

A1 Birtley to Coal House

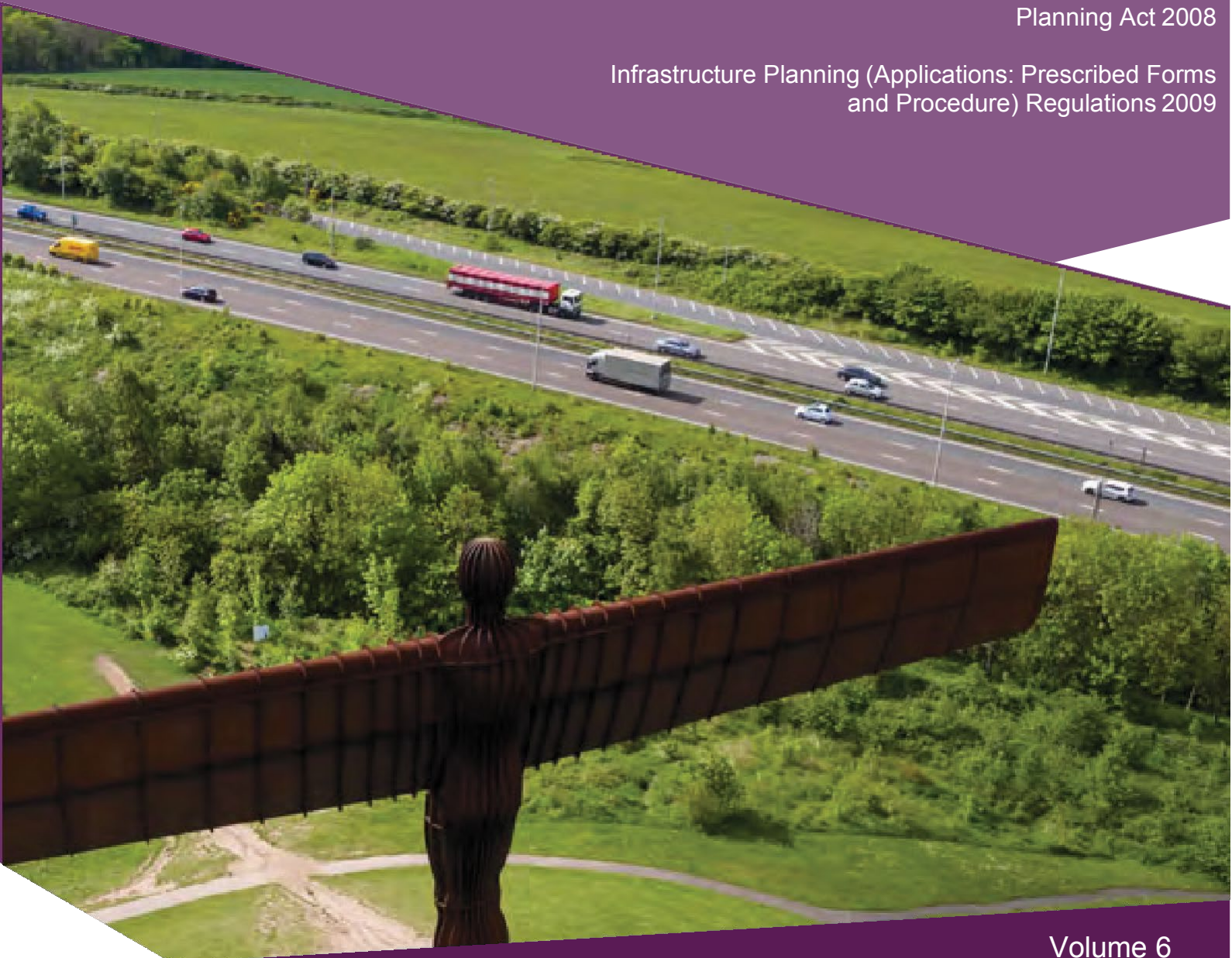
Scheme Number: TR010031

6.1 Environmental Statement Chapter 8 Biodiversity

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms
and Procedure) Regulations 2009



Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms and
Procedures) Regulations 2009**

**A1 Birtley to Coal House
Development Consent Order 20[xx]**

Environmental Statement

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8 BIODIVERSITY

8.1 INTRODUCTION

- 8.1.1. This chapter reports the outcome of the biodiversity assessment of the Scheme. This assessment has been carried out following the methodology set out in Interim Advice Note (IAN) 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment (**Ref 8.1**), which aligns ecological impact assessment methods within the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (CIEEM, 2016) (**Ref 8.2**) with impact assessment method used by the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 4 Ecology and Nature Conservation (**Ref 8.3**).
- 8.1.2. This chapter summarises the legislative and policy framework and describes the methodology followed for the assessment along with the assessment assumptions and limitations. The chapter identifies the potential impacts as a result of the Scheme, details the design, mitigation and enhancement measures that have been identified and reports the assessment of the significant effects of the Scheme. Details of monitoring that should be carried out for the Scheme are also provided. This chapter is intended to be read as part of the wider Environmental Statement (ES) and in conjunction with its associated figures and appendices.
- 8.1.3. A full description of the Scheme is provided in Chapter 2 The Scheme of this ES (Application Document Reference: TR010031/APP/6.1).

Allerdene Bridge Options

- 8.1.4. In the biodiversity assessment, the differences between Allerdene embankment option and Allerdene viaduct option, as detailed in **paragraphs 2.7.11 – 2.7.18** of this ES do not significantly affect the assessment. This is because the construction area will be subject to vegetation clearance prior to works commencing, removing the suitable habitat for the extant protected and notable species. The mitigation and landscape designed for each option does however differ in respect of the area of habitat creation post-construction.

8.2 COMPETENT EXPERT EVIDENCE

- 8.2.1. As detailed in **Table 8-1**, the professionals contributing to the production of this ES chapter have sufficient expertise to ensure the completeness and quality of this assessment.

Table 8-1 - Relevant experience

Name	Role	Qualifications and Professional Membership	Experience
Sarah Proctor	Author	– BSc (Hons) in Zoology	10 years' experience in ecological consultancy, Habitat Regulations Assessments

Name	Role	Qualifications and Professional Membership	Experience
		<ul style="list-style-type: none"> – Member of the Chartered Institute of Ecology & Environmental Management (MCIEEM) 	<p>(HRAs) and impact assessment. Other recent relevant experience includes:</p> <ul style="list-style-type: none"> – Ecological coordinator for A1 Morpeth to Felton (Preliminary Design) – Ecological technical reviewer for A1 Alnwick to Ellingham (Preliminary Design) – Specialist expert (bat) providing advice for A27 Bypass
Emma Hatchett	Reviewer	<ul style="list-style-type: none"> – BSc (Hons) – Chartered Ecologist – Member of the Chartered Institute of Ecology & Environmental Management (MCIEEM) 	<p>15 years' experience in ecological consultancy, HRAs and impact assessment. Other recent relevant experience includes:</p> <ul style="list-style-type: none"> – Technical expert providing ecological advice and assurance in the assessment of impact and delivery of mitigation for HS2 Phase 1 Area North.

8.3 LEGISLATIVE AND POLICY FRAMEWORK

LEGISLATION

International

8.3.1. The applicable legislative framework is summarised as follows.

- a. Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (1992) - transposed to the Conservation of Habitats and Species Regulations 2017 (as amended).
- b. Council Directive 2009/147/EC on the Conservation of Wild Birds (2009) - transposed to the Conservation of Habitats and Species Regulations 2017 (as amended).

National

8.3.2. The applicable legislative framework is summarised as follows.

The Wildlife and Countryside Act 1981 (as amended) (Ref 8.4)

- 8.3.3. Protected birds, animals and plants are listed under Schedules 1, 5, 8 and 9 respectively of the Wildlife and Countryside Act 1981 (WCA).
- 8.3.4. Birds listed under Schedule 1 of the WCA are afforded additional protection with regard to intentional or reckless disturbance whilst nest-building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.
- 8.3.5. Species listed in Schedule 5 can either be fully protected or be partially protected under Section 9, which makes it unlawful to intentionally: kill, injure or take; possess or control (live or dead animal, part or derivative); damage or destruct any structure used for shelter or protection; disturb them in a place of shelter or protection; obstruct access to place of shelter or protection; sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative); and advertise for buying or selling.
- 8.3.6. The Act makes it an offence (subject to exceptions) to pick, uproot, trade in, or possess (for the purposes of trade) any wild plant listed in Schedule 8.
- 8.3.7. Invasive species listed under Schedule 9 are prohibited from release into the wild and the Act prohibits planting or “causing to grow” in the wild of any plant species listed in Schedule 9. It should be noted that certain bird species listed on Schedule 1 of the WCA are also listed on Schedule 9 to prevent release of non-native and captive individuals, this includes barn owl, red kite, goshawk and corncrake.
- 8.3.8. Under the WCA (England and Wales) all birds, their nests and eggs (with exception of species listed under Schedule 2) are protected by the WCA.

The Natural Environment and Rural Communities Act 2006 (Ref 8.5)

- 8.3.9. Species and Habitats of Principal Importance in England and Wales are listed under Section 41 and Section 42 respectively of the Natural Environment and Rural Communities Act 2006 (NERC). Section 41 and 42 lists detail species that are of principal importance for the conservation of biodiversity in England and Wales and should be used to guide decision-makers such as local and regional authorities when implementing their duty to have regard for the conservation of biodiversity in the exercise of their normal functions – as required under Section 40 of the NERC Act 2006.

The Hedgerows Regulations 1997 (Ref 8.6)

- 8.3.10. Under the Hedgerow Regulations it is an offence to remove a hedgerow (as defined within the Regulations) without applying to the local planning authority (LPA) for permission. Should the hedgerow be deemed unimportant according to the criteria within the Regulations the LPA is obliged to allow removal; however, if the hedgerow qualifies as ‘Important’ under the Regulations the LPA must decide whether the reasons for removal justify the loss of an ‘Important Hedgerow’, with a presumption for retention.

The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref 8.7)

- 8.3.11. 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. They also transpose elements of the EU Wild Birds Directive in England and Wales. The Regulations are transposed through a combination of the Habitats Regulations 2010 (in relation to reserved matters) and the Conservation (Natural Habitats &c.) Regulations 1994.
- 8.3.12. All species listed under Annex IV of the Habitats Directive require strict protection and are known as European Protected Species (EPS). Under Regulation 42 of the Habitats Regulations it is unlawful to: Deliberately kill, capture or disturb; Deliberately take or destroy the eggs of; and Damage or destroy the breeding site/resting place of any species protected under this legislation.
- 8.3.13. If the Ecologist determines that impacts to an EPS are unavoidable then the works may need to be carried out under a site specific mitigation licence from Natural England or Natural Resources Wales (NRW). Low Impact Class licences are also available in both England and Wales for bats and great crested newts. This enables Registered Low Impact Consultants to undertake certain low impact activities reducing the EPS application paperwork and process length.
- 8.3.14. Certain EPS are also listed under Annex II of the Habitats Directive and are afforded protection by the establishment of core areas of habitat known as Special Areas of Conservation. This means these species are a relevant consideration in a HRA.
- 8.3.15. The Birds Directive seeks to maintain populations of all wild bird species across their natural range (Article 2). All bird species listed under Annex I of the Birds Directive are rare or vulnerable and afforded protection by the classification of Special Protection Areas (SPAs), these are also designated under all regularly occurring migratory species, with regard to the protection of wetlands of international importance (Article 4). This means these bird species and communities are a relevant consideration in HRA.

The Protection of Badgers Act 1992 (Ref 8.8)

- 8.3.16. It is an offence to wilfully take, kill, injure, possess or ill-treat a badger. Under the Protection of Badgers Act 1992 their setts are protected against intentional or reckless interference. Sett interference includes damaging or destroying a sett, obstructing access to any part of the sett, or disturbance of a badger whilst it is occupying a sett. The Act defines a badger sett as 'any structure or place, which displays signs indicating the current use by a badger' and Natural England takes this definition to include seasonally used setts that are not occupied but that show sign of recent use by badgers (Natural England, 2009).

The Countryside and Rights of Way (CRoW) Act 2000 Ref 8.9)

- 8.3.17. The Countryside and Rights of Way (CRoW) Act has amended the WCA in England and Wales strengthening the protection afforded to Sites of Special Scientific Interest (SSSI) and

the legal protection for threatened species. It adds the word ‘reckless’ to the wording of the offences listed under Section 9(4) of the WCA. This alteration makes it an offence to recklessly commit an offence, where previously an offence had to be intentional to result in a breach of legislation.

Office of the Deputy Prime Minister (ODPM) - Biodiversity and Geological Conservation - Statutory Obligations and their Impacts within the Planning System (Ref 8.10)

8.3.18. This Circular:

- a. “provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England (...)”
- b. Defines that habitats or species listed as priorities in the UK Biodiversity Action Plan (BAP), and by Local Biodiversity Partnerships can be considered a material consideration in the preparation of regional spatial strategies and local development documents and the making of planning decisions.
- c. Details the local planning authorities’ duties regarding trees, woodlands and hedgerows, which will have been transposed in to the local policies below.

POLICY

National

Table 8-2 - Relevant national policy

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
National Policy Statement for National Networks (Ref 8.11)	<p><i>The National Policy Statement for National Networks (NPS NN), sets out the Government’s policies to deliver nationally significant infrastructure projects on the national road networks in England. Relevant sections include the requirement:</i></p> <ul style="list-style-type: none"> – To detail likely significant effects on internationally, nationally and locally designated sites of ecological importance, protected species, habitats and other species identified as being of principal importance for the conservation of biodiversity, are clearly detailed within an Environmental Impact Assessment (EIA). – For the statement considers the full range of potential impacts on ecosystems. 	<p><i>It is considered that the Biodiversity ES chapter and therefore the Scheme adheres to the NPS NN requirements.</i></p> <p><i>The Scheme takes in to consideration the required receptors, which are detailed within the NPS NN within the impact assessment.</i></p> <p><i>This Biodiversity ES chapter provides mitigation requirements for the Scheme, including avoidance measures and enhancement opportunities.</i></p>

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
	<ul style="list-style-type: none"> – The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests. 	
<p>National Planning Policy Framework 2019 (NPPF)</p>	<p>The NPPF forms the basis for planning decisions with respect to conserving and enhancing the natural environment. The NPPF sets out, amongst other points, how at an overview level the “planning system should contribute to and enhance the national and local environment” by:</p> <ul style="list-style-type: none"> – “(...) 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...” <p>A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF. They include the following:</p> <ul style="list-style-type: none"> – “- if significant harm resulting from a development cannot be avoided adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; – -opportunities to incorporate biodiversity in and around developments should be encouraged.” <p>The NPPF is supported by a series of Planning Practise Guidance, of which two are key for this Chapter these are:</p>	<p><i>This chapter details design, avoidance, mitigation and compensation in order to minimise impacts on biodiversity in line with the NPPF requirements.</i></p>

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
	<ul style="list-style-type: none"> – Natural Environment, including Green Infrastructure and Biodiversity, geodiversity and ecosystems – Appropriate Assessment 	
<p>Highways England Biodiversity Action Plan (Ref 8.12)</p>	<p><i>The Highways England biodiversity plan sets out targeted outcomes, which include:</i></p> <ul style="list-style-type: none"> – Outcome 1: Highways England and our suppliers are equipped to produce good biodiversity performance – Outcome 2: The Strategic Road Network is managed to support biodiversity – Outcome 3: We have delivered biodiversity enhancements whilst implementing a capital programme of network improvement – Outcome 4: We have addressed the legacy of biodiversity problems on our network via a targeted programme of investment – Outcome 5: We are fully transparent about our biodiversity performance 	<p><i>The design, avoidance and mitigation design works towards achieving these action plan outcome targets</i></p>

Local

8.3.19. The local policies that are applicable to the Scheme are summarised in **Table 8-3**.

Table 8-3 - Relevant local policy

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
Gateshead Local Plan Policies (Ref 8.13)		
<p><i>CS18 Green Infrastructure and the Natural Environment</i></p>	<ul style="list-style-type: none"> – A high quality and comprehensive framework of interconnected green infrastructure that offers ease of movement and an appealing natural environment for people and wildlife will be achieved by: <ul style="list-style-type: none"> • Maintaining, protecting and enhancing the integrity, connectivity, multi-functionality and accessibility of the Strategic Green Infrastructure Network. • Biodiversity and geodiversity assets, including designated sites, designated wildlife corridors and priority habitats and species. • Trees, woodland and hedgerows. – Addressing gaps in the network and making improvements in Opportunity Areas – Improving and extending linkages to and within the Strategic Green Infrastructure Network 	<p>The Scheme directly impacts the interconnected green infrastructure along the extent of the Scheme, specifically the green wildlife corridor north of the Longacre Wood Local Wildlife Site (LWS). Part of the woodland would be permanently lost and a section temporarily lost during construction. Additionally, approximately 0.43% of the Longacre Wood LWS would be temporarily lost during construction works.</p> <p>However, changes to design have occurred to minimise habitat loss associated with Scheme design and construction activities.</p> <p>Additionally, the Scheme includes reinstatement of habitats and woodland habitats in areas of temporary loss. Woodland creation and creation of woodland corridors is included within the Scheme, including linking existing woodland at Robin’s Wood to the River Team and enhancing the wildlife corridors between Longacre Wood LWS and the existing wildlife corridor to the west.</p>

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
		<p>Bowes Railway Local Wildlife Site is designated for connectivity and could be considered to fall under this policy. This connectivity would be partly disturbed during construction. However, post-construction, it is considered that the connectivity would be maintained.</p> <p>Therefore, it is considered that the Scheme adheres to the policy.</p>
DC1 Environment	<ul style="list-style-type: none"> – Planning permission will be granted for new development where it: <ul style="list-style-type: none"> • Does not have an adverse impact on statutorily protected species. 	<p>Suitable mitigation is included within the Scheme to minimise impacts on protected species. Therefore, it is considered that the Scheme adheres to the policy.</p>
<i>ENV44 Woodland, Trees and Hedgerows</i>	<ul style="list-style-type: none"> – Works that will damage or lead to the loss of trees which contribute to the amenity of an area, or which enhance the character and/or appearance of a Conservation Area, or have a significant wildlife interest, will not normally be permitted. Healthy trees which contribute to the character of an area and which are under threat will be protected by means of Tree Preservation Orders or conditions attached to planning permissions. 	<p>Trees which contribute to the nature conservation of the area would be removed. However, changes to design have been included to minimise habitat loss associated with Scheme design and construction activities.</p> <p>The Scheme includes reinstatement of habitats and woodland habitats in areas of temporary loss. Woodland creation and creation of woodland corridors is included within the Scheme, including linking existing woodland at</p>

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
	<ul style="list-style-type: none"> – Proposals for works to trees will be considered on the basis of the following criteria: <ul style="list-style-type: none"> • The nature conservation value of the trees, woodland or hedgerows. • The extent and content of replanting proposals. • The extent and impact of the works. • In addition, schemes that will protect, maintain, manage and enhance existing woodland, trees and hedgerows will be generally encouraged. 	<p>Robin’s Wood to the River Team and enhancing the wildlife corridors between Longacre Wood LWS and the existing wildlife corridor to the west.</p> <p>Therefore, it is considered that the Scheme adheres to the policy.</p>
<i>ENV46 The Durham Biodiversity Action Plan</i>	<ul style="list-style-type: none"> – The delivery of relevant targets for species and habitats in the Durham Biodiversity Action Plan will be actively pursued in considering development proposals. 	<p>Local habitats and species included in action plans have been taken in to consideration within the Scheme including, but not limited to, habitats of principal importance and notable species such as brown trout, European eel, Atlantic salmon, great crested newt, bats.</p> <p>Therefore, it is considered that the Scheme adheres to the policy.</p>
<i>ENV47 Wildlife Habitats</i>	<ul style="list-style-type: none"> – Wherever possible, all types of wildlife habitats will be protected and enhanced. Land management practices beneficial to wildlife will 	<p>Changes to design have occurred to minimise habitat loss associated with Scheme design and construction activities. These alterations include minimising land take associated with great</p>

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
	<p>be encouraged in line with the Durham Biodiversity Action Plan. New development will be laid out and landscaped so as to be beneficial to wildlife. Proposals should avoid the use of non-native or inappropriate species in sensitive locations. Where there is evidence of damaging species that are invasive to existing habitats, these should be removed.</p>	<p>crested newt habitat and enhancing habitats associated with a bat commuting route.</p> <p>The Scheme includes mitigation to remove non-native invasive species which were recorded within the Scheme.</p> <p>Therefore, it is considered that the Scheme adheres to the policy.</p>
<p><i>ENV49 Sites of Nature Conservation Importance</i></p>	<p>Sites of Nature Conservation Importance will be protected from adverse development wherever possible.</p>	<p>Approximately 0.43% of the Longacre Wood LWS will be temporarily lost during construction works. Additionally, Scheme directly impacts the wildlife corridor north of the Longacre Wood LWS (see ENV51 below).</p> <p>However, changes to design have occurred to minimise habitat loss within the LWS and reduce impacts to the LWS. These changes are associated with Scheme design and construction activities.</p> <p>The Scheme includes reinstatement of habitats and woodland habitats in areas of temporary loss. Woodland creation and creation of woodland corridors is included within the Scheme, including linking existing woodland at Robin's Wood to the River Team and enhancing</p>

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
		<p>the wildlife corridors between Longacre Wood LWS and the existing wildlife corridor to the west.</p> <p>Bowes Railway LWS passes beneath the Scheme. The site is designated for habitats, namely: Lowland mixed deciduous woodland, heathland, acid grassland and a pond.</p> <p>Additionally, the LWS is designated for its value for wildlife connectivity. None of the habitats detailed above have been recorded within the Scheme Footprint. Therefore, the LWS value for connectivity is the main consideration within this chapter. The Scheme will result in a temporary closure of the underpass during construction. However, it will be retained and post-construction the underpass will be re-opened, ensuring that connectivity is maintained.</p> <p>Therefore, it is considered that the Scheme adheres to the policy.</p>
<p><i>ENV51 Wildlife Corridors</i></p>	<ul style="list-style-type: none"> – A network of wildlife corridors will be protected by resisting development or recreational use which would seriously impair their integrity or value to wildlife. Exceptionally, damaging developments may be allowed where habitats would be enhanced or where suitable 	<p>The Scheme directly impacts the wildlife corridor north of the Longacre Wood LWS. Part of the woodland would be permanently lost and a section temporarily lost during construction.</p>

Policy	Relevant Policy Objectives	Significance of impact of the Scheme on policy objective
	<p>replacement land is provided to retain the integrity of the corridor.</p>	<p>However, changes to design have occurred to minimise habitat loss associated with construction activities.</p> <p>The Scheme includes reinstatement of habitats and woodland habitats in areas of temporary loss. Woodland creation and creation of woodland corridors is included within the Scheme, including linking existing woodland at Robin’s Wood to the River Team and enhancing the wildlife corridors between Longacre Wood LWS and the existing wildlife corridor to the west.</p> <p>Bowes Railway LWS is designated for connectivity and could be considered to fall under this policy. This connectivity would be partly disturbed during construction. However, post-construction, it is considered that the connectivity would be maintained.</p> <p>Therefore, it is considered that the Scheme adheres to the policy.</p>

8.4 ASSESSMENT METHODOLOGY

SCOPE OF ASSESSMENT

- 8.4.1. The scope of the assessment is to consider the likely effects of the Scheme upon sensitive ecological features within the Study Area and in the wider area (where appropriate) identified during the baseline surveys and data collection.
- 8.4.2. The zone of influence for each ecological feature is defined by the pathways available for an impact, either directly or indirectly, to result in a potential effect to the habitat and/or species.
- 8.4.3. Ecological features (including habitats, species, ecosystems and their processes) within the following categories have been subject to assessment:
- a. Designated sites and habitats, including potential Special Protection Areas (pSPAs) and possible Special Areas of Conservation (pSAC)
 - b. Protected species and species of conservation concern
 - c. Species of Principal Importance (SPI)
 - d. Habitats of Principal Importance (HPI)
 - e. Habitats of nature conservation value at a Local scale and above

METHODOLOGY

- 8.4.4. The ecological assessment has been undertaken using the DMRB Volume 11, Section 3, Part 4 Ecology and Nature Conservation (**Ref 8.3**), supplemented by Highways England's IAN 130/10 (**Ref 8.1**) and Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater and Coastal (**Ref 8.2**).

Field Survey Methods

- 8.4.5. An extended Phase 1 habitat survey (**Appendix 8.1** of this ES (**Application Document Reference: TR010031/APP/6.3**)) of the Study Area was completed in March and April 2015 (updated in 2018 in response to slight alterations to the Scheme Footprint) to provide baseline information on the types and distribution of habitats present. Habitats were classified in line with standard definitions (**Ref 8.2**) in addition, the potential for protected and notable species to be present was scoped.
- 8.4.6. Following the extended Phase 1 habitat survey, a suite of baseline surveys was completed to record information relating to fauna within the Study Area to ensure that current baseline conditions could be evaluated accurately. Methods used are detailed within **Appendices 8.3-8.12** of this ES (**Application Document Reference: TR010031/APP/6.3**) and outlined in **Table 8-4**.

Table 8-4 - Summary of ecological survey methods and dates of surveys

Topic	Field Survey Methods	Dates of Surveys	Report name/ Appendix/Reference
Bats	<p>Bat Activity Survey:</p> <p>In order to gather baseline information on bat activity along the Scheme Footprint, a walked transect route covering the suitable habitats for bat foraging and commuting identified in the Preliminary Ecological Appraisal (PEA) (Appendix 8.1 of this ES (Application Document Reference: TR010031/APP/6.3)) was undertaken. Using a hand-held bat detector (BatBox Duet frequency division and heterodyne). Three surveys were carried out, one each month for June, July and October 2017, in accordance with BCT guidelines (Ref 8.14).</p> <p>A static detector was positioned on the edge of a woodland ride approximately 50m north of the southbound carriageway. A single static detector location was surveyed for at least five consecutive nights in each survey window, spring (April/May), summer (June/July/August) and autumn (September/October) during 2017.</p>	May to October 2017	Bat activity survey report - Appendix 8.3 of this ES (Application Document Reference: TR010031/APP/6.3).
	<p>Preliminary Roost Assessment:</p> <p>To gather information regarding potential for bat roosts to be present, an external, ground level inspection was</p>	July and November 2017	Preliminary roost assessment - Appendix 8.4 of this ES

Topic	Field Survey Methods	Dates of Surveys	Report name/ Appendix/Reference
	<p>undertaken. The survey was completed in line with good practice guidelines applicable at the time of survey (Ref 8.14).</p> <p>DEFRA Local Scale Surveys: Longbank Bridleway Underpass was identified as having potential to be used by commuting bats to pass underneath the A1.</p> <p>Two DEFRA Local Scale (crossing point) surveys were undertaken to assess if bats “used” the underpass. Once use was established, an additional 4 surveys were completed.</p> <p>Bat Dusk Emergence and Dawn Re-entry Surveys Six bridges identified as having features with potential to support bat roosts were subject to further surveys to watch and listen for bats emerging from, or returning to roost.</p> <p>All surveys were in line with the BCT guidelines (Ref 8.14) and dusk emergence and dawn re-entry surveys were completed as per required.</p>	<p>May and June 2018</p> <p>May and August 2018</p>	<p>(Application Document Reference: TR010031/APP/6.3)</p> <p>Bat roost and commuting route survey report, Appendix 8.5 of this ES (Application Document Reference: TR010031/APP/6.3)</p>
	<p>In order to determine the baseline of great crested newt populations within 500m of the Scheme Footprint, a desk</p>	<p>May to June 2017</p>	<p>Great crested newt survey report (2017) - Appendix 8.6 of this ES</p>

Topic	Field Survey Methods	Dates of Surveys	Report name/ Appendix/Reference
Great Crested Newts	based search for waterbodies was completed, followed by Habitat Suitability Index assessments, environmental DNA (eDNA) assessments, presence/absences surveys and population class assessments, where waterbodies were accessible.		(Application Document Reference: TR010031/APP/6.3)
	Due to access restrictions during 2017, additional surveys were completed during 2018, including HSI, eDNA assessments and presence/ absences surveys, where waterbodies were accessible.	May to June 2018	Great crested newt survey report (2018) - Appendix 8.7 of this ES (Application Document Reference: TR010031/APP/6.3)
Reptiles	A reptile survey was completed to identify the presence or likely absence of reptiles from suitable habitat along the Scheme corridor. Twenty artificial refugia were deployed within suitable habitat and subsequently checked on seven occasions. During each check a visual survey of natural refugia and suitable basking locations was also completed.	April to July 2017	Reptile survey report - Appendix 8.8 of this ES (Application Document Reference: TR010031/APP/6.3)
Breeding Birds	Following the recommendations of the PEA, breeding bird surveys were undertaken at land south of Allerdene Bridge. Four breeding bird survey visits were undertaken following a standard method based on the British Trust for Ornithology's (BTO's) Common Bird Census (CBC), as summarised by Bibby et al. (2000).	March and June 2018	Breeding bird report - Appendix 8.9 of this ES (Application Document Reference: TR010031/APP/6.3)

Topic	Field Survey Methods	Dates of Surveys	Report name/ Appendix/Reference
	<p>All four survey visits were completed in the early morning, commencing at dawn. Each of the survey visits was approximately 30 minutes in duration.</p> <p>Further surveys would be undertaken throughout the Scheme prior to construction clearance of vegetation where this is to be undertaken outside of during the main bird nesting season (March to August inclusive) to avoid damage or destruction of nests (see paragraph 8.9.7 in this ES).</p>		
Wintering Birds	<p>Surveys were completed in accordance with methods outlined within Bibby et al (2000). The survey was restricted to land south of Allerdene Bridge, only. A walked transect was completed on each survey visit, to encompass all habitats present.</p>	November 2017 to February 2018	<p>Wintering bird survey report - Appendix 8.10 of this ES (Application Document Reference: TR010031/APP/6.3)</p>
Badger	<p>A walkover of suitable habitat of the Study Area was completed in accordance with Harris et al. (1989).</p> <p>A further pre-construction badger survey of the entire Study Area will be undertaken at least three months prior to the commencement of works (see paragraph 8.9.7 in this ES).</p>	March 2018	<p>Confidential Appendix 8.11 of this ES (Application Document Reference: TR010031/APP/6.3)</p>

Topic	Field Survey Methods	Dates of Surveys	Report name/ Appendix/Reference
Red Squirrel	<p>A walkover survey of the woodlands was completed with reference to Practical Techniques for Surveying and Monitoring Squirrels Forestry Commission, 2009.</p> <p>A further pre-construction survey of the woodland east of Allerdene Bridge for red squirrel would be undertaken prior to tree clearance in this area (see paragraph 8.9.7.</p>	March 2018	Red squirrel report - Appendix 8.12 of this ES (Application Document Reference: TR010031/APP/6.3)

NATURE CONSERVATION EVALUATION

8.4.7. Ecosystems, habitats and species within the Study Area are assigned levels of importance for nature conservation based on the criteria from IAN 130/10 (**Ref 8.1**) and set out in **Table 8-5**. The rarity, ability to resist or recover from environmental change, and uniqueness of an ecological feature, function/role within an ecosystem, and level of legal protection or designation afforded to a given ecological feature are all factors taken into account in determining its importance. Consideration has also been given to the importance of the species or habitat and its conservation status at a geographic level taking population size, life cycle, rarity and/or distribution into account.

8.4.8. In addition, the importance of an ecological feature takes into account any statutory or non-statutory designations, the intrinsic value of the receptor and whether it supports legally protected or notable species.

Table 8-5 – Importance criteria

Importance	Criteria
International	<p>Ecosystems and Habitats - Ecosystems or habitats essential for the maintenance of:</p> <ul style="list-style-type: none"> – Internationally designated areas or undesignated areas that meet the criteria for designation; and/or – Viable populations of species of international conservation concern. <p>Species - Species whose presence contributes to:</p> <ul style="list-style-type: none"> – The maintenance of qualifying habitats, communities and assemblages that occur within internationally designated sites or within undesignated areas that meet the criteria for such designation.
National	<p>Ecosystems and Habitats - Ecosystems or habitats essential for the maintenance of:</p> <ul style="list-style-type: none"> – Qualifying communities and assemblages that occur within nationally designated sites or within undesignated areas that meet the criteria for such designation; and/or – Viable populations of species of national conservation concern. <p>Species - Species whose presence contributes to:</p> <ul style="list-style-type: none"> – The maintenance of qualifying habitats, communities and assemblages that occur within nationally designated sites or within undesignated areas that meet the criteria for such designation; or – The maintenance and restoration of biodiversity and ecosystems at a national level, as defined in the NERC s.41 requirements

Importance	Criteria
County	<p>Ecosystems and Habitats - Ecosystems or habitats essential for the maintenance of:</p> <ul style="list-style-type: none"> – Populations of species of conservation concern within the authority area. <p>Species - Species whose presence contributes to:</p> <ul style="list-style-type: none"> – The maintenance and restoration of biodiversity and ecosystems within a relevant area such as Northumberland.
Local	<p>Ecosystems and Habitats - Ecosystems or habitats essential for the maintenance of:</p> <ul style="list-style-type: none"> – Populations of species of conservation concern within the local area (for example a Local Nature Reserve). <p>Species - Species whose presence contributes to:</p> <ul style="list-style-type: none"> – The maintenance and restoration of biodiversity and ecosystems at a local level.

Impact Assessment

8.4.9. Characterisation of impacts has taken into account the processes that could lead to effects on ecological features, using the range of standard parameters from IAN 130/10, as well as others deemed appropriate. These included whether the impact was positive (beneficial) or negative (adverse), the probability of the impact occurring (certain, probable, unlikely), its complexity (direct, indirect, cumulative), extent, size, duration, reversibility and timing/duration.

Significance of Effects

8.4.10. Having characterised value and impacts, proposals for mitigation and compensation have been considered, with the aim of avoiding, preventing, reducing or, if possible, offsetting any identified significant adverse effects. Subsequent to mitigation proposals, the overall significance of effects on each feature has been assessed.

8.4.11. IAN 130/10 (**Ref 8.1**), does not prescribe a method for determining ecological effect significance but does propose significant effect categories which are aligned with other topic areas in the DMRB. These are neutral, slight, moderate, large or very large (Table 3 of IAN 130/10) and are reproduced in **Table 8-6** below.

8.4.12. In all instances, when determining the ecological effect level, **Table 8-6** below will be used as a guide in association with professional judgement (this is consistent with guidance in IAN 130/10). For example, there may be instances where an effect on a county level receptor could be considered Large if a particularly high proportion of the county resource

were to be affected. To determine whether an effect is significant or not, CIEEM's Guidelines will also be considered (in lieu of comparable guidance in the DMRB).

Table 8-6 – Significance of Effects

Significance Category	Typical Descriptors of Effect (Nature Conservation)
Very Large	An impact on one or more receptor(s) of International, European, UK or National Value.
Large	An impact on one or more receptor(s) of Regional Value.
Moderate	An impact on one or more receptor(s) of County or Unitary Authority Area Value.
Slight	An impact on one or more receptor(s) of Local Value.
Neutral	No significant impacts on key nature conservation receptors.

DATA SOURCES

8.4.13. A desk study exercise was undertaken during March and April 2015 (and updated in 2018). The desk-based assessment reviewed existing ecological baseline information available in the public domain and obtained information held by relevant third parties in relation to the Scheme Footprint. The detail of the desk study data is provided within **Appendix 8.1** of this ES (**Application Document Reference: TR010031/APP/6.3**).

8.4.14. Desk study data has been gathered from the following sources:

- a. Environmental Records and Information Centre North East (ERIC NE) - for protected sites and species
- b. Durham Bird Club - for bird records
- c. Durham Badger Group - for badger records
- d. Durham Bat Group - for bat records
- e. North East England Nature Partnership Biodiversity Priorities (**Ref 8.15**)
- f. Gateshead Council
- g. Environment Agency National Fisheries Populations Database (**Ref 8.16**)

POLICY AND GUIDANCE

8.4.15. The following guidance documents have been used during the preparation of this Chapter.

- a. DMRB Volume 11, Section 3, Part 4 Ecology and Nature Conservation (**Ref 8.3**)
- b. Highways England IAN 130/10: Ecology and Nature Conservation: Criteria for Impact Assessment (**Ref 8.1**)
- c. Highways England's IAN 125/15: Environmental Assessment Update (**Ref 8.17**)
- d. CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater and Coastal (**Ref 8.2**)
- e. Natural England Standing Advice on ancient woodland and veteran trees (**Ref 8.18**).

Baseline surveys completed to inform this assessment have been carried out with regard for good practice guidelines, and in compliance with the scope agreed with Highways England as detailed in the Environmental Study Report (**Ref 8.19**) produced at options selection stage of the Scheme. References to specific guidelines are contained within the respective technical reports contained in **Appendices 8.1- 8.12** of this ES (**Application Document Reference: TR010031/APP/6.3**) and noted where applicable in **Table 8-4** which summarises the ecological baseline surveys completed to inform this assessment.

8.4.16. The ecological assessment has included the following ecological features within the Study Area:

- a. LWS
- b. The presence of Section 41 Habitats of Principal Importance and Local Biodiversity Action Plan habitats
- c. The low level presence of protected and notable species

8.4.17. In order to characterise and assess the impacts of the Scheme, IAN130/10 has been used as the current best approach, building on existing advice as set out in DMRB Volume 11, Section 3, Part 4 Ecology and Nature Conservation.

CONSULTATION

8.4.18. The following bodies/organisations have been contacted for their comment on the Scheme, baseline surveys and mitigation proposals and this consultation is summarised in **Appendix 4.4** of this ES (**Application Document Reference: TR010031/APP/6.3**):

- a. Natural England
- b. Environment Agency
- c. Gateshead Council

8.4.19. Ongoing liaison is being undertaken with Gateshead Council ecological representatives, to discuss the finalised Landscape Mitigation Design in **Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**) which details the landscape design relating to biodiversity mitigation.

8.4.20. Natural England have also confirmed that a full EPS licence application was required to inform their assessment of the Scheme's impacts on roosting bats. The draft licence application can be found in **Appendix 8.14** of this ES (**Application Document Reference: TR010031/APP/6.3**).

8.4.21. Natural England have confirmed biodiversity net gain (BNG) is not required for Nationally Significant Infrastructure Projects schemes. Additionally, Natural England confirmed that having reviewed the BNG assessment, they had no comment on the assessment.

8.4.22. In addition, comments on the Scheme detailed within the Consultation Report (**Application Document Reference: TR010031/APP/5.1**) have been addressed within this Chapter.

8.5 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

8.5.1. Details of limitations encountered during the Scheme Footprint assessment are provided in **Appendices 8.1-8.12** of this ES (**Application Document Reference: TR010031/APP/6.3**). Every effort has been made to provide a comprehensive description of the Scheme Footprint; however, the following provides a summary of the limitations which apply to this assessment:

- a. A number of the protected and notable species surveys were partially undertaken during sub-optimal weather conditions, such as: Snow fall covering a number of survey areas, rain showers during some evenings (automated detector surveys); and warmer temperatures, which are slightly outside of standard guidelines at the start of survey (reptile surveys). This includes the Phase I Survey, **Appendix 8.1 (Application Document Reference: TR010031/APP/6.3)**; Badger Survey **Appendix 8.11 (Application Document Reference: TR010031/APP/6.3)**; and Red Squirrel Survey **Appendix 8.12 (Application Document Reference: TR010031/APP/6.3)** of this ES. However, it is considered that the surveys remain valid given the limited timeframes in which these poor weather conditions occurred. The number of visits conducted for each survey conformed to best practice standards.
- b. Access could not be gained to several areas within the Scheme Footprint for a number of the protected and notable species surveys due to refused access and health and safety restrictions. Health and safety restrictions included gaining access to sections isolated by the A1 e.g. centres of roundabouts, islands created by slip roads, where access could only be gained by crossing the A1 or slip roads on foot. This includes the Phase 1 Survey, **Appendix 8.1 (Application Document Reference: TR010031/APP/6.3)**; Great Crested Newt Survey, **Appendix 8.6 and 8.7 (Application Document Reference: TR010031/APP/6.3)**; Badger Survey, **Appendix 8.11 (Application Document Reference: TR010031/APP/6.3)**; and Red Squirrel Survey, **Appendix 8.12 (Application Document Reference: TR010031/APP/6.3)** of this ES. However, due to the higher percentage of area coverage, the isolation of a number of these habitats and additional survey techniques utilised, it is considered that the surveys remain valid.
 - i. With regard to access to inform the great crested newt (GCN) surveys (**Appendix 8.6 and 8.7** of this ES (**Application Document Reference: TR010031/APP/6.3**)), the level of survey effort is considered appropriate and assessments valid. It is considered that even though access restrictions occurred during both the 2017 and 2018 surveys, each waterbody has been subject to a sufficient level of survey effort to inform presence or inferred absence. Additionally, where populations surveys were required, these have been completed as per standard GCN guidelines (**Ref 8.20**).
- c. Ecological survey data is typically valid for two years unless otherwise specified, for example if conditions are likely to change more quickly due to ecological processes or anticipated changes in management.
- d. Records held by local biological record centres and local recording groups are generally collected on a voluntary basis; therefore, the absence of records does not demonstrate the absence of species, it may simply indicate a gap in recording coverage.

- e. Minor changes to the Scheme's Footprint have been made since the surveys were undertaken. However, it was not necessary to amend or repeat ecological work to account for this as data collected through surveys was sufficient to inform the assessment of impacts of the Scheme and determine the significance of effects.
- f. The draft Development Consent Order (DCO) contains powers of lateral and vertical deviation. The EIA has taken the Limits of Deviation (LoD) into account and the approach taken is described in Chapter 4 Environmental Assessment Methodology, paragraph 4.5.4 of this ES (Application Document Reference: TR010031/APP/6.1). The outputs of the assessment are not considered likely to change materially as a result of the power of deviation.

8.6 STUDY AREA

- 8.6.1. For the purpose of desk study, search radii, taken from the edge of the Scheme Footprint, (comprising the Study Area) were selected following Assessment Methods in DMRB Volume 11, Section 3, Part 4 Ecology and Nature Conservation (**Ref 8.3**) and CIEEM Guidelines for Preliminary Ecological Appraisal (**Ref 8.21**). The following search radii were used:
- a. 1km radius for protected species records, including bats
 - b. 2km radius for statutory and non-statutory designated sites
 - c. 10km radius for European designated sites
 - d. 30km for Special Areas of Conservation (SACs) designated for bats
- 8.6.2. The River Team passes through the Scheme Footprint. Additionally, minor unnamed tributaries of the River Team are present within the Scheme Footprint.
- 8.6.3. For field surveys, including detailed species surveys, the Study Areas were based on a zone of influence that varies for each receptor and which is influenced by the likely effects resulting from the Scheme. These are detailed below and are based on professional judgement in accordance with CIEEM Guidelines for Preliminary Ecological Appraisal (**Ref 8.21**).
- 8.6.4. The 2015 field survey area comprised the land within the Scheme Footprint (at that time), including A1 junctions 65-67, the verges of the northbound and southbound carriageways under Highways England control and the area proposed for a new road to be constructed south west of junctions 66-67 (hereafter referred to as the 'Study Area'). This Study Area was modified during the 2018 surveys to account for the slight alterations to the Scheme Footprint. This Study Area also applied to the PEA and the reptile survey. The Study Area for the PEA was based on professional judgement in accordance with CIEEM Guidelines for Preliminary Ecological Appraisal (**Ref 8.21**) and the Study Area for the reptile survey was defined in accordance with DMRB, Volume 10, Section 4, Part 7 Nature Conservation Advice in Relation to Reptiles and Roads (**Ref 8.22**).
- 8.6.5. For other detailed surveys, the Study Area was amended as follows, based on likely effects resulting from the Scheme:
- a. Bat Activity Survey: Land within the Scheme Footprint, which is most likely to be impacted by the Scheme, plus 30m from the Scheme Footprint. This study area is based

- on professional judgement in accordance with the Bat Conservation Trust Bat Surveys for Professional Ecologists, Good Practice Guidelines (**Ref 8.14**).
- b.** GCN surveys: Scheme Footprint plus 500m from the Scheme Footprint in accordance with the English Nature Great Crested Newt Mitigation Guidelines (**Ref 8.20**).
 - c.** Building and tree bat roost assessment: Land within the Scheme Footprint, which is most likely to be impacted or lost, plus 50m from the Scheme Footprint. This study area is based on professional judgement in accordance with the Bat Conservation Trust Bat Surveys for Professional Ecologists, Good Practice Guidelines (**Ref 8.14**).
 - d.** Red squirrel assessment: Suitable habitat within the Scheme Footprint, which is most likely to be impacted or lost, plus 30m from the Scheme Footprint where access is available. This study area is based on professional judgement in accordance with CIEEM Guidelines for Preliminary Ecological Appraisal (**Ref 8.21**).
 - e.** Badger survey: Suitable habitat within the Scheme Footprint which is most likely to be impacted or lost, plus 50m from the Scheme Footprint where access was available. This study area is based on professional judgement in accordance with CIEEM Guidelines for Preliminary Ecological Appraisal (**Ref 8.21**).
 - f.** Wintering and breeding bird survey: a single field (OS Central Grid Reference: NZ 25293 58361). The field measured approximately 9.2 hectares and 35m south of the A1 and south east of junction 67 (Coal House). Lamesley Road runs parallel with the western boundary. This study area is based on professional judgement in accordance with CIEEM Guidelines for Preliminary Ecological Appraisal (**Ref 8.21**).

8.7 BASELINE CONDITIONS

DESIGNATED SITE ASSESSMENT

- 8.7.1. No European or UK statutory designated sites were identified within the desk study search radius of 2km (10km for European sites and 30km for European sites where bats are one of the qualifying interests) as shown in **Figure 8.1** of this ES (**Application Document Reference: TR010031/APP/6.2**). Although the Scheme falls within the SSSI impact risk zone for three local SSSIs, risks are only identified as coming from “Airports, helipads and other aviation proposals”. Thus, risks to SSSIs have been scoped out.
- 8.7.2. A number of LWSs form two wildlife corridors identified within the Study Area. The River Team wildlife corridor is formed by: Lamesley Pastures; Tyne Marshalling Yard; Lamesley reedbeds; Bowes Railway Walk; and Longacre Wood. The Follingsby wildlife corridor consists of Sheddons Hill, Dunkirk Pond, Dunkirk Farm west and Bowes Railway Line (refer to **Figure 4** of the PEA (**Appendix 8.1** of this ES (**Application Document Reference: TR010031/APP/6.3**)).
- 8.7.3. A single statutory designated site Local Nature Reserve (LNR), 15 non-statutory designated sites, two ancient woodlands and a green wildlife corridor were identified within the 2km desk study search radius as summarised in **Table 8-7**.

Table 8-7 - Summary of designated sites identified within the desk-based assessment study area

Site Name	Distance from the Study Area	Designation Criteria
Norwood Nature Park LNR	700m north	Habitat inventories indicate the presence of broadleaved and deciduous woodland.
Shibdon Pond SSSI Impact Risk Zone	Over 4km north west	An important wetland habitat noted for its botanical and wintering wildfowl assemblage.
Dunkirk Farm West LWS	360m east	A grazed paddock and a disused wagonway (an extension of the Bowes Railway LWS). The site is noted for its breeding hedge sparrow <i>Prunella modularis</i> and song thrush <i>Turdus philomelos</i> and frequent presence of hedgehog <i>Erinaceus europaeus</i> . This site also represents a wildlife corridor crossed by the Scheme.
Longacre Wood LWS	Within Study Area	A substantial area of semi-natural deciduous woodland in an otherwise industrial and urban setting. The site is considered an important reservoir of local wildlife, with the presence of common spotted <i>Dactylorhiza fuchsia</i> and northern marsh orchid <i>Dactylorhiza purpurella</i> . This site also represents a wildlife corridor crossed by the Scheme.
Longacre Dene LWS and ASNW	Adjacent to the south	An area of ancient semi-natural woodland in the valley of the River Team. The site is noted for its bird assemblage, including breeding hedge sparrow and song thrush, and frequent presence of hedgehog.

Site Name	Distance from the Study Area	Designation Criteria
Ravensworth Ponds and Wood LWS	Adjacent to the west	This is one of the largest wildlife sites in Gateshead, conferring added importance as a refuge for wildlife, including badger <i>Meles</i> and red squirrel <i>Sciurus vulgaris</i> . The site includes ancient replanted woodland, broad-leaved and coniferous woodland in addition to several ponds. Great crested newts <i>Triturus cristatus</i> have been reported within the ponds. The site is considered ecologically diverse and supports a wide range of wildlife.
Bowes Railway LWS	Passes beneath the Scheme	Six kilometre linear length of recolonised disused railway line with patches of heathland and acid grassland. Small areas of linear woodland and a small pond are present. This site also represents an important wildlife corridor crossed by the Scheme. The wildlife corridor is the criteria for designation present within the Scheme Footprint.
Birtley Northside LWS	50m south	A small stream with a woodland dene and small adjacent areas of herb-rich grassland, scrub and wetland. The site has good populations of birds and small mammals, including pipistrelle bats <i>Pipistrellus</i> spp.
Team Colliery LWS	175m north west	<p>No information provided within the desk study data; site's existence recorded following a review with the information provided by the council. Habitats within the LWS appear (assessments undertaken via review of aerial imagery) to support a combination of woodland and parkland.</p> <p>Given the location of the LWS, it is thought to be renamed from Watergate Forest Park, which is located on the site of the former Watergate colliery. Following reclamation work in the 1990's the site includes woodland, lake and wildflower meadow habitats.</p>

Site Name	Distance from the Study Area	Designation Criteria
Sheddon's Hill LWS	340m northeast	Herb-rich horse-grazed meadow on the watershed between the Rivers Team and Wear. The designation states the presence of breeding hedge sparrow and song thrush, and frequent presence of hedgehog.
Lamesley Meadows LWS/Lamesley Pastures SNCI	420m south	A site containing permanent pasture, riverbank, ponds and reed beds. The site supports breeding waders such as lapwing <i>Vanellus</i> , redshank <i>Tringa tetanus</i> and snipe <i>Gallinago</i> . Otter <i>Lutra</i> have also occasionally been recorded in the River Team.
Dunkirk Pond LWS	500m north	An important component of the "Windy Nook" Wildlife Corridor, which connects the River Team to the River Tyne at Bill Quay, via a number of green spaces including this site. The pond supports breeding common toad <i>Bufo</i> .
Hagg Wood/Gill and Mitcheson's Gill LWS	800m south-west	The site supports semi-natural woodland and scrub, supporting breeding birds that include spotted flycatcher <i>Muscicapa striata</i> , hedge sparrow and song thrush. Badger are also regularly present.
Lamesley Reedbeds LWS	870m south-west	The main habitat is a large reedbed, the largest Phragmites bed in Gateshead. There are also pools and tree planted areas. The wildlife assemblage includes, of particular importance, otter and kingfisher <i>Alcedo atthis</i> (Schedule 1 species, WCA 1981).

Site Name	Distance from the Study Area	Designation Criteria
Birtley Union Brickworks LWS	1km south	A disused brickworks with a mosaic of wetland and grassland habitats (including marsh). The site also includes several ponds, which are known to support breeding great crested newt. Much of the southern part of the site has been damaged by infill activities from the adjacent active brickworks, however, the central areas retain considerable wildlife value.
Springwell Ponds LWS	1.1km north-east	A group of shallow ponds with good common amphibian populations and interesting plant communities in terms of aquatic plants and surrounding grassland.
Bowes Valley Nature Reserve LWS	1.2km south-west	Most of the site consists of grasslands, sown with wild-flower mixes, which have established quite successfully and support butterfly populations of importance (grayling <i>Hipparchia semele</i> and dingy skipper <i>Erynnis tages</i>). The site contains two ponds that support populations of common amphibians. The breeding bird assemblage contains a variety of birds with little ringed plover <i>Charadrius dubius</i> of particular interest (Schedule 1 species, WCA 1981).
River Team Woodlands LWS and ASNW	1.6km south	An ancient woodland site of mixed deciduous and coniferous woodland, with a diverse ground layer. The rare climbing <i>Corydalis claviculata</i> occurs within the north-east of the site, which is considered to be of ornithological value.
Hill Head Wood ARW	15m west from minor works	An area of ancient replanted woodland.

Site Name	Distance from the Study Area	Designation Criteria
Green wildlife corridor north of Longacre Wood LWS	Within Study Area	An area of broadleaved semi-natural and mixed plantation woodland, which was included as part of a network of wildlife corridors. Corridors were selected to protect wildlife by resisting development or recreational use, which would seriously impair their integrity or value to wildlife.

Key:

ASNW – Ancient Semi Natural Woodland

ARW – Ancient Replanted Woodland

LWS – Local Wildlife Site

SNCI - Site of Nature Conservation Importance

8.7.4. Shibdon Pond SSSI, which is located over 4km north west of the Scheme is of **National** importance. Shibdon Pond SSSI is hydrologically linked to the River Tyne as is the Scheme via the River Team. However, the SSSI hydrological link is located upstream of the Scheme, therefore, any hydrological pathways would not be from the Scheme to the SSSI. As such, Shibdon Pond SSSI is not a constraint to the Scheme and is not considered further in this assessment. Shibdon Pond SSSI is however assessed within **Chapter 5 Air Quality** of this ES (**Application Document Reference: TR010031/APP/6.1**) as it is within 200m of the ARN and has been identified as potential sensitive to air quality impacts.

8.7.5. Areas of ancient semi natural woodland and ancient replanted woodland are of **National** importance. Local wildlife sites are of **County importance**, as they form a network of sites within Tyne and Wear that represent sites for animals and plants. The green wildlife corridor north of Longacre Wood LWS, which is located within the Scheme Footprint, is considered to be of **Local** importance, given the corridors are listed within local policy (CS18 Green Infrastructure and the Natural Environment).

HABITAT BASELINE

8.7.6. **Table 8-8** below lists all habitats within the Study Area, whether they are HPI or listed within the local biodiversity action plan (LBAP) habitats.

8.7.7. HPI are species listed under section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 – NERC s.41 (refer to **Figure 8.2** of this ES (**Application Document Reference: TR010031/APP/6.2**)) and Figure 3 of the PEA (**Appendix 8.1** of this ES (**Application Document Reference: TR010031/APP/6.3**)).

Table 8-8 - Summary of habitats identified within study area

Habitat	Habitat of Principal Importance	Local Biodiversity Action Plan Habitat
Broad-leaved woodland – plantation – A1.1.1		✓
Broad-leaved woodland – semi-natural – A1.1.2	✓	✓
Coniferous woodland – plantation – A1.2.2		✓
Mixed woodland – plantation – A1.3.2		✓
Scrub – dense/continuous – A2.1		✓
Scrub – scattered – A2.2		
Scattered broad-leaved trees – A3.1		
Scattered coniferous trees – A3.2		
Neutral grassland – semi-improved – B2.2	✓	
Improved grassland – B4		

Habitat	Habitat of Principal Importance	Local Biodiversity Action Plan Habitat
Other tall herb and fern – ruderal – C3.1		
Running water – G2	✓	✓
Arable – J1.1		
Amenity grassland – J1.2		
Intact hedge – species poor – J2.1.2	✓	✓
Defunct hedge – species poor – J2.2.2		✓
Hedgerow with trees – species poor – J2.3.2	✓	✓
Dry ditch – J2.6		
Buildings and hard standing – J3.6		
Bare ground – J3.4		

8.7.8. The majority of habitats present within the Study Area are of limited importance and are not considered a constraint to the Scheme. However, habitats of principal importance are also present within the Scheme Footprint and these are considered to be of **Local** value.

Waterbodies

8.7.9. This section deals with the intrinsic importance of waterbodies such as ponds and wet ditches. Waterbodies which could be used by GCN for breeding have been discussed **paragraphs 8.7.54 to 8.7.61** below.

8.7.10. There were no waterbodies recorded within the Scheme Footprint, however, a total of nineteen waterbodies were identified within 500m of the Scheme from a review of aerial imagery and site investigation. Given that waterbodies would likely qualify as a habitat of principal importance, it is considered that the waterbodies would be of at least County importance. However, as all waterbodies fall outside of the Scheme Footprint, waterbodies are not a constraint to the Scheme and are not considered further in this assessment.

Watercourses, including the River Team

8.7.11. The River Team passes through the Scheme Footprint beneath Kingsway Viaduct at junction 67 (Coal House). Upstream of the roundabout the river is culverted as it enters beneath Coal House roundabout and is an underground culvert for approximately 1,300m immediately downstream (north) of the A1, beneath the Team Valley Trading Estate. To the remainder of the upstream (south of the Scheme Footprint) section of the River Team, the river has shallow sparsely vegetated banks with a gentle gradient.

8.7.12. The underground culverted section presents an existing barrier to fish migration to and from the lower reaches of the River Team and River Tyne downstream due to the change in

conditions brought about by water flowing through the culvert e.g. lack of vegetation, increased flow rate, shading from the culvert roof. Equally, the smaller watercourses to the west of the A1 and River Team are also culverted beneath the existing A1, and the Team Valley Trading Estate, before joining the culverted section of the River Team.

- 8.7.13. All rivers and streams are included within the local LBAP (as summarised in **Table 8-8**). Therefore, the River Team is considered to be a LBAP habitat.
- 8.7.14. The Water Framework Directive (WFD) Assessment (**Appendix 13.2** of this ES (**Application Document Reference: TR010031/APP/6.3**)) details an assessment of the River Team. The Tyne Lower and Estuary Operational Catchment incorporates the River Team catchment and its tributaries and is within a Nitrate Vulnerable Zone (NVZ). All of the eight surface watercourses within the catchment are expected to achieve good ecological and chemical status by 2027.
- 8.7.15. **Chapter 13 Road Drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**) reports the assessment of the River Team, which is located within the Tyne WFD Management Catchment. It states that the current Northumbria River Basin Management Plan (RBMP) (Environment Agency's Catchment Data Explorer⁷) shows that the River Team is a 'heavily modified waterbody'. The Northumbria RBMP classified the current Ecological and Chemical Quality of the River Team as Moderate and Fail, respectively.
- 8.7.16. As detailed within the WFD Assessment, it is considered that as the ordinary watercourse that drains through the Longacre Dene Ancient Woodland and the watercourse that passes under the Allerdene Bridge, drain in to the River Team, the water quality of these two ordinary watercourses is assumed to be similar to the River Team.
- 8.7.17. An additional 13 watercourses have been identified within the Scheme Footprint, which discharge into various ditches, culverts and watercourses that eventually contribute to the River Team in the west (Outfalls 2, 5 and 9, as shown on **Figure 13.4** of this ES (**Application Document Reference: TR010031/APP/6.2**)).
- 8.7.18. The River team supports fish populations of brown trout, European eel and Atlantic salmon, which have been assessed separately in **paragraphs 8.7.23 to 8.7.26**.
- 8.7.19. The River Team and minor tributaries of the River Team are considered to be of **County** value, while the remaining watercourses are considered to be of **Local** value.

SPECIES ASSESSMENT

- 8.7.20. The 2015 PEA (updated 2018) (**Appendix 8.1** of this ES (**Application Document Reference: TR010031/APP/6.3**)) and liaison with Natural England and the Environment Agency, identified habitat suitable for several species/species groups:
- a.** Fish
 - b.** Invertebrates
 - c.** Badger
 - d.** Bats

- e. Breeding birds
- f. Wintering birds
- g. Brown hare and hedgehog
- h. Great crested newt
- i. Otter and water vole
- j. Red squirrel
- k. Reptiles

8.7.21. Detailed results of each of the protected and notable species present (as shown in **Figure 8.2** of this ES (**Application Document Reference: TR010031/APP/6.2**)) is included within **Appendices 8.1-8.12** of this ES (**Application Document Reference: TR010031/APP/6.3**) and the sections below.

Fish

- 8.7.22. No records for fish, including brown trout *Salmo trutta*, European eel *Anguilla anguilla* or Atlantic salmon *Salmo salar* were returned within the desk study data.
- 8.7.23. The River Team was subject to electric fishing surveys during 2005, within the underground culverted section, beneath the Team Valley Trading Estate. This survey resulted in a zero catch, therefore, there were no records (at the time of the survey) of brown trout, European eel or Atlantic salmon passing through the extensive underground culvert section of the River Team.
- 8.7.24. However, the Environment Agency National Fisheries Populations Database has records (recorded via electric fishing during 2007, 2015 and 2017) for each of the species detailed above, in the following locations:
- a. River Team at Beamish Hall – brown trout
 - b. River Team nr. Kibblesworth – European eel
 - c. River Team Urpeth Caravan Park – brown trout
 - d. Team Valley Weir – brown trout, European eel and Atlantic salmon
- 8.7.25. Each of these locations above are up and down stream of the Scheme Footprint along tributaries of the River Team. It is reasonable to assume that these species commute through the Study Area, and that the River Team therefore supports such populations which are of **National** value.

Invertebrates

- 8.7.26. Ten terrestrial invertebrate SPI under NERC Section 41, were returned within the desk study data, of which there are habitats recorded within the Scheme Footprint to support nine of these species (**Appendix 8.1** of this ES (**Application Document Reference: TR010031/APP/6.3**)). No aquatic invertebrates were returned within the desk study data.
- 8.7.27. Suitable habitats recorded within the Scheme Footprint include the grassland and woodland habitats. However, given that these habitats are widespread within land adjacent to the Scheme Footprint, it is considered that the areas within the Scheme Footprint are not essential to support the conservation status of the NERC s.41 invertebrate species within

the wider area. Therefore, the terrestrial invertebrate population are not a constraint to the Scheme and are not considered further within this assessment.

Badger

8.7.28. A single badger record within 1km, from the last 10 years, was provided as part of the desk study data. A number of habitats within the Study Area are suitable to support badger, such as woodland, scrub grassland and hedgerow habitats. In addition, Ravensworth Ponds and Wood LWS, Longacre Wood LWS and Longacre Dean LWS are adjacent to the Scheme Footprint and provide potentially suitable habitat. However, despite this no evidence of badger was recorded within the Study Area.

8.7.29. As such, badgers are not a constraint to the Scheme and are not considered further in this assessment.

Bats

8.7.30. In total 32 records of bats were returned within the desk study data from within the previous 10 years. Species recorded include: common pipistrelle *Pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, *Myotis* (Unconfirmed *Myotis* species identification) and unidentified bat (*Chiroptera/Vespertilionidae*). These data included a single roost record of a common pipistrelle roost, which was lost under licence during 2014. The remaining records were of foraging bats.

8.7.31. A single common pipistrelle roost was confirmed to be in Eighton Lodge South underbridge (OS Central Grid Ref: NZ 26800 57466). During the May dusk emergence survey, a single bat was recorded emerging from a crack on the eastern side of the underside of the bridge. Given that a single bat was recorded, during a single survey and during optimal survey season, it is considered that the bat roost located within the bridge is of low conservation status.

8.7.32. The Longbank Bridleway Underpass (part of the Bowes Railway LWS) passes beneath the A1 carriageway and is utilised by bats to pass under the Scheme; thus, stopping fragmentation of the extant bat population within this area. Species recorded during the DEFRA local surveys include common pipistrelle, soprano pipistrelle, Daubenton's bat *Myotis daubentonii* (Identified utilising the BatClassify software package) and *Nyctalus* spp. However, species recorded as using the underpass include common pipistrelle and soprano pipistrelle. A total of 241 passes were recorded during the DEFRA local scale surveys, of which 181 had recorded flight lines and were using the structure. A summary of the findings is presented in **Table 8-9** which details the bats recorded utilising the underpass, only.

Table 8-9 - Summary of DEFRA local scale survey results

Species	Number of Recorded Passes	Number of Flight Lines Using the Structure* ¹	Number of Safe passes* ²
Common Pipistrelle	238	180 (75.63)	153 (85)

Species	Number of Recorded Passes	Number of Flight Lines Using the Structure* ¹	Number of Safe passes* ²
Soprano Pipistrelle	3	1 (33.33)	1 (100)
* ¹ - Brackets showing percentage of passes using the structure			
* ² - Brackets showing percentage of safe passes using the structure			

8.7.33. At least three bat species were recorded during the walked transects, namely common pipistrelle, soprano pipistrelle and Myotis species. Of the total bat passes recorded, 89 passes were identified as common pipistrelle, 17 passes were made by soprano pipistrelle and four passes by Myotis sp. Therefore 81% of activity was common pipistrelle, 15% was soprano pipistrelle and 4% was Myotis sp. The majority of the activity recorded was associated with the woodland habitat scattered throughout the Scheme Footprint.

8.7.34. Two bat species were recorded via the automated detector surveys, namely common pipistrelle and noctule. The automated detector recorded 36 bat passes in total across the three recording periods. No bat passes were recorded during the September automated detector survey. The breakdown of this activity is detailed within **Table 8-10** below.

Table 8-10 - Automated detector survey results summary

Month	Noctule		Common Pipistrelle	
	Total Passes	BAI value* ¹	Total Passes	BAI value
May	2	0.2	26	2.6
July	0	0	8	1.6
September	0	0	0	0
Total Values	2	0.1	5	1.7
* ¹ - BAI – Bat Activity Index Value, which is calculated via division of the number of passes by the number of nights survey				

8.7.35. All species recorded within the Study Area are common and widespread throughout England (**Ref 8.24**). Throughout Northumberland both common and soprano pipistrelle are considered to be common and noctule is considered to be scattered (**Ref 8.24**).

8.7.36. The majority of suitable habitats within the Scheme Footprint are roadside habitats that are subject to light spill and pollution. Therefore, these habitats are considered to be sub-optimal habitat for bats.

8.7.37. Given the information detailed above, that a commuting route has been recorded and that the single roost recorded within the Scheme Footprint is a low status transitional roost of a

common and widespread species, the bat population within the Scheme Footprint would be considered to be of **Local** value.

Breeding Birds

- 8.7.38. A total of 14 species were recorded on or over the Study Area during the breeding bird survey and of these, 11 are considered to be possible, probable or confirmed breeders on the Study Area.
- 8.7.39. The species recorded within the Study Area, which have been recorded as confirmed, probable or possible breeders are detailed within Table 2 of **Appendix 8.9** of this ES (**Application Document Reference: TR010031/APP/6.3**). In addition to the recorded breeding status and evidence for this, this table includes an indicative number of territories present on, or immediately adjacent to, the Study Area.
- 8.7.40. The bird community recorded during the breeding bird season within the Study Area is varied and mainly supported by the marginal habitats (hedgerows, woodland and scrub) located along the borders of the Study Area. The species seen and heard during the surveys are common throughout the UK, with only three species highlighted for their conservation status. These are dunnock *Prunella modularis* (NERC Act Section 41 and BoCC Amber List), mallard *Anas platyrhynchos* (BoCC Amber List) and curlew *Numenius arquata* (NERC Act Section 41 and UK BAP). See Section 4 of **Appendix 8.9** of this ES (**Application Document Reference: TR010031/APP/6.3**) for further information on these designations.
- 8.7.41. Adjacent habitats, such as Lamesley Meadows LWS and grazed pastoral fields are located to the south and immediately west of the Study Area (respectively), provide further suitable habitat for breeding birds.
- 8.7.42. Due to the relatively low number of species using the Study Area to breed, most of which are common and widespread, with only one having a notable conservation status, the breeding bird community recorded are not a constraint to the Scheme and are not considered further within this assessment.

Wintering Birds

- 8.7.43. Five LWS which are designated for their supporting value to wintering birds are present within the Study Area. These include the following which are detailed below:
- a. Lamesley Meadows LWS – supports dunnock and song thrush, but also breeding waders such as lapwing, redshank and snipe.
 - b. Hagg Wood/Gill and Mitcheson’s Gill LWS- supports spotted flycatcher *Muscicapa striata*, dunnock and song thrush.
 - c. Lamesley Reedbeds LWS supports song thrush, reed bunting *Emberiza schoeniclus* and kingfisher
 - d. Longacre Dene LWS - supports spotted flycatcher, dunnock and song thrush.
 - e. Bowes Valley Nature Reserve LWS - supports song thrush, skylark *Alauda arvensis*, grey partridge *Perdix* and little ringed plover.

- 8.7.44. The desk study identified several records of 41 protected and/or notable bird species within 2km of the Study Area with potential to occur within the Study Area between November and February. These are summarised in Table 4 of **Appendix 8.10** of this ES (**Application Document Reference: TR010031/APP/6.3**).
- 8.7.45. The grassland habitats within the Study Area were identified as a foraging resource for a variety of species of conservation concern including black-headed gull *Chroicocephalus ridibundus*, curlew, grey wagtail *Motacilla cinerea*, kestrel *Falco tinnunculus*, lapwing, mistle thrush *Turdus viscivorus*, starling *Sturnus vulgaris* and woodcock *Scolopax rusticola*. The high-water table within the Study Area provides damp soft invertebrate rich soils for the species identified above. Boundary features (woodland, hedgerow, scrub) act as a foraging resource for a number of species as well as areas of cover to rest and potentially roost.
- 8.7.46. A total of 35 species of bird were recorded on or over the Study Area, during the wintering bird survey. This includes 17 protected and/or notable species, included within Table 3 of **Appendix 8.10** of this ES (**Application Document Reference: TR010031/APP/6.3**). Of the 17 protected and/or notable species recorded, only 13 of these species were recorded on the Study Area. Of those that supported by the LWS listed within **Table 8-7** only lapwing, dunnock and song thrush have been recorded on the Study Area.
- 8.7.47. As the Study Area supports 35 species of wintering bird the Study Area lies within the 'Local' threshold of 54 - 25 species (Fuller, 1980) (**Ref 8.25**), for this reason the wintering bird assemblage within the Study Area is considered to be of **Local** value. This is believed to be a fair evaluation of the Study Area, given its small size and that it sits within a landscape of similar habitats.
- 8.7.48. All species of conservation concern were identified as being of Local importance within the context of this survey. It is therefore it is considered that the wintering the bird community recorded is of **Local** value.

Brown Hare and Hedgehog

- 8.7.49. No records of brown hare *Lepus europaeus* within the 1km Study Area were provided within the desk study data. However, a number were provided which were over 1km distant, which were located to the south-west near Kibblesworth (closest records).
- 8.7.50. The semi-improved neutral grassland fields, hedgerows, woodland edges and scrub within the Scheme Footprint provide potential foraging habitat for brown hare. These areas are also connected to the wider landscape, particularly to the south-west, which includes an expanse of agricultural land that is of high value to brown hare.
- 8.7.51. Five records of hedgehog were returned within the desk study data (with sufficiently accurate grid reference locations), which are located within the 1km search area. The data search confirms the presence of hedgehog within 100m of the Scheme (at junction 65 (Birtley)), with records largely obtained in or near urban areas. The Scheme Footprint includes grassland and scrub of potential value for foraging and sheltering hedgehog.

8.7.52. The Scheme Footprint is considered to be of **Local** value for brown hare and hedgehog. As such, brown hare and hedgehog are not a constraint to the Scheme and neither are considered further within this assessment.

Great Crested Newt

8.7.53. Fourteen GCN records were returned within the desk study data, from within the last 10 years. Seven of these waterbodies have been identified as supporting breeding populations of GCN. Many of the records are located along the River Team and have the potential to be directly connected to Scheme Footprint via the railway corridor. However, this potential corridor would place records over 2km from the Scheme Footprint. The closest point is approximately 1km south of the Scheme, with less of a direct connection. The population recorded adjacent to the River Team is surrounded by optimal habitat, reducing the chances of populations movements towards the Scheme Footprint.

8.7.54. A total of 19 waterbodies were identified within 500m of the Scheme Footprint (shown on Figure 2 in **Appendix 8.6** of this ES (**Application Document Reference: TR010031/APP/6.3**)), of these 11 were scoped out from further surveys. This was due to either:

- a. Being separated from the Scheme Footprint by barriers to newt migration (such as main roads or water courses with flowing water); or
- b. Were considered to be unsuitable for GCN.

8.7.55. Habitat Suitability Index (HSI) assessment of the remaining eight waterbodies ranged between below average and Good. Of these remaining eight waterbodies, waterbodies WB14, WB15 and WBB returned a positive environmental DNA (eDNA) result. However, no GCN were recorded during the 2017 presence/absence surveys.

8.7.56. The 2018 eDNA surveys of waterbodies WB15, WB16 and WB17 returned a negative result. Also, no GCN were recorded during the update presence/absence surveys of waterbodies of WBB and WB14.

8.7.57. A summary of the survey effort is detailed within **Table 8-11** summarises the 2017 and 2018 GCN survey results. Survey data is generally considered representative of current conditions for two - three years, therefore placing this data within the period of validity.

Table 8-11 - Summary of GCN survey results

Waterbody	2017 Results			2018 Results* ¹		
	HSI	eDNA	Presence /Absence	HSI	eDNA	Presence/Absence
A	Average	Negative	None recorded	N/A	N/A	N/A
B	Below Average	Positive	None recorded	Good	N/A	None recorded

Waterbody	2017 Results			2018 Results* ¹		
	HSI	eDNA	Presence /Absence	HSI	eDNA	Presence/Absence
7	Good	Negative	None recorded	N/A	N/A	N/A
8	Good	Negative	None recorded	N/A	N/A	N/A
14	Good	Positive	None recorded	Poor	N/A	None recorded
15	Below Average	Positive	None recorded * ²	Average	Negative	N/A* ³
16	Average	Negative	None recorded * ²	Poor	Negative	N/A* ³
17	Below Average	Negative	None recorded * ²	Below Average	Negative	N/A* ³

*¹ Surveys undertaken due to the restricted access to waterbodies WB15, WB16 and WB17 during 2017. However, surveys were only repeated for these waterbodies and those located north of the A1 (with no dispersal barriers)

*² Access restricted following first survey

*³ Access restrictions through much of the survey period. Access gained towards the end of June, allowing eDNA to be undertaken

8.7.58. The combined survey results indicate the likely absence of great crested newts within Ponds WB15, WB16 and WB17; as each pond sample provided negative great crested newt status. All samples were collected within the appropriate timeframe for eDNA testing and no degradation or inhibition of the samples was detected within the laboratory. Waterbodies WB15, WB16 and WB17 are all located within a small area of land bound by the surrounding road network and therefore, unconnected to other ponds in the surrounding area (including waterbodies WBB and WB14).

8.7.59. The 2017 eDNA assessment returned a positive result for waterbodies WB14 and WB15. However, as detailed above the 2018 presence/absence did not record the presence of any GCN. It is therefore possible that a small and remnant population was present in 2017 within waterbodies WB14 and WB15 and has been lost prior to the 2018 survey period. In addition, there is a chance that the 2017 results could have been a false positive result via contamination due to presence of waterfowl. During the 2017 and 2018 surveys no evidence of breeding was recorded within any of the waterbodies, therefore, the positive eDNA result may be due to movement of a single GCN within the wider area.

8.7.60. The 2017 eDNA results provided a positive result for waterbody WBB. However, no GCN were recorded during the 2017 population assessment and 2018 presence/absence surveys. For the purpose of this assessment it is considered that a Low population is present within waterbody WBB. However, given the assumed low number of GCN present and that no breeding was recorded, it is considered that the population of GCN assessed is of **Local** value.

Otter and Water Vole

8.7.61. Three water vole *Arvicola amphibius* records are present within the search area, although only a single record is in close proximity to the Scheme Footprint (within 500m). The record is located at the Angel of the North Fishing Lakes, to the north of junction 65 (Birtley), approximately 75m from the Scheme.

8.7.62. A habitat assessment was completed as part of the extended Phase I habitat survey and habitats within the Scheme Footprint were considered unsuitable. The River Team has negligible potential to support water vole on this particular stretch.

8.7.63. There are twenty-nine records of otter *Lutra lutra* within the search area, clustered approximately 750m to the south of the Scheme Footprint (near Lamesley) and 1.25km to the north of the Scheme Footprint within the Team Valley Industrial Estate. The River Team flows between these two locations, although is partially fragmented by a long length of culverted watercourse through the industrial estate.

8.7.64. No potential holts were identified during the PEA survey (**Appendix 8.1** of this ES (**Application Document Reference: TR010031/APP/6.3**)). However, during 2019 surveys undertaken by Gateshead council, otters have been recorded within the River Team - within the culverted section within the Team Valley Industrial Estate, in the vicinity of the Coal House roundabout and to the south within Lamesley area, detailed within (The Otter Network, 2019) (**Ref 8.29**).

8.7.65. Given the presence of a significant stretch of culvert (approximately 1.3km) within the Team Valley Industrial Estate, within this section of the river it is considered that habitat would be sub-optimal quality and only supports otter commuting and foraging activity. Anecdotal evidence has been provided by Gateshead council, indicating an otter laying up within the woodland on the west bank of the River Team.

8.7.66. The population of water vole and otter assessed is considered to be of **Local** value. As such, water vole and otter are not a constraint to the Scheme and neither are considered further within this assessment.

Red Squirrel

8.7.67. Three records of red squirrel were identified within 1km of the Scheme Footprint within the last 10 years. A record is located approximately 300m north of the Scheme at Smithy Lane Overbridge. A further record is approximately 700m south east from the Scheme, to the south of Junction 65 (Birtley). The accuracy of this record is questioned as it is in the middle of a large residential area which consists of small dwellings with small gardens. However,

there is a thin strip of woodland to the west of the record and south-east of the Scheme. Therefore, the record should not be completely discounted. Finally, a single record is located approximately 1.4km north of junction 65 (Birtley).

- 8.7.68. No incidental sightings were recorded within the Study Area. No feeding signs or red squirrel hairs were observed or recorded, nor were there any sightings of red squirrels during the survey. Three potential dreys were identified during the walkover survey within the woodland south-east of Allerdene Bridge.
- 8.7.69. Potential drey 1 was large, approximately 40cm across and appeared to have a 'roof' like structure and a tunnel like entrance. In addition, there appeared to be leaf material embedded in the structure. The potential drey was situated away from the main trunk of the tree. Potential drey 2 was approximately 30cm in diameter and appeared to have no canopy like structure to it, therefore, this structure could be a large corvid nest. However, the potential drey was situated in a triple leader feature of the tree, a common drey location for squirrels. Potential drey 3 is situated approximately 12m from the ground on a branch fork close to the main trunk. No tunnel entrance was observed but there did appear to be leaf material within the structure, which measured approximately 30cm. The dreys on site are not considered to be red squirrel dreys.
- 8.7.70. The population of red squirrel assessed is considered to be of **Local** value. As such, red squirrel are not a constraint to the Scheme and is not considered further within this assessment.

Reptiles

- 8.7.71. No records of reptiles were included within the desk study for within 1km of the Scheme Footprint. Suitable habitat within the Scheme Footprint includes the railway sidings, which consist of ballast/aggregate substrate with developing grassland/ephemeral vegetation in places. In addition, scattered scrub and dense bramble is present at the edge of the railway sidings, providing potential shelter for reptiles.
- 8.7.72. However, no reptile species or evidence of reptiles was recorded during the reptile survey. As such, reptiles are not a constraint to the Scheme and are not considered further within the assessment.

Invasive Species

- 8.7.73. Anecdotal evidence has been provided by the EA that Himalyan Balsam *Impatiens glandulifera* and *Rhododenron* species are present in the wider Team Valley area but these species have not been recorded on site.
- 8.7.74. A stand of Japanese knotweed *Fallopia japonica* was recorded to the north-east of junction 67 (Coal House), along the margin of the semi-natural broad-leaved woodland. Further to this, a significant area (approximately 1ha) of Japanese knotweed was recorded to the north of the A1 near the Angel of the North (grid reference NZ 270 574).

8.7.75. A possible giant hogweed *Heracleum mantegazzianum* plant was recorded approximately 20m from the Scheme Footprint Study Area in Longacre Wood.

Summary of Species Receptor Value

8.7.76. **Table 8-12** provides a summary of the species receptor value, extracted from the assessment above.

Table 8-12 - Protected and notable species valuation summary

Species Receptor	Valuation
Fish	National
Bats	Local
Wintering birds	Local
Brown hare and hedgehog	Local
Great crested newt	Local
Otter and water vole	Local
Red squirrel	Local

FUTURE BASELINE

- 8.7.77. The information presented within the baseline survey reports (**Appendices 8.1-8.12** of this **ES (Application Document Reference: TR010031/APP/6.3)**) and discussed above describe the ecological conditions as they were at the time of the surveys. However, conditions are subject to change over time, both with or without the completion of the Scheme. The following paragraphs consider how ecological conditions might change within the Scheme Footprint, even in the absence of the Scheme, by winter 2020/21 (assumed start date for construction), winter 2023/24 (assumed year in which the Scheme would be open to traffic) and 2038 (the ‘future year’, when environmental mitigation would reach maturity).
- 8.7.78. Given that the majority of the Scheme Footprint falls within Highways England soft estate, it is considered that the baseline would vastly remain in line with the current management regimes within the area.
- 8.7.79. LWSs and other areas of nature conservation fall within small sections of the Scheme Footprint. Gateshead Council management of these sites (**Ref 8.26**) includes active management and monitoring, to encourage wildlife opportunities. This includes a habitat creation project within Lamesley Pastures. It is considered that given sufficient funding, Gateshead Council would continue to manage these areas positively for wildlife. Therefore, the baseline would vastly remain in line the current management regimes.

8.7.80. Within the small areas of the Scheme Footprint which fall in to agricultural land (arable and grazed pasture), ecological conditions are unlikely to have significantly changed by 2020 or 2023. However, changes in farming practices could occur in response to changes in agricultural economics, farming policy, agri-environment proposals and climate change. These changes may result in variation (both positive and negative) to the species diversity, assemblage and distribution within the Study Area. Although distribution and abundance of fauna are likely to fluctuate, it is assumed that there would be no significant changes to species or habitat status by design year. However, it is not possible to accurately predict farming practices in the Study Area in 2038 ("future year").

8.7.81. The consent and completion of development within and around the Scheme Footprint may result in changes in land-use and associated changes to flora and fauna assemblages. This may result in cumulative impacts, which are considered in **Chapter 15 Cumulative and Combined Assessment** of this ES (**Application Document Reference: TR010031/APP/6.1**).

8.8 POTENTIAL IMPACTS

8.8.1. Details of the Scheme, as provided within Chapter 2 The Scheme of this ES (Application Document Reference: TR010031/APP/6.1), have informed the impact assessment below. The HRA (Appendix 8.2 of this ES (Application Document Reference: TR010031/APP/6.3)) concluded that there would be no impacts to European Sites as a result of the Scheme, during construction and operation.

CONSTRUCTION

8.8.2. The Scheme would result in the permanent direct loss of habitat within the area of permanent works and the temporary loss of habitat for temporary works, such as site compounds, storage areas and site access roads. **Appendix 8.13** of this ES (**Application Document Reference: TR010031/APP/6.3**) provides full details of all habitat loss. **Table 8-13** summarises the area of priority habitat within the Scheme Footprint, which is due to be lost, with linear habitats detailed within **Table 8-14**.

Table 8-13 - Baseline loss of priority habitat area-NERC s.41 and local BAP

JNCC Habitat	Area of Habitat (hectares)	
	Embankment	Viaduct
Broad-leaved woodland - semi- natural – A1.1.1	2.88	2.88
Broad-leaved woodland – plantation – A1.1.2	6.69	6.45
Coniferous woodland – plantation – A1.2.2	0.18	0.18

JNCC Habitat	Area of Habitat (hectares)	
	Embankment	Viaduct
Mixed woodland – plantation – A1.3.2	4.32	4.32
Dense/ continuous scrub – A2.2	1.71	1.71
Neutral grassland – semi-improved – B2.2	6.79	6.79

Table 8-14 - Baseline loss of linear priority habitats-NERC s.41 and local BAP

JNCC Habitat	Length of Habitat (meters)	
	Embankment	Viaduct
Intact hedge – species poor – J2.1.2	1,484	1,535
Defunct hedge – species poor – J.2.2.2	262	262
Hedgerow with trees – species poor – J2.3.2	407	407
Running water	553	552

8.8.3. **Table 8-15** below lists the ecological features identified during the baseline assessment and summarises the potential construction impacts which are to be taken forward in the assessment.

Table 8-15 - Potential construction impacts on ecological features

Ecological Feature	Description of potential impacts
Local Wildlife Sites, including Longacre Wood LWS and Bowes Railway LWS	<ul style="list-style-type: none"> – Degradation resulting from disturbance of key species (e.g. noise and visual) during construction phase. – Degradation resulting from airborne pollution during the construction phase. – Degradation resulting from hydrological changes during the construction phase. – Direct loss resulting from land take during construction phase, in respect to Longacre Wood LWS – temporary loss only.

Ecological Feature	Description of potential impacts
	<ul style="list-style-type: none"> – Temporary fragmentation to Bowes Railway LWS. No habitats included within the designation will be lost. Therefore, the main consideration would be the wildlife corridor and connectivity,
Wildlife Corridor north of Longacre Wood LWS	<ul style="list-style-type: none"> – Degradation resulting from disturbance of key species (e.g. noise and visual) during the construction phase. – Degradation resulting from airborne pollution during the construction phase. – Degradation resulting from hydrological changes during the construction phase. – Direct loss resulting from land take, in respect of the woodland block adjacent to Longacre Wood LWS, separated by Smithy Lane.
Habitats of Principal Importance	<ul style="list-style-type: none"> – Direct loss during the construction phase. – Habitat fragmentation during the construction phase. – Alteration (degradation or improvement) through hydrological changes or changes in management practices during the construction phase.
River Team and outfalls 2, 5 and 9	<ul style="list-style-type: none"> – Alteration (degradation or improvement) through hydrological changes or changes in management practices during the construction phase.
Outfalls 1, 3, 4, 6, 7, 8, 10, 11, 12 and 13	<ul style="list-style-type: none"> – Alteration (degradation or improvement) through hydrological changes or changes in management practices during the construction phase.
Fish	<ul style="list-style-type: none"> – Permanent and temporary loss of habitat. – Damage and degradation to habitats through changes in airborne pollutant levels and hydrological changes. – Disturbance (noise, dust, light, vibration, visual). – Entrapment in dewatered watercourses during culvert installation. – Obstruction of migratory route (in relation to salmon and trout in the River Coquet). – Reduction in population due to mortality.
Bats	<ul style="list-style-type: none"> – Direct loss (mortality and injury) of individuals during the construction phase, due to the loss of a roost in Eighton Lodge South underbridge.

Ecological Feature	Description of potential impacts
	<ul style="list-style-type: none"> – Direct habitat loss (roost destruction and loss of foraging and commuting habitat) during the construction phase. – Disturbance (noise and light) to bats during the construction phase, in habitats associated with Eighton Lodge South underbridge and Longbank Bridleway Underpass. – Habitat degradation (fragmentation/other alteration) during the construction phase.
Wintering Birds	<ul style="list-style-type: none"> – Direct loss (mortality and injury) during the construction phase. – Direct habitat loss during the construction phase. – Disturbance (noise, visual and light) during construction phase. – Habitat degradation (fragmentation/other alteration) during the construction phase.
Great crested newt	<ul style="list-style-type: none"> – Direct loss (mortality and injury) during the construction phase. – Direct habitat loss during the construction phase. – Disturbance (noise, visual and light) during construction phase. – Habitat degradation (fragmentation/other alteration) during the construction phase.

OPERATION

8.8.4. **Table 8-16** lists the ecological features identified during the baseline assessment and summarises the potential operational impacts which are to be taken forward in the assessment.

Table 8-16 - Potential operational impacts on ecological features

Ecological Feature	Description of potential impact
Longacre Wood LWS and Bowes Railway LWS	<ul style="list-style-type: none"> – Degradation resulting from disturbance of key species (e.g. noise) during the operational phase. – Degradation resulting from airborne pollution during the operational phase. – Degradation resulting from hydrological changes during the operational phase.

Ecological Feature	Description of potential impact
Wildlife Corridor north of Longacre Wood LWS	<ul style="list-style-type: none"> – Degradation resulting from disturbance of key species (e.g. noise) during the operational phases. – Degradation resulting from airborne pollution during the operational phases. – Degradation resulting from hydrological changes during the operational phases.
Habitats of Principal Importance	<ul style="list-style-type: none"> – Degradation resulting from airborne pollution during the operational phases. – Alteration (degradation or improvement) through hydrological changes or changes in management practices during the operational phase.
River Team and outfalls 2, 5 and 9	<ul style="list-style-type: none"> – Degradation resulting from airborne pollution during the operational phases. – Alteration (degradation or improvement) through hydrological changes or changes in management practices during the operational phase.
Outfalls 1, 3, 4, 6, 7, 8, 10, 11, 12 and 13	<ul style="list-style-type: none"> – Degradation resulting from airborne pollution during the operational phases. – Alteration (degradation or improvement) through hydrological changes or changes in management practices during the operational phase
Fish	<ul style="list-style-type: none"> – Damage and degradation to habitats through changes in airborne pollutant levels and hydrological changes. – Disturbance (noise, dust, light, vibration, visual).
Bats	<ul style="list-style-type: none"> – Direct loss (mortality and injury) during the operational phase. – Disturbance (noise and light) to bats during the operational phase. – Habitat degradation (fragmentation/other alteration) during the operational phase.
Wintering Birds	<ul style="list-style-type: none"> – Direct loss (mortality and injury) during the operational phase. – Disturbance (noise, visual and light) during operational phase. – Habitat degradation (hydrological changes) during the operational phase.

Ecological Feature	Description of potential impact
Great crested newt	<ul style="list-style-type: none"> – Habitat degradation (hydrological changes) during the operational phase.

ALLERDENE BRIDGE OPTIONS

8.8.5. Both Allerdene embankment option and Allerdene viaduct option would result in the clearance of vegetation, pre-construction, to provide a working footprint for demolition of the existing bridge and construction. Both options would result in the loss of the same area of habitat. The vegetation clearance would result in the removal of suitable habitat for protected and notable species ahead of the construction period. Therefore, given that the loss of suitable habitat, it is considered that disturbance of these notable and protected species would have taken place ahead of the construction.

8.8.6. Therefore, during construction and operation, the impacts of both Allerdene embankment option and Allerdene viaduct option are considered to be the same (detailed in **Table 8-15** and **Table 8-16** above). It is considered that both options would impact the following receptors:

- a. Wildlife corridor north of Longacre Wood LWS
- b. Habitats of principal importance
- c. Bats
- d. Wintering birds

8.9 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

8.9.1. Construction of the Scheme would result in the loss of habitat, for which compensatory habitat creation would be required. Habitat creation (mitigation planting) has been developed and incorporated into the landscape plan. Specific mitigation measures (for example, areas of habitat creation) are presented in the Landscape Mitigation Design in **Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**).

DESIGN

8.9.2. As detailed in **paragraph 2.7.1** of **Chapter 2 The Scheme** of this ES (**Application Document Reference: TR010031/APP/6.1**) the following design measures relevant to biodiversity have been incorporated in to the Scheme in order to reduce impacts:

- a. The earthworks design adjacent to Longacre Wood LWS has been revised from 1:3 to 1:2 slope to avoid land take and loss of woodland. The proposed earthworks are within Highways England land and no land acquisition is required from Longacre Woods.
- b. A noise barrier, approximately 670m long, has been provided along the Highway boundary from just north-west of the intersection with Longbank to the section of the roadway adjacent to Lockwood Avenue. This would reduce disturbance to ecological features from noise emitted from the A1.

- c. An attenuation pond has been included in the location of the redundant A1 carriageway as shown on the General Arrangement Plan (sheet 3 of 7) (**Application Document Reference: TR010031/APP/2.6**). The attenuation pond would capture water drained from the majority of the catchment (i.e. Eighton Lodge North underbridge to Allerdene Bridge south abutment) and would reduce surface water run-off, allow sediments and pollutants to settle out and prevent contaminated water entering the watercourse by using overflow and isolation systems.
- d. Attenuation in order to reduce the rate of surface water runoff would be provided using oversized pipes and geo-cellular storage.
- e. Oil interceptors have been specified at all outfalls in order to reduce pollution risk.
- f. Silt control vortex separators have been incorporated into the outfalls to Longacre Dene to minimise sediment deposition within watercourses.
- g. Installation of a Thin Surface Course System (TSCS) for all sections of the A1 and slip roads to the roundabouts but excluding the roundabout circulatory. The TSCS would be a high performance, cut resistant, low noise and skid resistant surface capable of supporting a high volume of traffic with a thickness < 50mm. This would reduce noise impacts throughout the Scheme.

8.9.3. Additionally, the following design measures have been implemented to address biodiversity impacts:

- a. Avoidance of permanent loss of priority habitat areas where possible and the reduction in construction footprint to reduce temporary loss of priority habitat areas and suitable GCN terrestrial habitat.
- b. Avoidance and revision of land-take within the vicinity of and adjacent to waterbodies B, 14, 15, 16 and 17 (**Appendix 8.7** of this ES (**Application Document Reference: TR010031/APP/6.3**)).
- c. Retention of existing vegetation, where possible, to reduce impacts relating to habitat loss and ecosystem services.

MITIGATION MEASURES

8.9.4. The approach to the Landscape Mitigation Design (**Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**)) has sought to where possible result in ecological enhancement in the longer term. As set out in **Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**), the design includes:

- a. Reinstatement of habitat features within the same geographical area, where possible, maintaining connectivity to existing retained habitat features.
- b. Creating a diversity of habitat creation across the Scheme, including grasslands, scrub and woodland.
- c. Creation of woodland corridors and treelines to link existing woodland at Robin's Wood to the River Team and enhance the wildlife corridors between Longacre Wood LWS and the existing wildlife corridor to the west.
- d. Creation of linear features (hedgerows and tree lines) using native species along much of the length of the Scheme, on both east and west sides of the carriageway (design permitting).
- e. The use of native species within the planting plan. However, this will include the omission of ash *Fraxinus excelsior* from all planting mixes due to the biosecurity risk of ash dieback.

- f.** Planting of native trees and hedgerows to enhance the Bowes Railway LWS wildlife corridors and strengthen the wildlife corridor to encourage use.
- g.** Use of native species and plant stock of local provenance within the mitigation planting design.

8.9.5. **Appendix 8.13** of this ES (**Application Document Reference: TR010031/APP/6.3**) provides full details of all habitat enhancement and creation. **Table 8-17** details the areas (in hectares) of further mitigation measures in the form of habitat creation included within the Scheme Footprint to mitigate for the loss of the habitats of principal importance.

8.9.6. In addition to the habitat creation areas detailed in **Table 8-17** below, some areas of habitat will be subject to improvement. These include the following for both Scheme options:

- a.** 0.29 hectares of broad-leaved woodland – plantation – A1.1.2
- b.** 0.03 hectares of Neutral grassland – semi-improved – B2.2

Table 8-17 – Priority habitat creation across the Scheme Footprint

Habitat Created JNCC Phase I Habitat Type	Habitat Compensated for	Total Area/Length within Scheme (Lost) (hectares/metres)		Compensation Area/Length Recommended (hectares/metres)	
		Allerdene embankment option	Allerdene viaduct option	Allerdene embankment option	Allerdene viaduct option
Broad-leaved woodland – semi-natural – A1.1.2	Broad-leaved woodland - semi- natural – A1.1.1	2.88	2.88	8.06	7.58
	Broad-leaved woodland – plantation – A1.1.2	6.69	6.45	3.97	3.9
	Coniferous woodland – plantation – A1.2.2	0.18	0.18	0.16	0.16
	Mixed woodland – plantation – A1.3.2	4.38	4.32	2.69	2.69
Dense/continuous scrub – A2.2	Dense/continuous scrub – A2.2	1.71	1.71	1.09	1.09
Species Rich Grassland	Neutral grassland – semi-improved – B2.2	6.79	6.79	6.41	5.94
Includes all native hedgerow category	Intact hedge – species poor – J2.1.2	1,484	1,535	3,628	3,674
	Defunct hedge – species poor – J.2.2.2	262	262	262	262
Hedgerow with trees – species poor – J2.3.2	Hedgerow with trees – species poor – J2.3.2	407	407	3,216	3,271
Running water – G2	G2 Running water -G2	553	552	505	505

Construction

8.9.7. Mitigation measures that have been developed for the Scheme relating to biodiversity during the construction phase are detailed below. These commitments have been included within the Outline Construction Environmental Management Plan (CEMP) for the Scheme (**Application Document Reference: TR010031/APP/7.4**).

- a.** To minimise impacts from construction activities on the River Team and other watercourses:
 - i.** During construction, and as detailed in **Chapter 13 Road Drainage and the Water Environment (Application Document Reference: TR010031/APP/6.1)** it is recommended that works adjacent to the River Team would be in accordance to the following:
 - Pollution Prevention for Businesses (**Ref 8.27**) Pollution prevention guidelines (PPG) 1: General guide to the prevention of pollution
 - PPG2: Above ground oil storage tanks
 - PPG6: Working at construction and demolition
 - PPG21: Pollution incident response planning
 - The details of which and further water quality mitigation requirements, would be expanded upon in the CEMP.
 - Guidance for Pollution Prevention (GPPs) are currently being developed and published in a progressive manner to provide environmental good practice guidance for the whole UK and replace the Environment Agency's Pollution Prevention Guidelines (PPGs), which have been withdrawn but in the instances where they have yet to be updated still provide good practice advice.
 - In particular, PPG1 provides practical advice on site drainage, PPG5 provides guidance for works in, near, or liable to affect watercourses, and PPG6 provides guidance on the control of water pollution during construction and demolition stages of works. Compliance with these GPPs/PPGs should be considered as part of the environmental management documentation developed for construction and occupation phases of the Scheme.
- b.** To protect fauna and habitats from pollution, throughout the Scheme:
 - i.** During construction mitigation measures to avoid or reduce potential impacts on surface waters would be employed, including adherence to PPG during construction, and appropriate road drainage and runoff treatment.
- c.** To protect badger from impacts, throughout the Scheme:
 - i.** The requirement of a pre-construction badger survey of the entire Study Area to be undertaken at least three months prior to the commencement of works. This approach can be staggered in line with the construction areas and timeframes.

- Positioning of lighting columns away from habitats of value to foraging and commuting bats (hedgerows, trees, woodland).
 - Reducing the height of lighting columns to reduce light spill onto adjacent habitats;
 - Avoid use of blue-white short wavelength lights and high UV content.
 - The lighting strategy would be developed based on guidance for lighting with regards to protected species.
- n. To comply with conservation legislation and protect roost bat species (specifically common pipistrelle), at Eighton Lodge South Underbridge:
- i. Given the presence of a confirmed bat roost within bridge at Eighton Lodge South underbridge, a EPS licence application and associated mitigation and compensation requirements would be required in advance of the Scheme (Pre-construction) **Appendix 8.14** of this ES (**Application Document Reference: TR010031/APP/6.3**).
 - ii. Timing of works - Subject to agreement with Natural England as part of the licence application, the capture and exclusion of bats and the removal of the roosts prior to proposed works on the bridge at Eighton Lodge South underbridge would be undertaken between mid-March and mid-November (inclusive). This timeframe avoids the core hibernation period, when bats are most at risk during demolition.
 - iii. A toolbox talk would be provided to the site contractor to outline the proposed works, actions to take if a bat is encountered and their legal responsibility regarding bats and their roosts.
 - iv. Capture and Exclusion - Upon receipt of the EPS licence, any licensable works would be directly supervised by the named ecologist (or their accredited agent), if safe to do so. All capture and exclusion methods would be detailed within the EPS licence application documents. These would include hand removal of suitable roosting features (if possible) and exclusion using one-way exclusion device and all features which cannot be removed by hand. These methods could be supplemented by the use of dusk and/or dawn surveys (if considered safe to undertake).
 - v. Prior to construction and start of works, the following permanent compensation features are considered necessary.
 - Provision of four tree mounted (two per tree) or pole mounted 'woodcrete' bat boxes (Schwegler 1FF or similar), to provide roosting opportunities during the demolition and renovation of the bridge at Eighton Lodge South underbridge. These features would be installed prior to any works commencing and remain in place for a minimum of five years and can only be removed after this time should there be no evidence of use during this period. However, it is recommended that the features are permanent to

- provide ecological enhancement and opportunities for roosting bats over an extended period.
- Inclusion of suitable bat features within the retained bridge, such as installation of a 'bat tube' or mounted bat box.
- o.** To protect great crested newt from impacts on land within 500m of waterbodies WB14, WB15, WB16, WB17 and WBB:
- i.** As the impact to great crested newts as a result of habitat loss is considered minimal, all pre-construction and construction works within 500m of waterbodies WB14, WB15, WB16, WB17 and WBB would be conducted under a precautionary working method statement (PWMS).
 - ii.** Habitat clearance within 500m of Ponds B and 14 would be undertaken during the optimal period of mid-April to mid-June, when the majority of newts will have returned to their breeding ponds. If these timings cannot be achieved, hand searching of areas of suitable habitat would be undertaken by a SEE.
 - iii.** Whilst it is considered unlikely that operatives will encounter a great crested newt during works, all site operatives would receive a briefing from a SEE. The briefing would include details of the legal protection of great crested newts, the PWMS, tips on identification of great crested newts and the procedures to follow should the species be discovered during works.
 - iv.** Immediately prior to the works commencing, the proposed works area would be thoroughly hand searched by a licenced ecologist (or accredited agent). The hand search must take place no earlier than 24 hours prior to works commencing and will concentrate on all suitable terrestrial vegetation within the works area ((including access route(s))).
 - v.** All vehicles, plant and equipment on site must stick to predetermined access routes and must not encroach onto any habitats or areas which have not been hand searched prior to works taking place.
 - vi.** If a great crested newt is encountered during the proposed works, all activities in the area would cease immediately. If not present on site at the time, the SEE would be contacted to make an assessment of the situation and to determine whether a EPS licence would be required before work in that area proceeds. If considered necessary, guidance would be sought from Natural England.
 - vii.** Creation of species rich grassland habitat, consisting of a native species mix, within the vicinity of the waterbodies. The location of which is detailed within the Landscape Mitigation Design (**Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**)).
- p.** To comply with conservation legislation and protect red squirrels and their dreys, within woodland east of Allerdene Bridge:
- i.** Tree felling in areas with potential red squirrel dreys would be timed outside of the red squirrel breeding season (February to September). Where these timescales cannot be achieved the ECoW would determine an appropriate

course of action. All tree felling in locations where dreys are present (active or inactive) would be supervised by the ECoW. A Natural England licence must be in place for the removal of all active dreys (and dreys where activity levels cannot be confirmed).

- q.** To prevent the spread of invasive, non-native species, to the north-east of junction 67 (Coal House), north of the A1 near the Angel of the North and within Longacre Wood LWS:
- i.** Pre -construction, the contractor would describe within the CEMP the strategy to be implemented for the appropriate treatment of invasive, non-native species.
 - ii.** The strategy would set out appropriate construction, handling, treatment and disposal procedures to prevent the spread of invasive, non-native species in line with recognised good practice.
- r.** To protect a number of protected and notable species from lighting impacts, throughout the Scheme:
- i.** During construction, lighting used must be switched-off when not in use and positioned so as not to spill on to adjacent land or retained vegetation within the Study Area.
- s.** To mitigate the effects of fragmentation for fish populations, at culverts throughout the Scheme:
- i.** Culverts have been designed, where possible, to include natural beds (between 100mm and 250mm) to maintain and assist fish passage.
 - ii.** To mitigate for potential downstream impacts and maintain passage along watercourses, baffles or similar structures would be installed within existing culverts.
- t.** To protect wintering birds from construction impacts such as noise, vibration and dust, within land south of Allerdene Bridge:
- i.** Planting requirements to mitigate for the construction and operational impacts on wintering birds is linked to the Allerdene embankment and viaduct options. General approaches to mitigate for wintering bird impacts are detailed within **Appendix 8.10** of this ES (**Application Document Reference: TR010031/APP/6.3**) and summarised below:
 - ii.** Remediate area south of the Allerdene Bridge to grassland.
 - iii.** Inclusion of fruiting species that provide winter berries for thrushes and finches, such as crab apple *Malus sylvestris*, wild cherry *Prunus avium*, rowan *Sorbus aucuparia*, elder *Sambucus nigra* and hawthorn *Crataegus monogyna*. Management of berry bearing shrubs and fruit trees would occur in the latter part of the winter (January/February) to maximise the availability of these as a foraging resource.
- u.** To protect sensitive mammal habitats from illumination, throughout the Scheme:

- i. The use of construction lighting would be in accordance with industry standards and follow best available guidance on lighting with regards to protected species ((e.g. Bat Conservation Trust (2009) and Institute of Lighting Engineers (2007)). The construction lighting design would take into account the need to avoid illuminating sensitive mammal habitats (e.g. for bats) in locations such as: adjacent to watercourses; along woodland edges; and, where there is known activity identified through pre-construction ecological surveys. Where this is not possible the Contractor will agree any exceptions with the ECoW, Highways England and Gateshead Council.
- v. To comply with guidelines provided in 'BS 5837 Trees in relation to Construction' (British Standards Institute, 2012), throughout the Scheme:

 - i. During construction, trees would be protected in line with guidelines provided in BS 5837 Trees in relation to Construction. This includes the following:

 - Establishment of Root Protection Areas (RPA)
 - Protective fencing would be erected around the RPA to reduce risks associated with vehicles trafficking over roots system or beneath canopies
 - Selective removal of lower branches of trees to reduce risk of damage by construction plant and vehicles
 - Prevent soil compaction measures
 - Maintain vegetation buffer strips (where practicable)
- w. Replacement of trees lost that are to be retained, throughout the Scheme:

 - i. Planting would be undertaken to replace any trees that were intended to be retained which are felled or die as a result of construction works. The size, species and location of replacement trees would be approved by Highways England and other relevant stakeholders.
- x. To avoid mammals becoming entrapped in and around compound areas during construction, throughout the Scheme:

 - i. Trenches, holes and pits created during construction, would be kept covered at night or provide a means of escape for mammals, reptiles and amphibians that may become entrapped. Gates to compound areas would be designed sensitively to prevent mammals from gaining access and will be closed at night.
- y. To avoid mammals becoming entrapped in and around compound areas during construction, throughout the Scheme:

 - i. Temporary mammal-resistant fencing would be provided around construction compounds.
- z. To protect bats utilising the Longbank Bridleway Underpass as a crossing structure.

 - i. Following completion of underpass construction works and prior to operation, planting of native trees and hedgerows at Longbank Bridleway Underpass (Bowes Railway LWS) to attempt to funnel bats down under the A1 so that they

continue to use the underpass, to reduce the effects of fragmentation of the extant bat population.

- aa.** To comply with conservation legislation and protect roosting bats, throughout the Scheme:
 - i.** Pre and during construction all trees assessed with bat roost potential that require to be pruned or felled to accommodate the Scheme would be subject to a pre-felling inspection no more than 24 hours prior in search of roosting bats. Where features cannot be wholly assessed and ambiguity exists over the possible presence of bats, trees would be 'soft-felled' (i.e. felled in small sections) with care taken not to compromise the integrity of any potential roost feature in order to safeguard any potential bats present.
- bb.** To minimise impacts to Longacre Wood LWS:
 - i.** Post-construction and prior to operation, planting would be undertaken to replace any trees that were intended to be retained which are felled or die as a result of construction works. The size, species and location of replacement trees will be approved by Highways England and other relevant stakeholders.
- cc.** To maintain/enhance habitat for species including reptiles and invertebrates, throughout the Scheme:
 - i.** During construction, where retained, deadwood will be placed in a variety of locations and conditions to benefit a number of species.
 - ii.** Deadwood would be stored in a location away from the working area to prevent risk of damage and then placed within areas of retained woodland or woodland planting at an appropriate time.
 - iii.** Tree stumps would be retained in situ where felled on the edge of working areas where this does not pose a constraint to the works.

OPERATION

8.9.8. Mitigation measures for the Scheme relating to biodiversity during the operation phase are detailed below.

- a.** In addition to measures within the bridge design to protect the wintering bird population from increased noise levels during operation, to the south of Allerdene Bridge:
 - i.** Creation of woodland strips south of Allerdene Bridge to screen the suitable wintering bird habitat to the south.
- b.** To protect the habitats created throughout the Scheme:
 - i.** Adherence to the landscape mitigation monitoring and maintenance as detailed in **Chapter 7 Landscape and Visual** of this ES (**Application Document Reference: TR010031/APP/6.1**).
- c.** To protect bats from road traffic accidents and prevent fragmentation of populations, at Longbank Bridleway Underpass:

- i. As lighting both during the operational phase of Longbank Bridleway Underpass could have a negative effect upon bats utilising the underpass a sensitive light strategy would be adhered to, which would include:
 - The use of movement triggers, thus lighting only turns on when people (large objects) move through the area.
 - Avoidance of light spill using directional and or baffled lighting.
 - Avoid use of blue-white short wavelength lights and high UV content.

ALLERDENE BRIDGE OPTIONS MITIGATION

8.9.9. The overall mitigation for each of the options are similar in design, both the Allerdene embankment option and Allerdene viaduct option include:

- a. Creation of woodland and woodland edge habitats to the north and south of the carriageway. This planting creates a nearly continuous corridor of woodland and/or treelines between Ravensworth Pond and Woods to the southeast corner of Longacre Wood LWS, measuring approximately 2km in length.
- b. A realignment of a section of Allerdene Culvert to create a naturalised line and to include an associated wet grassland. Each option provides a slight deviation on design.

8.9.10. Additionally, the Allerdene embankment option includes the creation of a waterbody and species rich grassland north of the embankment (refer to Sheet 2a of 5 of the Landscape Mitigation Design **Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**)).

8.9.11. The Allerdene viaduct option provides additional areas available for species rich grassland creation below the viaduct, to mitigate for the loss of grassland that supports the wintering bird populations.

ENHANCEMENT MEASURES

8.9.12. The NPPF (2019) states that at an overview level the 'planning system should contribute to and enhance the national 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'. At a local level, the Local Plan states within Policy CS18 the aims to maintain, protect and enhance the integrity, connectivity, multifunctionality and accessibility of the Strategic Green Infrastructure Network and other green infrastructure. Ecological enhancements will also deliver other green infrastructure benefits such as storm water attenuation and reducing the urban heat island effect.

8.9.13. The following enhancement measures are recommended.

- a. Bat and bird boxes could be installed onto suitable trees/buildings or mounted on poles. If installed, bat boxes would be installed in unlit areas on multiple aspects (including facing south, west or east) at a height of 3m plus and have a clear flight path to the access point. The bat boxes would be located within existing or newly created suitable foraging

and commuting habitats. The requirements of the bird boxes would be specific to the type installed and manufactures advice should be followed. The bat and bird boxes could be placed within existing retained woodlands, during construction. Additionally, once mature, the boxes could be placed within the newly created woodlands, (on poles or mature existing trees along the edge), post-construction. Suitable bat and bird boxes include:

b. Bat boxes:

- i.** 2F Schwegler bat boxes (General purpose), or similar
- ii.** 1FF Schwegler bat boxes with built-in wooden rear panel, or similar
- iii.** 2FN Schwegler bat boxes, or similar

c. Bird boxes:

- i.** 1B Schwegler nest boxes, or similar
- ii.** 2H Schwegler robin boxes, or similar
- iii.** Vivara pro Barcelona woodstone open nest boxes, or similar

d. Consideration at detailed design stage, as to whether a sustainable drainage system (SuDS), which has ecological benefits could be designed in regard to Allerdene culvert. Consideration would also be given at detailed design to providing additional ecological benefits at the attenuation pond e.g. multiple water bodies, or varying depths within a single water body.

8.10 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

8.10.1. Detailed below is the assessment of residual effects during construction and operation. This assessment assumes the adoption of mitigation measures detailed above.

CONSTRUCTION

Local Wildlife Sites and Green Wildlife Corridors

8.10.2. The Scheme would result in a temporary direct adverse effect over the medium term on Longacre Wood LWS, via the loss of approximately 57m² of woodland. This loss equates to c.0.43% loss of the overall woodland. Additionally, the earthwork design adjacent to Longacre Wood LWS was revised to avoid permanent loss of areas of woodland, which fall within the LWS. The majority of woodland habitat would not be directly impacted, as in most places, there is sufficient space to undertake the works immediately adjacent to the existing A1 carriageway. Re-establishment of the woodland would be undertaken post-construction and the LWS would be linked to habitats within the wider area, via the woodland corridors created post-construction. The Scheme would result in direct, temporary adverse effects of **moderate** significance.

8.10.3. The Scheme would result in a temporary direct adverse impact of the short term on Bowes Railway LWS. Longbank Bridleway Underpass would be extended during the construction period restricting the use of the LWS as a corridor and resulting in short term fragmentation. It is considered that the Scheme would result in direct, temporary adverse effects of **slight** significance (not significant).

- 8.10.4. The Scheme would result in a temporary direct impact to Bowes Railway LWS during construction from expanding the length of the underpass, which is part of the former railway route. Species that use the LWS may be temporarily disturbed by the works. However, following the successful implementation of compensatory woodland and creation of continuous woodland corridors, and habitats to improve connectivity, it is considered that the significance of effects would be **neutral** (not significant).
- 8.10.5. The Scheme would result in the permanent loss of 0.97 hectares of woodland. The Landscape Mitigation Design includes the creation of 0.31 hectares of embankment woodland planting and 0.55 hectares of interplanting enhancement, within this area. Additionally, woodland and treeline creation within the wider Scheme Footprint would link existing woodland at Robin's Wood to the River Team and enhance the wildlife corridors between Longacre Wood LWS and the existing wildlife corridor to the north. Therefore, these habitats would be restored following the Scheme completion, however they would take time to re-establish and this is therefore considered a direct, temporary adverse effect.
- 8.10.6. Following the successful implementation of the mitigation requirements, it is considered that the impacts associated with the Scheme would result in effects of **slight** significance (not significant). This would be equally applicable to Allerdene embankment option and Allerdene viaduct option.

Habitats

- 8.10.7. The A1 between Birtley and Coal House is constrained due to it being an existing road corridor and the Scheme would result in the loss of approximately 3.95 hectares of semi-natural woodland and approximately 4.37 hectares of other woodlands, such as broadleaved plantation, coniferous plantation and mixed plantation woodland. However, the Landscape Mitigation Design which was designed to encompass biodiversity mitigation requirements, includes the creation of approximately 6 hectares of semi-natural woodland. The habitat created to compensate this loss, would be a smaller area to that lost due to the Scheme, but all would be of a higher quality by creating a structure comprising varying tree ages, and with a management regime that creates gaps allowing light to reach the understorey layer in patches. However, the newly created woodland habitats will take time to establish and will not result in a biodiversity net gain. It is considered that this would result in a direct, adverse significant effect. It would also result in the loss of 2.68 hectares of neutral grassland which would result in a direct, permanent adverse effect.
- 8.10.8. Following the successful implementation of the mitigation requirements, it is considered that the impacts of the Scheme would result in effects of **moderate** significance. This would be equally applicable to Allerdene embankment option and Allerdene viaduct option.
- 8.10.9. The Scheme would result in direct effect of a temporary extension of the existing underground culvert within the River Team at junction 67 Coal House Roundabout during the construction period (winter 2020-winter 2023). Additionally, indirect effects would arise during construction from dust deposition and surface run off. Species that use these watercourses may be temporarily disturbed by the works. Following the implementation of

mitigation, the risk of direct and indirect effects during construction would be of **neutral** significance (not significant).

Fish

- 8.10.10. Given that long reaches of the River Team are culverted downstream of the Scheme Footprint, the addition of a temporary box culvert to enable widening of Kingsway Viaduct does not pose a constraint to the fish populations in the river. It presents no significant additional effect over and above those already experienced by fish within the River Team.
- 8.10.11. Following the implementation of mitigation, it is considered that the risk of an accidental pollution event occurring within the River Team is negligible, and therefore effects would be of **neutral** significance (not significant).

Bats

- 8.10.12. The Scheme would result in the loss of a single low status roost of a common and widespread species, of a single individual. Following the successful implementation of the EPS licence application mitigation requirements, it is considered that the Scheme would result in effects of **neutral** significance (not significant).
- 8.10.13. The Scheme will result in the modification of Longbank Bridleway Underpass utilised as a bat commuting route. The pass is utilised by common and widespread bat species. However, it provides a vital connection between habitats north and south of the A1. The Scheme would result in the disturbance of this habitat over the short term. Therefore, it is considered that the Scheme would result in a direct, temporary adverse effect of **slight** significance (not significant).

Wintering Birds

- 8.10.14. The construction compound would result in the temporary loss of suitable lapwing habitat south of Allerdene Bridge. However, the temporary loss of habitat only represents a small proportional loss of suitable habitat when placed in context with the wider environment. It is anticipated that the construction compound would not have a significant adverse effect upon the integrity of Lamesley Meadows LWS. Therefore, the presence of lapwing (cited as part of Lamesley Meadows LWS) does not pose a constraint to the construction compound and Scheme.
- 8.10.15. However, the Allerdene Bridge would permanently impact suitable habitat south of the current bridge location. With the availability of suitable optimal habitat within the wider area outside of the Scheme Footprint, it is considered that the loss of approximately three hectares of suitable habitat and the presence of lapwing (cited as part of Lamesley Meadows LWS) does not pose a constraint to the Scheme. In addition, the creation of the species rich grassland habitat to the south of the Allerdene Bridge footprint, ensures that suitable habitat for the species would be retained post-construction.
- 8.10.16. Following the successful implementation of the mitigation requirements, it is considered that the impacts of the Scheme would result in effects of **neutral** significance (not significant).

This would be equally applicable to Allerdene embankment option and Allerdene viaduct option.

Great Crested Newt

- 8.10.17. The Scheme would result in the loss of areas of suitable terrestrial habitat, which are located within the soft estate. Following the successful implementation of the mitigation which would be detailed in the CEMP and the required precautionary working method statement, it is considered that the Scheme would result in effects of **neutral** significance (not significant).

Invasive Species

- 8.10.18. Following the successful implementation of mitigation, with removal and control of invasive species, it is considered that the Scheme would result in the permanent, beneficial effect of **slight** significance (not significant).

OPERATION

Local Wildlife Sites and Green Wildlife Corridors

- 8.10.19. **Chapter 5 Air Quality** of this ES (**Application Document Reference: TR010031/APP/6.1**) concludes that no modelled receptors have annual mean concentrations above $30\mu\text{m}/\text{m}^3$ and no changes in NO_x concentrations are greater than $0.4\mu\text{g}/\text{m}^3$, which are below air quality significance thresholds.
- 8.10.20. The inclusion of oil interceptors, silt control and reduction of the rate of surface water runoff detailed within **Chapter 13 Road Drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**), have been designed to mitigate for hydrological impacts. However, these measures would have a dual benefit, including a reduction of impacts to the LWS and green wildlife corridor. The Landscape Mitigation Design detailed in **Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**), which was designed to encompass biodiversity mitigation requirements, would result in the restoration of any temporary loss of habitats within the LWS and green wildlife corridor. The landscape mitigation would establish during operation. The adherence of the landscape mitigation monitoring and maintenance as detailed within **Chapter 7 Landscape and Visual** of this ES (**Application Document Reference: TR010031/APP/6.1**) would protect retained and newly created habitats, which are linked to the LWS and green wildlife corridor.
- 8.10.21. Following the successful implementation of the mitigation requirements detailed within Chapter 7 Landscape and Visual and Chapter 13 Road Drainage and the Water Environment of this ES (Application Document Reference: TR010031/APP/6.1) and above, it is considered that the impacts associated with the Scheme would result in effects of neutral significance (not significant). This is equally applicable to Allerdene embankment option and Allerdene viaduct option.

Habitats

- 8.10.22. **Chapter 5 Air Quality** of this ES (**Application Document Reference: TR010031/APP/6.1**) concludes that no modelled receptors have annual mean concentrations above $30\mu\text{g}/\text{m}^3$ and that no changes in NO_x concentrations are greater than $0.4\mu\text{g}/\text{m}^3$, which are below air quality significance thresholds.
- 8.10.23. The inclusion of oil interceptors, silt control, creation of attenuation ponds and reduction of rate of surface water runoff, detailed within **Chapter 13 Road Drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**) have been designed to mitigate hydrological impacts. However, these designs would have a dual benefit, including a reduction of impacts on the retained habitats across the Scheme. Additionally, the Landscape Mitigation Design in **Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**) would result in the restoration of habitats along the Scheme, which would establish during operation. The adherence of the landscape mitigation monitoring and maintenance as detailed within **Chapter 7 Landscape and Visual** of this ES (**Application Document Reference: TR010031/APP/6.1**) would protect retained and created habitats throughout the Scheme.
- 8.10.24. Following the successful implementation of the mitigation requirements detailed within this and each of the chapters above, it is considered that the impacts associated with the Scheme would result in effects of **neutral** significance (not significant). This would be equally applicable to Allerdene embankment option and Allerdene viaduct option.

Fish

- 8.10.25. The inclusion of oil interceptors, silt control, creation of attenuation ponds and reduction of rate of surface water runoff detailed within **Chapter 13 Road Drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**), have been designed to mitigate hydrological impacts. However, these designs would have a dual benefit, including reduction of impacts on biodiversity receptors. **Chapter 13 Road Drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**) concludes that the likelihood of pollution road discharges occurring in the River Team would be reduced. Reduction in pollution road discharge would be beneficial to the fish population. However, road operations would still result in vibration and noise disturbance. Though, if present, fish populations would be somewhat habituated to the current levels. Therefore, it is considered that the mitigation would result in effects of **neutral** significance (not significant).

Bats

- 8.10.26. The Scheme would result in a small loss of suitable foraging habitat for extant bat populations. However, there is no observable impact anticipated given the existing degradation of these habitats due to the presence of the A1 and the availability of habitat within the wider area. Habitat creation as part of the Landscape Mitigation Design **Figure 7.6** of this ES (**Application Document Reference: TR010031/APP/6.2**) would provide new

connecting habitats that would over time provide optimal foraging and commuting habitat. Additionally, the sensitive lighting design would allow continued use of the underpass.

- 8.10.27. Following the successful implementation of the mitigation requirements, it is considered that the impacts associated with the Scheme would result in effects of **neutral** significance (not significant). This would be equally applicable to Allerdene embankment option and Allerdene viaduct option.

Wintering Birds

- 8.10.28. **Chapter 5 Air Quality** of this ES (**Application Document Reference: TR010031/APP/6.1**) concludes that no modelled receptors have annual mean concentrations above $30\mu\text{g}/\text{m}^3$ and that no changes in the NO_x concentration are greater than $0.4\mu\text{g}/\text{m}^3$, which is below the air quality significance threshold.
- 8.10.29. The inclusion of oil interceptors, silt controls, creation of attention ponds and reduction of surface water runoff, as detailed within **Chapter 13 Road drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**), were designed to mitigate hydrological impacts. However, these mitigation designs will have a dual benefit, including a reduction to impacts to biodiversity receptors. **Chapter 13 Water drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**), also concludes that the proposed drainage strategy will be an improvement to the existing, through the use of SuDS, including oversized pipes and geo-cellular tanks, which will improve the water quality of road drainage. These measures would therefore mitigate any surface water runoff impacts to the retained grasslands south of Allerdene Bridge, which supports the wintering bird assemblage.
- 8.10.30. Following the successful implementation of the mitigation requirements, it is considered that the impacts associated with the Scheme would result in effects of **neutral** significance (not significant). This would be equally applicable to Allerdene embankment option and Allerdene viaduct option.

Great Crested Newt

- 8.10.31. The inclusion of oil interceptors, silt controls and reduction of surface water runoff, as designed within **Chapter 13 Road drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**), were designed to mitigate hydrological impacts. However, the mitigation designs have a dual benefit, including a reduction of impacts to biodiversity receptors. **Chapter 13 Water Drainage and the Water Environment** of this ES (**Application Document Reference: TR010031/APP/6.1**), also concludes that the proposed drainage strategy will be an improvement to the existing, which will improve the water quality of road drainage. These designs would therefore mitigate any surface water runoff, which may occur within the vicinity of the GCN population. Therefore, it is considered that the Scheme would result in effects of **neutral** significance (not significant).

8.11 MONITORING

- 8.11.1. Monitoring during construction has been detailed as part of the mitigation strategy, which is detailed in **Section 8.9.7**.
- 8.11.2. Regarding NE EPS Licence requirements, no monitoring requirements have been identified for the loss of the bat roost, as required as part of the impact assessment, subject to agreement with Natural England.
- 8.11.3. Regarding DEFRA guideline (Berthinussen and Altringham 2015) (**Ref 8.28**) requirements and given that Longbank Bridleway Underpass is utilised by commuting bats, monitoring of the structure would be required during and post-construction. It is recommended that this takes the form of:
- a. Six survey visits per year, with two during June and four during July
 - b. The six visits to consist of four dusk visits and two dawn visits
 - c. A single year of monitoring will be completed during the construction period
 - d. Monitoring visits will be completed annually over a four year period post-construction
- 8.11.4. The monitoring would be undertaken by a Highways England appointed consultant. Following completion of each monitoring period, an interim assessment of the mitigation design would be undertaken.
- 8.11.5. Following completion of the entire monitoring period a final assessment would be undertaken. This assessment would consider the success of the mitigation implemented, in line with the standards detailed within the DEFRA guidelines (Berthinussen and Altringham 2015) (**Ref 8.28**). The results of the monitoring undertaken would inform any alterations to the designed mitigation system in place, if required.
- 8.11.6. Highways England would identify a suitable body to ensure any alterations required were completed.
- 8.11.7. These commitments have been included within the Outline CEMP for the Scheme (**Application Document Reference: TR010031/APP/7.4**).

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