 5.7.56 The avoidance of the use of known invasive plant species as part of the sites landscaping will ensure that the residual impact to all sensitive habitats through the effects of invasive species is reduced to negligible, which is of Negligible significance.
- 5.7.57 The establishment and beneficial management of a significant areas of woodland, grassland and wetland within the Proposed Development will significantly increase the local availability of these habitat types and make an important contribution to green infrastructure corridors. Therefore, the establishment of these habitats in accordance with Northamptonshire's conservation objectives is considered to result in a beneficial impact of at least Local significance in the long-term.

Fauna

- 5.7.58 By avoiding any significant alterations in the illumination of habitat used by bats for roosting, foraging and commuting, the proposals will ensure that there is a negligible residual impact to the local bat population as a result of artificial lighting, which is of **Negligible** significance.

Badgers

- 5.7.59 The implementation of good design to minimise the risk of accidental vehicle collisions, including the control of vehicle speeds and, where appropriate, the use of badger tunnels and fencing, will ensure that the residual impacts to badgers during operation of the Development are reduced to **Negligible** significance.

Bats

- 5.7.60 By providing flight lines around or over roads the establishment of new vegetation, including 'hop-overs', will assist in reducing the frequency of bat mortality as a result of vehicle collisions. Their final location would be subject to detailed design of the layout and landscaping (to be secured through DCO requirements linked to the Landscape and Ecological Management Plan). Therefore, following the establishment of this vegetation the short-term adverse impact of no more than **Local** significance occurring as a result of accidental vehicle collisions will, in the mi-term, be reduced to **Negligible** significance.
- 5.7.61 The adoption of a sensitive lighting scheme, which will include the shielding of sensitive habitats from light-spill, is considered sufficient to reduce the residual impact of lighting from the Proposed Development upon all bats to **Negligible** significance.
- 5.7.62 The creation of additional roosting opportunities through the provision of bat boxes at the Main Site that is designed to benefit a range of species is likely to result in a beneficial impact of up to **Local** significance.

Birds

Main Site

- 5.7.63 The establishment of well-designed green infrastructure around the built areas and retained habitats of the Main Site, which will include screening through the use of landscaping and planting, is considered sufficient to ensure that disturbance of all bird species from the operational development is reduced to **Negligible** significance.
- 5.7.64 Benefits for a range of breeding birds will be achieved through the creation of new nesting habitat within the sites green infrastructure, including a nest box scheme within retained woodland areas. This will be aimed at benefiting a broad range of existing bird populations and, where possible, also encouraging new breeding species to the area. These measures are considered sufficient to result in a beneficial residual impact of up to **Local** significance.

Bypass Corridor

- 5.7.65 The landscaping and screening of green infrastructure in the Bypass Corridor is considered sufficient to attenuate the adverse effects of increased noise upon the local bird populations. Therefore, the residual impact of noise upon all birds as a result of the Bypass Corridor will be of **Negligible** significance.
- 5.7.66 The barrier effect of the Bypass Corridor upon the local barn owl population is considered to result in a residual impact of **Negligible** significance.
- 5.7.67 Once established the provision of strategic landscaping and planting to discourage barn owls from flying across the route of vehicles on the Bypass Corridor will ensure that the residual impact upon barn owl from as a result of accidental harm is of **Negligible** significance.

Great Crested Newts

- 5.7.68 The risk of any increase in GCN mortality during operation of the development will be mitigated through the provision of fencing, off-set gully pots and dropped kerbs, which will be secured as part of the Natural England EPS licence and form part of the detailed design of the site, which would be secured by requirement of the DCO. Therefore, the accidental killing or injury during operation of the development is considered likely to result in a negligible impact, which is of **Negligible** significance.

Otters

- 5.7.69 The residual impact to otters as a result of accidental vehicle collisions is considered to be of **Negligible** significance.

Summary

5.7.70 As detailed above, a consideration of the Main Site has identified the residual impacts summarised below, none of which are considered significant:

- Habitats
 - Local beneficial impact from establishment of replacement ponds;
 - Local beneficial impact from establishment of woodland and scrub
 - Local short-term adverse impact from hedgerow loss, reversed to Local beneficial in the mid-term; and
 - Local beneficial impact from the creation of neutral grasslands.
- Fauna
 - Local beneficial impact from provision of potential bat roosting opportunities;
 - Local short-term adverse impact from loss and fragmentation of bat foraging habitat at Main Site, reduced to Negligible in mid-term;
 - Local short-term adverse impact from loss of badger foraging habitat, reversed to Local beneficial in the mid-term;
 - Local short-term adverse impact from habitat loss used by buzzard and stock dove, reversed to Negligible in mid-term;
 - Local short-term adverse impact from habitat loss used by bullfinch, mistle thrush and song thrush, reversed to Local beneficial in mid-term;
 - Local adverse impact from loss of breeding farmland bird (grey partridge, linnet, skylark, yellow hammer and yellow wagtail) habitat;
 - Local adverse impact to wintering farmland birds (skylark, lapwing, linnet and yellowhammer) as a result of habitat loss;
 - Local beneficial impact to woodland and scrub specialist birds through the provision of new nesting habitat;
 - Local beneficial impact from establishment of GCN-suitable terrestrial and aquatic habitats and reduced fragmentation /isolation effects; and
 - Local beneficial impact from establishment of a mix of terrestrial and aquatic invertebrate habitat.

5.7.71 Consideration of the Bypass Corridor, and other Highway Mitigation Works, has identified the significant residual impacts summarised below:

- Designated Sites
 - Local adverse impact as a result of habitat loss from Roade Cutting pLWS; and
 - Local – District short-term adverse impact from the loss of a proportion of Roade Field pLWS, reversed to negligible in the mid-term
- Habitats
 - Local – District short-term adverse impact from hedgerow loss, reversed to Local beneficial in the mid-term.
- Fauna
 - Local short-term adverse impact from fragmentation of H114 at Bypass Corridor, reduced to Negligible significance in mid-term; and
 - Local adverse impact from loss of breeding skylark habitat.

5.8 CUMULATIVE EFFECTS

5.8.1 The following section describes those effects from the Proposed Development which may give rise to likely significant cumulative effects in combination with other committed development.

Scope of Assessment

- 5.8.2 All information that is available at the time of writing has been used to assess cumulative impacts between the Proposed Development and other relevant committed developments.
- 5.8.3 Unless otherwise indicated it is considered that the residual impacts from the Proposed Development that have been assessed in this chapter as being of negligible significance are also considered unlikely to result in any significant cumulative impacts.
- 5.8.4 The committed developments considered are the two Sustainable Urban Extensions suggested for consideration through the ES Scoping process, at Northampton South, and South of Brackmills. With the nearer of these two sites being on the opposite side of the M1 motorway from the Proposed Development, there are limited, if any, direct links or relationships or sensitive species and habitats common to both schemes such that any significant cumulative effects would be expected. The South of Brackmills site is much more remote from the Proposed Development (and also separated by not only strategic road infrastructure, but urban development of south-east Northampton). The physical isolation and separation would prevent any significant cumulative effects on species or habitats.
- 5.8.5 The distance and relationships between the Proposed Development and these sites, plus the overarching policy requirement to minimise harm and seek to deliver a net gain in biodiversity through all major development proposals, means the scope for significant cumulative effects is considered to be very limited.
- 5.8.6 The Rail Central proposals, which are located west of the Proposed Development have the potential to result in ecological effects which, if both proposals were to proceed, could give rise to cumulative effects.
- 5.8.7 Habitats within the Rail Central site are similar to those within the proposals, with some areas of woodland and scrub and wetland features, including ponds watercourses and a section of canal. Additional features include frequent veteran trees.
- 5.8.8 There are no statutorily sites that are designated for their of nature conservation interest within the boundary of Rail Central. The Grand Union Canal – Northern Arm LWS lies adjacent the boundary and at least three unnamed pLWSs fall within the boundary, including Roade Cutting pLWS.
- 5.8.9 Based on a broad assessment of the habitats and available local records, it is evident that the Rail Central site supports a similar range of fauna to that identified within the Proposed Development site. There do not appear to be any particularly sensitive species or metapopulations common between the two areas and as such any cumulative effects are likely to be limited. The exception being common and widespread farmland birds, which, it is suggested in available Rail Central material (at March 2018), could be displaced. The proposed strategy of on-site mitigation will reduce the magnitude of the majority of adverse impacts from habitat loss upon birds of the proposed development. Also, based on the anticipated number affected, it is considered that cumulatively the developments, including Rail Central, will not significantly increase the magnitude of any of the identified impacts to breeding or wintering farmland species. In this context and given that both schemes support only common and widespread species common to much of the wider countryside in both a local and wider context, it is unlikely that any cumulative effect from displacement would be significant in species population terms at any more than **Local** significance.

- 5.8.10 It is considered by the Rail Central promoters that there is sufficient scope for Rail Central to avoid, mitigate and off-set the majority of impacts to ecological receptors. This may be achieved through the adoption of best practice, including Natural England licences, and appropriate design, such as the maintenance of ecological corridors and compensatory habitat creation and management (if required). As a result, additional cumulative impacts associated with that scheme are not anticipated.
- 5.8.11 It is noted that part of the Rail Central site includes land which is common to both of the DCO order limits. Contrary to earlier indications, the March 2018 draft PEIR shared by the scheme promoter shows this area is not now highlighted for any specific ecological mitigation, and as a result no further cumulative effects are anticipated.

5.9 CONCLUSION / STATEMENT OF EFFECTS

- 5.9.1 A comprehensive set of survey work has established a robust ecological baseline for the Proposed Development and surrounding area. The area of the Proposed Development is dominated by arable farmland and boundary hedgerows, with some areas of grassland, scattered woodland blocks, mature trees and ponds. The Upper Nene Valley Gravel Pits Special Protection Area (SPA) / Ramsar is located c.5.5km from the west boundary of the Main Site. The Roade Cutting Site of Special Scientific Interest (SSSI), which is a site of geological interest, falls within the boundary of the Bypass Corridor. There are no non-statutory Local Wildlife Sites (LWSs) within the boundary of the Proposed Development, the closest being Collingtree Golf Course LWS and Roade Quarry LWS. There are a number of non-statutory potential LWSs (pLWSs) within the boundary of the Proposed Development, including 236 / Unnamed pLWS of Highgate wood, Roade Cutting pLWS and Roade Field pLWS. Protected or notable species present include badgers, roosting and foraging bats, farmland and woodland birds, great crested newts (GCN), invertebrates, common lizard, grass snake and otter.
- 5.9.2 There will be no significant impacts upon the qualifying features of the Upper Nene Valley Gravel Pits SPA / Ramsar (or its supporting habitat) as a result of habitat loss.
- 5.9.3 Good design of the extensive areas of green infrastructure within both the Main Site, Bypass, and the Highway Mitigation Works, will include the retention, protection and stand-off from notable habitats and the provision extensive areas of habitat creation. A LEMP will also be adopted detailing the conservation-led prescriptions for the retained and created habitats. These measures will be sufficient to address the possible adverse effects to sensitive habitats, including designated sites that may be brought about by the Proposed Development, such as habitat loss and disturbance.
- 5.9.4 Adverse construction effects upon habitats and fauna will be managed by best practice measures, including the protection of retained features, the control of site drainage, management of accidental pollution events and suppression of construction dust. Where appropriate, the use of Natural England protected species licences, e.g. for bats, GCN and badgers, will both ensure legal compliance and shall also maintain the conservation status of faunal species. The appropriate timing of clearance, supervision of works and / or sensitive management of vegetation and features will avoid disturbance to other protected fauna, including birds and reptiles.
- 5.9.5 Significant habitat losses during each phase of the Proposed Development will be off-set through the re-creation and favourable management of hedgerows, trees, grassland and wetland features. Where appropriate the most sensitive habitats (hedgerows & neutral grassland) will be retained by translocation into part of the sites green infrastructure. These measures and the retention or replacement of features used by fauna, such as bat roosts or terrestrial habitat used by GCN, will avoid significant effects upon the majority of dependant fauna.

- 5.9.6 Once operational, ongoing landscape maintenance and management measures will ensure habitats are protected and maintained, with operational best practices – for example regarding dust suppression where required associated with any aggregates storage within the rail terminal area – also ensuring negligible ongoing effects over the longer-term.
- 5.9.7 The loss of arable fields will lead to the unavoidable displacement of some specialist farmland birds, including grey partridge, skylark, and yellow wagtail. In order to address some of these potential effects a number of measures will be introduced to benefit breeding birds, including the enhancement of nesting opportunities for a broad range of species and the enhancement of open habitat to the south of RW1, which provides an opportunity to maintain arable/agricultural habitats that could be used by typical farmland species including grey partridge, skylark and yellow wagtail.
- 5.9.8 Overall, no impacts are considered to be significant in EIA terms and the majority of adverse effects associated with the Proposed Development will be off-set in the mid- to long-term; through the creation and favourable management of ecological features. Sensitive management of the hedgerow network will benefit this habitat type and the fauna that relies upon it, particularly bats. Further gains will be achieved through the establishment of woodland and wetland features will also provide improved habitat for local fauna, including amphibians and invertebrates. In summary, the Proposed Development provides an opportunity to establish new habitats of nature conservation interest and to deliver a net gain for biodiversity in the locality.