Gatwick Airport Northern Runway Project

Environmental Statement
Chapter 9: Ecology and Nature Conservation

Book 5

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9.1. Introduction

9.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) concerning the potential effects of the proposal to make best use of Gatwick's existing runways and infrastructure (referred to within this report as 'the Project') on ecology and nature conservation.

9.1.2 This chapter identifies the potential effects of the Project on the ecology and nature conservation interest of the Project site and surrounding receptors.

9.1.3 In particular, this ES chapter:

- sets out the existing and future environmental baseline conditions, established from desk studies, surveys and consultation;
- identifies any assumptions and limitations encountered in compiling the environmental information;
- presents the potential environmental effects on ecology and nature conservation arising from the Project, based on the information gathered and the analysis and assessments undertaken;
- highlights any necessary monitoring and/or mitigation measures that could prevent, minimise, reduce or offset the potential environmental effects identified through the EIA process; and
- sets out any residual effects relating to ecology and nature conservation which arise from the Project.

9.1.4 This chapter is accompanied by the following appendices:

- ES Appendix 9.2.1: Summary of Ecology and Nature Conservation Legislation;
- ES Appendix 9.2.2: Summary of Local Planning Policy;
- ES Appendix 9.3.1: Summary of Stakeholder Consultation;
- ES Appendix 9.3.2: Summary of PEIR Responses for Ecology
- ES Appendix 9.3.3: Summary of Stakeholder PEI Responses for Ecology
- ES Appendix 9.6.1: Ecological Desk Study;
- ES Appendix 9.6.2: Ecology Survey Report;
- ES Appendix 9.6.3: Bat Trapping and Radio Tracking Surveys;
- ES Appendix 9.6.4: Confidential Badger Survey;
- ES Appendix 9.9.1: Habitats Regulations Assessment Report; and
- ES Appendix 9.9.2: Biodiversity Net Gain Statement.

9.1.5 The Preliminary Environmental Information Report (PEIR) Ecology and Nature Conservation chapter identified Next Steps and these have been addressed in this chapter as follows:

- trees that would be affected by the Project have been identified and preliminary bat roost surveys undertaken to determine the loss of potential bat roost locations. The effects of the loss of potential roost features have been assessed in this chapter. Follow-up pre-commencement surveys will determine whether roosts are present;

- further surveys have been undertaken for great crested newt and bat activity to better understand their distribution and presence around the populations already identified and this information has been used to inform the assessment of effects on these species in this chapter; and
- the findings of all the additional surveys are reported and an assessment of any effects are included in this ES chapter.

9.2. Legislation and Policy

Legislation

9.2.1 A range of legislation provides protection to habitats and species at an international, national and local level. Full details of the legislation relevant to this Project and taken into account for the assessment are provided in **ES Appendix 9.2.1: Summary of Legislation – Ecology and Nature Conservation** (Doc Ref. 5.3).

9.2.2 Key legislation relevant to ecology and nature conservation includes:

- The Conservation of Habitats and Species Regulations 2017;
- The Wildlife and Countryside Act (WCA) 1981;
- Countryside and Rights of Way (CRoW) Act 2000;
- The Natural Environment and Rural Communities (NERC) Act 2006;
- The Protection of Badgers Act 1992;
- Wild Mammals Protection Act 1996;
- The Hedgerow Regulations 1997; and
- The Environment Act 2021.

Planning Policy Context

National Policy Statements

9.2.3 The Airports National Policy Statement (NPS) (Department for Transport, 2018), although primarily concerned with a new runway at Heathrow Airport, remains a relevant consideration for other applications for airport infrastructure in London and the south east of England.

9.2.4 The 'Biodiversity and Ecological Conservation' section of the Airports NPS summarises the UK Government's biodiversity strategy (paragraph 5.84). The aim of the strategy is to *'halt biodiversity loss, support healthy, well-functioning ecosystems, and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.'*

9.2.5 This strategy is followed through in the Airports NPS by reference to the National Planning Policy Framework (NPPF) which supports a movement from net loss of biodiversity, through an interim stage of no net loss and on to achieving net gains for nature (paragraph 5.85).

9.2.6 The NPS for National Networks (Department for Transport, 2014)[1] sets out the need for development of road, rail and strategic rail freight interchange projects on the national networks

[1] The Department for Transport published a revised draft National Policy Statement for National Networks ("NPSNN") for consultation on 14 March 2023. The draft NPSNN confirms in paragraph 1.16 that the existing NPSNN remains the relevant government policy and has full force and effect in relation to any applicable applications for development consent accepted for examination before designation of the updated NPSNN. The draft NPSNN further notes in paragraph 1.17 that the emerging draft NPSNN is capable of being an important

and the policy against which decisions on major road and rail projects will be made. This has been taken into account in relation to the highway improvements proposed as part of the Project.

9.2.7 Table 9.2.1 provides a summary of the relevant requirements of the Airports NPS and NPS for National Networks relevant to ecology and nature conservation and how these are addressed within the ES.

Table 9.2.1: Summary of NPS Information Relevant to Ecology and Nature Conservation

Summary of NPS Requirements	How and Where Considered in the ES
Development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives. The applicant may also wish to make use of biodiversity offsetting in devising compensation proposals to counteract any impacts on biodiversity which cannot be avoided or mitigated. Where significant harm cannot be avoided or mitigated, as a last resort appropriate compensation measures should be sought (Airports NPS Para. 5.96 and NPS for NN Para. 5.25).	Relevant baseline data have been collected to determine ecological features of concern, and to inform the assessment of effects, which sets out effects on designated sites, protected species and habitats, and other species identified as being of principal importance for the conservation of biodiversity. The Project has taken into account the need to protect biodiversity and prevent significant harm, such as through avoiding areas of high biodiversity value. This has included changes to the Project boundary to avoid areas of high biodiversity value identified in the PEIR. Mitigation measures described in this chapter and adopted as part of the Project include measures to protect and minimise the potential for effects on biodiversity including habitat creation around the Project site, which would contribute to the overall effect in relation to biodiversity (Section 9.8). Details of compensation measures are provided where they are required as a last resort, such as the provision of alternative habitat to compensate for habitat losses for bats, great crested newts and reptiles. Biodiversity losses have been calculated based on the design of the Project (including ancillary services, temporary works areas and linked transport infrastructure). All terrestrial and freshwater habitats that would be lost to development have been included within the biodiversity net gain calculations that are provided in **ES Appendix 9.9.2 Biodiversity Net Gain Statement** (Doc Ref. 5.3).

and relevant consideration in the Secretary of State's decision making process. As such, the Applicant will continue to monitor the progress of the NPSNN review process and incorporate any updates to the Project's application documentation where considered appropriate in due course.

Summary of NPS Requirements	How and Where Considered in the ES
Appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats and other species of principal importance for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment (Airports NPS Para. 5.97 and NPS for National Networks Para. 5.25).	The ecology and nature conservation value of sites, species and habitats identified within the Project site boundary and within the relevant study area have been assessed and are explained in this chapter (Section 9.6). The value of each feature has informed the assessment of effects of the Project (Section 9.9).
The Secretary of State will ensure that the applicant's proposals to mitigate the harmful aspects of the development on Sites of Special Scientific Interest (SSSI) and, where possible, to ensure the conservation and enhancement of a SSSI's biodiversity or geological interest, are acceptable. Where necessary, requirements and / or planning obligations should be used to ensure these proposals are delivered (Airports NPS Para. 5.101 and NPS for National Networks Para. 5.29).	The Project would have no direct effect on SSSIs. Mitigation measures adopted as part of the Project for ecology and nature conservation are described in this chapter (Section 9.8). Measures include following best practice guidelines to ensure there is no significant effect on SSSIs.
Sites of regional and local biodiversity interest (which include Local Nature Reserves, Local Wildlife Sites and Nature Improvement Areas) have a fundamental role to play. The Secretary of State will give due consideration to such regional or local designations. Adequate compensation should always be considered, and ecological corridors and their physical processes should be maintained as a priority to mitigate widespread impacts (Airports NPS Para. 5.102 and NPS for National Networks Para. 5.31).	The Project would have no direct effect on Local Nature Reserves or Local Wildlife Sites due to the mitigation measures that would be put in place. Opportunities to enhance the Project site for the benefit of biodiversity have been included in the design of the Project and are set out in this chapter (Section 9.8). These have been informed by baseline surveys (Section 9.6 and **ES Appendix 9.6.2: Ecology Survey Report** (Doc Ref. 5.3)). The loss or covering of lengths of rivers and streams have been accounted for within the biodiversity net gain metric described in Appendix 9.9.2. Due to the nature of rivers and streams, the potential to create multiple lengths of new channel is limited due to the hydrological effects that this would create in other areas of the catchment. Therefore, biodiversity gains for rivers and streams include restoration of existing watercourses, as well as any relevant channel creation. Restoration would be targeted within the same rivers and streams in both upstream and downstream sections.

Summary of NPS Requirements	How and Where Considered in the ES
Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss. Where such trees would be affected by development proposals, the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons for this (Airports NPS Para. 5.103 and NPS for National Networks Para. 5.32).	A series of species and habitat surveys, including woodland, have been undertaken in order to inform this assessment of effects. These are reported in Section 9.6 and **ES Appendix 9.6.2: Ecology Survey Report** (Doc Ref. 5.3) Opportunities to avoid effects on these features and habitats have been taken during the site selection process and mitigation measures have been designed into the Project to avoid effects on ancient woodland. This includes removing these areas from within the Order Limits. As such, the Project will not result in the loss or deterioration of irreplaceable habitats including ancient woodland or the loss of aged/veteran trees outside the ancient woodland. These measures are reported in the Section 9.8.
The Secretary of State will consider whether the applicant has maximised opportunities for building in beneficial biodiversity as part of good design in and around developments, and particularly to establishing and enhancing green infrastructure (Airports NPS Para. 5.104 and NPS for National Networks Para. 5.33).	Opportunities to enhance the Project site for the benefit of biodiversity have been included in the design of the Project and are set out in this chapter (Section 9.8). These have been informed by baseline surveys (Section 9.6 and **ES Appendix 9.6.2: Ecology Survey Report** (Doc Ref. 5.3)). Opportunities for building beneficial biodiversity into the Project design have been sought and these have included opportunities to establish and enhance green infrastructure.
In addition to the habitats and species that are subject to statutory protection or international, regional or local designation, other habitats and species have been identified as being of principal importance for the conservation of biodiversity in England and Wales and therefore requiring conservation action. The Secretary of State will ensure that the applicant has taken measures to ensure that these other habitats and species are protected from the adverse effects of development. Where appropriate, requirements or planning obligations may be used in order to deliver this protection (Airports NPS Para. 5.105 and NPS for National Networks Para. 5.35).	The assessment provided in this chapter considers designated sites, habitats and protected and otherwise notable species throughout the chapter, including species and habitats identified as being of principal importance.

Summary of NPS Requirements	How and Where Considered in the ES
Appropriate mitigation measures should be included as an integral part of a proposed development, including identifying where and how these will be secured. The Secretary of State should consider what appropriate requirements should be attached to any consent and/or in any planning obligations entered into in order to ensure that mitigation measures are delivered (NPS for National Networks Para. 5.35).	This assessment provides details of the mitigation measures that have been designed into, and secured as part of, the Project (Section 9.8).

National Planning Policy Framework

9.2.8 The NPPF sets out the planning policies for England.

9.2.9 The principle of sustainable development in the NPPF acknowledges the environmental role of planning in protecting and enhancing the natural environment and helping to improve biodiversity. The NPPF recognises that achieving sustainable development involves pursuing positive improvements in the natural environment.

9.2.10 Chapter 15 of the NPPF 'Conserving and enhancing the natural environment' contains provisions for ensuring that planning can be sustainable from an environmental perspective. Specifically, paragraph 174 states that:

'...Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
- *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
- *maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*
- *minimising impacts and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality, taking into account relevant information such as river basin management plans; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'*

9.2.11 Paragraph 180 goes on to state that:

'When determining planning applications, local planning authorities should apply the following principles:

- *if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- *development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
- *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and*
- *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate*.'

9.2.12 The NPPF also states (paragraph 182) that '*the presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site*.'

9.2.13 The NPPF is supported by the Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Effect within the Planning System, jointly issued by the Office of the Deputy Prime Minister and the Department for Environment, Food and Rural Affairs (Defra) (ODPM, Defra, 2005). This joint circular aims to provide '*guidance on the application of the law in relation to planning and nature conservation as it applies in England*.'

9.2.14 The Government Circular makes reference to the UK Biodiversity Action Plan (BAP), England Biodiversity Strategy and Local Biodiversity Partnerships. These documents outline strategic actions for biodiversity at both the national and local level and are considered further below under Wildlife Legislation.

9.2.15 The Environment Act 2021 includes provisions applying certain biodiversity net gain (BNG) requirements to the nationally significant infrastructure projects (NSIPs) regime. A BNG requirement is proposed to be imposed on NSIP projects from November 2025[2], with the level of requirement detailed within a BNG statement(s) (subject to prior publication – currently expected to be November 2023, to allow a period of transition) and presently expected to be set at a minimum of 10%. The consultation sets out that projects which have been accepted for examination prior to the November 2025 date would not be required to deliver that minimum BNG target, but could choose to do so voluntarily. In this context, and noting the position remains

[2] The Consultation on Biodiversity Net Gain Regulations and Implementation; Consultation outcome Government response and summary of responses. Updated 21 February 2023 (defra.gov.uk).

subject to further confirmation from Government, whilst there is no legal requirement for the Project to deliver BNG, the design has been developed such that the extent of net gain possible has been maximised within the parameters of the Project and the safeguarding requirements associated with an operational airport. A Biodiversity Net Gain Statement is included in Appendix 9.9.2.

National Planning Practice Guidance

9.2.16 The National Planning Practice Guidance (NPPG) supports the NPPF and provides guidance across a range of topic areas.

9.2.17 The guidance states that the planning system should conserve and enhance the natural and local environment and requires local planning authorities to consider the opportunities that proposed developments may provide to conserve and enhance biodiversity and contribute to habitat connectivity in the wider area[3].

Local Planning Policy

9.2.18 Gatwick Airport is located in the county of West Sussex and immediately adjacent to the bordering county of Surrey. Gatwick Airport lies within the administrative area of Crawley Borough Council and adjacent to the boundaries of Mole Valley District Council to the north west, Reigate and Banstead Borough Council to the north east and Horsham District Council to the south west. The administrative area of Tandridge District Council is located approximately 1.9 km to the east of Gatwick Airport, while Mid Sussex District Council lies approximately 2 km to the south east.

9.2.19 The relevant local planning policies applicable to ecology and nature conservation based on the extent of the study area for this assessment and taken into account for the assessment are summarised in Table 9.2.2, with further details provided in **ES Appendix 9.2.2: Summary of Local Planning Policy – Ecology and Nature Conservation** (Doc Ref. 5.3).

Table 9.2.2: Local Planning Policy

Administrative Area	Plan	Policy
Adopted Policy		
Crawley	Crawley 2030: Crawley Borough Local Plan 2015-2030 (2015)	ENV2: Biodiversity
Reigate and Banstead	Reigate and Banstead Local Plan: Core Strategy (2014, reviewed 2019)	CS2: Valued Landscapes and the Natural Environment
	Reigate and Banstead Local Plan Development Management Plan 2018-2027 (2019)	NHE2: Protecting and Enhancing Biodiversity and Areas of Geological Importance
		NHE3: Protecting Trees, Woodland and Natural Habitats
		NHE4: Green and Blue Infrastructure

[3] Ministry of Housing, Communities and Local Government (2021) National Planning Policy Framework (www.gov.uk)

Administrative Area	Plan	Policy
Tandridge	Tandridge District Core Strategy 2008	CSP17: Biodiversity
	Tandridge Local Plan. Part 2: Detailed Policies 2014-2029 (2014)	DP19: Biodiversity, Geological Conservation and Green Infrastructure
Mid Sussex	Mid Sussex District Plan 2014-2031 (2018).	DP17: Ashdown Forest SPA and SAC
		DP36: Historic Parks and Gardens
		DP37: Trees, Woodland and Hedgerows
		DP38: Biodiversity
	Mid Sussex Local Plan 2004 (saved policies)	C5: Areas of Importance for Nature Conservation
		C6: Trees, Hedgerows and Woodlands
	Site Allocations Development Plan Document (2022)	
Horsham	Horsham District Planning Framework (2015)	Policy 25: The Natural Environment and Landscape Character
		Policy 31: Green Infrastructure & Biodiversity
Mole Valley	Mole Valley Core Strategy 2009	CS15: Biodiversity and Geological Conservation
	Mole Valley Local Plan 2000	ENV11: Local and non-statutory nature reserves
		ENV12: Sites of Nature Conservation Importance and Potential Sites of Nature Conservation Importance
		ENV13: Features of Local Importance for Nature Conservation
		ENV14: Enhancement, management and creation of nature conservation features
		ENV15: Species Protection
Emerging Policy		
Crawley	Draft Crawley Borough Local Plan 2021-2037 (2021)	GI1: Green Infrastructure
		GI2: Biodiversity Sites
		GI3: Biodiversity and Net Gain
		SD1: Presumption in Favour of Sustainable Development
Mole Valley	Draft Future Mole Valley 2020-2037 Proposed Submission Version (2021)	EN9: Enhancing Biodiversity EN11: Green Infrastructure and Play Space

Administrative Area	Plan	Policy
Horsham	Draft Horsham District Local Plan 2019-2036: Regulation 18 Consultation (2020)	Strategic Policy 27 - The Natural Environment and Landscape Character Strategic Policy 31 - Green Infrastructure and Biodiversity
Tandridge	Our Local Plan 2033 (2019)	TLP35: Biodiversity, Ecology & Habitats
		TLP36: Ashdown Forest SPA

9.3. Consultation and Engagement

9.3.1 In September 2019, Gatwick Airport Limited (GAL, 2019) submitted a Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects and, where necessary, to determine suitable mitigation measures for the construction and operational periods of the Project. It also described those topics or sub-topics which are proposed to be scoped out of the EIA process and provided justification as to why the Project would not have the potential to give rise to significant environmental effects in those areas. The Scoping Report is provided in **ES Appendix 6.2.1: Scoping Report** (Doc Ref. 5.3).

9.3.2 Following consultation with the statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 11 October 2019 (Planning Inspectorate, 2019). The Scoping Opinion is provided in **ES Appendix 6.2.2: Scoping Opinion** (Doc Ref. 5.3).

9.3.3 Key issues raised during the scoping process by PINS specific to ecology and nature conservation are listed in Table 9.3.1, together with details of how these issues have been taken into account within the ES. Other stakeholder responses to scoping are summarised in **ES Appendix 9.3.1: Summary of Stakeholder Scoping Responses – Ecology and Nature Conservation** (Doc Ref. 5.3).

Table 9.3.1: Summary of Scoping Responses

Details	How/where taken into account in ES
Planning Inspectorate	
Notes the potential need to carry out an assessment under The Conservation of Habitats and Species Regulations 2017 (now amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019) (the Habitats Regulations). This assessment must be coordinated with the EIA in accordance with Regulation 26 of the EIA Regulations. The Applicant's ES should therefore be coordinated with any assessment made under the Habitats Regulations	The need for assessment under the Habitats Regulations has been considered throughout the EIA process. The findings of this are presented in **ES Appendix 9.9.1: Habitat Regulations Assessment Report** (Doc Ref. 5.3).

Details	How/where taken into account in ES
The Scoping Report includes no evidence relating to wintering birds, amphibians and terrestrial mammals. For the avoidance of doubt the ES should assess the impacts to these ecological receptors where a likely significant effect could occur.	Surveys have been undertaken for wintering birds, amphibians and terrestrial mammals and survey results are reported in Section 9.6. Effects are reported in Section 9.9.
The Scoping Report does not provide information demonstrating an absence of hydrological pathways from the Proposed Development to European Designated sites. In absence of such information the Inspectorate cannot agree to scope this matter out. The ES should include an assessment of the impacts from dust or changes in water quality at European Designated sites where significant effects are likely to occur.	An assessment of effects on European designated sites is provided within Section 9.9 of this chapter and within **ES Appendix 9.9.1: Habitat Regulations Assessment Report** (Doc Ref. 5.3), which considers the potential for effects on European designated sites, including via hydrological pathways.
Biodiversity Opportunity Areas (BOAs) and Sites of Nature Conservation Importance (SNCIs) are not listed as locally designated sites to be included in the ES assessment. The ES should include these sites as potential ecological receptors in the assessment of significant effects.	SNCIs and BOAs are included as locally designated sites within this assessment **ES Appendix 9.6.1: Ecological Desk Study** (Doc Ref. 5.3).
The ES should include an assessment of the potential impacts to ecology from changes in watercourse flows and drainage systems during the construction and operation of the Proposed Development. The Inspectorate recognises the degree of overlap between the ecological and hydrological assessment in this regard and therefore that there will need to be a degree of overlap and cross referencing between these aspects.	The ecological assessment provided in this chapter has taken into consideration the hydrological assessment set out in **ES Chapter 11: Water Environment** (Doc Ref. 5.1).
It remains unclear whether fish species are scoped in or out of the ES as the Scoping Report determines that fish surveys are only to be undertaken should the Proposed Development warrant direct works or changes to watercourses. The ES should scope fish species in to the assessment and assess both indirect impacts and direct impacts on such species; this should cross refer to other assessments in the ES such as the Water Environment.	Fish surveys of the River Mole have been undertaken and are reported in **ES Appendix 9.6.2: Ecology Survey Report** (Doc Ref. 5.3) with an assessment of effects in Section 9.9.

Details	How/where taken into account in ES
The Scoping Report omits ancient and veteran trees as sensitive habitats that should be assessed. However, the Scoping Report does not provide evidence to suggest they are not present within the study area. Figures 5.2.1(e and f) indicate potential areas for flood compensation and construction compounds respectively adjacent to ancient woodland areas as identified by the Forestry Commission. The ES should consider the potential impacts and disturbance within the buffer zone of the ancient woodland and consider appropriate mitigation. Site investigations should be carried out to determine whether they are present within the study area of the Proposed Development and if so, impacts to ancient and veteran trees and ancient woodland should be assessed where significant effects are likely to occur and mitigation measures proposed where necessary.	No ancient or veteran trees were identified within the Project boundary during the Phase 1 habitat survey. Ancient woodland was identified within the Project survey area but are outwith the Order Limits. Details are reported in **ES Appendix 9.6.1: Ecological Desk Study** (Doc Ref. 5.3) and summarised in Section 9.6. Opportunities to avoid effects on these features and habitats have been taken during the site selection process (see Chapter 3: Need and Alternatives Considered) and mitigation measures have been designed into the Project to avoid effects on ancient woodland, as described in Table 9.8.1. This includes removing these areas from within the Order Limits. As such, the Project will not result in the loss or deterioration of irreplaceable habitats including ancient woodland or the loss of aged/veteran trees outside the ancient woodland, as described in Section 9.9.
The assessment of ecological effects in the ES should be undertaken in accordance with the new, updated CIEEM Ecological Impact Assessment Guidelines published in September 2019.	The assessment is based on the CIEEM Ecological Impact Assessment Guidelines published in September 2022 guidance.
The definitions of notable species and habitats should be refined in the ES and include 'priority' species and habitats in line with the NERC Act 2006. Additionally, any mitigation and monitoring measures considered should account for the identified priority habitats and species where appropriate.	Priority habitats and species have been identified as Important Ecological Features in Table 9.6.2 and any potential effects on them are described in Section 9.9.
The Scoping Report doesn't explain in detail how the Proposed Development's Zone of Influence (ZoI) has been determined and how it relates to the study areas applied in the ecological assessments (2 km for protected species, 500 metres up and downstream for aquatic fauna). Potential impacts to the Thames Basin Heaths Special Protection Area (SPA) have also apparently been omitted. The Applicant should ensure that any assessments in the ES relate to the extent of the ZoI and ensure that all potential impacts with a likely significant effect on sensitive receptors are assessed.	The ZoI for the Project was determined based on the Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2022) combined with that adopted in previous studies in relation to expansion at Gatwick, in particular work undertaken by the Airports' Commission in respect of a second runway (Airports Commission 2014). However, as noted in the Scoping Report (para 7.3.8), the study area (and hence ZoI) for both protected species (bats, in particular) and designated sites responds to the findings of both survey work

Details	How/where taken into account in ES
	and modelling of traffic flows with the ZoI adjusted accordingly. Impacts to the Thames Basin Heaths SPA have been considered and are reported within **ES Appendix 9.9.1: Habitat Regulations Assessment Report** (Doc Ref. 5.3).
The Scoping Report proposes that anticipated change in traffic flows on routes serving the site, will be an indicator of impacts for the purposes of the assessment. Ecologically designated sites within 200 metres of these routes will be included within the study area. In the ES assessment, this should also include habitats and protected species.	The effects of changes in traffic flows on sites and habitats/species they support are considered in Section 9.9.
The ES should explain which species are regarded as being 'mobile' for the purposes of the assessment. Surveys are proposed for bats, aquatic mammals and potentially fish but surveys for other relevant mobile species should be undertaken, particularly in relation to birds located within the Proposed Development's ZoI.	Surveys have been undertaken for a range of species that could potentially be affected by the Project, if present. This includes surveys for more mobile species such as bats, birds, fish, otters and some flying invertebrates. Wintering and breeding bird surveys were undertaken. The survey findings are provided in Section 9.6.
The Scoping Report provides sparse detail on the mitigation proposed and uses vague wording such as 'may' meaning it remains unclear what mitigation is proposed where. The ES should clearly present the mitigation required to address significant effects and ensure this is secured appropriately, eg as part of a landscaping and ecological management plan to be secured by requirements in the DCO. Draft or finalised management plans should be provided with the ES.	Details of mitigation measures designed into the Project and the mechanisms by which they would be secured are described in Table 9.8.1 and described in **ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan (LEMP)** (Doc Ref. 5.3)
Impacts resulting from implementation of proposed mitigation should be assessed where significant effects may occur. This is particularly relevant to proposed bird mitigation measures and the potential for collision risk. The Applicant should make efforts to ensure that mitigation areas do not result in increased hazards to air traffic.	Details of mitigation measures designed into the Project are described in Table 9.8.1. These have been designed in consultation with the airport's Bird Hazard Management team to ensure there would be no increased risk to air traffic. The mitigation areas have been designed to include habitats that would not attract large flocks of birds or those birds most likely to pose a collision risk, such as wildfowl.
Monitoring of the effects of nitrogen deposition should be included in the proposed/ongoing surveys to inform the assessment of likely significant effects and any subsequent remedial	Assessment of the effects on European designated sites, including nitrogen deposition, are provided within Section 9.9 of this chapter and within the Habitats Regulations (Non-significant Effects) Report

Details	How/where taken into account in ES
measures for the ES, particularly for receptors sensitive to such changes including (but not limited to) Ashdown Forest Special Area of Conservation (SAC) and Special Protection Area (SPA), Mole Gap and Reigate Escarpment SAC, botanical receptors and areas of ancient woodland/notable trees.	included in **ES Appendix 9.9.1: Habitat Regulations Assessment Report** (Doc Ref. 5.3). Effects on ancient woodland and notable trees are assessed in Section 9.9.

9.3.4 The PEIR was issued to inform the statutory consultation carried out on the Project in Autumn 2021. It presented the preliminary findings of the EIA process for the Project at that time. The consultation responses specific to the ecology assessment and the way in which they have been taken into account in this ES chapter are set out in **ES Appendix 9.3.2: Summary of PEIR Responses for Ecology** (Doc Ref. 5.3).

9.3.5 In June 2022 an additional consultation was undertaken to update stakeholders and the local community on the ongoing work and refinement to the Project proposals, which included a targeted, statutory consultation on the design changes to the proposed highway improvement changes. As these changes to the Project could lead to new or materially different significant environmental effects compared to those reported in the PEIR, an updated PEI was issued as part of this additional consultation. The consultation responses specific to the ecology and nature conservation assessment and the way in which they have been taken into account in this ES chapter are set out in **ES Appendix 9.3.3: Summary of Stakeholder PEIR Responses for Ecology** (Doc Ref. 5.3).

9.3.6 Further detail about the consultation process for the Project and way the consultation responses have been taken into account is provided in the separate **Consultation Report** (Doc Ref. 6.1).

9.3.7 Outside of the above-described public consultations, GAL also continued to engage with key stakeholders and during such engagement, key issues raised specific to the ecology and nature conservation assessment are listed in Table 9.3.2 together with details of how these issues have been considered within the ES.

9.3.8 The main form of this engagement has been via a series of Topic Working Groups (TWGs) and a dedicated Biodiversity Working Group.

Table 9.3.2: Summary of further consultation.

Date	Consultation (topic working group etc.)	Issue raised in relation to ecology	Where addressed in ES
10th January 2023	Land and Water TWG	Detailed plans showing the extent of vegetation loss	Details of vegetation loss/gain are shown on Figures 2.1-2.6 of **ES Appendix 9.9.2 Biodiversity Net Gain Statement** (Doc Ref. 5.3)

Date	Consultation (topic working group etc.)	Issue raised in relation to ecology	Where addressed in ES
14th December 2022	NRP Biodiversity Sub-group	Off-site biodiversity net gain opportunities? A coordinated approach to the enhancement of habitats for Bechstein's bats. In respect of off-site provision it is suggested that GAL undertakes a call for sites which focuses on landowners in the area who may be willing to provide biodiversity net gain. What will form (and its calculated extent) temporary biodiversity loss and what will form permanent loss (and its calculated extent) (and safeguarding reason) Further detail to support the conclusions on this HRA screening and whether Natural England are in agreement	GAL do not consider off site provision of BNG is necessary. Details of BNG with respect to the Project are provided in Appendix 9.9.2. Details of surveys with respect to Bechstein's bats are provided in **ES Appendix 9.6.3: Bat Trapping and Radio Tracking Surveys** (Doc Ref. 5.3) Details of vegetation loss/gain are shown on Figures 2.1-2.6 of Appendix 9.9.2, including with respect to permanent and temporary loss. Discussions with Natural England have been held to ensure agreement with respect to the scope of the HRA.
8th November 2022	NRP Biodiversity Sub-group	Gatwick bat hibernaculum Biodiversity enhancements for the Museum/Brook Farm area	GAL do not consider the provision of a bat hibernaculum feasible from an engineering perspective. Habitat creation within the Brook Farm area is shown within the landscape plans that form part of the Outline LEMP (Appendix 8.8.3)
2nd December 2022	Land and Water TWG	Clear labelled plans and further explanation about what BNG is intended for marked areas	Details of vegetation loss/gain are shown on Figures 2.1-2.6 of Appendix 9.9.2 including with respect to permanent and temporary loss.

Date	Consultation (topic working group etc.)	Issue raised in relation to ecology	Where addressed in ES
		Ecological and visual impact of the development on Pentagon Field	The impact of the spoil works on Pentagon Field are addressed in Section 9.6.
26th September 2022	NRP Land & Water TWG	Rivers & Streams Biodiversity Metric. Biodiversity action plan. WSCC would like to see a stronger commitment to adopting BNG There may be potential to enhance the biodiversity interest of the airfield grassland through changes in management such as cut and collect to reduce nutrient status (rather than high fertility topsoil) The introduction of a few low-growing wildflowers, such as bird's-foot-trefoil, black medick, lady's bedstraw and yellow rattle could be very beneficial.	Details of BNG with respect to the Project are provided in Appendix 9.9.2. Due to safeguarding requirements, it is not possible to change how the airfield grassland is managed.

9.4. Assessment Methodology

Relevant Guidance

9.4.1 The following guidance has been used to inform the assessment of likely effects, where relevant:

- British Standards Institution (2013) Biodiversity – Code of Practice for Planning and Development: BS 42020:2013;
- Chartered Institute of Ecology and Environmental Management (2022) Guidelines for Ecological Impact Assessment in the UK and Ireland;
- Ministry of Housing, Communities and Local Government (2019b) Planning Practice Guidance: Natural Environment – Biodiversity, Ecosystems and Green Infrastructure;
- Institute of Environmental Assessment (1995) Guidelines for Baseline Ecological Assessment;
- Design Manual for Roads and Bridges (2020c) LA108 Biodiversity;
- Design Manual for Roads and Bridges (2019) LA105 Air Quality; and
- Civil Aviation Authority (CAA) (2017) Wildlife Hazard Management at Aerodromes.

9.4.2 The HRA in Appendix 9.9.1 explains further guidance that is relevant to the assessment of the effects of the project on European sites. Guidance relevant to other specific species groups has also been considered and is set out in the relevant sections of this chapter.

Scope of the Assessment

9.4.3 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees listed in Table 9.3.2 and also informed by the consultation on the PEIR in 2021 and updated PEI relating to the highway improvement changes in 2022 (see Appendix 9.3.1, 9.3.2 and 9.3.3).

9.4.4 Taking into account the scoping and consultation process, Table 9.4.1 summarises the issues relating to ecology and nature conservation considered as part of this assessment.

Table 9.4.1: Issues Considered in the Assessment

Activity	Potential Effects
Construction Period (including Demolition)	
Construction and demolition activities	Effects on designated sites and habitats as a result of construction activity including habitat severance and loss of ecological connectivity, habitat disturbance (eg light, noise pollution/ introduction of toxic pollutants), changes to water quality/flow and changes in air quality (emissions from traffic and dust). Effects on species valued as important features of designated sites.
	Effects on habitats as a result of construction activity eg habitat loss, habitat severance and loss of ecological connectivity, habitat disturbance (eg dust, light, noise pollution/introduction of toxic pollutants), through changes to air and water quality/flow.
	Effects on species as a result of construction activity within the Project boundary (eg direct killing or injuring of fauna, disturbance and displacement of species (particularly to those sensitive to noise and light disturbance), introduction or spread of invasive species, changes to water quality).
Construction of highways improvements	Effects on habitats as a result of construction of upgraded highway junctions (eg habitat loss, habitat severance and loss of ecological connectivity, habitat disturbance (eg dust, light, noise pollution/introduction of toxic pollutants), changes to air and water quality/flow).
	Effects on species as a result of construction of upgraded highway junctions (eg direct killing/injury through activity/pollution, disturbance by increased noise/light, loss of foraging/commuting habitat).
Use of construction compounds and creation of mitigation areas	Effects on habitats, including ancient woodland, as a result of use of construction compounds and creation of mitigation areas beyond the airport boundary (eg habitat loss, habitat severance and loss of ecological connectivity, habitat disturbance (eg dust, light, noise pollution/ introduction of toxic pollutants), introduction or spread of invasive species (in particular along the water courses within the airport and surrounding land), changes to air/water quality/flow).
	Effects on species as a result of use of construction compounds and creation of mitigation areas beyond the airport boundary (eg direct killing or injuring of

Activity	Potential Effects
	fauna, disturbance and displacement of species (particularly those sensitive to noise and light disturbance), introduction or spread of invasive species).
Operational Period	
Use of airport, including upgraded highway junctions	Effects on designated sites as a result of changes to air quality both from airport operations and traffic emissions.
	Effects on habitats as a result of operational activity, including light and noise, as well as from changes to air quality both from airport operations and traffic emissions (air traffic movements and surface access) (eg habitat loss, habitat severance and loss of ecological connectivity, habitat disturbance (eg dust, light, noise pollution/introduction of toxic pollutants)).
	Effects on species as a result of operational activity (including light and noise) (eg direct killing or injuring of fauna (including bird/bat strike from increased air traffic movements and road traffic collisions), disturbance and displacement of species (particularly of those sensitive to noise and light disturbance), introduction or spread of invasive species).

9.4.5 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in Table 9.4.2.

Table 9.4.2: Issues Scoped Out of the Assessment

Issue	Justification
Effects on designated sites arising from direct habitat loss.	No habitat loss would occur within any of the identified designated sites, at European, national or local level. Therefore, no impact pathway would exist.

Study Area and Zone of Influence

Designated Sites

9.4.6 The initial search area for European designated sites (including SACs, SPAs and Ramsar sites) covered the area within 20 km of the Project site boundary. This buffer was extended for SACs designated for bats and for SACs/SPAs which are sensitive to changes in air quality from vehicle emissions and located within 200 m of major roads.

9.4.7 An area within 5 km of the Project site was searched for other sites (SSSIs, National Nature Reserves (NNRs), Local Nature Reserves (LNRs) and locally-designated sites) to allow for effects arising from works at the Project site and effects arising from changes to surface access arrangements. A 5 km buffer search area is considered appropriate since this recognises that effects due to surface access arrangements may occur at some distance from the Project site.

Protected and Notable Species

9.4.8 Records of protected or otherwise notable species were requested from the local records centres for an area extending 2 km from of the Project site boundary, except for otters and bats where a larger 10 km search area was used.

9.4.9 The survey area for the majority of ecology surveys was within the PEIR Project site boundary, which extended slightly beyond the current Project site boundary. However, it is recognised that effects on ecological receptors can occur beyond such limits, especially for mobile species such as bats where radio-tracking was used to record bats and identify their roosts outside of the Project boundary, as reported in Appendix 9.6.3. Surveys for great crested newts (GCN) were also undertaken on ponds outside of the Project boundary (to the north-west) as any GCN using the ponds could utilise terrestrial habitats within the Project boundary.

9.4.10 Barriers to dispersal have also been considered in survey designs, for example where GCN ponds have been discounted due to them being separated from the Project site by major roads which would prevent a meta-population from utilising habitats within the Project site boundary. Additional surveys were undertaken as knowledge of the survey area was gained during the earlier surveys and as the Project design evolved. Details of where and when survey work was undertaken is provided in **ES Appendix 9.6.2: Ecology Survey Report** (Doc Ref. 5.3).

9.4.11 The survey area included the major watercourses that flow through the Project site to identify any potential sign of otters or water voles, including 500 metres both upstream and downstream, where access permitted.

Zone of Influence

9.4.12 The study areas for both designated sites and species have been used to determine the Zone of Influence (ZoI) for the assessment of effects. This means that the ZoI has also adapted and responded as survey/modelling data are collected.

Methodology for Baseline Studies

Desk Study

9.4.13 Information on ecology and nature conservation within the desk study search area was collected through data gathering exercises in 2019 and 2022 to obtain information relating to statutory and non-statutory nature conservation sites, priority habitats and species, and legally protected and controlled species. A review of existing studies and datasets was also undertaken.

9.4.14 Details of the organisations and individuals contacted to obtain ecological data are provided in **ES Appendix 9.6.1: Ecological Desk Study** (Doc Ref. 5.3), and comprised:

- Sussex Biodiversity Record Centre[4];
- East Surrey Badger Protection Society;
- West Surrey Badger Group;
- Badger Trust-Sussex;
- Surrey Biodiversity Information Centre[5];;
- R. Bicker, Gatwick Airport Biodiversity Consultant (Bicker, 2018); and
- MAGIC mapping (DEFRA).

[4] Sussex Biodiversity Record Centre collate and manage data from a range of biological recording groups and individuals within each county. Relevant local groups they do not receive data from were contacted separately, as listed in paragraph 9.4.14.
[5] Surrey Biodiversity Information Centre collate and manage data from a range of biological recording groups and individuals within each county. Relevant local groups they do not receive data from were contacted separately, as listed in paragraph 9.4.14

Site-Specific Surveys

9.4.15 The scope and methodology of surveys undertaken for the Project were determined following an assessment of site conditions. The following site-specific surveys were conducted and are described below:

- Phase 1 habitat survey;
- Botanical Survey and National Vegetation Classification Survey;
- hedgerow survey;
- badger survey;
- bat activity, emergence and trapping surveys;
- breeding bird survey;
- wintering bird survey;
- dormouse survey;
- great crested newt survey;
- reptile survey;
- water vole and otter survey;
- national vegetation classification survey;
- fish survey;
- invertebrate habitat appraisal;
- terrestrial invertebrate survey; and
- aquatic invertebrate survey.

9.4.16 A summary of the methodologies used is provided below, with further details and plans showing survey areas provided in Appendix 9.6.2: Ecology Survey Report, Appendix 9.6.3: Bat Trapping and Radio Tracking Surveys and confidential Appendix 9.6.4 Badger Survey Report.

9.4.17 Surveys were completed between 2018 and 2022. During consultation with Natural England, it was agreed that, given the extent of survey work completed, surveys for birds and reptiles that had been undertaken earlier in this period could be updated pre-construction. This was based on the fact that the Gatwick estate has been surveyed extensively for many years by the Gatwick Biodiversity team and that, consequently, both the bird and reptile populations on site have been established sufficiently to enable a thorough impact assessment to be completed. In addition, incidental habitat recording during protected species surveys between 2020 and 2022 identified that the habitats have not changed significantly since the initial surveys for this Project were undertaken in 2019 and therefore the results are considered to still be representative.

9.4.18 Surveys for all species groups will be updated, where necessary, pre-commencement, and details of the timings of surveys would be set out in the CEMP, to be secured via a Requirement within the DCO, as referenced in Table 9.8.1.

9.4.19 As the Project evolved and became more defined, the site boundary became smaller. As such, the surveyed areas reflected the site boundary at the time the initial surveys were undertaken. The survey results are considered representative as they fully encompass the current Project site boundary but also consider habitats immediately adjoining and well connected to it. The survey results are therefore considered robust. This is reflected in the descriptions below.

Phase 1 Habitat Survey

9.4.20 The methodology and habitat descriptions used were based on the standard Joint Nature Conservation Committee (JNCC) Phase 1 habitat survey methodology 'Handbook for Phase 1 Habitat Survey' (JNCC, 2010).

9.4.21 The Phase 1 habitat survey was carried out ind March and July 2019, with changes to habitats checked for during other survey work at the Project site. The Phase 1 survey covered the Project site boundary at the time of survey.

9.4.22 Habitats identified during the survey were described using the categories set out in the Phase 1 Survey handbook (JNCC, 2010). Trees were surveyed to identify their ancient or veteran tree status following guidance set out in the Ancient Tree Guide 4; What are ancient, veteran and other trees of special interest (Woodland Trust, 2008).

9.4.23 Further details of the methodologies used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

9.4.24 Together with the desk study, the Phase 1 habitat survey identified the further Phase 2 surveys needed for protected and otherwise notable species. These are described below.

Hedgerow Survey

9.4.25 A hedgerow survey was undertaken to establish which hedgerows (if any) would qualify as 'Important' under the Hedgerow Regulations 1997.

9.4.26 The surveys were undertaken in August 2019. The surveys took into account guidance provided in the Hedgerow Survey Handbook (Department for Environment, Food and Rural Affairs (Defra), 2007) and the Hedgerow Regulations 1997. For the purposes of this survey, only hedgerows over 30 years old were included, as defined in the Hedgerow Regulations (1997) Section 4a.

9.4.27 The survey included all species-rich hedgerows within the Project site boundary at the time of survey.

9.4.28 Further details of the methodology used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Badger Survey

9.4.29 A badger survey was carried out in August 2019. The survey covered the Project site area at the time and was based on standard survey practice for badgers and sought to identify and record all signs of badger activity. An additional bait marking exercise was subsequently undertaken in April 2021 to understand the movement of badgers and their social groups and an update survey was undertaken on specific setts to check their status in 2022. Any incidental signs of badger activity were also noted during the course of other survey work undertaken on site.

9.4.30 Further details of the methodologies used and plans showing survey areas are provided in Appendix 9.6.4: Badger Survey Report.

Bat Surveys

9.4.31 A range of bat surveys was undertaken based on the methods set out in 'Bat Surveys - Good Practice Guidelines' (Bat Conservation Trust, 2016).

9.4.32 Twice monthly bat activity surveys were undertaken between April and September 2019. A total of six transect routes were surveyed which covered the areas of habitats suitable for foraging and commuting bats within the Project site and within adjoining areas of suitable habitat where potential effects on habitat connectivity were foreseen.

9.4.33 In addition to the transect surveys, static automated surveys of bat activity at key points were conducted between April and October 2019. These surveys used bat detectors placed in particular locations to monitor bat activity continuously over a period of several days. These surveys were undertaken in locations which were likely to be used by the rarer species, particularly Bechstein's bats.

9.4.34 Further data on bat activity for land not surveyed during the 2019 surveys were gathered during August 2021 to October 2022, including both transect surveys and static automated surveys.

9.4.35 With respect to roosting bats, a walkover survey was conducted in March 2019 to identify buildings with potential to support bat roosts. Two buildings were identified within the Project site boundary at the time and in July, August, September and October 2019 evening emergence and dawn re-entry surveys were undertaken to identify whether bats were emerging from or returning to them.

9.4.36 Further details of the methodologies used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Bat Trapping

9.4.37 Trapping surveys were undertaken during three periods which corresponded with key stages of the annual life cycle of bats. The surveys were undertaken in May 2019 (maternity), July 2019 (post-maternity) and September 2019 (autumnal dispersal). Additional surveys were completed in July 2020, September 2020 and May 2021.

9.4.38 Trapping focused more intensively on parts of the Project site that may be of importance to bats, such as locations of known roosts and areas of high suitability foraging/commuting habitat. The full details of the trapping locations are shown in Appendix 9.6.3.

Radio-tracking

9.4.39 Bats were selected for radio-tagging on the basis of their species and apparent health and body condition. Female bats, and in particular reproductive females (avoiding heavily pregnant bats), were radio-tagged in preference to male bats to enable identification of the location of breeding colonies.

9.4.40 Bat species selected for radio-tagging focused on species indicative of a typical woodland assemblage and/or rarer species where captured, such as alcathoe bat, barbastelle, Bechstein's bat, Brandt's bat, brown long-eared bat, Daubenton's bat, grey long-eared bat, Nathusius' pipistrelle, Natterer's bat and whiskered bat.

9.4.41 Each bat fitted with a radio-tag was followed for a minimum of three nights and a maximum of seven nights depending on the results obtained from the estimates of home range analysis.

9.4.42 Further details of the methodology used and plans showing survey areas are provided in Appendix 9.6.3.

Bat collision risk

9.4.43 Surveys to parameterise modelling of collision risk with respect to bats and aircraft during take off and landing were undertaken in 2019 (Annex 5 of Appendix 9.6.3). These comprised thermal camera surveys combined with standard echo-location recording at four locations across three time periods:

- Two dusk and two dawn surveys during pre-maternity season (May and June);
- Two dusk and two dawn surveys during post-maternity season (July and August); and
- One dusk and one dawn survey during autumn dispersal season (September and October).

9.4.44 Surveys were undertaken along the existing taxiway in the approximate location where the Northern Runway would be located.

9.4.45 A statistical analysis was used to determine the current collision risk. This used a Bayesian method to predict the annual bat fatality rate, collision probability, fatalities and to account for uncertainty for the existing taxiway. This approach was based on existing models which allowed for the assessment of collision risk probability of eagles with wind turbines (New *et al*., 2015). However, this model altered the calculation of the estimated hazardous space of the project to appropriately fit the specifics of the runways.

Wintering Bird Surveys

9.4.46 Wintering bird surveys were undertaken within the Project site boundary at the time. The wintering bird surveys were based on a transect survey methodology as described in Bibby *et al.* (2000) and Gilbert *et al.* (1998). Surveys for wintering birds were undertaken between October 2018 and March 2019. A total of five survey visits were undertaken, each over two consecutive days.

9.4.47 Further details of the methodology used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Breeding Bird Surveys

9.4.48 Breeding bird surveys were undertaken within the Project site boundary at the time. These surveys were carried out in accordance with a standard territory mapping methodology as outlined in Gilbert *et al*. (1998) and Bibby *et al.* (2000). Visits were undertaken in March, April, May and June 2019.

9.4.49 Further details of the methodology used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Dormouse Surveys

9.4.50 Dormouse surveys were undertaken based on the methodology and best practice guidelines and recommendations described in the Dormouse Conservation Handbook (Bright *et al.,* 2006).

9.4.51 Dormouse nest tubes were installed inApril and May 2019 within woodland and hedgerows both within the Project site boundary and within habitats immediately adjoining it. Each tube was checked monthly, between May and October 2019, then between May and November 2022 when additional nest tubes were placed in woodland along the A23 corridor.

9.4.52 Further details of the methodology used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Great Crested Newt Survey

9.4.53 Waterbodies within the Project site boundary at the time were identified during a desk-based study using Ordnance Survey mapping and aerial photography and during the Phase 1 habitat survey.

9.4.54 A Habitat Suitability Index (HSI) assessment was subsequently undertaken to determine the value of ponds as breeding sites for GCN.

9.4.55 GCN presence/absence surveys were carried out using a combination of traditional methods (bottle trapping, torching and egg searches) and using the environmental DNA (eDNA) technique. The surveys were undertaken on ponds within 250 metres of the Project site boundary which had an HSI score of 'Average' or above, and which were accessible.

9.4.56 The eDNA surveys were undertaken in April 2019 and in April 2021 which falls within the optimum period for this type of survey and followed the eDNA surveying and laboratory analysis guidance (Biggs *et al.*, 2014).

9.4.57 Population class size surveys were undertaken on ponds found to support GCN from the presence/absence surveys. The presence/absence and population class size surveys were undertaken between April and June 2019 following the guidance provided in the Great Crested Newt Mitigation Guidelines (English Nature, 2001).

9.4.58 Further details of the methodologies used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Reptile Surveys

9.4.59 A reptile survey was undertaken between April and early October 2019. This survey was undertaken for areas identified during the Phase 1 habitat survey as providing potentially suitable reptile habitat.

9.4.60 The survey was undertaken having regard to the methodology described in the Froglife Advice Sheet 10: Reptile Survey (Froglife, 1999) and the JNCC Herpetofauna Workers' Manual (Gent and Gibson, 2003).

9.4.61 The recommended survey methodology contained in the Design Manual for Roads and Bridges (Highways England *et al.*, 2020a) includes a combination of direct observation and artificial refugia based surveys. Artificial refugia were laid out in suitable locations.

9.4.62 Findings from the survey were used to estimate population sizes for the reptile species recorded at each site by employing the method suggested in Froglife (1999).

9.4.63 Further details of the methodology used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Water Vole and Otter Survey

9.4.64 Otter and water vole surveys were initially undertaken in May 2019, with further surveys completed in October 2022. Survey work completed in 2022 extended the survey area 500m

downstream and upstream from the Project site boundary. Watercourses within the Project site boundary were surveyed for signs that could indicate the presence of either otters or water voles.

9.4.65 The otter survey was undertaken with regard to the methodology described in the Design Manual for Roads and Bridges, LD118 (Highways England *et al*., 2020a). The methodology was developed for linear schemes which may affect otter habitats or populations.

9.4.66 The water vole survey was based on the survey methodology described in the Water Vole Conservation Handbook (Strachan, Moorhouse and Gelling, 2011). Further details of the methodologies used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Invertebrate Habitat Appraisal

9.4.67 An invertebrate habitat appraisal was undertaken in June 2019. This survey identified potential areas of interest for terrestrial and aquatic invertebrates by an invertebrate specialist. The appraisal identified the areas where more detailed terrestrial and aquatic invertebrate surveys would be required and their scope.

Terrestrial Invertebrate Survey

9.4.68 Walk-over surveys for terrestrial invertebrates were completed on six occasions in May, June and September 2020. These focused on areas along the River Mole and the Gatwick Stream. On each occasion, the areas were walked by an experienced entomologist who sampled along each transect using sweep netting, a beating tray and stout trowel.

9.4.69 The survey concentrated on the following major groups (orders): Coleoptera (beetles), Diptera (flies), Hemiptera (bugs, froghoppers, etc), Hymenoptera (bees, wasps and ants) and Lepidoptera (butterflies and moths). Some examples of other groups were noted if found.

9.4.70 Samples were collected for later laboratory identification.

9.4.71 Further details of the methodologies used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Aquatic Macroinvertebrate Survey

9.4.72 A walkover survey was undertaken in June 2020 to identify representative sites on the River Mole and Gatwick Stream for macroinvertebrate sampling and fish survey. Three macroinvertebrate sampling sites, one on the River Mole and two on the Gatwick Stream were sampled on three occasions in June, July and September 2020. A second round of sampling was undertaken on two visits in August and October 2022. In 2022 only one sample was taken on the Gatwick Stream and two on the River Mole.

9.4.73 The 2022 sampling site on the Gatwick Stream lies approximately 700m upstream of the confluence with the River Mole. The 2022 upstream sampling site on the River Mole is approximately 75m upstream of the 2020 sampling site and the 2022 downstream site is approximately 100m downstream of the 2020 sampling site. The change in the number and location of the sampling sites responded to changes in the design of the scheme and safety of access to the channel.

9.4.74 Samples were collected using the Whalley Hawkes Paisley Trigg (WHPT) method comprising a standard three-minute kick sample using a long-handled pond net with 1 mm mesh size, which was supplemented by a one-minute hand search.

9.4.75 A macroinvertebrate sample was also taken from Pond F in 2022 using the Predictive System for Multi-metrics (PSYM) method for monitoring the ecological quality of ponds and canals (Environment Agency, 2002). The method involves sweeping beneath the water surface using a long-handled pond net for a three minute period, then agitating marginal and submerged vegetation to dislodge macroinvertebrates.

9.4.76 Further details of the methodologies used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Fish Survey

9.4.77 Fish surveys were undertaken during 2020 and 2022 using the catch depletion method to assess species composition, age structure and to estimate population size. Surveys were undertaken by an accredited electric fishing team comprising three members of staff. Surveys and analysis conformed to the relevant guidance outlined in BS EN 14011:2003 Water Quality: Sampling of Fish with Electricity (British Standards Institute, 2003).

9.4.78 Two rounds of surveys were undertaken in 2020; in early summer (4th June) and autumn (29th September) on one 100 m stretch on the Gatwick Stream and one on the River Mole. The 100m survey sections on both watercourses coincided with the macroinvertebrate sampling sites. The 2022 surveys were undertaken in summer (2nd August) and autumn (11th-12thOctober). Fish surveys were only undertaken in autumn on the River Mole due to a pollution incident and high water temperatures during summer.

9.4.79 Further details of the methodologies used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Botanical Survey and National Vegetation Classification Survey

9.4.80 A national vegetation classification (NVC) survey (JNCC, 2006) was undertaken in April, July and August 2019 to investigate habitats of raised conservation interest. The potential areas of interest were identified from the Phase 1 habitat mapping and were visited by a botanist.

9.4.81 The botanist also undertook a search for protected and notable flora and invasive plant species within the Project site boundary during the survey.

9.4.82 Further details of the methodologies used are provided in Section 2 of Appendix 9.6.2: Ecology Survey Report which also includes plans showing survey areas.

Assessment Criteria and Assignment of Significance

9.4.83 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors, the magnitude of potential impacts and the significance of effects. The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the Design Manual for Roads and Bridges (DMRB) methodology (Highways England *et al.*, 2020b), which is described in further detail in Chapter 6: Approach to Environmental Assessment of this ES.

Receptor Value and Sensitivity

9.4.84 Several factors have been taken into consideration when assessing the value/sensitivity of an ecological feature and whether it is considered important and therefore requires assessment.

9.4.85 In assessing the value of habitats or species populations, a subjective assessment has been made based on a range of factors that influence overall ecological value. Amongst other factors, a series of criteria have been considered for habitats and populations of species including: fragility, rarity, extent, diversity, position in the landscape, naturalness, and recorded history.

9.4.86 Other resources that have been used to inform the assessment of value and importance include, but are not limited to:

- UK legislation;
- Habitats and Species of Principal Importance (Section 41 of the NERC Act, 2006);
- Birds of Conservation Concern (BoCC) Red and Amber lists; and
- National and County Red Data Book species.

9.4.87 The resources used to assess the value and importance of features also help to define the importance in the context of geographical scale. The CIEEM guidelines (CIEEM, 2019) state that the significance of effects on ecological features should be qualified with reference to the appropriate geographic scale. Therefore, to provide a framework that is consistent for both assessing the importance of ecological features and determining the significance of effects, the importance of ecological features has been described using the following geographic scales:

- international;
- national;
- regional (south east England);
- county;
- local; and
- site and immediate surroundings.

9.4.88 Table 9.4.3 below indicates how the value of receptors has been described within this assessment.

Table 9.4.3: Sensitivity/Value Criteria

Sensitivity/Value	Definition
Very High (International)	An internationally designated site or candidate site, such as a Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar Site, Biosphere Reserve or an area Natural England has determined meets the published selection criteria for such a designation, irrespective of whether or not it has yet been notified.
High (National)	A nationally designated site, eg SSSI, National Nature Reserve (NNR), Marine Nature Reserve or an area which Natural England has determined meets the published selection criteria for national designation (eg SSSI selection guidelines) irrespective of whether or not it has yet been notified.

Sensitivity/Value	Definition
Medium (Regional/County)	Viable areas of habitat identified in a County Biodiversity Action Plan (BAP) or designated as a Local Wildlife Site (LWS), a locally significant population of a species identified as important on a county basis, such as one included in a County BAP.
Low (Local)	Diverse and/or ecologically valuable habitats not of County importance.
Site	Features of value to the immediate area only.
Negligible	Commonplace feature of little or no habitat/species significance. Loss of such a feature would not be seen as detrimental to the ecology of the area.

Magnitude of Impact

9.4.89 Impacts may be described in terms of changes to the structure or function of an ecological resource and are characterised according to a number of parameters where these are relevant. These parameters include:

- beneficial or adverse – impacts may be either, depending on the nature of the impact;
- extent - the geographical range over which the impact occurs;
- magnitude – the size of the impact in terms of the amount of a feature affected;
- duration and timing – when the impact would occur and how long it would last;
- frequency – whether the impact would be a single event or multiple events; and
- reversibility – the impact may be permanent, or may naturally reverse without mitigation, or may be reversible with appropriate mitigation.

9.4.90 Table 9.4.4 below indicates how the magnitude of impacts has been described in this assessment.

Table 9.4.4: Impact Magnitude Criteria

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

Magnitude of Impact	Definition
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Significance of Effect

9.4.91 The significance of an effect has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in Table 9.4.5. Where a range of significance levels are presented, the final assessment for each effect is based upon professional judgement.

9.4.92 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

9.4.93 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 9.4.5: Assessment Matrix

Sensitivity/value	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very High	No change	Minor	Moderate or Major	Major or Substantial	Substantial

9.4.94 A description of the significance levels is as follows.

- Substantial: Only adverse effects are normally assigned this level of significance. These effects are generally, but not exclusively, associated with sites or features of international importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of national importance may also enter this category.

- Major: These beneficial or adverse effects are generally, but not exclusively, associated with sites or features of national importance that are likely to suffer a most damaging/improving impact and loss/gain of resource integrity, or less substantial impacts on International sites. However, a major change in a site or feature of regional importance may also enter this category.
- Moderate: These may be beneficial or adverse effects arising from a high level of impact on a less sensitive site or a lower magnitude of impact on a more sensitive site. The cumulative effects of such factors may lead to an increase in the overall effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects are often localised but may be important in enhancing biodiversity on the Project site.
- Negligible: No effects or those that are of no consequence, either positive or negative, or are within the margin of forecasting error.

9.5. Assumptions and Limitations of the Assessment

9.5.1 No assumptions or limitations have been identified in the preparation of this chapter that would prevent an assessment of the potential effects being made.

9.5.2 It was not possible to obtain access to survey every area identified as having the potential to support protected species (particularly areas located outside the Project site boundary). This is particularly the case with respect to potential effects on bats where access to every woodland to the west of the airport for the purposes of trapping was not possible. However, access to a suitable selection was obtained to ensure that the core breeding areas were identified, as described in Appendix 9.6.3. As such, access did not represent a limitation to the assessment.

9.5.3 It should also be noted that all surveys have inherent limitations in their design and are indicative of what is happening at a particular point in time. However, appropriate assumptions based on the information available and through applying professional expert judgement have been made for the purposes of assessment.

9.5.4 Bat surveys to inform the collision risk modelling were undertaken prior to the COVID-19 pandemic in 2019. Subsequent data capture to further refine the modelling has not been possible as flight numbers have not returned to pre-pandemic levels at the time of submission meaning that any further data gathered to refine the models presented here would not be representative of bat usage of the airspace around the runway when flight numbers were at pre-COVID-19 levels. Lower flight numbers are likely to mean greater bat usage such that any model based on such elevated numbers of bats would over-estimate the risk of collision under pre-COVID-19 conditions. Due to operational restrictions, it has also not been possible to refine the modelling with additional data such as bat carcass counts. As such, the modelling completed is likely to over-estimate the existing risk.

9.5.5 Further details of survey limitations are provided in Appendices 9.6.2, 9.6.3 and 9.6.4.

9.6. Baseline Environment Conditions

9.6.1 As described in section 9.4 of this chapter, an ecological desk study, Phase 1 habitat survey and a number of terrestrial and aquatic surveys were undertaken during the period 2018 to 2022 to establish ecological baseline conditions and these are summarised in this part of the chapter. The full results are provided in Appendix 9.6.2: Ecology Survey Report.

Statutory and Non-statutory Designated Sites

9.6.2 The locations of statutory designated sites located within the search areas are shown on Figure 9.6.1. These include three internationally designated sites within 20 km of the Project site boundary which are:

- Mole Gap to Reigate Escarpment SAC: located 9.27 km to the north west of the Project site boundary;
- Ashdown Forest SAC: located 12 km to the south west of the Project site boundary; and
- Ashdown Forest SPA: located 12 km to the south west of the Project site boundary.

9.6.3 In addition, following consultation with Natural England, the following European sites designated for their bat populations beyond 20 km from the Project site boundary have been identified for consideration:

- Ebernoe Common SAC: located 29 km to the south west of the site; and
- The Mens SAC: located 25 km to the south west of the site.

9.6.4 In addition, following further consultation with Natural England with respect to the potential impacts of changes in air quality from vehicle emissions on major roads, the following sites have also been included:

- Thames Basin Heaths SPA: located 24km to the north west of the site; and
- Thursley, Ash, Pirbright and Chobham SAC: located 33.8 km to the north west of the site

9.6.5 There are 11 nationally designated sites within 5 km of the Project site boundary. These are:

- Willoughby Fields Local Nature Reserve (LNR): located 786 metres to the south of the site;
- Grattons Park LNR: located 1.25 km to the south of the site;
- Edolph's Copse LNR: located 1.55 km to the west of the site;
- Glover's Wood SSSI: located 1.67 km to the west of the site;
- Waterlea Meadow LNR: located 3.49 km to the south of the site;
- Tilgate Forest LNR: located 4.19 km to the south of the site;
- House Copse SSSI: located 4.35 km to the south west of the site;
- Buchan Hill Ponds SSSI: located 4.39 km to the south of the site;
- Hedgecourt SSSI: located 4.46 km to the east of the site;
- Buchan Hill Ponds SSSI: located 4.93 km to the south of the site;
- Target Hill Park: LNR located 4.92 km to the south of the site; and
- Broadfield Park LNR: located 5.06 km to the south of the site.

9.6.6 There are no statutory designated sites within the Project site boundary, with the nearest being Willoughby Fields Local Nature Reserve (LNR) located approximately 786 metres to the south of the Project site.

9.6.7 A total of 71 non-statutory designated sites were identified within 5 km of the Project site boundary through the desk study. Horleyland Wood Local Wildlife Site (LWS), comprised of woodland, is located adjacent to the Project site boundary. A list of all 71 sites and their distance from the Project site boundary is provided in Table 9.6.1 below and these sites are shown on Figure 9.6.2.

9.6.8 Gratton's Park Biodiversity Opportunity Area (BOA) and the River Mole (and tributaries) BOA fall within the Project boundary and Gatwick Woods BOA is located partially within the Project boundary to the east of the airport. Details of further BOAs within the study area are also included in Table 9.6.1 below and these are shown on Figure 9.6.2.

Table 9.6.1: Non-Statutory Sites within 5 km of the Project Site

Site name	Type	Distance from Project site (m)
Local Wildlife Sites		
Horleyland Wood	LWS	Adjoining Project boundary
Rowley Wood	LWS	751
Willoughby Fields	LWS	781
Grattons Pond	LWS	1,396
Wood near Lower Prestwood Farm	LWS	1,298
A264 Copthorne	DRV	1,643
Ifield Brook Wood and Meadows	LWS	1,676
Copthorne Common	LWS	1,686
Ewhurst Wood	LWS	2,187
Orltons Copse	LWS	2,216
Worth Way	LWS	3,169
Ifield Pond and surroundings	LWS	3,135
The Hawth	LWS	3,737
Worth Meadows	LWS	3,626
Hyde Hill	LWS	3,534
Oaken Wood, Stony Plats & High Lines	LWS	3,608
Woldhurstlea Wood	LWS	3,722
Tilgate Park	LWS	4,429
Lobbs Wood & Furnace Pond	LWS	4,706
Kilnwood Copse	LWS	4,924
Buchan Country Park	LWS	4,930
Sites of Nature Conservation Importance		
The Roughs	SNCI	133
Withy Gill	SNCI	147
Bridgeham Wood	SNCI	1,126
Copper Coin Paddocks	SNCI	1,400
Copper Coin Pond	SNCI	1,434
Edolphs Copse	SNCI	1, 5833
Wheatfield Marsh	SNCI	1,672
Langshott Wood	SNCI	1,731
Brook Wood	SNCI	1,888
Bolters Wood	SNCI	1,923
Charlwood Stanhill Court Meadow	SNCI	2,084

Site name	Type	Distance from Project site (m)
Beggars Gill Wood	SNCI	2,240
Wrays Wood	SNCI	2,288
Crutchfield Copse	SNCI	2,349
Copthorne Meadows	SNCI	2,451
Ricketts Wood	SNCI	2,579
Woods West of Crutchfield Copse	South SNCI	2,598
Perry Wood and Gail Lane	SNCI	2,813
Pockmires Wood	SNCI	2,908
Alder Gill and Lumber Wood (Beam Brook Copse)	SNCI	3,034
Ten Acre Wood	SNCI	3,081
Acorn Wood, Cidermill and The Birches	SNCI	3,182
Leg of Mutton Wood, The Jordans and Jordans Wood	SNCI	3,364
Horne Field S of Bones Wood	SNCI	3,913
Hornecourt Wood	SNCI	4,076
Petridgewood Common	SNCI	4,107
Outwood Common	SNCI	4,109
East Outwood	SNCI	4,243
Stonehouse Field	SNCI	4,351
Dukes Copse	SNCI	4,370
Newdigate Brickworks	SNCI	4,580
Home Grove	SNCI	4,452
Furzefield Wood	SNCI	4,494
Hammond's Copse	SNCI	4,624
Cobbler's Gill	SNCI	4,643
Axeland Crost Shaw, Bannister Shaw & Grayhouse Furze	SNCI	4,684
Burnt Oak Farm	SNCI	4,769
Hare Wood and Lodge Farm Shaw	SNCI	4,794
Potential Sites of Nature Conservation Importance		
Bridges Fields	pSNCI	73
Bridges Wood	pSNCI	129
Collins Wood	pSNCI	835
Bellhatch Wood	pSNCI	1,131
Kiln Heath	pSNCI	1,200
Rede Hall Pond	pSNCI	1,271
Stonelands Wood	pSNCI	1,871
Murgins Wood	pSNCI	2,025

Site name	Type	Distance from Project site (m)
Cophall Field	pSNCI	2,172
Rickett's Wood, nr Charlwood	pSNCI	2,441
Woods West of Crutchfield Copse	pSNCI	2,669
Furzes Field	pSNCI	2,918
Collendean Copse	pSNCI	3,104
West Park Wood	pSNCI	3,127
Effingham Lane Field	pSNCI	3,186
Bush House Copse	pSNCI	3,503
Leg of Mutton Wood, The Jordans & Jordans Wood	pSNCI	3,790
The Marl Pond	pSNCI	3,832
Bakers Wood	pSNCI	3,853
Benting Wood	pSNCI	4,004
Domewood	pSNCI	4,117
Prince of Wales Meadow	pSNCI	4,187
Wind Hill Field	pSNCI	4,245
Domewood Meadows	pSNCI	4,248
Copsley Court Outwood	pSNCI	4,319
Newdigate Brickworks	pSNCI	4,380
Lambert's Place Meadow	pSNCI	4,459
The Plantation	pSNCI	4,635
Woodland (West of Brick Field)	pSNCI	4,751
Nalder's Wood/ Dudlands Copse, Leigh	pSNCI	4,755
Brick Field	pSNCI	4,808
The Plantation	pSNCI	5,030
Biodiversity Opportunity Areas		
River Mole (plus tributaries)	BOA	Partially within Project site boundary
Gatwick Woods	BOA	Partially within Project site boundary
Ifield Brook	BOA	930
Grattons Park	BOA	1,250
Glover's Wood and Edolph's Copse	BOA	1,285

Abbreviations used in Table 9.6.1: LWS: Local Wildlife Site; DRV: Designated Road Verge; SNCI: Site of Nature Conservation Interest.

Priority Habitat

9.6.9 Natural England's Priority Habitat Inventory identifies 'Lowland Mixed Deciduous Woodland' within the Project site boundary. This is discussed further in the relevant habitat section below.

Habitats

9.6.10 The findings of the Phase 1 habitat survey are summarised below and set out in more detail in Appendix 9.6.2: Ecology Survey Report, including a Phase 1 habitat plan. Figure 9.6.3 identifies

the key habitat types present. Where key areas or features have been identified, they have been given a target note (TN) to highlight their location on the habitat plan, these are referenced in the text below. A full list of target notes is in Appendix 9.6.2, Annex 3, Table A3.4.

9.6.11 The majority of the Project site comprised habitats associated with the airport including areas of tarmacked hard standing and an array of buildings associated with the wider airport. Areas of grassland (Phase 1 habitat category; amenity grassland) occurred frequently on the airfield which were managed to retain a short, uniform sward thereby making them unattractive to wildlife and minimise the wildlife strike hazard.

9.6.12 Undeveloped areas around the periphery of the airport included areas of broadleaved woodland and neutral grasslands.

9.6.13 The Project site includes two areas managed by GAL as part of their Biodiversity Action Plan[6] (BAP). These are:

- the North West Zone (NWZ) made up of the corridor of the River Mole comprising the watercourse, neutral grasslands and broadleaved woodland; and
- the Land East of the Railway Line (LERL) made up of broadleaved woodland, neutral grassland (including a flood storage area) and the Gatwick Stream.

9.6.14 The locations of the BAP areas and other areas around the periphery of the Project site are shown in Chapter 4 on Figure 4.2.1c along with the names used to describe them in this chapter.

Semi-natural Broadleaved Woodland

9.6.15 Semi-natural broadleaved woodland habitats within the Project site are located mainly within the LERL site (to the east of the airport) and within the NWZ and both sides of the River Mole (to the west side of the airport) and along the southern boundary. There are areas of woodland designated as ancient woodland located immediately adjacent to the Project boundary; Brockley Wood (TN7), Horleyland Wood, a portion of Lower Picketts Wood (TN4) and a woodland along the north west side of the River Mole.

9.6.16 MAGIC mapping identifies areas of the Priority Habitat ‘Lowland Mixed Deciduous Woodland’ as being present within the Project site boundary. The semi-natural broadleaved habitat areas identified during the survey work were broadly consistent with those areas identified on MAGIC.

9.6.17 However, a number of areas of the Priority Habitat identified on MAGIC comprised plantation woodland, or to a lesser degree other non-woodland habitats, which do not accord with this Priority Habitat definition. The locations of these habitats are fully described and illustrated in Appendix 9.6.2, and are summarised below.

Broadleaved Plantation Woodland

9.6.18 Broadleaved plantation woodland is associated with highway planting along the embankments of the M23 spur road, around the south west corner of Pentagon Field, new planting within the LERL biodiversity area (TN6) and along the western edge of London Road.

[6] GAL actively manages 75 hectares of woodlands, grasslands and wetlands inhabited by hundreds of species within the airport boundary through its Biodiversity Action Plan.

Mixed Plantation Woodland

9.6.19 Within the northern part of the airfield; south of Perimeter Road North, a large bank has been planted with a mix of broadleaved and coniferous trees.

Dense/Continuous Scrub

9.6.20 Dense and continuous scrub is present along the M23 spur road embankments and in a large area on the western flank of Brockley Wood.

Scattered Scrub

9.6.21 Scattered scrub was identified around the base of a large earth bank south west of Brockley Wood (TN8) and on earth mounds north-west of the runway.

Scattered Broadleaved Trees

9.6.22 Scattered broadleaved trees are present throughout the Project site, especially within the car parks including; Long Stay South, Long Stay North, Car Park X and KFC; within Pentagon Field (TN1); the LERL biodiversity area; and around Museum Field where they include individual trees and trees planted in groups or lines. Individual trees forming lines of trees comprising both mature and semi-mature trees were identified along existing roadsides.

Mixed Scattered Trees

9.6.23 Within Longbridge roundabout, a mix of semi-mature broadleaved and coniferous trees have been planted. Tree species include oak, silver birch and Leyland cypress.

9.6.24 Around the north west corner of the roundabout, south east of Holiday Inn, coniferous trees line the eastern side of the amenity grassland, west of the pavement. A Leyland cypress, a sycamore and a cherry were present within the line of conifers.

Neutral Semi-improved Grassland

9.6.25 The main areas of neutral semi-improved grassland were identified in the south of the Project site within the LERL, in the north-east south of the M23 spur road and along the River Mole corridor (NWZ).

Improved Grassland

9.6.26 The grassland areas around Museum Field were identified as being heavily managed improved grassland fields. The field north of the M23 spur-Airport Way roundabout and the fields south of the M23 spur were also noted as being managed improved grassland paddocks.

Marshy Grassland

9.6.27 Marshy grassland was recorded in two fields south of Brockley Wood and south west of the new Boeing hangar, and in areas along the River Mole corridor (NWZ) (TN10 a, b and c). Marshy grassland was also present around Dog Kennel Pond.

Poor Semi-improved Grassland

9.6.28 Poor semi-improved grassland occurred within Pentagon Field, within fields east and west of the fire training ground and within a field north of Longbridge roundabout. An area of poor semi-

improved grassland was also present around Pond E, where the grassland was less managed but did not have a diverse species range.

Tall Ruderal

9.6.29 Patches of tall ruderal vegetation were located in the LERL and within a field west of the fire training ground.

Marginal Vegetation

9.6.30 Marginal vegetation was identified along the banks of the River Mole.

Swamp

9.6.31 The area immediately surrounding Pond E11 is dominated by reedmace creating a swamp habitat.

Standing Water

9.6.32 At the time of survey, standing water was evident as a number of ponds, lagoons and ditches. These habitats are located within all areas of the Project site boundary and include pollution storage features.

Running Water

9.6.33 The River Mole, Crawter's Brook and Gatwick Stream are the largest linear sections of running water through the Project site boundary.

Amenity Grassland

9.6.34 Managed and mown amenity grassland is located around the runways and taxiways, the new and old lagoons and various ponds (as described within Appendix 9.6.2, Annex 3, Table A3.1), and around the roundabouts and roadside verges.

Introduced Shrub

9.6.35 Planted beds of introduced shrub are present throughout the car parks and at the entrances to the airport.

Species-rich Hedgerow

9.6.36 A species-rich hedge was identified around the Pentagon Field.

Species-poor Hedgerow

9.6.37 A short section of species-poor hedgerow was present along a field margin north of Museum Field and sections were present within car parks.

Species-poor Hedgerow with Trees

9.6.38 A species-poor hedge with trees was located along a footpath north of the M23 spur road and along a margin of Pentagon Field.

Species-rich Hedgerow with Trees

9.6.39 Species-rich hedgerows with trees were located along some margins of the Museum Field and fields to the north of it.

Fences

9.6.40 Large security fences surround the whole of the airport which is likely to restrict the movement of some species, particularly larger mammals. Metal security fencing was also present around Crawley Sewage Treatment Works and all car parks. Badger gates were present in the fencing around the sewage treatment works. Wood and wire and picket fencing was also identified through the woodland in the south east of the site which could restrict some species movement.

Ditches

9.6.41 Within the car parks in the north and south of the airport, and through the fields south of the M23 spur road, a number of drainage ditches were identified, which intermittently held water.

Earth Banks

9.6.42 A number of earth banks were present, including a large one to the east of the River Mole and south of Brockley Wood (TN11). An earth noise bund was located along the western boundary of the airfield. Within the biodiversity fields, several low earth banks were identified. A large earth bank was present in the east of the south long stay car park.

Buildings

9.6.43 Apart from the buildings associated with the terminals, hangars and maintenance buildings within the airport, there was a variety of buildings with a mix of uses around the north, east and south of the airport.

Bare Ground

9.6.44 Bare ground was associated with the car park for the biodiversity areas south east of the London to Brighton railway (within the LERL).

Hardstanding

9.6.45 The majority of the areas of hardstanding comprised the operational runways, aprons and taxiways, car parks in the northern part of the site and to the east of the railway, and roads.

Species

9.6.46 The findings of the surveys that have been undertaken for protected and notable species are summarised below and reported in full in Appendix 9.6.2.

Plants

9.6.47 The WCA 1981 lists protected plant species under Schedule 8. Two plant species listed on Schedule 8 were recorded within the Project site: Bluebell *Hyacinthoides non-scripta* and pennyroyal *Mentha pulegium*.

9.6.48 The WCA 1981 lists non-native invasive plant species under Schedule 9. One plant species listed on Schedule 9 was recorded within the Project site: Himalayan balsam *Impatiens glandulifera.*

9.6.49 A total of four notable species were recorded within the survey area; solomon's seal *Polygonatum odoratum* and narrow-lipped helleborine *Epipactis leptochila,* both of which are Nationally Scarce, were located to the south of Upper Pickett's. Lesser quaking grass *Briza minor* and ragged robin *Lychnis flos-cuculi* were both found along the River Mole corridor and are Nationally Scarce and Near Threatened respectively.

Wintering Birds

9.6.50 A total of 61 species were recorded within the survey boundary during the wintering bird survey between October 2018 and March 2019. Subsequent surveys for other protected species have identified that the habitats within the Project boundary have not changed significantly since the surveys were undertaken and therefore the results are considered to still be representative. Those species recorded that were of conservation interest are listed in Table 9.6.2 below.

Table 9.6.2: Conservation Status of Wintering Birds Recorded within the Project Site (October 2018 - March 2019)

Species	Annex 1 EU Birds Directive	UK BAP Priority Species	NERC Species of Principal Importance	Birds of Conservation Concern
Bullfinch		●	●	Amber
Black-headed gull				Amber
Common gull				Amber
Dunnock		●	●	Amber
Fieldfare				Red
Green sandpiper				Amber
Greylag goose				Amber
Grey wagtail				Amber
Herring gull		●	●	Red
House sparrow		●	●	Red
Kestrel				Amber
Lapwing		●	●	Red
Lesser black-backed gull				Amber
Mallard				Amber
Marsh tit		●	●	Red
Mistle thrush				Red
Meadow pipit				Amber
Moorhen				Amber
Red kite	●			N/A
Redwing				Amber
Reed Bunting				Amber
Rook				Amber
Skylark		●	●	Red
Snipe				Amber

Species	Annex 1 EU Birds Directive	UK BAP Priority Species	NERC Species of Principal Importance	Birds of Conservation Concern
Song thrush		●	●	Amber
Sparrowhawk				Amber
Starling		●	●	Red
Woodcock				Red
Woodpigeon				Amber
Wren				Amber

9.6.51 No wintering species were recorded in any numbers which were considered to be of national or international significance. The numbers recorded during the winter bird surveys are considered unremarkable and broadly representative of the species in the wider landscape.

9.6.52 Of the 61 species recorded, the Project site was considered to be of local importance for lapwing, which were recorded predominantly around the Crawley Sewage Treatment Works. The numbers recorded during the wintering bird surveys were generally considered unremarkable and broadly representative of the species in pastoral farmland in the South East of the UK. However, the site was considered likely to have some minor importance for wintering lapwing due to the likely suitable foraging habitat it supports.

9.6.53 The wintering bird population within the Project site is considered as being of no more than local importance.

Breeding Birds

9.6.54 The desk study search returned records for 73 species of notable and / or protected birds within 2 km of the Project site boundary. Many of these were from GAL's recording of their site and included 13 amber list species (including Nightingale *Luscinia megarhynchos*) and 12 red list species.

9.6.55 The management techniques on land around Gatwick follow the guidance provided in CAP 772 Wildlife Hazard Management at Aerodromes (CAA, 2017) which may result in a lower baseline of recorded numbers of certain bird species and reduced counts of specific species during the breeding bird surveys than would be recorded if the management was not in place.

9.6.56 A total of 72 species were recorded during the survey of breeding birds within the Project site boundary and surrounding study area, of which 48 were confirmed to be breeding and three possibly breeding (peregrine, little ringed plover and firecrest), resulting in a breeding assemblage of 51 species.

9.6.57 All species of wild bird breeding in the UK (other than a few pest species) are given general protection under Part 1 Section 1(1) of the WCA 1981 and birds listed under Schedule 1 of the Act are further protected.

9.6.58 Species listed as being Species of Principal Importance on the Section 41 list of the NERC Act 2006, species included in BoCC Red and Amber Lists (Eaton *et al*., 2021) and species occurring in nationally, regionally or locally important numbers are also considered.

9.6.59 Of the 51 species recorded as breeding or possibly breeding within the survey area, 20 species meet at least one of the above criteria relating to special statutory protection or conservation importance and are listed in Table 9.6.3 below.

Table 9.6.3: Birds of Conservation Interest Confirmed as Breeding/Possibly Breeding within the Project Site and Surrounding Area

Species	Breeding status	No. of territories	Annex 1 EU Birds Directive	Schedule 1 WCA	NERC Species of Principal Importance	BoCC 5 Red and Amber species
Peregrine	Possible	1	■	■	-	-
Little ringed plover	Possible	1	-	■	-	-
Firecrest	Possible	1	-	■		-
Skylark	Confirmed	12	-	-	■	Red
Song thrush	Confirmed	19	-	-	■	Amber
Whitethroat	Confirmed	9	-	-	-	Amber
Marsh tit	Confirmed	1	-	-	■	Red
Starling	Confirmed	2	-	-	■	Red
House sparrow	Confirmed	4	-	-	■	Red
Linnet	Confirmed	1	-	-	■	Red
Grey wagtail	Confirmed	1	-	-	-	Red
Mistle thrush	Confirmed	2	-	-	-	Red
Mallard	Confirmed	9	-	-	-	Amber
Kestrel	Confirmed	4	-	-	-	Amber
Moorhen	Confirmed	5	-	-	-	Amber
Stock dove	Confirmed	3	-	-	-	Amber
Wren	Confirmed	74	-	-	-	Amber
Dunnock	Confirmed	18	-	-	■	Amber
Bullfinch	Confirmed	1	-	-	■	Amber
Reed bunting	Confirmed	2	-	-	■	Amber

9.6.60 Three species (little ringed plover, peregrine and firecrest) were recorded within the Project site boundary and could possibly have bred. All three are listed under Schedule 1 of the WCA 1981 and Peregrine is also listed under Annex 1 of the EU Birds Directive.

9.6.61 Little ringed plover - one adult was recorded on visit five flying over the main lagoon east of Crawley Sewage Treatment Works in an area not accessible during the survey; it is possible birds may have been present on previous surveys and not detected.

9.6.62 Peregrine - one male was recorded on visit three on top of Pier 3, just north of the South Terminal building. As only one observation was recorded, and due to access restrictions around airport buildings and high noise levels (which restricted the possibilities of detecting adults), it was not possible to confirm breeding during the surveys.

9.6.63 Firecrest - single singing males were recorded at the eastern fringe of Horleyland Wood on visit two and in Upper Pickett's Wood on visit three. These observations could relate to territorial males that failed to find a mate or passage migrants as there were no further records beyond late April.

9.6.64 Nine species, confirmed as breeding within the survey area (skylark, dunnock, song thrush, marsh tit, starling, house sparrow, linnet, bullfinch and reed bunting) are listed in Section 41 of the NERC Act 2006 as being of principal importance for the conservation of biodiversity in England.

9.6.65 Seven species confirmed breeding within the survey area are included on the BoCC Red list (starling, marsh tit, skylark, mistle thrush, house sparrow, grey wagtail and linnet).

9.6.66 Ten species recorded during the survey are included on the BoCC Amber List (mallard, moorhen, stock dove, kestrel, song thrush, whitethroat, wren, dunnock, bullfinch and reed bunting).

9.6.67 The breeding population of no species within the survey area approaches 1% of the national population. Therefore, no species considered to be breeding or possibly breeding are present in nationally important numbers.

9.6.68 The geographical importance of the breeding populations of species of conservation interest is local for all species except little ringed plover, marsh tit and firecrest, which are of county interest and peregrine, which is of regional interest. The diversity of species present within the survey area is at a level indicative of County importance for breeding birds.

Reptiles

9.6.69 The Project site offers a number of suitable habitats for reptiles, including wet and marshy areas, dense and scattered scrub, taller areas of grassland and earth banks.

9.6.70 Grass snakes were recorded within and immediately adjacent to the Project site in two distinct areas, along the River Mole corridor (NWZ) and within the grassland areas of the LERL. Juvenile grass snakes were recorded in both areas meaning that the two distinct populations are viable.

9.6.71 Grass snake is partially protected under Schedule 5 of the WCA 1981 and is also listed under Section 41 of the NERC Act (2006).

9.6.72 No other reptiles were recorded during the 2019 reptile surveys.

Amphibians

9.6.73 A number of ponds and linear water features were identified during the Phase 1 habitat survey as being suitable to support all species of native amphibian.

9.6.74 A previous GCN survey (Wadsworth, 2016) in relation to the creation of the New Lagoon identified GCN as being present in Pond; 8N8, W46 and 1WH.

9.6.75 GCN were recorded within four ponds adjacent to the Project site. Two of the ponds (Ref. 8N8 and W46 in Appendix 9.6.2 Figure 3.8c) were located in the woodland between the Old and New Lagoons associated with the water treatment works. During the 2019 survey season one pond (Ref. 1WH) to the south of the water treatment works dried up, meaning not all surveys could be completed. No GCN were recorded whilst water was present in that pond.

9.6.76 The other two ponds (Ref. TTD and K5F) were located west of the River Mole, within the grounds of the Bear and Bunny nursery.

9.6.77 Using the GCN Population Size Class assessment (Froglife, 2001) the maximum GCN count on one night using one survey method for each pond was zero, 13, eight and ten for the four ponds.

9.6.78 This equates to a medium GCN population size for one pond and small GCN population sizes for the remaining three ponds.

9.6.79 Although no GCN were recorded within one of the ponds, the eDNA survey result was positive and a single GCN egg was identified in the pond confirming that they were present, but likely to be in low numbers.

9.6.80 Common toad was recorded in one pond and along the northern edge of the field south of Brockley Wood.

9.6.81 GCN is a European protected species and fully protected under Schedule 5 of the WCA 1981. All other native amphibians are partially protected under Schedule 5 of the WCA 1981 prohibiting their sale. Common toad is also listed under Section 41 of the NERC Act (2006).

Badgers

9.6.82 Badgers and their setts are protected under the Protection of Badgers Act 1992.

9.6.83 Signs of badger activity were recorded during badger surveys, with additional information gathered during a bait marking exercise. Due to the sensitive nature of badger data, the full findings of the surveys are reported in a confidential appendix (Appendix 9.6.4) which is available upon request to those with a legitimate need for the information.

Hazel Dormouse

9.6.84 In the 2019 surveys no dormice were found along the River Mole corridor (NWZ), through Brockley Wood, Horleyland Wood, Upper Picketts Wood, Crawter's Wood or Riverside Garden Park. Furthermore, no dormice were recorded during surveys subsequently undertaken along the A23 boundaries and within land north of Longbridge Roundabout in 2022.

9.6.85 Hazel dormouse is protected under Schedule 5 of the WCA Act 1981 .

9.6.86 No dormice were recorded within the Project site, or within suitable habitat adjoining it, and they are therefore not considered further in this assessment. Due to dormice living at such low densities, a precautionary further season of surveys will be undertaken to confirm absence before construction commences.

Otter

9.6.87 No signs of otters were identified within the Project site during surveys. Otters are known to occur along watercourses within the wider area, with two records of otter included in the desk study

located within 10km of the Project site boundary. Accordingly, due to their large territories, there is potential for them to use the habitats within the Project site.

9.6.88 Otter is a European protected species and is protected under Schedule 5 of the WCA 1981 .

Water Vole

9.6.89 No records of water voles were provided in the desk study and no signs of water vole were recorded within the Project site. They are not considered further in the assessment.

9.6.90 Water voles are fully protected under Schedule 5 of the WCA 1981 .

Bats

9.6.91 The desk study provided records for at least fourteen bat species within and immediately adjacent to the Project site, including records for Bechstein's bat, Alcathoe bat and barbastelle bat. Records were provided that were not identified to species level and could therefore represent additional species.

9.6.92 All UK bats are European protected species and protected under Schedule 5 of WCA 1981.

Buildings

9.6.93 An assessment of the suitability of buildings for bat roosting potential, within the landside and airside areas of the Project site, was undertaken at the time of the Phase 1 habitat survey.

9.6.94 Two buildings within the Project site were identified as having suitable features to support roosting bats: one, the Old Control Tower located in the north west of the Project site (landside), adjacent to Control Tower Road and east of the River Mole; and the second, a disused ancillary building located along the southern boundary of the airside perimeter fencing, adjacent to Crawter's Brook and Staff Car Park Z.

9.6.95 A total of three emergence and/or dawn re-entry surveys were undertaken on each of the two buildings described above. No bats were recorded emerging from either building, and bat activity was generally low across the site during the emergence surveys.

Trees

9.6.96 An assessment of the suitability of trees within the Project site for bat roosting potential was undertaken in 2022.

9.6.97 A total of 43 trees within the Project site were identified as having features suitable to support roosting bats. The majority of these trees are located adjacent to the M23 within the eastern section of the site and the A23 London Road within the north eastern section of the site.

Activity Transects

9.6.98 Bat activity transects were undertaken across the Project site between 2019 and 2022.

9.6.99 A total of five transect routes were devised in 2019 to cover a broad range of habitat types present on site but focusing on those likely to be of greatest value to bats, including woodland, woodland edges, river corridors and open grassland. A further three routes were partially completed in 2020 covering areas of the site not surveyed previously, with outstanding surveys

inclusive of a fourth additional route being undertaken in 2021 and a fifth additional route in 2022 to complete coverage of the Project site and connected habitats.

9.6.100 At least eight bat species were recorded across the survey area, including passes made by Leisler's bat, Nathusius' pipistrelle and *Myotis* bats. The *Myotis* bats could include rarer species.

9.6.101 Confirmed bat species recorded in the bat activity surveys included:

- common pipistrelle;
- soprano pipistrelle;
- Nathusius' pipistrelle;
- noctule;
- Leisler's bat;
- *Myotis* spp.; and
- serotine bat.

9.6.102 A number of calls of bats could not be identified to species level. These included bats from the long-eared group of bats (brown long-eared and grey long-eared) and bats from the *Myotis* group of bats (Alcathoe bat, Bechstein's bat, Brandt's bat, Daubenton's bat, Natterer's bat and whiskered bat).

9.6.103 Some of these calls were more characteristic of a particular bat species including:

- Brandt's bat;
- Daubenton's bat;
- Natterer's bat; and
- whiskered bat.

9.6.104 Higher value foraging and commuting habitat was identified within the woodland areas in the east of the Project site, along woodland edges, river corridors and mature hedgerows and treelines.

9.6.105 The highest levels of bat activity were recorded throughout Horleyland Wood, around the eastern part of the LERL fields and along the Gatwick Stream and southern boundary of the LERL fields east of the railway.

9.6.106 Within Riverside Garden Park but outside the Project site, high levels of bat activity were recorded along the Gatwick Stream, around the lake and along the north west edge of the park, towards Longbridge roundabout.

9.6.107 In the west of the site the highest levels of activity were recorded along the woodland belt, west of the River Mole. Foraging and commuting activity was recorded within the wider fields east of the Gatwick Aviation Museum. This activity was predominantly associated with the field boundary hedgerows and mature tree lines.

9.6.108 Relatively little bat activity was recorded along the southern Project site boundary during the bat transects compared with the other transect routes.

9.6.109 Overall, the continuity of connective habitat is likely to provide an extensive network of habitat features suitable for a wide range of commuting, foraging and roosting bats, providing links to the wider landscape in this area.

Static/Automated Surveys

9.6.110 A total of 11 static detector units was deployed across the survey area between April and October 2019 for a minimum of five nights per location per month, with an additional five units deployed in 2022. The units were positioned at various locations in order to sample a broad range of the habitat types present on site, but focusing on those likely to be of greatest value to bats. The static detector locations are described in Appendix 9.6.2. The detectors were set out to record the same nights in each location, though equipment difficulties occasionally resulted in inconsistences between nights and some missing recordings, as described in Appendix 9.6.2.

9.6.111 The static detectors were located at:

- land west of the Fire Training Ground (Location 1);
- land south west of the River Mole (Location 2);
- Brockley Wood (Location 3);
- north of Long Stay North car park (Location 4);
- Riverside Garden Park (Location 5);
- land west of the railway (Location 6);
- Horleyland Wood (Location 7);
- LERL wetland (Location 8);
- Perimeter Road South (Location 9);
- land west of Car Park X (Location 10); and
- Crawter's Wood (Location 11).

9.6.112 Additional detectors were located along transects in 2022 at:

- River Mole south of Brockley Wood (Location 12);
- Riverside Garden Park (Location 13);
- Land north of A23 (Location 14);
- Dairy Farm (Farm) (Location 15); and
- Dairy Farm (Gate) (Location 16).

9.6.113 At least nine bat species were recorded across the survey area, including passes made by barbastelle bat, Leisler's bat and Nathusius' pipistrelle.

9.6.114 Activity across the survey area varied considerably, with higher levels of activity noted within particular areas including Brockley Wood and Horleyland Wood, with elevated activity also recorded (albeit to a lesser degree) at Perimeter Road East and Crawter's Wood. The higher levels of activity in these areas indicate the increased value of the woodland habitats in contrast to other habitats within the Project site.

Bat Crossing Point Surveys

9.6.115 Crossing Point surveys were undertaken at two locations, the River Mole corridor and Riverside Park, in August 2020, September 2020, May 2021 and June 2021. The locations were selected using the results of trapping and radio-tracking surveys undertaken in 2019, which recorded Bechstein's bats flying along the River Mole and foraging within Riverside Park, as well as due to potential impacts to the areas in relation to a new flood mitigation strategy and North Terminal Junction improvements.

9.6.116 At the River Mole crossing point, a total of 1,278 bat passes from at least five species were observed using the feature over three survey visits, with the highest total number of passes from common pipistrelle (1017) and the lowest total number from brown long-eared bat (3).

9.6.117 Twenty-four passes of *Myotis* species bats were recorded flying within the river corridor or directly above it. This, in conjunction with results of advanced bat survey techniques (trapping and radio-tracking), indicates that *Myotis* bat species, likely to include Bechstein's bats, are using the River Mole corridor to move across the landscape and for foraging.

9.6.118 At Riverside Garden Park, a total of 1,159 passes from at least five species were observed using the feature over three survey visits, with the highest total number from common pipistrelle (654) and the lowest from brown long-eared bat (2).

9.6.119 A total of 18 passes of *Myotis* species were recorded within Riverside Park. This, in conjunction with the results of advanced bat survey techniques (trapping and radio-tracking) , indicates that *Myotis* bat species, likely including Bechstein's bats, are using Riverside Park for foraging and commuting.

9.6.120 Of the passes observed using the feature, 19% were observed passing at an "unsafe height" (below 5 metres) above the road where they would be at risk of collisions and 81% were observed passing at a safe height.

9.6.121 Soprano pipistrelle and noctule were also recorded at each crossing point.

Trapping Surveys

9.6.122 A total of 154 bats of nine species were captured over nine trapping nights between 28 May and 4 September 2019 in 22 different locations within the Project site boundary.

9.6.123 Bat species caught during the trapping surveys included:

- Bechstein's bat;
- Brandt's bat;
- Daubenton's bat;
- noctule bat;
- whiskered bat;
- whiskered/Brandt's bat;
- Natterer's bat;
- brown long-eared bat;
- common pipistrelle; and
- soprano pipistrelle.

9.6.124 Breeding females of seven species were trapped during the survey. No female breeding Bechstein's bats were captured within the Project Area, but the presence of juvenile males and females indicated there was likely to be a colony of breeding females in the wider landscape that was functionally connected to the Project Area.

9.6.125 Additional surveys were undertaken across three locations within the Project Area and in five woodlands in the wider landscape over three survey periods in July 2020, September 2020 and May 2021. A total of 98 bats from a minimum of nine species were captured over nine nights trapping over this period in 28 different locations.

9.6.126 Bat species caught during the trapping surveys included:

- Barbastelle;
- Bechstein's bat;
- whiskered/Brandt's/Alcathoe bat;
- brown long-eared bat;
- common pipistrelle;
- Natterer's bat;
- noctule;
- soprano pipistrelle; and
- whiskered bat.

9.6.127 Breeding females of a minimum of six species were trapped during the survey, including Bechstein's bat which were recorded within the wider survey area and not within the Project site boundary.

DNA Analysis

9.6.128 Droppings were obtained from nine of the trapped small *Myotis* bats, which were all sent for DNA analysis. Eight of these samples were successfully analysed to species level, which confirmed the bats as being whiskered bats.

Radio-tracking Surveys

9.6.129 Twenty of the trapped bats in 2019 were selected for radio-tracking. The species, sex, breeding status and bat identification numbers are shown in Table 9.6.4 below.

Table 9.6.4: The species, sex, breeding status and month of capture of bats tagged and radio tracked within the Project site and surrounding area in 2019.

Bat identification number	Trapping location	Trapping location ref.	Species	Sex	Breeding status	Month of capture
1	Crawter's Wood	3c	Brown long-eared bat	Female	Pregnant	May
2	Crawter's Wood	3c	Brandt's bat	Female	Pregnant	May
3	Crawter's Wood	3c	Bechstein's bat	Male	N/A	May
4	Crawter's Wood	3b	Whiskered bat	Female	Pregnant	May
5	Lower Pickett's Wood	6a	Daubenton's bat	Female	Pregnant	May
6	Crawter's Wood	3a	Brown long-eared bat	Female	Lactating	July
7	Crawter's Wood	3b	Natterer's bat	Female	Lactating	July

Bat identification number	Trapping location	Trapping location ref.	Species	Sex	Breeding status	Month of capture
8	Eastern boundary of Museum Field	1a	Bechstein's bat	Male	N/A	July
9	Horleyland Wood	5d	Bechstein's bat	Male	N/A	July
10	Riverside Garden Park	4c	Bechstein's bat	Male	N/A	July
11	Horleyland Wood	5d	Daubenton's bat	Female	Lactating	July
12	Upper Pickett's Wood	7a	Brown long-eared bat	Female	Lactating	July
13	Brockley Wood	2c	Brown long-eared bat	Female	Non-parous	September
14	Eastern boundary of Museum Field	1b	Bechstein's bat	Female	Juvenile (non-parous)	September
15	Eastern boundary of Museum Field	1a	Brown long-eared bat	Female	Juvenile (non-parous)	September
16	Crawter's Wood	3c	Whiskered bat	Female	Young adult (non-parous)	September
17	Brockley Wood	2a	Bechstein's bat	Male	Juvenile	September
18	Eastern boundary of Museum Field	1b	Bechstein's bat	Female	Non-parous	September
19	Riverside Garden Park	4c	Brown long-eared bat	Female	Post-lactating	September
20	Horleyland Wood	5e	Daubenton's bat	Female	Post-lactating	September

9.6.130 A total of ten confirmed roosting locations were identified from nine radio-tagged bats of five species. Additionally, eight estimated roosting locations were identified. Dusk emergence surveys were undertaken on eight of the confirmed roosts. The locations of these roosts and counts of the roosts are provided in Appendix 9.6.3 and described below:

- woodland strip to the west of Brockley Wood (Bechstein's bat);
- to the east of the M23 (Daubenton's bat); and
- Upper Pickett's Wood (Daubenton's bat).

9.6.131 Key flightlines were identified for seven of the radio-tagged bats, which included four Bechstein's bats, one brown long-eared bat and two Daubenton's bats.

9.6.132 Bechstein's bats were recorded using various sections of the River Mole to commute between foraging areas, including the area of the River Mole to the west of Brockley Wood, the area south of Povey Cross Road and the area to the north of Brockley Wood. Flightlines for Bechstein's bats were also recorded along Man's Brook, to the south of Burlands Farm.

9.6.133 Flightlines were identified for one of the radio-tracked brown long-eared bats which was recorded using Man's Brook to the south of Burlands Farm.

9.6.134 Flightlines were identified for two Daubenton's bats; one from the roost location south along Burstow Stream to a large waterbody; and the second was identified from its roosting location in Upper Pickett's Wood through the woodland to the sewage works lakes.

9.6.135 Core foraging areas for radio-tracked Bechstein's bats were identified within the following areas:

- Museum Field;
- Charlwood Place Farm;
- woodland strip to the west of Brockley Wood;
- River Mole;
- woodland to the east of Shangri-La and south of Brook Farm;
- woodland strip to the south-west of the Project area, north of Charlwood Road;
- Riverside Garden Park;
- Upper Pickett's Wood; and
- woodland to the north of Crawley Sewage Treatment Works.

9.6.136 Foraging areas for non-target bat species (Brandt's bat, brown long-eared bat, Daubenton's bat, Natterer's bat and whiskered bat) were identified in similar locations to Bechstein's bats including:

- Brockley Wood;
- River Mole;
- woodland strip to the west of Brockley Wood;
- Upper Pickett's Wood
- Man's Brook;
- Lower Pickett's Wood;
- woodland to the south of Shipley Bridge; and
- hedgerows and woodlands to the south of Charlwood.

9.6.137 Fourteen of the Bechstein's bats trapped in 2020/21 were selected for radio-tracking. The species, sex, breeding status and bat identification numbers are shown in Table 9.6.5 below.

Table 9.6.5: The species, sex, breeding status of bats tagged and radio tracked within the Project site and surrounding area in 2020/21.

Bat identification number[7]	Trapping location	Trapping location ref.	Species	Sex	Breeding status	Month of capture
1J	Glover's Wood	1	Bechstein's bat	F	Lactating	July 2020

[7] The letter after the number indicates month of capture; J=July 2020, S=September 2020, M=May2021

Bat identification number[7]	Trapping location	Trapping location ref.	Species	Sex	Breeding status	Month of capture
2J	Glover's Wood	6	Bechstein's bat	F	Lactating	July 2020
3J	Edolph's Copse	7	Bechstein's bat	F	Lactating/post-lactating	July 2020
4J	Edolph's Copse	11	Bechstein's bat	F	Post-lactating	July 2020
5J	Edolph's Copse	10	Bechstein's bat	F	Post-lactating	July 2020
6J	Brockley Wood	13	Bechstein's bat	M	Adult	July 2020
7J	Brockley Wood	12	Bechstein's bat	M	Adult	July 2020
8J	Brockley Wood	14	Bechstein's bat	M	Adult	July 2020
1S	Glover's Wood	4	Bechstein's bat	M	N/A – Juvenile	September 2020
2S	Glover's Wood	4	Bechstein's bat	F	N/A – Juvenile	September 2020
3S	Glover's Wood	4	Barbastelle	M	N/A – Juvenile	September 2020
4S	Edolph's Copse	9	Bechstein's bat	F	N/A – Juvenile	September 2020
5S	Brockley Wood	14	Bechstein's bat	F	N/A – Juvenile	September 2020
1M	Glover's Wood	6	Bechstein's bat	F	Adult – Non-parous	May 2021
2M	Glover's Wood	4	Bechstein's bat	F	Adult - Parous	May 2021

9.6.138 Of 19 roost locations identified, three Bechstein's bat roosts were identified within the Project site; all within Brockley Wood. Core foraging areas for Bechstien's bats were identified to the west of the Project site associated with larger areas of woodland and interconnecting habitats. Peripheral foraging areas within the Project Area were recorded along Man's Brook and River Mole in the north west of the Project Area.

9.6.139 Due to the lack of breeding females recorded with the Project Area over the surveys in 2019, 2020 and 2021, it is considered that the habitats within the Project Area provide resource primarily for foraging Bechstein's and a roosting resource for predominantly male Bechsteins.

9.6.140 No core or peripheral foraging areas for Barbastelle were recorded within the Project site boundary.

9.6.141 Full descriptions of the roosting and foraging areas are provided in Appendix 9.6.3.

Collision risk surveys

9.6.142 A total of 3,078 bat calls were recorded across 82 hours survey time over the three survey seasons in 2019. The species identified include common pipistrelle, Leisler's bat, *Myotis spp.*, Nathusius' pipistrelle, noctule, *Plecotus spp.*, serotine and soprano pipistrelle. Overall, 74.4% of the bat passes recorded during the surveys were identified as common pipistrelle bats (2291 passes), followed by *Myotis spp*. bats with 13.1% (403) of the passes, and noctule bats with 9.9% (306 passes).

9.6.143 Of the 943 bats observed by thermal imagery, 590 (63%) could not be identified to genera or species level. The species that could be identified in the thermal footage comprised *Myotis spp.* and brown long-eared bats, common, Nathusius' and soprano pipistrelles and noctule bats.

9.6.144 The modelling identified that bats were at risk of collision mortality under the existing situation although not to an extent that would impact conservation status.

Other Mammals

9.6.145 The desk study data showed that the west European hedgehog, harvest mouse and brown hare have been recorded within the Project site.

9.6.146 All three species are listed under Section 41 of the NERC Act (2006) and have suitable habitat within the Project site.

Terrestrial Invertebrate Assemblage

9.6.147 A total of 31 species listed under Section 41 of the NERC Act (2006) were identified by the desk study and the two biodiversity areas, the River Mole corridor (NWZ) and the land east of the railway (LERL), are recognised as being of raised invertebrate interest.

9.6.148 In 2019 an invertebrate habitat appraisal of areas outside the biodiversity areas identified that the land south of the Aviation Museum and west of the Fire Training Ground, Museum Field and the land to the north and west of it, the artificial earth noise bund and Pentagon Field all had features of moderate invertebrate interest above the expected regional background level.

9.6.149 On-going monitoring by GAL of the NWZ and LERL biodiversity areas has identified a diverse assemblage of terrestrial invertebrates in these areas. Follow up detailed surveys in 2020 confirmed this, including a range of scarce and unusual species, illustrative of the diversity of habitats present in the NWZ and LERL.

Aquatic Invertebrates

9.6.150 The desk study included one record from 2013 of shining ram's-horn snail *Segmentina nitida*, an IUCN Red List species and UK species of principal importance under the 2006 NERC Act. A survey for the species was undertaken by an experienced mollusc surveyor in July 2022. Ten survey locations were sampled on the east and west banks and associated marginal habitats of the River Mole within the study area. Shining ram's-horn snail was not recorded although samples contained 13 species of mollusc and bivalve. None of these species are notable or receive protection. Shining ram's-horn snail is therefore considered to be absent from the study site and is not included as an Important Ecological Feature or considered in the assessment.

9.6.151 One notable dragonfly species, common sympetrum *Sympetrum striolatum* was recorded within 1km of the site. The species is listed in the UK Red Data Book. A total of 44 observations were made of the species in the vicinity of the Gatwick airport, with a number of them within the study section. There are no records of the larvae in the River Mole, either from the Sussex Biological Records Centre or the Environment Agency, and therefore breeding sites are unclear.

9.6.152 In 2019, the invertebrate habitat appraisal identified that Pond M and the ditches adjacent to Pentagon Field had features of moderate invertebrate interest above the expected regional background level.

9.6.153 Further baseline macroinvertebrate surveys of the River Mole and Gatwick Stream were undertaken in 2020 and 2022. The consistent occurrence in the 2020 samples of macroinvertebrate taxa with a low Biological Monitoring Working Party (BMWP) score in the River Mole samples suggests that the watercourse is affected by low dissolved oxygen, probably as a result of low flow velocities and potentially organic pollution. In both years there was a reduction in LIFE score (a biotic index used to measure the response of macroinvertebrate communities to low flow conditions), between summer and autumn reflecting low flow conditions. Autumn die back of the dense in-stream macrophyte beds in the River Mole combined with low flow conditions may also be contributing to acute reductions in dissolved oxygen. Nevertheless, the Community Conservation Index for the River Mole indicated moderate conditions, possibly due to the presence of water beetle species (*Coleoptera).*

9.6.154 Based on the 2020 data the Gatwick Stream supported a macroinvertebrate assemblage indicative of moderate to poor water quality. Slightly higher scores were obtained from the sampling site upstream of Crawley sewage treatment works, suggesting that there is a discharge point between the two sampling sites although this is unlikely to be from the works itself. The sampling location for the 2022 survey was located in Riverside Park approximately 450m upstream from the confluence with the River Mole. There was an increase in diversity and abundance of macroinvertebrate taxa between the summer and the autumn sample at this site, with a consequential increase in biotic scores. This was considered to be due to an autumn re-charge of the watercourse resulting in higher flow velocities and dissolved oxygen concentrations.

9.6.155 The invasive New Zealand mud snail was identified at the River Mole and Gatwick Stream sites, and signal crayfish were observed at both the Gatwick Stream sites during each visit.

Fish

9.6.156 Records of brown trout *Salmo trutta subsp. Fario* and bullhead *Cottus gobio* were returned from the desk study for the reach of the River Mole within the Project site boundary. Neither species were recorded during the 2020 fish surveys, although bullhead was recorded in the Gatwick Stream in the autumn 2022 survey. Bullhead is on the IUCN Red list of Threatened Species and Annex II of the EC Habitats Directive.

9.6.157 A total of ten coarse fish species were recorded in the River Mole during electrofishing surveys in spring 2020 compared with only five species in the autumn. Abundance was also higher in spring (415 fish compared with 28 in autumn) with a wider representation of age classes. This stretch of the River Mole was considered to provide a good environment for juvenile and sub-adult chub *Squalius cephalus* and dace *Leuciscus leuciscus* given the high abundances of pollution tolerant macroinvertebrates such as *Oligochaete* worms as a food source, as well as providing good foraging habitat for predatory fish species such as pike *Esox Lucius*.

9.6.158 There was a pollution incident on the River Mole upstream of the airport in summer 2022 which resulted in the discharge of surfactants and detergents. No surveys were undertaken on the River Mole during summer due to the incident. However, it is likely that this incident, coupled with very high air and water temperatures which will have resulted in reduced dissolved oxygen concentrations, will have had impacts on fish populations. Nevertheless, the fish assemblage recorded during autumn 2022 surveys was similar in composition and abundance to that recorded in autumn 2020. However, tench *Tinca tinca* was absent during autumn 2022 despite having been recorded in both spring and autumn surveys in 2020. Tench is a hardy species with relatively high tolerance to poor water quality and therefore its absence may be due to predation and low breeding success.

9.6.159 The fish community of the Gatwick Stream is typical of a slow flowing freshwater system with the presence of roach *Rutilus rutilus* and pike. Additionally, species such as dace and chub favour the shaded habitat provided by bankside scrub and trees, and marginal macrophytes. Seven coarse fish species were recorded in the Gatwick Stream in both spring and autumn 2020 with chub and dace the most abundant species. Abundances were relatively consistent between spring and autumn.

9.6.160 In addition to the species recorded during 2020, barbel *Barbus barbus* was recorded during the summer 2022 survey and barbel and bullhead were recorded during the autumn 2022 survey.

Summary of Nature Conservation Interest and Identification of Important Ecological Features (IEFs)

9.6.161 The majority of the Project site comprised common and widespread habitats that were not protected and there are no statutory designated sites within the site. One non-statutory designated site, Horleyland Wood LWS, and areas of ancient woodland were present adjacent to the south-east of the Project site. Brockley Wood, encompassed by the Project boundary to the west, was also ancient woodland.

9.6.162 The Project site boundary also includes Habitats of Principal Importance which are listed under Section 41 of the NERC Act (2006) including; hedgerows; woodland; rivers and ponds (ponds where protected and notable species have been recorded). Two protected plants (bluebell and pennyroyal) were recorded within the Project site. Bluebell was found in woodland and pennyroyal in an area of grassland.

9.6.163 The areas of hardstanding, amenity grassland, poor semi-improved grassland, scrub and tall ruderal vegetation were not considered to be IEFs. The areas of hardstanding and amenity grassland were of no to very low ecological value and were not considered important habitats. The other habitats were either relatively young and did not display the characteristics of more established habitats, or had low species or structural diversity and were therefore not considered to be important habitats.

9.6.164 The Project site was found to support European Protected Species including foraging and commuting bats using the various habitats present and populations of great crested newt centred around ponds to the east and west of the Project site. No signs of otters were identified within the Project site during surveys but they are known to occur along watercourses within the wider area and, due to their large territories, there is potential for them to use the habitats within the Project site boundary. Dormice were not found to be present and are not therefore considered further in this assessment.

9.6.165 Additionally, data from bat trapping/radio tracking and thermal imaging crossing point surveys showed that the periphery of the Project site supports a population of Bechstein's bat. There are a number of habitats of value for the overall bat population including the mature woodlands and River Mole corridor. The overall bat assemblage is also relatively diverse.

9.6.166 The Project site was also found to support species listed under Schedules 1 and 5 of the Wildlife and Countryside Act, including a variety of breeding birds and grass snake. Water voles were not found to be present and are not therefore considered further in this assessment.

9.6.167 A number of Species of Principal Importance listed under section 41 of the NERC Act (2006) were also found to be present during field surveys (common toad) and from the desk study. Records of harvest mouse and hedgehog were provided in the desk study from within the Project site and they are therefore also considered in the assessment.

9.6.168 Both existing biodiversity areas were found to be of importance for terrestrial invertebrates while aquatic invertebrate surveys of the water courses and water bodies found species assemblages generally indicative of moderate to poor water quality.

9.6.169 IEFs comprising designated sites, habitats and species that could be affected by the Project and which are of particular nature conservation interest or concern are identified in Table 9.6.5 below.

Table 9.6.5: Important Ecological Features

IEF	Value of IEF	Covering legislation and guidance
Designated Sites		
Ashdown Forest SPA and SAC	International	Conservation of Habitats and Species Regulations 2017
Mole Gap to Reigate Escarpment SAC	International	Conservation of Habitats and Species Regulations 2017
Thames Basin Heaths SPA	International	Conservation of Habitats and Species Regulations 2017
Thursley Ash, Pirbright & Chobham SAC	International	Conservation of Habitats and Species Regulations 2017
The Mens SAC	International	Conservation of Habitats and Species Regulations 2017
Ebernoe Common SAC	International	Conservation of Habitats and Species Regulations 2017
Glover's Wood SSSI	National	Wildlife & Countryside Act 1981. Supports NERC Act (2006) Section 41 Habitats of Principal Importance
House Copse SSSI	National	Wildlife & Countryside Act 1981. Supports ancient woodland and NERC Act (2006) Section 41 Habitats of Principal Importance
Hedgecourt SSSI	National	Wildlife & Countryside Act 1981. Supports NERC Act (2006) Section 41 Habitats of Principal Importance
Buchan Hill Ponds SSSI	National	Wildlife & Countryside Act 1981. Supports NERC Act (2006) Section 41 Habitats of Principal Importance
Ancient woodland (Horleyland Wood, woodland	National	Designated ancient woodland

IEF	Value of IEF	Covering legislation and guidance
north of River Mole, woodland to east, Bridge's Wood, The Roughs and Brockley Wood)		
Willoughby Fields LNR	County	Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the NERC Act (2006)
Grattons Park LNR	County	Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the NERC Act (2006)
Edolph's Copse LNR	County	Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the NERC Act (2006)
Waterlea Meadow LNR	County	Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the NERC Act (2006)
Worth Way CP	County	Countryside Act 1968
Tilgate Forest LNR	County	Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the NERC Act (2006)
Tilgate Park CP	County	Countryside Act 1968
Target Hill Park LNR	County	Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the NERC Act (2006)
Buchan CP	County	Countryside Act 1968
Broadfield Park LNR	County	Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the NERC Act (2006)
Horleyland Wood LWS (LWS adjacent to Project site)	County	Considered in local authority policies under the domestic planning regime with applications made to local authorities
LWS, SNCI and DRV outside Project site(x32)	County	Considered in local authority policies under the domestic planning regime with applications made to local authorities
Gratton's Park Biodiversity Opportunity Area (BOA)	County	Considered in local authority policies under the domestic planning regime with applications made to local authorities
River Mole (and tributaries) BOA	County	Considered in local authority policies under the domestic planning regime with applications made to local authorities
Gatwick Woods BOA	County	Considered in local authority policies under the domestic planning regime with applications made to local authorities
Habitats		

IEF	Value of IEF	Covering legislation and guidance
Semi-natural broadleaved woodland and mature broadleaved trees	National	NERC Act (2006) Section 41 Habitats of Principal Importance
Hedgerows	National	NERC Act (2006) Section 41 Habitats of Principal Importance
Watercourses	National	NERC Act (2006) Section 41 Habitats of Principal Importance
Ponds (NERC S.41)	National	NERC Act (2006) Section 41 Habitats of Principal Importance
Ponds (non-NERC S.41)	Local	Not qualifying under NERC Act (2006) Section 41 but supporting high species diversity
Semi-improved neutral grassland (NVC MG9)	Local	Not qualifying under NERC Act (2006) Section 41 but supporting high species diversity
Marshy grassland	Local	Not qualifying under NERC Act (2006) Section 41 but supporting high species diversity
Broadleaved plantation woodland and associated scrub	Local	Not qualifying under NERC Act (2006) Section 41 but providing a habitat connection.
Species		
Flora: Bluebell and pennyroyal	Local	Listed under Schedule 8 of the Wildlife & Countryside Act 1981
Flora: Lesser quaking grass, narrow-lipped helleborine, ragged robin and Solomon's seal	Local	Listed under the Vascular Plant Red List Data for Great Britain – 2006 as Nationally Scarce or Nationally Threatened
Breeding birds (confirmed or possible) peregrine, firecrest and little ringed plover	Regional	Listed under Section 1 Schedule 1 of the Wildlife & Countryside Act 1981 and Peregrine also listed under Annex 1 of the Birds Directive
Breeding bird assemblage including species of conservation interest (confirmed or possible); mallard, moorhen, kestrel, stock dove, skylark, grey wagtail, dunnock, song thrush, mistle thrush, marsh tit, starling, house sparrow, linnet, bullfinch, whitethroat, wren and reed bunting	County	Listed under Section 1 of the Wildlife & Countryside Act 1981 and some NERC Act (2006) Section 41 Species of Principal Importance and BoCC Red or Amber listed species.
Wintering birds	Local	No species recorded in numbers of national or international significance. NERC Act (2006) Section 41 Species of Principal Importance and BoCC Red or Amber listed species.
Grass snake	Local	Listed under Schedule 5 of the Wildlife & Countryside Act 1981 and NERC Act (2006) Species of Principal Importance

IEF	Value of IEF	Covering legislation and guidance
Great crested newt	Local	GCN is protected through inclusion in the Habitats Regulations. It is a EPS and as such any development works which could affect them may require a licence from Natural England to comply with the Habitats Regulations. It is also a NERC Act (2006) Section 41 Species of Principal Importance
Common toad	Local	NERC Act (2006) Section 41 Species of Principal Importance
Badger	Local	Badgers are protected under the Protection of Badgers Act 1992.
Otter	County	Otters is protected through inclusion in the Habitats Regulations. It is a EPS and as such any development works which could affect them may require a licence from Natural England to comply with the Habitats Regulations. It is also a NERC Act (2006) Section 41 Species of Principal Importance
Bats: Bechstein's bat and barbastelle bat	National	All bat species are protected through inclusion in the Habitats Regulations. They are EPSs and as such any development works which could affect them may require a licence from Natural England to comply with the Habitats Regulations. Barbastelle, Bechstein's, noctule, soprano pipistrelle and brown long-eared bats are NERC Act (2006) Section 41 Species of Principal Importance. Bechstein's bat and barbastelle are rare in the UK and the distribution of alcathoe is unknown.
Assemblage of other bat species	Local	
Harvest mouse	Local	NERC Act (2006) Section 41 Species of Principal Importance
Hedgehog	Local	NERC Act (2006) Section 41 Species of Principal Importance
Fish	Local	Good species assemblage
Aquatic invertebrate assemblage	Local	Assemblage indicative of moderately polluted conditions. One UK Red Data Book species, common sympetrum, recorded in desk study
Terrestrial invertebrate assemblage	County	Diverse assemblage including scarce and rare species

Future Baseline Conditions

9.6.170 The EIA Regulations require consideration of the likely changes to baseline conditions over time, taking into consideration the future development at Gatwick Airport without the Project. Therefore, an assessment of the future baseline conditions has been carried out and where relevant, the changes have been factored into the assessment as described below.

9.6.171 Development proposals at the airport which have either already been consented or are committed to (and do not require consent) and which would proceed without the Project, including works being undertaken by other parties, considered within this section are (further details are provided in Chapter 4: Existing Site and Operation):

- extension to Pier 6, including alterations to Taxiway Quebec and reconfiguration of aircraft stands;
- normal or planned maintenance and asset replacement programme for the main runway, including resurfacing of the main runway and replacement of the Instrument Landing System (ILS) localisers in accordance with the usual maintenance schedule;
- an additional rapid exit taxiway from the main runway;
- an electric vehicle charging forecourt to the west of the Marriott Hotel at the South Terminal;
- Hilton multi-storey car park (820 vehicles);
- multi-storey car park 7 (3,250 vehicles);
- use of robotics technology within existing long stay parking areas to increase capacity, resulting in an additional 2,500 spaces;
- local widening of the junction entry/exit lanes to the North Terminal and South Terminal roundabouts, signalisation and signage; and
- Gatwick Station improvements.

GAL Decade of Change Goals

9.6.172 Positive work through the GAL Biodiversity Action Plan (BAP) is likely to continue, especially given GAL's Decade of Change goal of having a sector-leading net gain approach to protecting and enhancing biodiversity and habitats on the airport estate, including zero use of pesticides by 2030, and supporting biodiversity partnerships in the region. Therefore, biodiversity across the GAL estate is likely to increase, particularly within the LERL and NWZ.

Climate Change

9.6.1 The Paris Agreement is a legally binding international treaty on climate change which aims to keep global temperature rise to below 2°C and pursue efforts to limit it to 1.5°C by 2050. However, its success is reliant on Countries committing to it and implementing measures to combat climate change soon enough. The UK Government Office for Science (2021) states *"the 2030 carbon emission reduction pledges, made by 184 countries under the Paris Agreement, aren't enough to limit global warming to below 2°C and pursue 1.5°C. The world is still heading for a temperature rise in excess of 3°C this century."* Therefore, temperatures are expected to rise by at least 1.5°C by the end of the assessment period for this Project; 2047, but could rise higher.

9.6.2 Overall, climate change is expected to increase the chance of warmer, wetter winters and hotter, drier summers along with an increase in the frequency and intensity of extreme weather events leading to increased drought and flooding. This includes increases in the intensity of heavy summer rainfall events, despite the general trend for summers to be drier.

9.6.3 The relationship between climate change and biodiversity in the UK has been summarised by the Inter-Agency Climate Change Forum (IAACCF, 2010). They have found that the impact on species of increased temperatures includes changes in distribution and abundances, timing of seasonal events and the timing of when habitats are used. As a result, the overall species composition, habitats and ecosystem characteristics are likely to change.

9.6.4 In general, climate influences the ranges of the majority of terrestrial and freshwater species, and climate change therefore results in changes to species ranges (Thomas,, 2010). Species are also directly affected by extreme weather events resulting in flooding and drought.

9.6.5 Research (Bell *et al*, 2019) into spatial habitat variations in certain species affected by climate change found that variations were difficult to predict and varied across the UK. Therefore, ecosystem responses were difficult to predict. The direct effects of climate change on the future baseline of the Project site are therefore also difficult to predict. However, it is very unlikely that there would be sufficient change over the period of the assessment considered here to change the outcome of the assessment.

9.7. Key Aspects of the Project

9.7.1 The assessment has been based on the description within Chapter 5: Project Description.

9.7.2 The Project site boundary encloses an area of approximately 735 hectares. The majority of this area is the existing operational airport and the configuration of habitats would remain largely unchanged. Individual elements of the Project which would affect habitat loss are identified in Chapter 5; Figures 5.2.1a to 5.2.1h.

9.7.3 Table 9.7.1 below identifies the maximum design scenarios and worst-case assumptions relevant to this assessment. The maximum design scenario or worst-case assumption selected is the one having the potential to result in the greatest effect on an identified receptor or receptor group. Effects of greater adverse significance are not predicted to arise.

Table 9.7.1: Maximum Design Scenarios

Potential Impact	Maximum Design Scenario/worst case assumptions	Justification
Initial Construction Period: 2024-2029		
Complete loss (temporary or permanent) of all existing habitats within the areas proposed for development as part of the Project between 2024 and 2029, except where detailed designs show the limits of loss	Construction of the full extent of the land within the boundaries of each element of the Project (excluding a 15 metre buffer around ancient woodland).	The loss of the full extent of the habitats within the boundaries would be the maximum design scenario resulting in the greatest area of habitat loss and disturbance.
Release of sediment during works to connect the new river diversion and the channels from	Creation of the new river diversion on River Mole, lowering of stretch of river bank for inflow channel from Museum flood compensation area, and new inflow channel from Car Park X flood compensation area.	The worst-case assumption would be a reduction in fish and macro-invertebrate populations. A complete loss of population would be prevented from happening as monitoring and remedial work would be undertaken throughout this period.

Potential Impact	Maximum Design Scenario/worst case assumptions	Justification
flood alleviation areas at Museum Field and Car Park X have potential to cause pollution of River Mole within and downstream of the scheme resulting in loss or change to fish and macroinvertebrate communities.		
2030-2032		
Complete loss (temporary or permanent) of all existing habitats within the areas proposed for development as part of the Project between 2030 and 2032, except where detailed designs show the limits of loss.	Construction of the full extent of the land within the boundaries of each element of the Project (excluding a 15 metre buffer around ancient woodland).	The loss of the full extent of the habitats within the boundaries would be the maximum design scenario resulting in the greatest area of habitat loss and disturbance.
Reduction in predicted area of neutral grassland, marshy grassland, woodland and trees, shrubs and hedgerows. Loss of habitat for bats, breeding birds, GCN and grass snake.	Habitat creation not reached desired level of establishment or partially failed.	The worst-case assumption could occur if the habitat creation associated with the maximum design scenario either fails partially or establishes less quickly than expected. A complete failure of habitat creation would be prevented from happening as monitoring and remedial work would be undertaken throughout this period.

Potential Impact	Maximum Design Scenario/worst case assumptions	Justification
Reduction in area of vegetated riparian (river bank) and in channel habitat. Loss of habitat for fish and aquatic invertebrates.	Habitat associated with River Mole diversion does not establish or partially fails.	The worst-case assumption could occur if the habitat creation associated with the maximum design scenario either fails partially or establishes less quickly than expected. A complete failure of habitat creation would be prevented from happening as monitoring and remedial work would be undertaken throughout this period.
Reduction in GCN, breeding birds, grass snake, bats.	Mitigation not working as effectively or as quickly as expected.	The worst-case assumption would be a reduction in GCN and grass snake populations or a decrease in bat activity and number of breeding birds. A complete loss of population/activity would not happen as monitoring and remedial work would be undertaken throughout this period.
2033-2038		
Unsuccessful habitat creation.	Habitat creation not reached desired level of establishment or partially failed.	The worst-case assumption could occur if the habitat creation associated with the maximum design scenario either fails partially or establishes less quickly than expected. A complete failure of habitat creation would be prevented from happening.
Reduction in GCN, breeding birds, grass snake, bats.	Mitigation not working as effectively or as quickly as expected.	The worst-case assumption would be a reduction in GCN and grass snake populations or a decrease in bat activity. A complete loss of population/activity would not happen.
Design Year: 2038		
Unsuccessful habitat creation.	Habitat creation not reached desired level of establishment or partially failed.	The worst-case assumption would occur if the habitat creation associated with the maximum design scenario either fails partially or establishes less quickly than expected. A complete failure of habitat creation would be prevented from happening.
Reduction in GCN, breeding birds, grass snake, bats.	Mitigation not working as effectively or as quickly as expected.	The worst-case assumption would be a reduction in GCN and grass snake populations or a decrease in bat activity. A complete loss of population/activity would not happen.

Potential Impact	Maximum Design Scenario/worst case assumptions	Justification
2047		
Unsuccessful habitat creation.	Habitat creation not reached desired level of establishment or partially failed.	The worst-case assumption would occur if the habitat creation associated with the maximum design scenario either fails partially or establishes less quickly than expected. This is considered unlikely in 2047 due to the amount of time that would have passed since habitat creation and because there would have been time for remedial action to have rectified any failures. A complete failure of habitat creation would be prevented from happening.
Reduction in GCN, breeding birds, grass snake, bats.	Mitigation not working as effectively or as quickly as expected.	The worst-case assumption that could occur would be a reduction in GCN and grass snake populations or a decrease in bat activity. A complete loss of population/activity would not occur.

9.8. Mitigation and Enhancement Measures Adopted as Part of the Project

9.8.1 A number of measures have been designed into the Project to reduce the potential for impacts on ecology and nature conservation. These are listed in Table 9.8.1.

Table 9.8.1: Mitigation and Enhancement Measures

Measures Adopted as Part of the Project	Justification	How secured
Mitigation and Enhancement		
The locations of all pre-construction archaeology, ground investigation and unexploded ordnance surveys would be assessed for their potential impacts on ecology and nature conservation and appropriate mitigation would be implemented. This would include altering survey locations to avoid damage to features of high value and watching briefs to ensure such features are not impacted upon.	To minimise the impact of construction on features of ecology and nature conservation value.	**ES Appendix 7.8.1: Written Scheme of Investigation for post-consent archaeological Investigations – Surrey** (Doc Ref. 5.3). DCO requirement in Schedule 2. **ES Appendix 7.8.2: Written Scheme of Investigation for post-consent Archaeological**

Measures Adopted as Part of the Project	Justification	How secured
		Investigations and Historic Building Recording – West Sussex (Doc Ref. 5.3). DCO requirement in Schedule 2. **ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.
The Project has been developed to avoid designated sites, areas of woodland and other ecologically sensitive habitats wherever practicable.	To minimise the impact of construction on features of ecology and nature conservation value.	**Works Plans** (Doc Ref. 4.4)- DCO requirement in Schedule 2
The Project has been designed to avoid areas of ancient woodland. Measures would be put in place to ensure that a minimum 15 metre buffer is retained between ancient woodland and construction areas. Appropriately sturdy fencing would be erected around the 15 metre buffer to prevent access by people, materials or machinery to avoid compaction of soils or roots and to avoid any accidental damage. Dust suppression methods would be used to reduce the risk of dust deposition on areas of ancient woodland and a lighting strategy would prevent increased light spill.	To minimise loss of habitats of conservation interest.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.
Any other existing trees, scrub and hedgerows proposed to be retained and incorporated into the design for the Project would be protected during construction. Measures would be put in place to ensure that bat foraging/commuting habitat and areas of trees, hedge or scrub to be retained are adequately protected from damage or destruction during the construction phase of the Project. Protective fencing, in accordance with BS 5837, would be erected around these features to prevent access by people, materials or machinery. This would reduce the risk of accidental damage during construction activities.	To reduce impacts on protected or otherwise notable species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.

Measures Adopted as Part of the Project	Justification	How secured
This assessment is based on the maximum design scenario which assumes all habitats within construction parcels would be lost. However, at detailed design stage, existing features of ecological value would be reviewed to see if they could be incorporated within the design, where feasible to do so.	To minimise the impact of construction on features of ecology and nature conservation value.	Evolution of project in detailed design phase, post consent
Measures for the appropriate storage of materials and fuels and the management of dust during construction activities (such as the breaking up of the existing runway) and runoff (including silt) would be implemented to avoid the pollution of designated sites, ancient woodland and the local water environment during construction. Measures proposed for the construction phase would be managed through the Code of Construction Practice (CoCP). An outline CoCP is provided at Appendix 5.3.2.	To minimise the impact of construction on features of ecology and nature conservation value.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.
A lighting strategy would be included in the CoCP to ensure that construction lighting was directed to where it was needed and did not significantly increase levels of artificial lighting on sensitive habitats, such as retained woodland and river corridors. Lighting will be designed in accordance with Institute of Lighting Professionals /Bat Conservation Trust guidelines. Construction task lighting will be directed to where it is needed only, to avoid light spillage. Accessories such as hoods, cowls and shields will be used to direct light to the intended area only. Light levels will be as low as the guidelines permit. If construction lighting is not needed, it will be avoided	To minimise the impact of lighting during the construction phase on features of ecology and nature conservation value.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.
Lighting design principles will be considered in the development of detailed design, as per the Operational Lighting Framework in Appendix 5.2.2. These principles include details of the installation requirements of permanent lighting to be installed for the operational phases of the Project including positioning and the use of shields to prevent unintended light spill.	To minimise the impact of lighting during the operational phase on features of ecology and nature conservation value.	Design principles – DCO Requirement

Measures Adopted as Part of the Project	Justification	How secured
Lighting would be designed to avoid disturbance to areas of value for bats by shielding adjacent habitats of value.		
The small areas of semi-natural broadleaved woodland due to be lost would be cleared sensitively so that any bluebell bulbs could be collected and replanted within new or existing woodland.	To reduce impacts on protected species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.
Surface access works undertaken along the margins of Pond F, or within close proximity to it, would be undertaken following an ecology method statement and with an Ecological Clerk of Works present to reduce the likelihood of effects on the pond and pennyroyal.	To reduce impacts on protected species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.
Suitable habitat for breeding birds would be cleared between October and mid-February, outside the breeding bird season, as far as practicable. Where this is not feasible the vegetation, building or structure due to be removed would first be inspected by a suitably qualified ecologist. Any active nests would be retained along with a minimum 5 metre buffer around them. Any nest of a Schedule 1 species found to be active during construction works would be protected by a suitably sized buffer that would be identified by a suitably experienced ornithologist. Where necessary, such nests would be monitored during construction by the ornithologist for signs of disturbance and where necessary methods would be altered to prevent it	To reduce impacts on protected or otherwise notable species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.
Pre-construction surveys will be carried out to identify any protected species (including GCN, dormice, bat, reptile, peregrine, little ringed plover and firecrest) within the area. This will inform any necessary applications for protected species licences and any method statements which are required to be complied with during the construction period, and will inform detailed LEMPs during the operational period.	To reduce impacts on protected species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2. **ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO

Measures Adopted as Part of the Project	Justification	How secured
		requirement in Schedule 2. Any necessary protected species license
Previous work on bird and bat strike risk management has been taken into consideration during the design process, including in the chosen locations and specification of new landscape planting. This includes the continued management of the airfield to limit its value for both birds and bats.	To minimise the impact of operation on features of ecology and nature conservation value and to safeguard operation of the airport.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Receptor areas for GCN and grass snake would be prepared, and the species translocated into these areas, using appropriate methods and timings, prior to construction commencing within suitable habitats.	To reduce impacts on protected species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2. **ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2 and any necessary GCN license.
Areas of lower value reptile habitat that could support low numbers of grass snake, such as the drainage ditches and tree lines around and within car parks, would be cleared sensitively with an ecological clerk of works present.	To reduce impacts on protected species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2.
Active badger setts that would be damaged or destroyed, or which could result in badgers using them being disturbed, would be closed using appropriate methods and timings.	To reduce impacts on protected species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in Schedule 2 and badger license
The following measures would be implemented to ensure that no badgers are harmed during the construction phase:	To reduce impacts on protected species.	**ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3). DCO requirement in

Measures Adopted as Part of the Project	Justification	How secured
▪ suitably sturdy fencing to be erected around all construction works to deter foraging badgers from the works' areas; ▪ any excavated holes to have a wooden board placed in them over night so as to provide a means of escape should any badgers accidentally enter the excavation; and ▪ any chemicals to be securely stored at night in a locked container. In order to avoid attracting badgers to the works area any food waste would be disposed of in appropriate bins or removed from site at the end of each day.		Schedule 2 and badger license
Creation of new, high value habitats comprising a mixture of wet and dry neutral grasslands along the new channel of the River Mole and within the Museum Field to provide new habitats for fauna displaced during the diversion of the River Mole and construction of the flood compensation area, including grass snake and terrestrial invertebrates.	To minimise the impact of construction on features of ecology and nature conservation value.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Creation of an earth bund in the south and east of Museum Field to provide a mosaic of habitats comprising scrub, grassland and bare or poorly vegetated ground to provide a matrix of habitats suitable for a variety of invertebrates.	To minimise the impact of construction and provide an enhancement to features of ecology and nature conservation value.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Creation of new habitats within a newly created ecology area in the western part of the Project site (Brook Farm) comprising woodland, wet woodland, scrub and tree planting and species-rich grassland. The design of this area will enhance habitat used by foraging bats (including Bechstein's bat), helping to encourage bats away from both the new and existing runways.	To minimise the impact of construction on features of ecological and nature conservation value.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Tree and shrub planting to compensate for loss of existing habitat within built-up areas (such as car parks) to provide nesting sites for breeding birds and to maintain and enhance connectivity for foraging and commuting bats.	To minimise loss of habitats of conservation interest and to reduce impacts on protected species. To improve habitat connectivity	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO

Measures Adopted as Part of the Project	Justification	How secured
	around the perimeter of the site for bats.	requirement in Schedule 2.
Woodland creation to compensate for loss of existing habitat, to provide nesting sites for breeding birds and to maintain connectivity for foraging and commuting bats to compensate for the loss of woodland and scrub due to highway improvements. New woodland would be created along new road alignments.	To minimise loss of habitats of conservation interest and to reduce impacts on protected species.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Woodland, scrub and species-rich grassland creation within Car Park B to provide an extension of Riverside Garden Park and to compensate for habitat loss along the highway.	To minimise loss of habitats of conservation interest.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Restoration of temporary land take to habitats of existing or greater ecological value.	To minimise loss of habitats of conservation interest.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
The retention of a strip of woodland between the Gatwick Stream and new highway alignments/water attenuation area to retain a dark corridor and well-used bat foraging and commuting route.	To minimise loss of habitats of conservation interest and to reduce impacts on protected species.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Creation of new habitats within a newly created mitigation area north and east of Longbridge roundabout comprising woodland, scrub and tree planting and species-rich, wet and dry grassland creation to compensate for construction and highway related habitat losses. Marginal planting would also be introduced around new attenuation ponds	To minimise the impact of construction on features of ecology and nature conservation value.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.

Measures Adopted as Part of the Project	Justification	How secured
Creation of woodland belts in Pentagon Field to compensate for woodland and trees lost in other parts of the site in a location that extends existing woodland and enhances connectivity.	To minimise loss of habitats of conservation interest.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
An existing non-native hedgerow comprising Leyland cypress between the A23 London Road and Perimeter Road East would be replaced with a native species-rich hedgerow.	To strengthen habitat connectivity east of the airfield.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Provision of bat roost features within higher value habitats away from the airfield and suitable for the species present.	To compensate for loss of existing bat roost features.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Landscape planting to include a variety of native trees and shrubs and wildflower grasslands.	To provide habitats of conservation interest and improve habitat connectivity.	Design Principles – DCO Requirement **ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Tree and shrub planting to reinforce retained tree lines within existing car parks and to improve habitat connectivity across them.	To provide habitats of conservation interest and improve habitat connectivity.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO

Measures Adopted as Part of the Project	Justification	How secured
		requirement in Schedule 2.
Creation of an attenuation pond supporting reedbed to the north of South Terminal Roundabout to provide a high value habitat.	To provide habitats of conservation interest.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Woodland creation and tree and shrub planting.	To provide habitats of conservation interest and improve habitat connectivity.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Diversion of the River Mole would create an increased length of channel with a more sinuous, natural course. The diversion will have a two stage profile with a central low flow channel and a higher bench or berm to provide flood capacity.	To provide habitats of conservation interest and improved geomorphological function.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
The airfield satellite construction compound would occupy land outside of the River Mole diversion footprint to allow the new river channel to establish early in the Project. A minimum 8 metre buffer would be created along the channel.	To provide habitats of conservation interest and safeguard river bank habitat.	CoCP – DCO Requirement
Creation of refugia and hibernacula within newly created habitats for GCN and grass snake.	To provide habitats of conservation interest.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Where trees with potential bat roost features (PRF's) require removal, those trees with Low bat roost potential will be subject to a supervised soft-	To ensure any bat roosts are identified and any loss suitably mitigated	**ES Appendix 5.3.2: Code of Construction**

Measures Adopted as Part of the Project	Justification	How secured
felling methodology and those with Medium or High bat roost potential will be subject to climbing inspections and/or dusk emergence/dawn re-entry surveys as appropriate to inform where further mitigation was required. This would include an application for a Natural England licence with supporting method statement. A range of bat boxes suitable for the species recorded foraging and commuting in the area and which imitate the type of PRF's present in trees would be installed on retained trees prior to any vegetation clearance to ensure that was not an overall loss of roost features available		**Practice** (Doc Ref. 5.3)Bat licence, if required **ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Monitoring		
Monitoring of GCN and grass snake populations affected.	To determine success of mitigation and identify remedial measures if required.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2. GCN license if required
Monitoring of bat activity.	To determine success of mitigation and identify remedial measures if required.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Monitoring of badger setts.	To determine success of mitigation and identify remedial measures if required.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2. Badger license

Measures Adopted as Part of the Project	Justification	How secured
Undertake habitat condition assessments	To determine success of habitat creation in delivering anticipated biodiversity net gain.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.
Undertake River Condition Assessment at three intervals following creation of river diversion.	To determine success of river diversion in providing new ecological habitats and improving geomorphological function.	**ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3). Landscape proposals will be secured as a DCO requirement in Schedule 2.

9.9. Assessment of Effects

9.9.1 This assessment is based on the elements of the Project described in Chapter 5 of this ES and shown on Figures 5.2.1a to 5.2.1h. The surface access improvements described in the assessment are shown on Figures 41710-XX-C-HGN-GA-20001 to 20005.

9.9.2 The locations of the statutory and non-statutory designated sites described in this section are shown on Figures 9.6.1 and 9.6.2 and the habitats described are shown on Figure 9.6.3. The distributions of species are shown on Figures within Appendices 9.6.2 to 9.6.4.

9.9.3 The extent of loss of areas of habitat is shown on Figures 2.1-2.6 of Appendix 9.9.2.

9.9.4 The habitat creation proposed as part of the surface access improvements is shown on the Landscape Proposal sheets at Figure 509 and proposed habitat creation in other parts of the Project site are shown on Figure 5.2.1g.

9.9.5 The assessment is based on the mitigation measures designed into the Project, as described in Table 9.8.1.

9.9.6 The timings provided in the Construction Phasing Schedule provided in Chapter 5 have been used to guide this assessment although it should be noted that they are indicative only.

Pre-Construction: Up to 2024

9.9.7 A number of pre-construction surveys would be undertaken, both for ecology (including for birds, reptiles and other protected species) and other disciplines. These would include intrusive surveys such as ground investigation excavations and archaeological trial trenching, together with unexploded ordnance surveys. The measures designed into the Project would ensure that high value habitats would be avoided as far as practicable and that any localised impacts on habitats for protected species, such as nesting birds, grass snake and GCN would be avoided.

9.9.8 Effects would be controlled through the CoCP, which would ensure that ecological constraints are taken into account in agreeing the locations and methodologies for these pre-construction works and ensuring they were not significant.

Initial Construction Period: 2024-2029

Statutory Designated Sites

9.9.9 There are no statutory designated sites within the Project site boundary. The nearest statutory designated site of County importance is Willoughby Fields LNR, located approximately 786 metres from the Project site. The nearest site of national importance is Glover's Wood SSSI, located approximately 1.67 km away, while the nearest site of international importance is Mole Gap to Reigate Escarpment SAC, approximately 9.27 km away.

9.9.10 Due to the distance between the statutory designated sites and the Project site boundary, and the mitigation measures designed into the Project to ensure that potential pollutants are prevented from reaching them, the construction of the Project would have no impact on statutory designated sites. Measures for the appropriate storage of materials and fuels and the management of dust during construction activities (such as the breaking up of the existing runway) and runoff (including silt) would be implemented to avoid pollution events from occurring, as set out in Table 9.8.1. Further details of the pollution control measures that would be put in place can be found in Appendix 5.3.2: Code of Construction Practice.

9.9.11 Further details of the assessment of effects on internationally designated sites are provided in Appendix 9.9.1: Habitats Regulations Assessment Report. There would be no effect arising at designated sites as a result of loss or alteration to the habitats or disturbance or harm to species present. Given this, the magnitude of impact and significance of effect on these international, national and county value receptors would be **no change** and therefore not significant.

Non-statutory Designated Sites

9.9.12 There is one non-statutory designated site adjoining the Project site: Horleyland Wood LWS, which is ancient woodland located south of the Project site.

9.9.13 A foul water pipeline would be constructed along the eastern and southern boundaries of Horleyland Wood LWS. The pipeline would predominantly be located within lower value habitats associated with the Old and New Lagoon but could result in a small loss of woodland and/or broadleaved trees adjoining and outside the LWS boundary. The final pipeline location will be designed to ensure no loss of ancient woodland would occur.

9.9.14 The loss of individual trees and/or a small area of woodland resulting from the Project requirements for the foul water pipeline would result in a small decrease in the overall habitat resource connecting to the LWS. The overall area of loss would be small and connectivity to other higher value habitats within the vicinity would be maintained and therefore the functionality of the LWS would not be affected.

9.9.15 Pollution control measures set out in Table 9.8.1 and the use of physical barriers to protect retained vegetation are designed into the Project to reduce the likelihood of the foul water pipeline works resulting in accidental damage to the LWS.

9.9.16 The temporary and localised nature of the works would have no impact on the hydrology of the woodland.

9.9.17 Construction works on the airfield, and to the south of it, associated with new taxiways, MA1 main construction compound and valet MA-1 car park would be approximately 200 metres away at the nearest point but separated from the woodland by the mainline railway and main A road (A23). Potential pathways for pollutants to reach the LWS would therefore be reduced and pollution control measures designed into the Project would remove the risk of pollution events occurring.

9.9.18 Measures designed into the Project (set out in Table 9.8.1), including installing protective fencing around retained vegetation and ensuring that potential pollutants are prevented from reaching the non-statutory designated sites, would ensure that the Project would have a negligible impact upon Horleyland Wood LWS. There would therefore be a short-term, negligible effect due to loss or alteration to the adjoining habitats or disturbance or harm to species present. As such, the magnitude of impact and significance of effect on these County value receptors would be **negligible** and therefore not significant.

9.9.19 Highway improvement works to Longbridge roundabout are anticipated to commence in 2028. This would result in works being undertaken within 150m of Withy Gill SNCI. The SNCI would be separated from construction works by agricultural land and no direct habitat loss would occur.

9.9.20 The Withy SNCI comprises wetland habitat that would be sensitive to any changes to water quality. The risk of pollution incidents occurring as a result of the Project would be mitigated through the use of pollution control measures. Therefore, the risk of a pollution event affecting the habitats or species present within the SNCI would be negligible. The magnitude of impact and significance of effect on the County receptors would be **negligible** and therefore not significant.

9.9.21 Works to create ecological enhancements to the area north east of Longbridge roundabout are anticipated to have commenced in 2028 but would not have established sufficiently to offer any beneficial effects to The Withy SNCI by increasing the resource of wetland habitat in close proximity. Any potential detrimental effects during the construction of the enhancement features would be mitigated using pollution control measures and would not result in the significance of effect increasing from **negligible** and therefore not significant.

9.9.22 The Roughs SNCI and two pSNCIs; Bridges Fields and Bridges Wood, are located within 120m of the eastern Project boundary and the works area of the improvements to the South Terminal roundabout. However, they are separated from it by agricultural land and the M23 motorway.

9.9.23 The Roughs and Bridges Wood comprise ancient woodland and damp grassland and would be sensitive to both dust deposition and changes to water quality. No description was provided for Bridges Fields but it is likely to support habitats and species that would be detrimentally affected by pollution.

9.9.24 The agricultural land and the motorway between construction areas and the SNCIs would reduce the likelihood of pollution events occurring and mitigation measures designed into the Project to control pollution (set out in Table 9.8.1) would prevent any from reaching the non-designated sites resulting in no change to them. The distance and the small scale of the works near to the SNCI's/pSNCI's would mean there would be no change to the hydrological regime**.** The magnitude of impact and significance of effect on the County receptors would be **no change** and therefore not significant.

9.9.25 Both Gatwick Woods BOA and the River Mole BOA fall partially within the Project boundary. The parts of the Gatwick Woods BOA affected by the Project include the western extent of a narrow strip of broadleaved plantation woodland that would be lost as part of the surface access improvements and the temporary disturbance to agricultural land at Pentagon Field whilst it was used for spoil deposition. There would also be the potential for the degradation of adjoining habitats which are considered in the assessment of effects on semi-natural broadleaved woodland (para. 9.9.59), ancient woodland (para. 9.9.35) and Horleyland Wood LWS (para. 9.9.11) and all found to be not significant for the habitats within the BOA.

9.9.26 Upon completion of the works at Pentagon Field, new tree planting would be undertaken along the eastern boundary resulting in increased woodland within the BOA. This would contribute towards the BOA's targets to create more woodland and creating ecological enhancements. The overall impact due to the very small loss of woodland from surface access improvements and the creation of a larger area of new woodland, that would also contribute to ecological networks, would be low resulting in an overall **minor beneficial effect** to a receptor of county value and would not be significant.

9.9.27 The parts of the River Mole BOA affected by the Project include the river corridor north of the A23 comprising semi-natural broadleaved woodland, semi-improved neutral grassland and scattered trees that would be affected by the North Terminal roundabout improvements and Longbridge roundabout alterations. The objectives of the BOA are to restore and create the following priority habitats; floodplain grazing marsh; wet woodland; rivers; meadows; and, reedbeds.

9.9.28 The Project would not directly affect the target habitats of the BOA. However, it would result in the small loss of bankside habitat of rivers which would result in a low impact, given the very small area of the overall habitat resource within the BOA, and it would not prevent the BOA targets being achieved.

9.9.29 The BOA also sets targets for the stabilization or recovery or the following priority species; marsh stitchwort; harvest mouse; water vole; otter; brown trout; and European eel. Where there is potential for these species to be present within the Project boundary, an assessment of effects has been undertaken for each species later in this section (9.9) of the chapter. There have been no significant effects identified for any of the species identified and therefore the Project would not impact on the achievability of the BOA's targets.

9.9.30 A low impact on a receptor of county value would result in a **minor adverse** effect which would not be significant.

9.9.31 The remaining non-statutory designated sites are more than 700 metres from the Project site boundary and are therefore less sensitive to effects from construction so no further effects have been identified.

9.9.32 As set out in Chapter 13 Air Quality, modelling of aerial emissions from construction traffic with respect to gaseous nitrogen oxides (NO_x) and ammonia (NH_3) along with corresponding nitrogen deposition from both gases has been undertaken. No modelled receptor points within non-statutory sites were found to have increases in any pollutant considered to be potentially significant (ie >1% of the critical load/level). The magnitude of impact and significance of effect on the County receptors would be **no change** and therefore not significant.

Ancient Woodland

9.9.33 Four areas of ancient woodland are present immediately adjacent to the Project site boundary: Horleyland Wood; Lower Picketts Wood; Brockley Wood and a section of woodland along the north west side of the River Mole. A further two areas are located within 120m to the northeast; The Roughs and Bridges Wood and one area; Huntsgreen Wood, is located 75 metres south of the Project boundary.

9.9.34 A number of measures to remove or reduce the risk of effects on ancient woodland form part of the Project, as described in Table 9.8.1 and listed below:

- A minimum 15 metre buffer would be retained between all ancient woodland and work areas to protect tree roots and prevent compaction of soils;
- Sturdy fencing would be used along the outer edge of the 15 metre buffer to prevent access by personnel, machinery or storage of materials;
- A lighting strategy during construction and the Operational Lighting Framework would ensure no increased light spill on ancient woodland; and
- Pollution control measures, including dust suppression, would prevent any accidental damage from air- or waterborne contaminants occurring to ancient woodland.

Horleyland Wood, The Roughs and Bridges Wood

9.9.35 Horleyland Wood, The Roughs and Bridges Wood are LWS and the potential effects already described above for non-statutory designated sites would be the same for the ancient woodland they support. The measures to protect LWS and ancient woodland would be used.

Lower Pickett's Wood

9.9.36 Lower Pickett's Wood is located 70m south of Pentagon Field which would be reprofiled following deposition of soil arisings from the construction of the Museum Field flood compensation area. Therefore, a larger, 70 metre buffer comprising broadleaved plantation woodland would be provided. This would remove the risk of soil compaction within the root protection zone of trees within Lower Pickett's Wood and further limit the risk of airborne dust reaching the ancient woodland although dust suppression methods would also be used.

Brockley Wood

9.9.37 Construction works associated with creating the diversion of the River Mole corridor would be undertaken in proximity (approximately 30 metres) to Brockley Wood, resulting in the loss of some of the habitats to the south of it, comprising marshy grassland and semi-natural broadleaved woodland. However, species-rich grassland would be reinstated upon completion of the diversion works. The loss of a strip of semi-natural broadleaved woodland that connects to the ancient woodland would result in a small reduction in the overall habitat resource in the vicinity but would not reduce connectivity due to the airfield already creating a barrier to further areas of woodland to the south.

9.9.38 The airfield satellite contractor compound would be located approximately 200 metres south east of Brockley Wood.

9.9.39 The Project would ensure a minimum 15 metre buffer would be provided, which would include a 10 metre strip of semi-natural broadleaved woodland, to ensure protection from accidental damage and soil and tree root compaction. The diversion of the River Mole would be located

lower than Brockley Wood and downstream from it and would therefore not affect the hydrological flows into the woodland. The other embedded measures would reduce the risk of pollution events or increased lighting affecting the woodland.

Other areas of ancient woodland

9.9.40 The measures that form part of the Project (set out in Table 9.8.1) are also sufficient to mitigate the potential effects on the remaining areas of ancient woodland identified close to the Project boundary but considered sufficiently far to ensure there is no risk of other impacts occurring.

Assessment of effects

9.9.41 Implementation of the measures described above would ensure that the Project would have no impact upon ancient woodland during the construction period. There would be no impact resulting in loss or alteration to the habitats or increased disturbance. Given this, the magnitude of impact and significance of effect on this receptor of national value would be **no change** and therefore not significant.

9.9.42 As set out in Chapter 13 Air Quality (see Appendix 13.4.1), modelling of aerial emissions from construction traffic with respect to gaseous nitrogen oxides (NO_x) and ammonia (NH_3) along with corresponding nitrogen deposition from both gases has been undertaken. These identified a small number of exceedances of a 1% threshold of the critical level for NO_x (30 $\mu g.m^{-3}$) within ancient woodland during the construction phase. However, the maximum final concentration of NO_x once the contribution from construction traffic is included where the contribution is >1% of the critical level is 44.9 $\mu g.m^{-3}$. At these concentrations, the effects of NO_x on flora tend to be in respect of changes in growth patterns due to the fertilising effect of nitrogen rather than directly toxic (WHO 2000). The fertilising effect is dealt with directly by the critical load and associated nitrogen deposition. Therefore, the impact of changes in NO_x due to construction emissions on the ancient woodland is considered to be no change with respect to both impact and significance.

9.9.43 The changes to nitrogen deposition within ancient woodland predicted during construction includes a number of receptor points where the modelled values exceed 1% of the critical load (10 $kg.ha^{-1}.yr^{-1}$). These locations are adjacent roads with the peak increase predicted within woodland at the junction of Balcombe Road and Crawley Avenue (1$kg.ha^{-1}.yr^{-1}$, 10% of the critical load). However, this is in the context of an existing background in this location of >60$kg.ha^{-1}.yr^{-1}$. For the other ancient woodland sites within the modelled extent, the increase in nitrogen deposition is generally low and occurs directly adjacent to the road side (ie where the existing road passes through/adjacent to ancient woodland). As such, given the very high existing deposition rate within the woodlands and the localised nature of any effects (generally directly adjacent to the road) the impact on ancient woodland from changes in air quality would therefore be considered to be a medium term and low magnitude impact to a receptor of National importance resulting in a **minor adverse** significance of effect which is not considered to be significant.

Habitats

9.9.44 The overall change in habitats across the site and the Project approach to Biodiversity Net Gain is shown in Appendix 9.9.2 Biodiversity Net Gain Statement.

Semi-natural Broadleaved Woodland and Mature Broadleaved Trees

9.9.45 Areas of semi-natural broadleaved woodland and individual broadleaved trees would be lost due to the following construction works that would require site clearance anticipated between 2024 and the end of 2029 (indicative dates set out below):

- Diversion of River Mole from 2024.
- Museum Field flood compensation/storage area and haul road from 2024.
- Car Park X flood compensation area from 2024.
- Noise mitigation feature from 2024.
- Construction of hotel and multi-storey car park in existing Car Park H from 2025.
- North Terminal long stay decking from 2027.
- Lead-in works for the surface access improvements from 2028.
- South Terminal roundabout contractor compound from 2028.
- Longbridge roundabout contractor compound from 2028.
- Car Park B compound from 2029.

Lead-in works for surface access improvements, south terminal roundabout contractor compound, Longbridge roundabout contractor compound and car park B compound

9.9.46 The lead-in works for the surface access improvements would require construction works and working areas to be created along the southern edge of Riverside Garden Park westwards to Longbridge roundabout.

9.9.47 This would result in the direct loss of a strip of semi-natural broadleaved woodland north of the highway. Woodland to the north would be retained, ensuring a substantial amount of the existing woodland within Riverside Garden Park would remain along much of the working area. This would ensure habitat connectivity was not lost along most of the route.

9.9.48 The existing woodland narrows at the north-western end of the works area north of the A23 where it lies parallel to the Gatwick Stream and then the River Mole. The woodland along the southern side of the streams would be predominantly removed along this section to facilitate construction works but the Project has been designed to ensure a strip of the existing scrub and some woodland along the streams would be retained to maintain connectivity between woody habitats and a dark corridor. However, a small area of woodland would be removed from both sides of the River Mole immediately south of the bridge under the A23 Brighton Road.

9.9.49 A small area of woodland would be lost to the south of the A23 London Road, also bordering the River Mole.

9.9.50 Individual broadleaved trees would also be lost due to the lead-in works for the surface access improvements around Longbridge roundabout in 2028. The commencement of works would result in the loss of all trees within the Project site boundary to the north of the roundabout and along the A23 Brighton Road to the north-east. Broadleaved trees would also be lost from the area west of the roundabout and from on the roundabout.

9.9.51 As well as the direct loss of habitat, the loss of woodland and trees would result in a loss of habitat connectivity at the north-western end of the Project, reducing the ability for flora and fauna to disperse across the landscape.

9.9.52 The extent of the surface access improvement works is shown on the general arrangement plans (Figure reference 41700-XX-C-HGN-GA-200001-200005).

9.9.53 Upon completion of the surface access improvement works (anticipated in 2031 and 2032), new areas of linear broadleaved woodland would be created along the new highway alignment. The overall depth of woodland to the north of the highway would be less due to the additional land take of the new highway but habitat connectivity would be fully reinstated by creating a continuous linear strip of broadleaved woodland along the full length of the highway. To further compensate for the loss of habitat, and to strengthen habitat connectivity to the east, additional broadleaved woodland would be planted within the adjacent Car Park B.

9.9.54 An additional area of broadleaved woodland would also be created in Church Meadows, north-east of Longbridge roundabout, and new tree and shrub planting would be undertaken north of the roundabout. This would further compensate for the loss of woodland as a result of the highway aspects of the Project and reinstate the habitat connectivity lost as a result of it.

9.9.55 The proposed woodland planting is shown on the Gatwick NRP Surface Access Landscape Proposals (RPS Drawing / Figure Number; 501 and in the **ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3)).

9.9.56 Due to the lack of vegetation during the construction period and the time it would take new planting to establish, there would be a long-term loss of habitat and reduction in connectivity.

9.9.57 The lead-in works for the surface access improvements around the South Terminal roundabout would result in the loss of mature broadleaved trees along the B2036 Balcombe Road. The maximum design scenario considers the loss of the full length of field boundary whereas efforts would be made to ensure loss was limited to the minimum area required for access to the site during construction.

9.9.58 In 2028, site clearance is anticipated to have been undertaken resulting in the permanent loss of some woodland, with the remaining woodland being temporarily lost until construction works were complete in 2031 when new woodland planting would be undertaken. Some permanent loss would be required to provide an access route to an attenuation pond post-construction.

9.9.59 These works would be undertaken during the same time period as the vegetation clearance previously described to enable the surface access improvements further north. However, these works would be separated from them and would not have an effect on habitat connectivity between the two areas as they do not comprise a significant part of the east-west highway woodland corridor.

Diversion of the River Mole and other aspects of the project resulting in the loss of semi-natural broadleaved woodland and trees

9.9.60 The remaining aspects of the Project that would result in the loss of semi-natural broadleaved woodland or broadleaved trees are anticipated to be undertaken earlier in the anticipated Project construction timeline; in approximately 2024 and 2025.

9.9.61 The diversion of the River Mole would result in the loss of a narrow strip of broadleaved woodland connected to further areas of broadleaved woodland to the north, including Brockley Wood. This would result in the permanent loss of a relatively small area of woodland, given the overall resource in the vicinity. It would not reduce habitat connectivity due to the strip being lost not

connecting to other woody habitats. The airfield to the south also prevents connectivity to other similar habitats.

9.9.62 The route of the new river corridor would prevent woodland creation in the area where it was lost. Therefore, it would be compensated for through woodland creation on land west of the River Mole where it would contribute to creating a more diverse network of habitats with better connectivity to the wider countryside.

9.9.63 The remaining construction works previously listed would result in the loss of small areas of semi-natural broadleaved woodland from existing larger woodland areas. Therefore, despite the loss, areas of woodland would be retained in each location. Individual broadleaved trees would also be lost from some of the locations, including small clumps of trees and tree lines. No ancient or veteran trees would be lost.

Woodland and tree planting

9.9.64 Further woodland and tree planting included in the Project design, would be undertaken early in the Project programme in other areas within the Project site, such as within Pentagon Field and the land west of the River Mole, to compensate for the losses described, in addition to the highway planting that would be undertaken later in the Project. This would be described in the **ES Appendix 8.8.1: Outline Landscape and Ecology Management Plan** (Doc Ref. 5.3) (set out in Table 9.8.1). The woodland would still be young in 2029 and would therefore not directly compensate for the loss of any woodland until it had matured and there would be a long-term loss of woodland and trees due to the amount of time it would take for the new planting to reach maturity. New tree planting would comprise a variety of native species, including examples of those lost and the introduction of other species of local provenance.

9.9.65 The measures designed into the Project would ensure retained areas of woodland adjacent to working areas were protected from physical damage.

Assessment of effects

9.9.66 Figures 2.1 – 2.6 of Appendix 9.9.2 show the progressive loss/gain of habitats, including woodland, through the duration of the Project. The combined loss of semi-natural broadleaved woodland and trees would result in the long-term reduction in the amount present until new planting had matured beyond 2029 (approximately 2060). It would not completely remove semi-natural broadleaved woodland from any area or leave a remaining area too small to continue to function. It would also not result in a reduction in habitat connectivity in most areas due to sufficient connections being retained and protected or due to the woodland or trees being lost offering little or no connections to other habitats. The majority of the woodland loss would occur during enabling works for the surface access improvements along the A23 (Figure 2.1 of Appendix 9.9.2).

9.9.67 The exception to this would be in the north of the Project site where the lead-in works for the surface access improvements would result in a reduction in connectivity due to the loss of all, or substantial areas of, woodland and trees, when considered with the loss of broadleaved plantation woodland in the same area. However, habitat connectivity in this location is already reduced due to the network of roads. The overall loss of semi-natural broadleaved woodland and broadleaved trees within the Project boundary and the resulting loss of habitat connectivity would therefore be considered to be a long term, reversible and medium magnitude impact to a receptor

of National importance resulting in a **moderate adverse** significance of effect which is considered to be significant. However, this should be seen in the context of the significance of impacts by the time of the later assessment years (paragraph 9.9.407).

Hedgerows

9.9.68 The reconfiguration of airport facilities anticipated in 2025-2026 associated with relocating the motor transport facilities and Rendezvous Point North (as described in the project description at Chapter 5) would result in the partial loss of species-poor hedgerows within existing car parking areas, the locations of which are shown on Figure 9.6.3**.** The hedgerows are relatively low value habitats due to their locations within large areas of hard standing and their low species diversity and lack of connectivity to the wider landscape.

9.9.69 The improvements to the South Terminal roundabout have been redesigned following the PEIR to retain a species-poor hedgerow with trees which forms part of an east-west habitat corridor north of the M23.

9.9.70 Landscape planting would be undertaken around the new facilities and car parking that would include the creation of native, species-rich hedgerows to compensate for those lost. However, this would not occur until after the works were complete, anticipated to be beyond 2029. There would be a long-term loss of hedgerows followed by a long-term increase in hedgerow value, due to species-poor hedgerows being replaced with species-rich hedgerows. The overall impact would be negligible on a receptor of National importance resulting in a medium-term **negligible** significance of effect and therefore not significant.

9.9.71 Once established, the additional planting would result in a long-term medium magnitude impact to a receptor of National importance resulting in a **moderate beneficial** significance of effect which is considered to be significant.

Watercourses

9.9.72 General airfield construction activities and the start of the construction of the North and South Terminal roundabout improvement works have the potential to impact on all watercourses, the locations of which are shown on Figure 9.6.3. The A23 Brighton Road and London Road bridges over the River Mole would be widened requiring an extension to the existing culvert. This would result in the loss of bank habitat and some additional shading of the river. Best practice measures to mitigate the construction impacts including measures to reduce run-off of silt into the channel (implemented through the CoCP and reported in Chapter 11: Water Environment) would substantially control impacts and no significant effects have been identified.

9.9.73 Flood compensation works would be undertaken in the west and south of the Project site. This would include the construction of a new channel connecting the River Mole to the Museum Field and east of Museum Field flood compensation areas and the potential construction of two new connections between River Mole/Crawter's Brook to the Car Park X flood compensation area.

9.9.74 The construction of the new channels would result in the short-term loss of two small sections of the existing riverbank where they connect to the River Mole. Disturbance to bankside habitat including loss of emergent reed margin has the potential to release sediment resulting in increased suspended solids and downstream accretion. There is also potential for change to the hydromorphology of the channel in the immediate vicinity of the connections although the new channels have been designed to minimise disruption to hydromorphology. In the long-term, new

bank side habitats would develop along the new channels resulting in a net increase in bankside habitats.

9.9.75 The measures set out in Table 9.8.1 would protect the River Mole from potential pollution from increased levels of suspended sediment. This would include the use of settlement traps to limit the amount of sediment entering the stream during channel construction.

9.9.76 There would be a short-term impact on water quality when the channels connecting the Museum Field and Car Park X flood compensation areas are connected to the River Mole. This may be expected to affect the immediate area and downstream of the works. However, suspended sediment levels in the River Mole are relatively high, and given the temporary nature of the impact and measures included in the **ES Appendix 5.3.2: Code of Construction Practice** (Doc Ref. 5.3) this would result in a short-term, negligible impact to a receptor of County value resulting in a **negligible** significance of effect and therefore not significant.

9.9.77 The creation of new bankside habitats and channels, connecting flood compensation areas to the River Mole, that are intermittently wet would increase the overall habitat resource. This would result in a long-term, low impact to a receptor of County value resulting in a **minor beneficial** significance of effect and therefore not significant.

9.9.78 A short (350 metre) section of the River Mole would be diverted as part of the Project, and the existing Pond A infilled. The diversion would follow a more sinuous course than the existing reach which runs parallel with the northern boundary of the airport. The diversion would be circa 550 metres in length, therefore creating circa 200 metres of new watercourse. It would be a two-stage channel with a narrow low flow channel and a marginal berm at a higher level to carry flood flows. The sinuosity would allow for the development of natural hydromorphological features such as pools and riffles thus creating a wider range of ecological habitats for fish, macroinvertebrates and macrophytes. The infilling of Pond A and creation of the new channel is anticipated to take place during the first year of construction, 2024. The new channel will be filled with water and plant material and sediment transferred from the existing channel to aid establishment prior to the flow being transferred to the new channel. The existing section of river would then be infilled.

9.9.79 There would be a medium-term negative impact on the river following the connection of the new channel due to the small loss of part of the original channel and before flora have not fully established and associated fauna have not colonised the new channel. Given that a relatively short stretch of the river would be affected, this would result in medium-term, low impact to a receptor of County value resulting in a **minor adverse** significance of effect and therefore not significant.

9.9.80 In the long-term, new and translocated habitats and species would be establishing within the new channel. Habitats adjoining the new river corridor would also be restored to wet grassland from 2035 when the airfield satellite contractor compound is anticipated to be decommissioned. This would result in a longer length of stream and associated habitats, designed to be of higher value than the section of river lost, resulting in a long-term, medium impact on a receptor of County value. This would result in a **moderate beneficial** effect and therefore significant.

9.9.81 Any failures in habitat or species establishment identified during monitoring would mean the realignment could continue to have a medium-term negative impact on the river. Given a relatively short stretch of the river would be affected, this would result in a medium-term, low impact to a receptor of County value resulting in a **minor adverse** effect.

Ponds (NERC S.41 Habitat)

9.9.82 No ponds qualifying as a NERC S.41 Habitat would be directly impacted by the Project. Measures to protect habitats of value designed into the Project, including pollution prevention measures and the erection of sturdy fencing around higher value habitats, as set out in Table 9.8.1, would ensure that no adverse effects are likely. The magnitude of impact and significance of effect would be **no change** and therefore not significant.

Ponds (not NERC S.41 Habitat)

9.9.83 Two ponds, shown on Figure 3.3 of Appendix 9.6.2 would be lost due to the Project. Pond A would be lost, anticipated during the period 2026 to 2027, to allow for the construction of Taxiway Juliet West and Pond FFJ is anticipated to be removed in 2029 to allow for the construction of Taxiway Juliet West Spur.

9.9.84 No new pond creation is proposed due to airport safeguarding requirements regarding wildlife strike hazards.

9.9.85 Pond F would be affected due to the construction of a retaining wall along it to allow the rearrangement of the westbound access from the South Terminal roundabout. The retaining wall would be likely to be constructed using a sheet pile method. As such, there is the potential to cause an increase in silt within the pond during piling as well as disturbance of fish and other wildlife using it. Any disturbance or changes to water quality would be temporary and reversible in the medium-term.

9.9.86 The permanent loss of Pond FFJ and Pond A and the medium-term disturbance to Pond F would result in a long-term, medium magnitude impact to a receptor of local value due to a reduction in the amount of pond habitat within the Project site boundary. This would result in a **minor adverse** significance of effect and therefore not significant.

Semi-improved Neutral Grassland

9.9.87 Small areas of semi-improved neutral grassland would be temporarily lost during the construction of the airfield satellite contractor compound and the diversion of the River Mole in the west of the Project site, south of Brockley Wood and in the north east of the Project site due to the South Terminal roundabout improvements. A small area would also be lost to allow the construction of the Museum Field Haul Road. The location of existing areas of semi-improved neutral grassland are shown on Figure 9.6.3, the location of those lost are shown on Figures 2.1-2.6 of Appendix 9.9.2. There would be a long-term, temporary loss whilst the compound is anticipated to remain present between 2024 and 2034. Semi-improved neutral grassland would be recreated upon completion of all the works affecting the habitat beside the newly constructed highway and river channel, some of which would be created beyond this assessment period. Grassland creation would be secured through the LEMP.

9.9.88 New areas of semi-improved neutral grassland would also be created within a mitigation area in the west of the Project site early in the construction period (anticipated 2025 to 2028). This would compensate for the remaining areas of grassland that would be lost from construction areas and increase the overall amount of neutral semi-improved grassland on the Project site by the end of the construction period.

9.9.89 There would be an overall long-term, medium magnitude impact on a receptor of local value which would result in a **minor adverse** significance of effect when existing habitats were lost and before newly created habitats had established. This would be followed by an overall long-term, medium magnitude impact on a receptor of local value which would result in a **minor beneficial** effect that would not be significant, when construction is complete due to the long-term net increase in the amount of semi-improved neutral grassland within the Project site.

Marshy Grassland

9.9.90 Areas of marshy grassland would be lost in the west of the Project site due to the siting of the diversion of the River Mole corridor south of Brockley Wood and by the construction of a new channel connecting the River Mole to the East of Museum Field flood compensation area. The location of the marshy grassland is shown on Figure 9.6.3. The location of the areas which would be lost are shown on Figures 2.1-2.6 of Appendix 9.9.2.

9.9.91 There would be an increase in the amount of marshy grassland in the long-term due to an increase in the amount of damp ground within the Museum Field and along the diverted River Mole corridor in the west of the site. Therefore, there would be a net increase in the amount of marshy grassland.

9.9.92 There would be a medium-term, low adverse impact on a receptor of local value resulting in a **minor adverse** significance of effect and therefore not significant. This would be followed by a long-term medium beneficial impact resulting in a **minor beneficial** significance and therefore not significant.

Broadleaved Plantation Woodland and Associated Scrub

9.9.93 Lead-in works for the surface access improvements would result in the loss of broadleaved plantation woodland and scrub, anticipated from 2028. The woodland and scrub forms an east-west habitat corridor along the northern and southern boundaries of the existing South Terminal roundabout, M23 and Airport Way between the B2036 Balcombe Road and the mainline railway (approximately 675 metres long). Areas of dense scrub are present between Balcombe Road and the M23 slip roads. The full extent of the plantation woodland and scrub to the north of the roundabout and road and the majority to the south would be lost. The location of those areas lost are shown on Figures 2.1-2.6 of Appendix 9.9.2.

9.9.94 The lead-in works for the surface access improvements would also result in the loss of broadleaved plantation woodland that forms an east-west habitat corridor between the existing North Terminal roundabout and A23 London Road, to the south of the road and to the west of the railway line. This is approximately 1.2 km long, although is already dissected by slip roads thereby limiting connectivity for some less mobile flora and fauna. The majority of the woodland would be lost, particularly areas closer to the existing highway.

9.9.95 There would also be a loss of some plantation woodland on the northern side of the A23 road. This would result in a slight reduction in habitat connectivity at the far eastern end where the existing woodland adjoins the mainline railway corridor.

9.9.96 The loss of habitat connectivity has been assessed in combination with the loss of semi-natural broadleaved woodland and broadleaved trees from the north of the North Terminal roundabout improvements and Longbridge roundabout alterations, the effects of which are reported previously in this chapter. Overall, there would be a substantial decrease in the existing linear

woody vegetation, which currently provides a near continuous connection from east to west through the north of the Project site. There would also be a greater distance from north to south between the linear strips of woody vegetation.

9.9.97 However, the trees and shrubs within the linear strips are typically less than 60 years old, having been planted when the roads were constructed and are therefore of less value than the more mature trees and shrubs present within the nearby Riverside Garden Park. Additionally, some of the surrounding habitats to which this habitat connects are low value, such as the airport and the M23 motorway.

9.9.98 Replacement native, broadleaved woodland and trees would be planted upon completion of the improvements to the South Terminal roundabout and alterations to Longbridge roundabout, anticipated in 2031, and to the North Terminal roundabout in 2032 to compensate for this loss.

9.9.99 Due to the amount of time needed for new woodland to establish sufficiently (approximately 30+ years) to compensate for the loss, the combined effect of the loss of woodland, trees and scrub along both sides of the A23 London Road would result in a long-term, high magnitude impact on a receptor of Local value resulting in a **moderate adverse** significance of effect, which is considered significant. However, this should be seen in the context of the significance of impacts by the time of the later assessment years (paragraph 9.9.407).

9.9.100 Woodland planting would start providing a benefit to biodiversity within approximately five years after planting by providing food and shelter for some invertebrates and small mammals, and potentially nesting sites for birds. The significance of the adverse effect would start reducing at this point but it would take at least 30 years for the full effect of the loss to be removed.

9.9.101 Once new woodland had established, there would be a small increase in the amount of broadleaved woodland present within the Project site boundary which would result in a long-term, low beneficial impact resulting in a **minor beneficial** significance and therefore not significant.

Flora: Bluebell and Pennyroyal

9.9.102 The majority of the areas of semi-natural broadleaved woodland that would be lost at this stage of the Project were originally planted approximately 30-40 years ago when the A23 was constructed and are therefore unlikely to support naturally occurring bluebell. Small areas of more mature woodland or tree lines connecting to areas of ancient woodland that would be affected south of Brockley Wood would have greater potential to support them.

9.9.103 Measures as set out in Table 9.8.1 to protect bluebell by collecting bulbs during the clearance of woodland and replanting them within woodland planted in the mitigation area would ensure that the long-term impact on bluebells, which are of local value, would be low. This would result in a **minor adverse** effect and would therefore not be significant.

9.9.104 Sheet piling works along the northern margins of Pond F would not directly affect the location where pennyroyal is growing around it but there would be potential for accidental damage. Measures included within the Project, such as the use of exclusion fencing, would be put in place to reduce the likelihood of such affects. Therefore, the Project could result in a medium-term, medium impact on a plant of local value resulting in a **minor adverse** effect and would therefore not be significant.

Flora: Lesser Quaking Grass, Narrow-lipped Helleborine, Ragged Robin and Solomon's Seal

9.9.105 No construction works would be undertaken within the locations where these notable flora were noted. Measures to protect habitats of value from pollution events would ensure the plants are not affected. This would ensure there would be no change to the presence or distribution of the species due to the Project. The magnitude of impact and significance of effect would be **no change** and therefore not significant.

Breeding Birds (Annex 1 EU Birds Directive and/or Listed under Schedule 1 of the WCA)

9.9.106 No Schedule 1 breeding birds were confirmed to be present, although peregrine, firecrest and little ringed plover were recorded as possibly breeding and therefore no effects are currently foreseen.

9.9.107 Peregrine was recorded perching on stands at the South Terminal and there is potential for it to nest there or on other tall structures within the airfield which are due to be removed as part of the Project or are close enough that any nesting birds could be disturbed. Given the high levels of noise and disturbance already occurring in these areas any peregrines would be accustomed to those conditions and would potentially be desensitised to additional noise or disturbance from construction activities. However, any measures needed to protect the nest or the birds using it would need to be assessed on a case by case basis and therefore preconstruction surveys would be undertaken to determine where any active nests were in relation to construction activities. Construction activities that could damage, destroy or disturb an active nest would be timed to avoid the peregrine nesting season (typically March to June inclusive).

9.9.108 Male firecrests were recorded singing within Horleyland Wood and Upper Pickett's Wood, both in/adjacent to the eastern Project site boundary. The only works in this part of the Project site that could affect firecrest nests, should they nest in the woodland in future, would be the construction of a foul water pipeline along the boundary of Horleyland Wood. Given the small footprint of the pipeline and the temporary and short-term nature of the works, the risk of disturbance to firecrest would be considered relatively low. However, a pre-construction survey would be undertaken of all suitable habitat within the Project boundary and should any nests be identified measures would be implemented to ensure disturbance did not occur, such as timing works to be outside the breeding season or once nests were disused within a suitable buffer around the nest. There is potential for firecrest to utilise other woodland within/adjacent to the Project boundary.

9.9.109 A single alarm/territorial call of a little ringed plover was record on the Old Lagoon adjacent to the Water Treatment Works in the east of the Project site. As part of the Project, a pipeline would be constructed between a new water treatment plant and the Old Lagoon. Construction works at and near to the lagoon would therefore be temporary, short-term and localised. However, should little ring-plover be nesting on the lagoon, there is potential for nests to be damaged or disturbed by the construction work. Where practicable, construction works would be timed to avoid the breeding season. Any works undertaken during the breeding season would be informed by a pre-construction survey to determine if nests were present and whether measures would be required to avoid any potential impacts, such as delaying works within a suitable buffer area until the young had fledged and the nest was no longer in use. It is unlikely that little ringed plover would utilise other waterbodies within the Project site during the breeding season.

9.9.110 Further surveys will be undertaken to determine whether any other Schedule 1 birds were breeding within the Project site as a precaution prior to construction works commencing. Should

Schedule 1 breeding birds be present, measures as set out in Table 9.8.1 would ensure they were not disturbed by any Project related work. This would include identifying appropriate buffers around the nest within which works that could lead to disturbance would be prohibited. The nests would also be closely monitored by suitably experienced ornithologists who would undertake dynamic risk assessments to ensure measures were altered to further reduce the risk of disturbance if necessary. Where practicable, works that could disturb Schedule 1 birds whilst they were nesting would be undertaken outside the breeding season.

9.9.111 Post construction habitat creation has been designed with the Gatwick Bird Hazard Management team to ensure collision risks are not increased.

Breeding Bird Assemblage (including NERC Species of Principal Importance and BoCC Red or Amber listed species)

9.9.112 The works anticipated to be undertaken between 2024 and 2029 would result in the loss of a range of habitats suitable for breeding birds across the Project site, including buildings and structures as well as vegetation.

Project proposals in the west of the Project site

9.9.113 Areas of grassland, scrub and a woodland strip would be lost in the west of the Project site due to the siting of the airfield satellite contractor compound south of Brockley Wood, diversion of the River Mole corridor, construction of a noise mitigation feature and relocation of the fire training ground. The species assemblage in these areas includes reed bunting and kestrel, which are Amber listed species and song thrush and skylark, which are Red listed species. They also provide suitable habitat for a variety of other breeding birds, although they were not recorded nesting there during the baseline surveys.

9.9.114 In the long-term, the diverted River Mole would create new areas of suitable habitat comprising areas of marshy and dry grassland and additional areas of marshy and dry grassland would be created within the Museum Field flood compensation area.

9.9.115 Species such as kestrel and song thrush are less likely to be affected by the construction works in this area given the large amount of alternative habitat within and immediately adjacent to the Project site.

9.9.116 Reed bunting is predominantly associated with farmland and wetland habitat and therefore the loss of the pond, river corridor and marshy grassland in this area could adversely affect the amount of suitable breeding habitat. There would be a medium-term loss of river corridor habitats and marshy grassland during the work period, anticipated to be 2024 to 2025, and during the time it would take for new habitats to establish.

9.9.117 Construction of flood compensation at Museum Field would result in a relatively small loss of farmland habitat that could be used by reed bunting, resulting in a loss of some alternative habitat nearby during the anticipated construction period 2024 to 2025. Further areas of suitable farmland would remain present within the wider area.

9.9.118 The completion of the Museum Field flood compensation area would create a new, larger area of marshy grassland of higher value to reed bunting than the existing farmland once established after its creation in 2025. New marshy grassland would also be created within the diverted river corridor in 2025 when construction was complete. The marshy grassland may occasionally hold

shallow pools of water but there would be no new pond habitat provided. There would be a long-term increase in the amount of wetland habitats, post-2025 once new habitats had established, resulting in more habitat for reed buntings than originally present.

9.9.119 Overall, there would be a loss of breeding habitat in the medium-term as a result of the Project resulting in a low adverse impact on this species of County value resulting in a **minor adverse** significance of effect, that was not significant. This would be followed by a moderate increase in the amount of breeding habitat locally in the long-term, providing a low beneficial impact which would result in a **minor beneficial** significance of effect, again not significant.

Project proposals on the airfield

9.9.120 Skylark territories were recorded in the airside amenity grassland areas, adjacent to the runway in the south of the Project site. The diversion of utility works associated with Taxiway Juliet, the northern runway and associated spurs would impact upon suitable breeding habitat in this area through the displacement of skylark territories, anticipated between 2024 and 2029. However, the impacts arising during construction would be temporary and localised to the northern boundary of the runway where the works would be undertaken.

9.9.121 Suitable habitat would be created within the mitigation area in the west of the Project site between 2025 and 2028. In the medium-term, once construction works were complete, new areas of suitable habitat would develop on the airfield. The short-term, low impact on skylark, which is of County value would result in a **minor adverse** significance of effect and therefore not significant.

Other Project proposals

9.9.122 The following Project proposals are predominantly located within areas of hardstanding but include habitats suitable for breeding birds, such as scattered trees, scrub, ornamental planting, hedgerow and small areas of plantation woodland. These features offer some value to nesting birds and some would be lost to the Project through construction of:

- Flood alleviation works at Car Park X;
- Aircraft Hanger;
- Larkins Road diversion;
- Relocation of motor transport/Rendezvous Point North; and
- New hotel and surface car parking at multi-storey Car Park H;
- Museum Field Haul Road; and
- South Terminal Forecourt Hotel.

9.9.123 New planting as part of the Project, as set out in Table 9.8.1, would introduce new shrubs, trees and hedgerows within areas of development to compensate for the habitats lost and to provide new nesting sites for smaller birds. A range of bird boxes would also be installed within new buildings, such as the new hotel, where there was no conflict with bird hazard management.

9.9.124 The stand amendments, reconfiguration of airport facilities and terminal extensions have the potential to disturb nesting sites for a variety of common species of breeding bird on existing buildings or structures. There could be short to medium-term reductions in nesting site availability, but the construction of new buildings and structures would provide alternative nesting sites.

9.9.125 The lead-in works for the surface access improvements would result in the loss of a large amount of woodland, tree and scrub habitat which are suitable for breeding birds, including dunnock, bullfinch, whitethroat, mistle thrush and song thrush (recorded during surveys undertaken in 2019). The loss of habitat associated with these works would be partially compensated for through the planting of native, species-rich hedgerows and woodland once the highways works are anticipated to be complete in 2031-2032, although there would be a temporary, long-term loss until new planting is established.

9.9.126 The works anticipated to be undertaken from 2024 would result in the loss of a range of habitats suitable for breeding birds across the Project site.

9.9.127 Woodland, broadleaved tree and shrub planting, as set out in Table 9.8.1, would be undertaken early in the Project to compensate for the loss. However, there would be a long-term loss of these habitats due to the amount of time it would take for the new planting to reach maturity, particularly woodland. These areas are likely to be used by a variety of bird species for foraging and nesting. However it is likely that birds displaced from these areas would move to nearby suitable habitat.

9.9.128 Other measures incorporated within the Project and as set out in Table 9.8.1, would include; retaining a 15 metre buffer around areas of ancient woodland, which would limit the levels of disturbance on birds using these areas; and measures to ensure birds and their nests were not harmed by the clearance of vegetation or by other demolition and construction works.

9.9.129 Overall, the measures incorporated within the project, set out in Table 9.8.1, would ensure that areas of suitable foraging and nesting habitat were replaced across the Project site and birds displaced from areas of construction would be likely to move to similar areas of suitable habitat within and adjacent to the Project site boundary. However, the time it would take for new planting to establish as a habitat of equal value would result in a long-term loss and a reduction in habitat connectivity. Nonetheless, this would not result in the complete loss of breeding sites and substantial areas of habitat would be retained within the Project site and within the vicinity.

9.9.130 The loss would result in a long-term, medium impact on other breeding birds (a feature of County value) due to the amount of time habitats would be absent, resulting in a **moderate adverse** significance and therefore considered significant. However, this should be seen in the context of the significance of impacts by the time of the later assessment years, once planting has established sufficiently to be used by breeding birds.

9.9.131 An increase in noise due to construction works is considered unlikely to increase the significance of the effects reported above. The birds in the area are already habituated to high levels of noise from both aeroplanes and traffic.

Wintering Bird Assemblage (including BoCC Red or Amber listed species)

9.9.132 The works anticipated to be undertaken between 2024 and 2029 would result in the loss or disturbance of habitats suitable for wintering birds, principally around the periphery of the Project site.

9.9.133 During surveys undertaken in 2018 and 2019, there were no wintering bird species recorded in any numbers that were considered to be of national or international significance. The overall impacts on the populations identified from loss of foraging habitat on a receptor of local value during construction between 2024 and 2029 within the Project site boundary would be low and medium term, resulting in a **negligible** significance of effect and therefore not significant.

Grass Snake

9.9.134 Two populations of grass snake were identified within the Project site boundary. The small population in the east of the Project site would not be affected by any construction activities during this period of the Project. The larger population in the west of the site (NWZ) is associated with the wetland and grassland habitats along the corridor of the River Mole. The southern extent of this habitat would be temporarily lost due to the construction and use of the airfield satellite contactor compound (2024-2035) and the diversion of the River Mole corridor (2024-2025).

9.9.135 A translocation exercise, as set out in Table 9.8.1, would be undertaken to move grass snakes into existing retained habitat adjacent to and protected from construction areas prior to construction works affecting the existing habitat.

9.9.136 The completion of the Museum Field flood compensation area and the creation of new habitats along the corridor of the diverted River Mole, would create new areas of habitat in the long-term thereby providing an increase in the amount of habitat available to grass snake in this area. Further areas of suitable habitat would then be created on the land west of the River Mole between 2025 and 2028 and in 2035 when the airfield satellite contractor compound is anticipated to be decommissioned.

9.9.137 Due to the potential stress to individual snakes, the translocation could have a medium-term, low impact on the grass snake population present which is of local value, resulting in a **minor adverse** significance and therefore not significant.

Great Crested Newt

9.9.138 Two metapopulations of GCN were recorded within the Project site boundary. A small population was recorded in two closely located ponds in the north west of the site, west of the River Mole. The River Mole is considered a barrier to newt dispersal due to its steep sided channel and flowing water. Therefore, works within terrestrial habitats within 500 metres of the ponds but to the east of the River Mole would be unlikely to affect any GCN. This includes the Larkins Road diversion and the relocation of the motor transport facilities/ Rendezvous Point North. The majority of the work proposed within this area would be within areas of existing hardstanding which provides unsuitable habitat for GCN further reducing the risk of effects. No work is currently proposed on the western side of the River Mole within 500 metres of the ponds.

9.9.139 A medium population of GCN was recorded in two closely located ponds in the east of the Project site within woodland near to Crawley Sewage Treatment Works. The proposed water treatment works and foul water pipeline would affect suitable GCN terrestrial habitat comprising grassland, woodland and bare ground within 500 metres of the ponds.

9.9.140 A GCN mitigation strategy would be as set out in Table 9.8.1 and works would be undertaken under a Natural England mitigation licence to ensure no GCN were harmed or disturbed by the works.

9.9.141 Due to the majority of the habitats affected nearest to the ponds being low value terrestrial habitat and the small footprint of the works, the risk of GCN being encountered is expected to be low. The grassland that would be lost is unlikely to form a core area of GCN terrestrial habitat (it is anticipated that the woodlands surrounding the ponds perform this function). Therefore, the medium-term impacts would be low and the effects on the GCN population of local value would be of **negligible** significance and therefore not significant.

Common Toad

9.9.142 The construction period would result in the reduction in area of suitable terrestrial habitat for common toads when the airfield satellite contractor compound is constructed/in use, the River Mole corridor is relocated, when Pond A and FFJ are lost, and when East of Museum Field flood compensation area is constructed. Although there would be a reduction in the size of suitable habitat present, a significant habitat resource would remain within the local area to sustain the population present. Upon completion of the works to Museum Field and the River Mole, anticipated in 2025, there would start to be an increase in the amount and value of suitable habitat present within these work areas as the new habitats establish. This would result in a long-term, low impact on a receptor of local value as favourable habitats would be restored and extended upon construction completion. This would result in a **negligible** significance of effect and therefore not significant.

Badger

9.9.143 A main badger sett would be closed to allow the Project to be constructed and an artificial sett would be created within the badger social group's territory, as set out in Table 9.8.1. The sett would be closed using appropriate methods and timings and undertaken under licence from Natural England.

9.9.144 Full details are provided in confidential Appendix 9.6.4.

9.9.145 The closure of the main sett would result in a medium-term, low impact on the badger clan which is of local value, resulting in a **minor adverse** significance of effect and therefore not significant.

9.9.146 The increase in construction traffic and associated movements in areas around setts on site would mean that there would be the potential for a corresponding increase in road mortality for badgers using the site. However, it is not expected that badger movement (principally at night) and construction would overlap significantly. Construction would be undertaken at night on the airfield, but this is not considered to be an area well used by badgers. There is also the risk of badgers accessing construction areas. The mitigation measures designed into the Project would be implemented to ensure that no badgers were harmed within the construction areas.

9.9.147 Implementation of these best-practice measures, as set out in Table 9.8.1, would ensure that any impact on the badger population, which is of local value, during construction would be negligible. This would result in a **negligible** significance of effect and therefore not significant.

Otter

9.9.148 No signs of otters have been confirmed within the Project site, but they are known to be present within the wider area and there is potential for them to utilise the River Mole. The river corridor would be monitored regularly prior to, and during, the diversion of the river and the construction of the new channel connecting to the Museum Field flood compensation area, to detect any otter presence and to inform whether mitigation was required.

9.9.149 An area of semi-natural broadleaved woodland would be cleared to the north east of Longbridge roundabout which borders the River Mole. The loss of the woodland would result in less screening of the river channel and it would become less secluded which could have an effect on otter behaviour resulting in them being deterred from crossing the open area, particularly when levels of disturbance were high from construction activities.

9.9.150 The compound would be located adjacent to the River Mole, which would also increase the risk of disturbance to otters from human activity and increased artificial lighting. Otters could be deterred from accessing part of their territory which could impact their access to food and ability to breed.

9.9.151 However, given that otters have not been recorded within the Project site and that the section of river that would be affected would account for a small part of an otter's wider territory, the impact would be low. No physical severance of territory is anticipated as otters are expected to be able to pass the Project site at all times, as no closure of the River Mole is expected during the diversion.

9.9.152 Implementation of best-practice methods for pollution prevention and lighting during construction (as set out in Table 9.8.1) would ensure that impacts to and effects on otters, should they be present in the wider catchments, would be minimised. This would give rise to a **minor adverse** significance of effect on a receptor of County value and therefore not significant.

Bat Assemblage

9.9.153 The works anticipated to be undertaken between 2024 and 2029 would result in the loss of a range of habitats suitable for foraging, commuting and roosting bats across the Project site.

9.9.154 A strip of broadleaved woodland and an area of marshy grassland would be lost in an area between Brockley Wood and the existing River Mole channel due to the proposals for the diversion of the River Mole. The levels of bat activity recorded in the south of Brockley Wood were very high (a total of 41,710 bat passes) compared to other areas of the site, including the next nearest static survey location, which recorded 3,886 bat passes on land west of the River Mole (approximately 250 metres from Brockley Wood). Crossing point surveys found the River Mole south of Brockley Wood to provide an important foraging and commuting resource for bats. Therefore, construction work in this area anticipated during the period 2024 to 2025 has the potential to affect bats.

9.9.155 The proposed river diversion would require the temporary loss of the majority of the existing marshy grassland and the permanent loss of a woodland strip connected to Brockley Wood. The route of the existing channel would be diverted to follow a more sinuous (and natural) route through this area. Parts of the existing engineered, straight channel would be retained in-situ to provide backwaters. Upon completion, damp grassland would be created within remaining areas and the more natural channel profile would allow a varied wetland flora to develop.

9.9.156 The Project is considered unlikely to significantly affect habitat connectivity, as the area of high value habitat to the south of Brockley Wood is small and beyond it lie the lower value habitats associated with the airfield. A low number of bats were recorded commuting over the airfield, and it is likely that those bats would not be deterred by the presence of the works. Brockley Wood would remain well connected to the River Mole and higher value habitats to the north and west.

9.9.157 The River Mole was found to be an important flightline for bats and a number of species were recorded foraging and commuting along it. The Project would affect the southern end of the river before it enters a culverted section beneath the airfield. Therefore, connectivity to the south is already severed and the Project would not severe an otherwise important flightline.

9.9.158 A minimum 15 metre buffer between Brockley Wood and the river diversion would ensure the high value habitats associated with Brockley Wood are protected. It would also retain a strip of

habitat comprising woodland edge, scrub and grassland, which would aid in maintaining connectivity to the west from the south of Brockley Wood.

9.9.159 Overall, the works could result in a slight reduction in foraging habitat for the bat assemblage within this area due to the loss of the marshy grassland and strip of woodland. However, the higher value habitats in Brockley Wood would be retained and large areas of high value habitat would remain present within connecting areas along the Mole corridor (NWZ) to the west and north west of Brockley Wood. Therefore, there would not be a total loss of foraging habitat but there would be a long-term, low reduction until the new river corridor had been diverted and new habitats had established within it. In the longer term, this would result in higher value habitat than that present originally.

9.9.160 Measures would be implemented during construction to ensure retained habitats were not affected by pollution generated by the Project as set out in Table 9.8.1. Silt traps would be used to prevent the sedimentation of the River Mole and spill kits would be used to prevent accidental releases of chemicals from reaching the river. The dampening down of soils would take place in dry weather to prevent airborne dust from reaching sensitive features and directional lighting would be used to prevent light pollution from reaching them. This would include the use of directional lighting to minimise increases in lighting along the most sensitive features, such as rivers and woodland.

9.9.161 The River Mole diversion and airfield satellite contractor compound would therefore result in the temporary, long-term loss of habitat in close proximity to Brockley Wood until the River Mole had been diverted and new habitats had established.

9.9.162 The works could therefore slightly reduce the amount of bat activity recorded in Brockley Wood due to the loss of habitat immediately south of it but as this loss would be relatively small in the context of the wider landscape, and because habitat connectivity to the north and west is considered to be more important than to the south, the impact is considered to be no more than medium. The creation of the new river corridor would create new habitat of value to bats early in the Project period (anticipated 2025) thereby minimising the effect.

9.9.163 The relocation of the fire training ground and new taxiways to the south of it, anticipated from 2024, would result in the loss of small areas of scrub and Pond A, which may be of some value to foraging bats but are considered to be lower value habitats. Their loss is therefore considered unlikely to significantly increase the effects on the bat assemblage present.

9.9.164 The Museum Field flood compensation area would be created at the same time (2024-2025) in relatively close proximity within habitats to the west. It would result in the loss of improved grassland but boundary features would be retained which are of greater value to the bat assemblage present. The loss of the improved grassland would be unlikely to materially affect foraging or commuting behaviour and the impact would be negligible.

9.9.165 Upon completion the flood compensation area would enhance the habitat suitability for foraging bats compared to the existing habitat by creating more species-rich grassland and areas of damp grassland. The bunding that would be created to the south and east would provide a variety of habitats for invertebrates, thereby increasing the foraging resource for bats. It would be well connected to the River Mole corridor.

9.9.166 Habitat loss associated with the construction work in these areas would be predominantly compensated for through the creation of higher value habitats that would be created upon completion of the works. In addition to this, hedgerows, scattered broadleaved trees and broadleaved woodland, and neutral grassland would be created within the mitigation area to the west of the River Mole between 2025 and 2028 to strengthen connectivity and the value of the habitats in that area.

9.9.167 Although there would be a temporary, long-term loss until new planting has established, the mitigation would provide an enhancement due to new, higher value habitats being present and improved habitat connectivity to the west in addition to the restored river corridor once the River Mole had been diverted.

9.9.168 Additional areas of semi-natural broadleaved woodland and broadleaved trees are anticipated to be lost between 2024 and 2025 in areas for car parking and a hotel at existing Car Park H, Museum Field flood compensation area and the construction of the noise mitigation feature. The loss would be small in comparison to the overall larger woodland areas. However, their absence would have a low adverse impact on the bat assemblage using these areas for foraging and commuting between sites.

9.9.169 The construction of the replacement motor transport facility/relocation of Rendezvous Point North from 2025 would result in the loss of some small areas of woody vegetation where hedgerows, treelines and scrub form linear features within areas of hardstanding. The relatively low value of these areas to bats for foraging and commuting, due to the dominance of hardstanding, means their loss would have a negligible impact on the bat assemblage present.

9.9.170 Replacement hedgerow and shrub planting would be undertaken within the airport around these developments to provide alternative habitats. In addition, new hedgerow would be created south and east of the airfield to enhance this part of the Project for bats.

9.9.171 The implementation of suitable mitigation measures (as per Table 9.8.1) would ensure that any impacts due to habitat loss to the south of Brockley Wood, and habitat loss resulting from the other works areas described above, on the bat assemblage within this part of the site, which is of local value, would be no more than a long-term medium impact.

9.9.172 In 2028, the lead-in works for the surface access improvements would result in the loss of a large amount of semi-natural broadleaved woodland and broadleaved plantation woodland to the north and south of the existing highway, which are suitable for foraging and commuting bats. Replacement native, broadleaved woodland and hedgerow planting would be undertaken upon completion of the highway improvements in 2031 and 2032 to compensate for this loss. However, it would take time for any planting to establish.

9.9.173 The South Terminal roundabout improvements would result in the loss of broadleaved plantation woodland on both sides of the highway between the B2036 Balcombe Road and the mainline railway. The majority of the scrub that forms a strip of woody vegetation to the north and south of the highway east of Balcombe Road to the M23 would also be lost. An intact, species-poor hedgerow would be retained along the northern side from Balcombe Road eastwards.

9.9.174 The vegetation loss would result in the direct loss of bat foraging and commuting habitat and would result in the loss of the existing habitat connectivity provided by the east-west lines of woody vegetation that currently line the road. It would also result in the distance between habitats

across the road becoming greater, thereby deterring bats from crossing, and resulting in a barrier to dispersal being created.

9.9.175 Surveys completed during the latter half of 2020 suggest the habitats both sides of the eastern end of the highway, where the South Terminal roundabout improvements would be undertaken, are not used by significant numbers of bats.

9.9.176 The improvements to the North Terminal roundabout would result in the direct loss of a small amount of semi-natural broadleaved woodland along the A23 adjacent to the southern boundary of Riverside Garden Park and the loss of a large area of broadleaved plantation woodland to the north and south of the road. This would result in a reduction in foraging habitat for bats and reduced habitat connectivity from east to west and from north to south through widening the size of the gap between the northern and southern sides of the road, which could affect commuting behaviour.

9.9.177 The majority of the woodland to the north of the new road alignment would be retained. This would ensure a substantial amount of the existing woodland remains within Riverside Garden Park and that the area along the Gatwick Stream, where the highest levels of bat activity were recorded, would be least affected. However, where the woodland narrows towards the western end, some of the vegetation to the south of the stream would be lost except for the existing bankside scrub. The mature trees to the north of the stream would be retained and in combination with the scrub on the south bank, a dark commuting and foraging route would be retained for bats.

9.9.178 A small area of semi-natural broadleaved woodland would also be lost on the southern side of the highway, beside the River Mole as would additional areas on both sides of the River Mole before it passes beneath the A23 Brighton Road.

9.9.179 The River Mole and the Gatwick Stream were identified as an important foraging and commuting route for a number of bat species.

9.9.180 To the south of the highway, the majority of the broadleaved plantation woodland between the railway and the Longbridge roundabout would be lost. This woodland was found to be of lower value to bats than the woodland in Riverside Garden Park and was already fragmented by roads.

9.9.181 Works to Longbridge roundabout would result in the loss of a mature tree line north of the roundabout and an area of semi-natural broadleaved woodland east of the roundabout, which forms a continuation of the habitat corridor west of Riverside Garden Park and would therefore further reduce habitat connectivity and result in the loss of suitable foraging habitat.

9.9.182 Surveys completed in this area, including crossing point work, found that the habitat around the River Mole corridor has the highest levels of bat activity. The Project has been designed to retain, so far as practicable, vegetation along both the River Mole and the Gatwick Stream to maintain their existing value as a foraging resource and commuting route. The retained vegetation would also seek to maintain a dark corridor.

9.9.183 This has been achieved along most of the watercourses with gaps resulting predominantly where the road network crosses them. The gaps have been minimised as far as practicable within the Project design and the impacts on bats are considered to be low.

9.9.184 The crossing point surveys identified Riverside Garden Park as being an important commuting and foraging resource for bats. Approximately 19% of bats recorded flying across the road were doing so at a height where they were at risk of collision with vehicles.

9.9.185 The construction of the surface access improvements would result in the distance between habitats across the road becoming increased substantially in places, including at Riverside Garden Park. This is likely to deter some bats from crossing.

9.9.186 The points where the River Mole are crossed by the road are likely to continue to function as commuting routes with some reduction in use possible due to the loss of woodland at culvert/bridge entry and exit points.

9.9.187 The lead-in works for the surface access improvements would result in the loss of trees found to have features suitable as bat roosts. A total of 43 trees within the surface access improvements boundary were identified as having bat roost potential and of these 36 would be lost. They comprised nine with High roost potential, 28 with Medium roost potential and six with Low roost potential. The majority were located at the northern end of the improvement works adjoining the North Terminal roundabout and Longbridge roundabout.

9.9.188 As bats are a highly transient species and roost locations can change frequently, all trees would be subject to pre-construction surveys to determine if they were being used by bats. Regardless of the findings, bat boxes would be installed on retained trees prior to vegetation clearance commencing to ensure there was no reduction in the availability of roost features.

9.9.189 The further surveys would allow more detailed and specific mitigation to be incorporated into the Project design to mitigate any specific effects on the types of roost found and the species using them. The loss of any roosts would be undertaken under a method statement agreed under a Natural England licence.

9.9.190 The surveys undertaken to date found the vegetation along the A23 to be predominantly of low value to foraging and commuting bats compared to other parts of the Project site. The low numbers recorded suggest this does not constitute an important roost location for bats and no roosts were identified during the bat tracking surveys in the trees identified as having bat roost potential.

9.9.191 The sections where the River Mole is crossed by the A23 constitute higher value habitat that could be of greater value as roosts and could require more specific mitigation for the type of roost and species affected. It is considered feasible to provide alternative roosting opportunities mimicking those that would be lost within the Project design.

9.9.192 The measures designed into the Project to protect retained woodland and recreate woodland once the new highway alignment is complete would ensure the effects would be temporary. However, they would be long-term due to the time it would take for new habitats to establish and mature.

9.9.193 A mitigation area north-east of the Longbridge roundabout is anticipated to start to be created in 2028 and would include broadleaved woodland planting.

9.9.194 Due to the amount of time needed for new woodland to establish sufficiently to compensate for the loss, it is likely that the combined effect of the loss of woodland and scrub resulting from the

lead-in works for the surface access improvements would result in a long-term, medium to high magnitude impact on a receptor of local value.

9.9.195 When considered with the other aspects of the Project being undertaken in the period 2024 to 2029, the overall impact would be long-term and high, resulting in a **moderate adverse** significance of effect and therefore significant. However, this should be seen in the context of the significance of impacts by the time of the later assessment years when planting will have established sufficiently to be of use to bats for both foraging and commuting.

9.9.196 The remainder of the pre-construction activities undertaken between 2024-2029 would not result in an adverse impact on the bat assemblage present, above those which have already been identified.

Bat Assemblage – Bechstein's Bat and Barbastelle

9.9.197 The advanced survey techniques surveys identified that Museum Field (and surrounding area), the adjacent River Mole corridor (NWZ) and Brockley Wood were used as core foraging areas for a number of Bechstein's bats with the River Mole Corridor identified as being of regional importance for foraging and commuting Bechstein's bats. Riverside Garden Park was also identified as an important foraging and commuting area and Bechstein's bats were recorded flying over the runway in the west of the Project site.

9.9.198 During bat activity surveys, barbastelle bats were recorded in the southern section of Brockley Wood, in woodland to the west of the fire training ground and near Perimeter Road South in the south of the Project Site.

9.9.199 Construction works in these areas would impact on the bats foraging and commuting in this area through habitat loss and disturbance. The diversion of the River Mole and the airfield satellite contractor compound would reduce habitat suitability and connectivity to the south of Brockley Wood. However, measures to protect the wood and maintain a 15 metre buffer along it, as set out in Table 9.8.1, would ensure bats could continue to commute into the wider landscape, including to the south. The completion of the River Mole diversion anticipated in 2025 would result in high value habitat establishing. Further damp and dry grassland habitat would be created resulting in an enhancement to the habitat availability south of Brockley Wood.

9.9.200 The Museum Field flood compensation area would be constructed within the existing field and would not disturb the boundary woodland and trees, other than a small channel connecting it to the east. Therefore, the habitats utilised by bats in this area would be retained, reducing any impact construction works would have on the Bechstein's bat or barbastelle populations.

9.9.201 The habitat creation and enhancement measures to the west of Brockley Wood that is anticipated to be completed between 2025 and 2028 would significantly improve the value of this habitat for bats by improving connectivity between roosting and foraging areas. This would be particularly beneficial for the Bechstein's bat populations to the west of the Project site. Although there would be a temporary, long-term loss until new planting had established, and therefore there would be a slight decrease in habitat availability during the construction period of the Project. In the long-term this would enhance the overall value of habitats and habitat connectivity and would therefore have a beneficial impact on the Bechstein's bat and barbastelle populations.

9.9.202 The activities associated with the construction of new and replacement car parks, the reconfiguration of airport facilities and noise mitigation features early in the Project would be likely

to have a negligible adverse impact on Bechstein's bats or barbastelle through the removal of small areas of broadleaved trees, hedgerows and scrub which do not provide a core foraging resource for Bechstein's bats or barbastelle.

9.9.203 Both species were recorded along the southern boundary of the Project site and a Bechstein's bat roost was also recorded in Crawter's Wood. The construction activities associated with the Project in the south of site would predominantly affect urban habitats and would result in a small loss of broadleaved trees and scrub within them which are of limited value as foraging or commuting habitat. The potential impact on Bechstein's bats and barbastelles would be negligible.

9.9.204 Bechstein's bats have been recorded foraging and roosting in Upper Pickett's Wood, Lower Pickett's Wood, Horleyland Wood and the surrounding landscape, where high activity levels from other bat species were also recorded. Works within this area that have potential to impact habitats suitable for bats include the construction of a foul water pipeline through a small area of woodland and the deposition of spoil within Pentagon Field. Both activities would be subject to the measures set out in Table 9.8.1, to protect retained adjacent habitats and would be designed to minimise the loss of higher value habitat. This would include the measures to protect the boundary woodland around Pentagon Field and route the pipeline where it would have least impact, such as by avoiding tree loss. The overall impact on the habitat resource would therefore be negligible.

9.9.205 Upon completion of the spoil deposition in Pentagon Field, a tree belt comprising native broadleaved trees, would be planted along the eastern and part of the southern boundary of the field. This would create a new area of foraging and commuting habitat for bats once it had matured.

9.9.206 A substantial amount of woodland and scrub habitat loss would occur from the lead-in works for the surface access improvements. Neither Bechstein's bats nor barbastelles were recorded using these areas around the South Terminal roundabout and east to the M23 during surveys. However, it is possible that they would use the habitat along the M23 for commuting to other foraging and roosting habitats within the wider area, as the woodland and scrub forms an east-west habitat corridor along the northern and southern boundaries of the existing South Terminal roundabout, M23 and Airport Way.

9.9.207 Riverside Garden Park was identified as a core foraging and commuting area for Bechstein's bat. The majority of the habitats in the park would be retained with the exception of a narrow strip where it borders the A23 road to the south which would be lost to the North Terminal roundabout improvements. The home range of the bat was found to also include habitats in the west of the Project site along the River Mole. The Project has been designed to retain as much woodland as practicable, particularly along the River Mole to ensure a dark, well vegetated corridor would be retained. However, there would be a small loss of woodland from both banks of the River Mole where it enters and exits culverts/bridges beneath the A23 London Road and A23 Brighton Road.

9.9.208 There would also be a more substantial loss of broadleaved plantation woodland south of the highway which would further reduce connectivity, but this was a less valuable habitat for bats than the river corridor or semi-natural broadleaved woodland found in Riverside Garden Park.

9.9.209 The loss of habitat as a result of the improvement works would reduce habitat connectivity between these two areas due to the loss of woodland habitats between them. Bechstein's bats

have been recorded crossing large areas of lower suitability habitats within the Project site and therefore bats may continue to cross this area but there is potential for them to be deterred by the open space and lack of vegetation cover.

9.9.210 In the long-term, new woodland planting along the new road alignment would create new areas of foraging habitat for Bechstein's bats and restore habitat connectivity to a level similar to that currently present. The area of woodland due to be lost is considered to be of lower value to Bechstein's bats than the woodland habitats in Riverside Garden Park and in the east and west of the site, which would be predominantly retained and enhanced.

9.9.211 In addition, new habitats that would provide high value foraging habitat for bats and that would improve connectivity for commuting bats would be created as part of the surface access improvement works.

9.9.212 Land north east of Longbridge roundabout would be used to create a mosaic of grassland, wetland and woodland habitats on both sides of the River Mole. Species-rich grassland and woodland habitats would also be created in Car Park B, to the east of Riverside Garden Park to compensate for the small loss of habitats within the park.

9.9.213 These areas would increase the overall foraging resource for Bechstein's bats (and barbastelles should they use this part of the site in future). They would also provide better habitat connections where there are currently lower value habitats. Over a longer period of time, roost features may also develop in trees to provide new roosting sites.

9.9.214 Due to the time it would take for new habitats to establish and mature, there would be a long-term, low impact on the Bechstein's bat population present.

9.9.215 Given that very low numbers of barbastelles were recorded, the Project site is considered unlikely to provide a key area of habitat for the local population. The medium to long-term loss of foraging habitat would result in a relatively low impact given the amount of suitable habitat within the wider area. The new habitat creation proposed in the west of the Project site would provide a larger area of higher value habitat than that which would be lost.

9.9.216 The remainder of the activities anticipated to be undertaken between 2024-2029 would not result in an adverse impact on Bechstein's bat or barbastelle, above those which have already been identified. With the incorporation of the measures that form part of the Project, the long-term impacts on Bechstein's bat and barbastelle, which are of national value, would be low resulting in a **minor adverse** significance of effect and therefore not significant.

Harvest Mouse

9.9.217 Harvest mouse has been recorded within the drier grassland associated with the River Mole corridor (NWZ), shown in the west of the Project site on Figure 9.6.3. Parts of the suitable habitat for harvest mouse would be temporarily affected by the Project during the re-routing of the River Mole but the majority of areas would be retained. Post construction, suitable habitats would be restored and new habitats would be created, both within the River Mole corridor and the land west of the River Mole.

9.9.218 This would result in a medium-term, low impact to a receptor of local value followed by a long-term, low beneficial impact due to the creation of new habitats resulting in a **negligible** significance of effect and therefore not significant.

Hedgehog

9.9.219 Hedgehog has been recorded within the Project site boundary. Areas of suitable habitat for hedgehog would be affected by the Project temporarily and permanently during the construction period, including woodland, grassland and hedgerows, but further areas would be retained. Post construction, areas of suitable habitats would be restored.

9.9.220 This would result in a long-term, low impact to a receptor of local value resulting in a **minor adverse** significance of effect and therefore not significant.

Terrestrial Invertebrate Assemblage

9.9.221 The key areas of the Project site for terrestrial invertebrates include the two Gatwick biodiversity areas – the LERL and NWZ. Other incidental areas of relatively higher value for invertebrates include the bunding around the Fire Training Area and Pentagon Field. The Project has been designed to retain the areas of highest value for terrestrial invertebrates, including the bunding to the south of Brockley Wood and edge habitat around Pentagon Field.

9.9.222 The NWZ biodiversity area would be affected by the diversion of the River Mole during the construction period with the temporary loss of areas of marshy and semi-improved grassland. Other areas of habitat loss (mainly grassland but also areas of scrub) would occur within Pentagon Field to allow for spoil deposition and alterations on the airfield to the existing Northern Runway and reconfiguration of the taxiways.

9.9.223 The land in the LERL would not be affected by construction while the creation of the River Mole diversion would provide an overall increase in habitat of value to invertebrates.

9.9.224 A new area of habitat would also be created within the Museum Field where spoil from the flood attenuation features would be used to create bunding to the south and east of the feature to replicate the bunding identified as being of value to invertebrates in other parts of the site.

9.9.225 This habitat loss would result in a medium-term, medium adverse impact to a receptor of county value resulting in a **moderate adverse** significance of effect. This would be followed by a long-term, medium beneficial impact due to the creation of new habitats resulting in a **minor beneficial** significance of effect.

Fish

9.9.226 Both the River Mole and Gatwick Stream were found to support good populations of coarse fish species. It is anticipated that works to create the new route of the Mole would be undertaken without affecting the existing channel to minimise any impact to the river, including fish. There would be some physical disturbance of the bank and bed as the connection is made here and at the connections to channels from flood alleviation areas at Museum Field and Car Park X. However, the affected reaches of the River Mole would be isolated and a fish rescue undertaken to limit impacts on fish.

9.9.227 There is potential for pollution from the release of sediment during works to connect the new river diversion and the channels from flood alleviation areas at Museum Field and Car Park X. There could be smothering of fish spawning habitat as suspended sediment accretes downstream of the site whilst increases in suspended sediment would result in a lowering of dissolved oxygen concentrations within and downstream of the scheme. Low dissolved oxygen concentrations (hypoxia) have the potential to cause fish mortality. The risk of hypoxia is greatest during the

summer months when water temperatures are higher and oxygen is less soluble. Measures to limit the release of sediment are as set out in Table 9.8.1.

9.9.228 Assuming works can be undertaken outside the summer months, the risk of hypoxia related fish mortality is considered to be low. Although there will be some increases in sediment accretion rates downstream of the scheme, the period over which sediment will be released is relatively short and given that background levels of silt in the River Mole are relatively high, the overall impact is considered to low and reversible and of no more than **minor** significance.

9.9.229 Once created, the diverted Mole is expected to have improved flow characteristics and associated higher oxygen levels. As such, the impact of the new habitat creation during the construction period on fish is expected to be long-term, low beneficial resulting in a **negligible** effect and therefore not significant.

9.9.230 A proposed water treatment works for the de-icer pollution storage lagoons would discharge into the Gatwick Stream resulting in an increase in flows. There may be some increase in scour in the vicinity of the discharge although this is not anticipated to result in significant impacts on fish or their breeding or foraging habitats. The effect is thus considered to be **negligible** and therefore not significant**.**

Aquatic invertebrates

9.9.231 There would be direct loss of macroinvertebrates at the points in the channel where the diversion and the flood alleviation channels are connected. However, this would be a limited area of channel bed and would not result in changes to the overall macroinvertebrate assemblage within the study area.

9.9.232 Release of sediment during the connection works may result in smothering of macroinvertebrate habitat. Associated reductions in dissolved oxygen concentrations may result in temporary loss of less pollution tolerant taxa such as mayfly and caddisfly larvae, although this is considered to be a temporary and reversible impact of minor significance in the connection year, reducing to negligible over time.

9.9.233 New hydromorphological features such as pools and riffles within the new channel diversion would provide additional habitat niches for aquatic macroinvertebrates in the medium and long term. Effects of the river diversion on aquatic macroinvertebrates are considered to be minor beneficial increasing to moderate beneficial in the long term.

9.9.234 There would be little or no change to the macroinvertebrate assemblage of the Gatwick Stream as a result of the Project. Construction of the discharge structure from the treatment works for the de-icer pollution storage lagoons may result in some localised increases in suspended sediment and minor changes to channel hydraulics. There may be some changes to the macroinvertebrate assemblage in the immediate vicinity of the discharge structure but these are considered to be minor and reversible, and are therefore considered to be an effect of **negligible** significance and therefore not significant.

Further Mitigation

9.9.235 No further mitigation measures, beyond the measures incorporated within the Project, are proposed at this stage. When the detailed design of other elements of the Project are produced, post consent, opportunities for retaining existing habitats would be sought where feasible to do

so, for example, where boundary habitats can be retained within the design to further reduce the significance of effects. Further, when detailed planting plans are produced post consent, they would be designed to ensure the delivery of woodland is maximised, where appropriate from a safeguarding perspective.

Future Monitoring

9.9.236 Monitoring for bats, badgers, GCN and reptiles would be carried out during the construction period, after species have been translocated and new habitats created.

9.9.237 Monitoring for breeding birds, otters and badgers would be carried out prior to and during construction.

Significance of Effects

9.9.238 Opportunities to reduce the impact on habitats would be sought in the detailed design stage but no further measures are specifically proposed and so the significance of effects remain as presented above; therefore, the significance of effects would remain as presented above.

2030-2032

9.9.239 The northern runway is anticipated to be operational in 2029 but construction activities would continue during the period 2030 to 2032. These construction works would include the further reconfiguration of taxiways, stands and other airport facilities, the extension of terminals and internal access alterations within the airport boundary and the construction (or continued construction) of car parks, hotel and office space. The habitats within these areas are predominantly low value and most potential impacts on habitats or species would have already occurred in the period 2024 to 2029 and are assessed in the section above, with reference to the long-term effects (beyond that assessment period) included (where applicable). Any further potential effects from works anticipated to be undertaken during the period 2020 to 2032 are considered in this section.

9.9.240 The surface access construction works would continue during this period with the South Terminal roundabout improvements and Longbridge roundabout alternations and compound anticipated to complete in 2031. The improvements to the North Terminal roundabout are anticipated to be completed in 2032 when the South Terminal roundabout contractor compound would also cease to be used. The Car Park B compound would no longer be used from 2030. Vegetation clearance anticipated to have occurred in 2029 and the effects of habitat loss are assessed in the previous section.

9.9.241 Works comprising the construction of car parks, offices and hotels at Car Parks H and Y is anticipated to continue between 2030 and 2032. Any habitat clearance from these areas is anticipated to have already been undertaken in the period 2024 to 2029 and is assessed in the section above. However, any potential for further effects from the ongoing construction works are assessed in this section.

Statutory Designated Sites

9.9.242 Due to the distance of the statutory designated sites from the Project site boundary, and the measures designed into the Project to ensure that potential pollutants are prevented from reaching them (set out in Table 9.8.1), the construction of the Project would continue to have no impact on statutory designated sites. There would be no effect due to loss or alteration to the

habitats or species present. The magnitude of impact and significance of effect would continue to be **no change** and therefore not significant.

9.9.243 The altered northern runway is anticipated to be fully operational by 2029, resulting in an increase in flights and an increase in vehicles accessing the airport during this assessment period. This in turn would increase airborne emissions.

9.9.244 Changes to air quality arising from emissions can impact habitats and the animals/plants they support through direct toxicity and through indirect effects such as eutrophication of the soil and associated changes in species composition. Operational emissions have been modelled following standard good practice guidelines at a selection of discrete receptor points at the closest points of the statutory designated sites within 5 km of the Project (see Chapter 13: Air Quality and associated appendices for full details and results).

9.9.245 For the 2032 interim assessment year, the predicted nitrogen oxides (NO_x) concentration is below the critical level set for vegetation (30 $\mu g.m^{-3}$) both without and with the Project at all modelled points around the statutory designated sites. On this basis, therefore, no changes due to air quality to these receptors of national value are predicted. The magnitude of impacts and significance of effects would continue to be **no change** and therefore not significant.

9.9.246 Changes to air quality at sites beyond the 5 km buffer around the Project site may occur through emissions from increased vehicle movements associated with surface access to the airport. Such sites are of international value and include the SPAs and SACs described in Table 9.6.5. Modelling of operational emissions has been undertaken, based on the strategic traffic model created for the Project, with an interim assessment year of 2032 (see Chapters 13 Air Quality and 12 Traffic and Transport, and associated appendices for details).

9.9.247 Impacts to international designated sites from operational emissions to air in 2032 are considered within Appendix 9.9.1 Habitats Regulations Assessment Report. The conclusion of that assessment is that there would be no adverse effect on the integrity of any of the sites assessed.

Non-statutory Designated Sites

9.9.248 Horleyland Wood LWS is the nearest non-statutory site to works areas within the Project boundary but the works in closest proximity to it are anticipated to have been undertaken prior to 2030. The magnitude of impacts and significance of effects of the further work would continue to be **no change** and therefore not significant.

9.9.249 The potential effects of the on-going surface access improvement works on the Withy SNCI, the Roughs SNCI, Bridges Fields pSNCI and Bridges Wood pSNCI, which are all within 150m of the works, would remain the same as the assessed effects for the period 2024 to 2029. Measures to control pollution within the Project boundary would continue to ensure the magnitude of impacts and significance of effects would be **no change** on the Roughs SNCI, Bridges Fields pSNCI and Bridges Wood pSNCI. Due to the sensitivity of the habitats within the Withy SNCI, there would continue to be a potential medium term, negligible impact to a receptor of County value resulting in a continued **negligible** effect that would not be significant.

9.9.250 There would continue to be a very small loss of bankside habitat along the River Mole BOA as a result of the surface access improvements. New planting undertaken at the end of this period along the new surface access routes and the creation of new habitats north-east of Longbridge roundabout would replace the woodland previously lost and introduce new habitats including

reedbed. Given the small part of the BOA affected, the impact would be negligible leading to an overall continued **negligible** effect that would not be significant.

9.9.251 The remaining non-statutory designated sites are more than 600 metres from the Project site boundary and therefore less sensitive to effects from construction.

9.9.252 An assessment of the effects of operational air quality on non-statutory sites has been undertaken. For all sites considered, either the difference between the future baseline and the with Project scenarios is less than 1% of the relevant critical load/level, or the total concentration/deposition does not exceed the relevant critical load/level. Further details regarding air quality emissions are provided in Chapter 13: Air Quality and associated appendices.

9.9.253 This would result in no change to a receptor of county value. The magnitude of impact and significance of effect would continue to be **no change** and therefore not significant.

Ancient Woodland

9.9.254 No new construction activities are anticipated to start in close proximity to ancient woodlands in the period 2030 to 2032.

9.9.255 Measures designed into the Project to ensure that potential pollutants are prevented from reaching ancient woodland would continue to ensure the Project would have no impact upon them. This would result in no change to a receptor of regional value. The magnitude of impact and significance of effect would continue to be **no change** and therefore not significant.

9.9.256 An assessment of the effects of operational air quality on ancient woodland has been undertaken. With respect to NO_x, for the majority of areas of ancient woodland considered, either the difference between the future baseline and the with Project scenarios is less than 1% of the relevant critical level (30 $\mu g.m^{-3}$), or the total concentration does not exceed the relevant critical level. Where the difference between the future baseline and the with Project scenarios is >1%, no new exceedances of the critical level as a result of the Project are predicted; ie this level is already exceeded at all sites where the contribution from the Project is >1%. Further, the maximum 'do something' concentration is 78.6 $\mu g.m^{-3}$ in woodland adjacent to the M23 (receptor ID Eco_33). This compares to the background of 77.8 $\mu g.m^{-3}$. At these concentrations (<100 $\mu g.m^{-3}$), the effects of NO_x on flora tend to be in respect of changes in growth patterns due to the fertilizing effect of nitrogen rather than direct toxicity (WHO 2000). Therefore, the impact of changes in NO_x due to operational emissions in 2032 on ancient woodland is considered to be **no change** with respect to both impact and significance.

9.9.257 The changes to nitrogen deposition within ancient woodland predicted as a result of operational emissions from the Project are considered below for the assessment year 2038.

9.9.258 Further details regarding air quality emissions are provided in Chapter 13: Air Quality and associated appendices.

Habitats

Semi-natural Broadleaved Woodland and Broadleaved Trees

9.9.259 Towards the end of the surface access improvement works anticipated to be in 2031 and 2032, native broadleaved woodland and tree and shrub planting would be undertaken along the new

highway boundaries within the area to the north east of the Longbridge roundabout and in Car Park B, all in the north of the Project site.

9.9.260 This would seek to compensate for the loss of the original woodland which comprised semi-natural broadleaved woodland and broadleaved plantation woodland. It would also reinstate habitat connectivity from east to west along the highway and in doing so reconnect retained woodland in Riverside Garden Park, beside the River Mole/Gatwick Stream and areas of retained plantation woodland south of the highway.

9.9.261 By 2032, the tree planting would be immature and no new areas of woodland would have formed. Some tree planting would have been undertaken earlier in the Project on land west of the River Mole and within Pentagon Field. This woodland would have begun to mitigate some of the effects of woodland loss in other parts of the Project site, such as the loss of nesting sites for some breeding birds, but would still be immature and would not fully compensate for woodland loss.

9.9.262 There would also be an additional loss of a line of broadleaved trees in this period as a result of the construction of Pier 7. The trees are located within a built-up area in the airport and do not provide habitat connectivity to the wider landscape.

9.9.263 Therefore, the impacts assessed for the period 2024 to 2029 would yet to have been mitigated for and there would continue to be a medium impact on a habitat of National importance resulting in a **moderate adverse** effect which would continue to be significant. However, this should be seen in the context of the significance of impacts by the time of the later assessment years.

Hedgerows

9.9.264 An intact species-poor hedgerow would be lost to construct Pier 7 and a section of species-poor hedgerow would be lost to construct the aircraft hangar. To compensate for the loss of hedgerow, new hedgerows would be planted along access roads in close proximity. This would replace the habitat lost and help retain habitat connectivity.

9.9.265 Therefore, there would be a medium-term loss of hedgerow followed by a long-term increase in the length of hedgerow in this part of the site. This would result in an overall negligible impact on a hedgerow of National value resulting in a **negligible** significance of effect and therefore not significant.

Watercourses

9.9.266 Best practice measures to mitigate the ongoing construction impacts would continue to control the impacts on surface water resulting in no significant effects, as reported in Chapter 11: Water Environment.

9.9.267 Pollution control measures would limit any impacts during the improvements to the North and South Terminal roundabouts and the works to Longbridge roundabout. The surface water assessment in Chapter 11: Water Environment identifies that the roadworks would have impacts during construction, including increased suspended sediment concentrations and potential change to water quality. However, the overall effect would be negligible/minor adverse. The lengthening of the River Mole culverts beneath the A23 London Road and A23 Brighton Road would have increased shading of the watercourse resulting in the loss or reduction in the extent of any in-channel macrophytes. Emergent vegetation associated with the banks in these widened sections would have been lost during the construction period between 2024 and 2029. The

incremental increase in shading due to the culvert extensions is considered to be a minor impact given background levels of shading from the existing A23 culvert.

9.9.268 The river diversion is anticipated to have established by 2030 providing additional river and bank habitat, and an increased marginal reed habitat which would offset losses as a result of the culvert extension. Overall, negative effects on the ecology of the watercourse would therefore be low to negligible for the medium-term and would result in a **negligible** effect to a receptor of County value and therefore not significant.

Ponds (NERC S.41 Habitat)

9.9.269 No ponds qualifying as a NERC S.41 habitat would be directly impacted by the Project. Measures to protect habitats of value designed into the Project, including pollution prevention measures and the erection of sturdy fencing around higher value habitats would ensure that no adverse effects occur. The magnitude of impact and significance of effect would continue to be **no change** and therefore not significant.

Ponds (not NERC S.41 Habitat)

9.9.270 There would be no new aspects of the Project that would impact ponds. On-going aspects of the Project, such as the surface access improvements, would continue to be subject to measures to prevent accidental damage, including pollution control (set out in Table 9.8.1). This would result in a medium-term, negligible impact on a receptor of local value and would result in a **negligible** significance of effect (reduced from a minor adverse impact in 2024 to 2029) which would continue to be not significant.

Semi-improved Neutral Grassland

9.9.271 No areas of semi-improved neutral grassland would be impacted by construction works undertaken during this period of the Project so the minor adverse effect identified for the 2024 to 2029 period would no longer occur. Newly seeded areas of grassland would yet to have fully established. The magnitude of impact and significance of effect would therefore have reduced to **negligible** and therefore not significant.

Marshy Grassland

9.9.272 No areas of marshy grassland would be impacted by construction works undertaken during this period of the Project.

9.9.273 A new area of marshy grassland would already have been created in the west of the site; along the River Mole diversion and within the Museum Field Flood Compensation area and would be establishing. This was previously assessed as having a long-term medium beneficial impact, resulting in a **minor beneficial** significance of effect and therefore not significant.

9.9.274 Any delay in creating the grassland or failure in it establishing successfully resulting in the need for remedial works would delay the grassland reaching its desired outcome. This would therefore continue the medium term, low negative impact on a receptor of local value resulting in a continued **minor adverse** significance of effect and therefore not significant.

Broadleaved Plantation Woodland and Associated Scrub

9.9.275 No areas of broadleaved plantation woodland would be impacted by construction works undertaken during this period of the Project.

9.9.276 The impacts assessed for the period 2024 to 2029 would yet to have been mitigated for due to new tree planting being immature and there would continue to be a high impact on a habitat of Local importance which would result in a **moderate adverse** effect which would continue to be significant. However, this should be seen in the context of the significance of impacts by the time of the later assessment years.

Species

Flora: Bluebell and Pennyroyal

9.9.277 No new areas of semi-natural broadleaved woodland or mature tree belts would be affected where bluebells could be present. Therefore there would be no new impacts on bluebell between 2030 and 2032. The magnitude of impact and significance of effect would be **no change** and therefore not significant.

9.9.278 The effects on pennyroyal as a result of improvements to the South Terminal roundabout are discussed in the above section for 2024 to 2029. No further impacts would occur during this period.

Flora: Lesser Quaking Grass, Narrow-lipped Helleborine, Ragged Robin and Solomon's Seal

9.9.279 No construction works are required within the locations where notable flora were identified. Measures to protect habitats of value from pollution events would ensure the plants were not affected. This would ensure there would be **no change** to the presence or distribution of the species due to the Project and therefore not significant.

Breeding Birds (Annex 1 EU Birds Directive and/or listed under Schedule 1 of the WCA)

9.9.280 No Schedule 1 breeding birds were confirmed to be present and therefore no effects are predicted for this period. No construction works would be undertaken in the east of the site during this stage where firecrest and little ringed plover were recorded as possibly breeding. Construction works would be undertaken on airside buildings which could potentially disturb nesting peregrine, should they be present. The measures previously described for the period 2024 to 2029 (see paragraphs 9.9.107 to 9.9.112) would be repeated during this period if required, as set out in Table 9.8.1.

Breeding Birds (NERC Species of Principal Importance and BoCC Red or Amber listed species)

9.9.281 The works anticipated to be undertaken between 2030 and 2032 would result in the loss of small areas of habitat suitable for breeding birds within the Project site.

9.9.282 Hedgerows, which provide suitable habitat for breeding birds, would be lost as part of the construction of Pier 7 and the aircraft hangar. To compensate for the loss of the hedgerow, new hedgerow planting would be created along adjacent access roads.

9.9.283 There would continue to be an absence of woodland and trees resulting from the losses in 2024 to 2029 as the majority of the replacement planting would not have matured sufficiently. Some

areas of replacement planting could have grown enough to offer nesting sites for some bird species, such as those areas in Pentagon Field and the land west of the River Mole.

9.9.284 The works from 2030 to 2032 would result in a small additional loss of suitable nesting sites for breeding birds in addition to the habitats lost between 2024 and 2029. New habitats would be establishing, and some would be at a stage suitable for supporting nesting birds within the wider Project site. However, there would continue to be an overall reduction in nesting sites for birds resulting in the continued long-term, medium impact to a feature of County value resulting in a **moderate adverse** significance of effect and therefore significant. However, this should be seen in the context of the significance of impacts by the time of the later assessment years.

Wintering Bird Assemblage (including BoCC Red or Amber Listed Species)

9.9.285 Any new works anticipated to be undertaken from 2030 to 2032 would be outside habitats used by wintering birds across the Project site (as per surveys in Appendix 9.6.2), see Figures 2.1-2.6 in Appendix 9.9.2 for location of habitat change.

9.9.286 The magnitude of impact and significance of effect would be **no change** and therefore not significant.

Grass Snake

9.9.287 Grass snake would not be affected by construction activities anticipated to be underway at this stage of the Project. The magnitude of impact and significance of effect would be **no change** and therefore not significant.

Great Crested Newt

9.9.288 Great crested newt would not be affected by construction activities anticipated to be underway at this stage of the Project. The magnitude of impact and significance of effect would be **no change** and therefore not significant.

Common Toad

9.9.289 The construction activities anticipated to be underway at this stage of the Project would have a limited impact on habitats suitable for common toad and would be unlikely to have any impact on the overall population. The magnitude of impact and significance of effect would be **no change** and therefore not significant.

Badger

9.9.290 A main badger sett would have been closed to allow earlier aspects of the Project to be constructed. An artificial sett would have been created within the badger social group's territory. Ongoing monitoring would have determined whether the badger social group had successfully moved to the artificial sett and any necessary remedial works would have been implemented.

9.9.291 New habitats would have been created around the artificial sett, increasing the foraging resource for badgers. By 2030, there would be no impacts on the new sett and habitat creation resulting in no effect on the badger sett.

9.9.292 The continued levels of construction traffic and associated movements in areas around setts would mean that there would be the potential for a corresponding increase in road mortality for badgers using the site. However, it is not expected that badger movement (principally at night)

and construction would overlap significantly. There is also the risk of badgers accessing construction areas. The measures designed into the Project would be implemented to ensure that no badgers were harmed within the construction areas during the construction period.

9.9.293 The implementation of best-practice measures during construction would ensure that any impact on the badger population, which is of local value, during construction would be negligible. This would result in a **negligible** effect and therefore not significant.

Otter

9.9.294 The river corridors would continue to be monitored regularly during the construction of the Longbridge roundabout alterations, the use of the Longbridge roundabout compound and during works to create flood attenuation features and landscaping within the land north-west of the roundabout to ascertain whether mitigation was required.

9.9.295 Implementation of best-practice methods for pollution prevention (as set out in Table 9.8.1) would ensure that such impacts and effects on otters, should they be present in the wider catchments, would be negligible.

9.9.296 There would continue to be a reduction in woodland cover along small parts of the River Mole which could continue to affect otter behaviour.

9.9.297 However, given that otters have not been recorded within the Project site, and that the section of river that would be affected would account for a small part of an otter's wider territory, the medium term impact would be low. This would give rise to a **minor adverse** significance of effect on a receptor of County value and therefore not significant.

Assemblage of Bat Species

9.9.298 In the period 2030 to 2032, work would continue within Car Parks H and Y and in the North Terminal Long Stay decked car park. The vegetation within these areas would have already been cleared in the period 2024 to 2029 but works to construct decked parking and offices would continue into 2030 to 2032.

9.9.299 This would result in the potential for increased light spill onto retained habitats around the periphery of these locations and light spill from an increased height. Car Park Y and the North Terminal Long Stay decked car park border the higher value habitats for bats along the River Mole corridor and therefore there would be a risk of increased light spill onto the river corridor affecting bat activity. External lighting of car parks would be designed to prevent light spill from reaching the river corridor to mitigate this effect, as set out in the Operational Lighting Framework for the Project (Appendix 5.2.2).

9.9.300 Intact species-poor hedgerows would be lost to construct Pier 7 and a new hangar. To compensate for the loss of the hedgerow, new hedgerows would be planted along access roads in close proximity. This would replace the foraging habitat lost and help retain habitat connectivity for commuting bats.

9.9.301 The hedgerows are within an area dominated by hardstanding associated with roads, car parking and the airfield so the overall value of the area for bats is considered to be relatively low. This would result in a long-term, negligible impact on the bat assemblage.

9.9.302 Tree planting would be undertaken in 2031 and 2032 to compensate for the woodland lost from the surface access improvements but would be too immature to mitigate the effects at this stage.

9.9.303 The woodland habitats created within the land west of the River Mole and land north east of Longbridge roundabout would have started to establish but would also still be immature. Some of the grassland and wetland habitats in this area would have started to develop and would be of some value to bats for foraging.

9.9.304 The habitats around the River Mole diversion and Museum Field flood compensation area would have nearly fully established by 2032 and would be offering foraging opportunities for bats.

9.9.305 There would continue to be a long-term, high impact on the bat assemblage, which is of local value, due to the continued loss of habitats along the highway and due to mitigation areas being predominantly immature. This would result in a **moderate adverse** significance of effect and therefore considered significant. However, this should be seen in the context of the significance of impacts by the time of the later assessment years.

9.9.306 The commencement of operations on Taxiway Juliet and the associated spur would bring aeroplanes closer to higher value habitats to the north. However, the risk of bat mortality due to collision with aeroplanes and associated turbulence would not substantially increase. The new spur would not be in constant use and aeroplanes using it would not be travelling at speed, therefore increased exposure to the risk of collision would be intermittent and not constant.

9.9.307 Collision risk modelling undertaken shows that the risk of bats being involved in collisions with aircraft and barotrauma from wake under existing conditions is possible. Aircraft using the Northern Runway and would increase this risk due to the increased flight numbers in this location. During this period, the increased flight numbers are low and as such the risk of increased collision compared to the existing situation is also considered to be low. The improvements to the River Mole corridor, Brook Farm habitat creation area and Museum Field FCA will all enhance the north of the airfield with respect to bat foraging. This enhanced foraging will attract bats away from the risk zones for collision. This would ensure that any impact from increased aircraft collision risk on the bat assemblage which is of local value would be negligible This would result in a **negligible** effect and therefore not significant.

Bats (Bechstein's and Barbastelle Bats)

9.9.308 The majority of habitat loss that would occur as a result of the Project would have already occurred prior to 2030 and woodland planting undertaken in this period, and prior to it, would yet to have matured sufficiently to mitigate for the losses. However, these were predominantly associated with the surface access improvements which were not identified as key areas of habitat for Bechstein's or barbastelle bats and therefore the impact of on-going works on these species would remain low.

9.9.309 The risk of increased light spill on the River Mole corridor, as described in paragraph 9.9.302, would potentially affect these species. However, the Operational Lighting Strategy, as set out in Table 9.8.1, would ensure lighting was not at a level that could affect the behaviour of these species. The other work proposed in this period would be unlikely to affect habitats used by these species.

9.9.310 In the long-term, new woodland planting along the new road alignment and within mitigation areas would create new areas of foraging habitat for Bechstein's bats and barbastelles and

restore habitat connectivity to a level similar to that currently present. The area of woodland due to be lost is considered to be of lower value to Bechstein's bats compared with the habitats in the east and west of the site, which would be retained and enhanced.

9.9.311 Due to the time it would take for new habitats to establish and mature, there would be a long-term, low impact on the Bechstein's bat and barbastelle populations which are of National value, resulting in a **minor adverse** significance of effect and therefore not significant.

9.9.312 Whilst Bechstein's bats were recorded crossing the runway, the numbers doing so were low and therefore the risk of increased collision for this species would be low. The improvements to the River Mole corridor, Brook Farm habitat creation area (which was identified as a core Bechstein's bat foraging area (Appendix 9.6.3) and Museum Field FCA will all enhance the north of the airfield with respect to bat foraging. This enhanced foraging will attract bats away from the risk zones for collision. This would ensure that any impact from increased aircraft collision risk on the Bechstein's bat and barbastelle populations which is of National value would be negligible. This would result in a **negligible** effect and therefore not significant.

Harvest Mouse

9.9.313 In 2030, it is anticipated that new areas of semi-improved neutral grassland would have been created within the mitigation area to the west of the River Mole to compensate for the loss of habitat during construction and to create new areas of suitable habitat. It would be developing into suitable habitat for harvest mouse and the Project would therefore have a long-term low beneficial impact on harvest mouse (a receptor of local value) resulting in a **minor beneficial** significance of effect and therefore not significant.

Hedgehog

9.9.314 Some of the habitats lost in the earlier period of construction work; associated with road improvements and construction of car parks, would yet to have been re-instated but further areas would be retained within the wider Project boundary. In 2030 to 2032, it is anticipated that areas of suitable habitats would have been restored and new areas of suitable habitat would be establishing within the mitigation area to the west of the River Mole and within Pentagon Field.

9.9.315 In the medium-term, the new habitat creation would have started to offset the previous habitat losses and there would continue to be a significant habitat resource within the wider areas. There would be a negligible impact to a receptor of local value resulting in a **negligible** effect and therefore not significant.

Terrestrial Invertebrate Assemblage

9.9.316 By 2030, the new areas of flood compensation would have been created and would be establishing. New bunding to create high value habitat for terrestrial invertebrates around the Museum Field would also have been created. No further works to areas that might support terrestrial invertebrate assemblages of conservation interest are proposed in this period. This would result in the same long-term, low beneficial impact and **minor beneficial** significance of effect identified previously and therefore not significant.

Fish

9.9.317 By 2030, the new River Mole diversion would have been created and would be establishing. Provided reed habitat has established on the river margins and the channel hydromorphology is

functioning as predicted, the new diversion would be providing new spawning, foraging and refuge habitat for coarse fish species. No further works to watercourses are proposed in this period. Ongoing implementation of pollution and sediment control measures (as set out in Table 9.8.1) would ensure water quality is maintained. This would result in the same long-term, low beneficial impact and **negligible beneficial** effect identified previously and therefore not significant.

Aquatic macroinvertebrates

9.9.318 There would be no additional impacts on macroinvertebrate communities during the period. Based on the predicted impacts from climate change some of the more pollution sensitive taxa may be lost during the summer period. The new channel diversion would provide new habitat niches for macroinvertebrates in the River Mole resulting in a low beneficial impact and **negligible beneficial** effect and therefore not significant.

Further Mitigation

9.9.319 No further mitigation is proposed at this stage. When the detailed design of other elements of the Project are produced, post consent, opportunities for retaining existing habitats would be sought where feasible to do so, for example, where boundary habitats can be retained within the design to reduce the significance of effects.

Future Monitoring

9.9.320 Monitoring for breeding birds, otters and badgers would be required prior to and during the further construction as these are dynamic species whose centres of activity can change over time. Therefore, up to date data on their activity would better inform potential effects as a result of construction and inform where mitigation measures could be required, such as avoidance of active birds' nests, otter holts and badger setts or identify the need for appropriate licencing to disturb them (where applicable).

9.9.321 Continued monitoring of the populations of bats, GCN and grass snake would be carried out to determine the success of the measures implemented, as set out in Table 9.8.1. This would inform how the relevant populations were performing against baseline levels and identify if any additional measures would be required if there were signs that populations were declining, such as changes to habitat creation or enhancement areas to ensure the measures were successful.

9.9.322 Monitoring of any habitat creation would also be required to determine its success and to inform whether any remediation works were required. As set out in Table 9.8.1, the relevant LEMP would detail the frequency of the monitoring and would include mechanisms to allow for alterations to be made to ensure habitat creation was successful, such as alterations to mowing regimes to encourage species diversity in grassland and replacement planting should any tree planting fail.

Significance of Effects

9.9.323 The project would continue to have a significant effect on; semi-natural broadleaved woodland and mature trees; broadleaved plantation woodland and associated scrub; breeding birds (excluding Schedule 1 and Annex 1 species); and the bat assemblage (excluding Bechstein's bat and barbastelle). This would be due to new woodland planting being immature during this period.

9.9.324 There would no longer be a significant effect on the terrestrial invertebrate assemblage as new habitats would have established sufficiently to result in a minor beneficial effect (not significant).

9.9.325 All other effects on Important Ecological Features would continue to be not significant.

2033-2038

Ongoing Construction Activities

9.9.326 In the period 2033 to 2038, new construction activities would include phase 2 of Car Park Y and the works on the autonomous vehicle maintenance building constructed near to Pier 5. There would not be any new effects on ecology and nature conservation from these works.

9.9.327 Some works started prior to 2033 would be ongoing, including the construction of Pier 7 and the aircraft hangar, internal access works, terminal extensions and the continuing use of the main contractor construction compound MA1, the airfield satellite contractor compound and car park Z compound. There would be no new adverse ecological effects from any construction activities that were started prior to 2033, but continuing through this period, that have not been assessed under the previous section of this chapter covering the period 2030-2032. Some areas of habitat creation would have established, as shown on Figures 2.1-2.6 of Appendix 9.9.2, resulting in beneficial effects previously assessed being realised. Therefore, this section only addresses any new activities specific to this period.

Operational Activities

9.9.328 Airport operations enabled by the Project will continue to increase during this period, with flight numbers and surface access traffic all increasing. Where this could give rise to impacts, these are specifically discussed in this section. It is not anticipated that increased passenger numbers would give rise to increased recreational pressure through the sensitive habitats/species around the site. Passengers visiting the airport stay within the terminal buildings and surrounding infrastructure. As such, effects from this impact are considered negligible on all receptors and not assessed further.

Statutory Designated Sites

9.9.329 Construction activities would continue from 2033 to 2038. Due to the distance of the statutory designated sites from the Project site boundary, and the measures designed into the Project to ensure that potential pollutants are prevented from reaching them, the construction of the Project would continue to have no impact on statutory designated sites during this assessment period. There would be no effects due to loss or alteration to the habitats or species present. The magnitude of impact and significance of effect would continue to be **no change** and therefore not significant.

9.9.330 No specific modelling of the impact of operational emissions to air has been undertaken for this period with impacts from changes to air quality completed for the 2032 (discussed above) and 2038 (discussed below) assessment years.

Non-statutory Designated Sites

9.9.331 No new aspects of the Project would have any impacts on non-statutory designated sites and previous construction activities in close proximity to them would have been completed during this assessment period.

9.9.332 The remaining non-statutory designated sites are more than 600 metres from the Project site boundary and therefore less sensitive to effects from construction.

9.9.333 There would be no effect due to loss or alteration to the habitats or species present. The magnitude of impact and significance of effect for this assessment period would continue to be **no change** for the majority of sites and would have reduced to **no change** from negligible for The Withy SNCI, and therefore effects would not be significant.

9.9.334 No specific modelling of the impact of operational emissions to air has been undertaken for this period with impacts from changes to air quality completed for the 2032 (discussed above) and 2038 (discussed below) assessment years.

Ancient Woodland

9.9.335 No additional works would be undertaken in the vicinity of ancient woodland and previous works would have been completed. This would continue to result in **no change** to a receptor of National value and therefore not significant.

9.9.336 No specific modelling of the impact of operational emissions to air has been undertaken for this period with impacts from changes to air quality completed for the 2032 (discussed above) and 2038 (discussed below) assessment years.

Habitats

Semi-natural Broadleaved Woodland and Mature Broadleaved Trees

9.9.337 No new areas of semi-natural broadleaved woodland or mature broadleaved trees would be affected by construction activities being undertaken at this stage of the Project. Tree planting to create new areas of woodland within land west of the River Mole and within Pentagon Field would be maturing but would not be fully mature by 2038. The tree planting along the surface access improvements would be immature. The magnitude of impact on this receptor of National value would continue to be medium and long-term and the significance of effect **moderate** and therefore considered significant.

Hedgerows

9.9.338 No new hedgerows would be affected by construction activities being undertaken at this stage of the Project. New hedgerows would have been planted and would be establishing resulting in a low, medium term impact on this receptor of National importance, and a continued **negligible** effect which would not be significant.

Watercourses

9.9.339 No additional works would be undertaken to watercourses or within the vicinity of them during this period and previous works that could affect them would have been completed. This would result in the negligible effect from the previous assessment period reducing to **no change** to a receptor of county value and therefore not significant.

9.9.340 Surface water runoff (including potentially polluted water from de-icer/aviation fuel) during operational activities from an increased area of impermeable surface will continue to be managed through the various attenuation features and water treatment facilities to ensure that any impacts

from such activities would be **no change** to a receptor of county value and therefore not significant.

Broadleaved Plantation Woodland and Associated Scrub

9.9.341 There would be no additional loss of broadleaved plantation woodland and associated scrub.

9.9.342 Tree planting to create new areas of woodland within land west of the River Mole and within Pentagon Field would be maturing but would not be fully mature by 2038. The tree planting along the surface access improvements would be immature. However, the new planting would be starting to provide some habitat value and would be starting to strengthen habitat connectivity along the highway.

9.9.343 There would continue to be a long-term loss until new planting had reached the maturity of the trees that had been lost, but as the woodland was maturing the magnitude of the impact would reduce from high to medium. Therefore, by 2038 there would be an overall, long-term, medium loss in the amount of woodland, of local value, resulting in a **minor adverse** significance of effect and therefore not significant.

Semi-improved Neutral Grassland

9.9.344 There would be no additional losses of semi-improved neutral grassland during this period.

9.9.345 New areas of semi-improved neutral grassland would have been created within the Museum Field flood compensation area, along the new corridor of the River Mole and in the mitigation area to the west of the River Mole and it would have established by this time. New species-rich grassland on land north west of Longbridge roundabout would have been created but would not have fully established by 2038. The overall habitat creation would compensate for the loss of the semi-improved neutral grassland from other aspects of the Project. There would therefore be a negligible, long-term impact on this habitat of local value resulting in a continued **negligible** significance of effect and therefore not significant.

9.9.346 Any delay in creating the grassland, or failure in it establishing successfully, resulting in the need for remedial works would delay the grassland reaching its desired outcome. This would therefore continue the medium term, low negative impact on a receptor of local value resulting in a continued **minor adverse** significance of effect and therefore not significant.

Marshy Grassland

9.9.347 No new areas of marshy grassland would be affected by the Project during this period. Newly established marshy grassland was recognised for the habitat enhancements it would deliver in the 2030 to 2032 assessment period. This would result in **no change** to a receptor of local value in the period 2033 to 2038 and therefore not significant.

9.9.348 Any delay in creating the grassland or failure in it establishing successfully resulting in the need for remedial works would delay the grassland reaching its desired outcome. This would therefore continue the medium term, low negative impact on a receptor of local value resulting in a continued **minor adverse** significance of effect and therefore not significant.

Species

Breeding Bird Assemblage (including NERC Species of Principal Importance and BoCC Red or Amber Listed species)

9.9.349 The suitable habitat for breeding birds which would be lost due to the Project would have been lost prior to 2033. In the period 2033 to 2038, the habitats created within mitigation areas early in the Project would be developing with most (except woodland) having reached maturity by 2038. Due to there still being a reduction in the amount of woodland habitat, there would still be an adverse impact on breeding birds. However, some tree planting would have grown sufficiently to provide suitable nesting sites for some bird species. The continuing long-term impact on breeding birds would therefore reduce to low from the medium impact identified in the previous assessment period, resulting in a **minor adverse** significance of effect on this receptor of county value and therefore not significant.

Wintering Bird Assemblage (including BoCC Red or Amber listed species)

9.9.350 New planting undertaken in other parts of the Project site would be establishing and would provide alternative foraging habitats, therefore resulting in a negligible medium term impact on a receptor of local value which would continue to have a **negligible** effect and therefore not significant.

Grass Snake

9.9.351 The creation of semi-improved neutral grassland and marshy grassland along the banks of the realigned River Mole, within the Museum Field flood compensation area and within the mitigation areas west of the River Mole and north east of Longbridge roundabout, would create new, high value habitats for grass snake resulting in a long-term, low beneficial impact. This would result in the negligible effect from the previous assessment period increasing to a **minor beneficial** significance of effect and therefore not significant.

9.9.352 Any failure of proposed habitat creation within these areas would result in a decrease in the expected extent of habitat for grass snakes. It is considered unlikely that there would be a complete failure of habitat creation and there would continue to be retained habitats within both areas where grass snake was recorded. Measures to remediate any failure, as set out in Table 9.8.1, would be put in place ensuring any impact was no more than medium-term. Therefore, this would result in a medium-term low impact on the grass snake population which was of local value, resulting in a **minor adverse** significance of effect and therefore not significant.

Great Crested Newt

9.9.353 The ponds where GCN were found to be present, and the surrounding terrestrial habitat likely to be used by the populations, would be sufficiently far from any new or ongoing works that no impacts would be foreseen. The new areas of habitat creation within mitigation areas and within flood compensation areas and the River Mole diversion are sufficiently far from the GCN populations that they are unlikely to have a beneficial impact through increased terrestrial habitat availability. However, GCN dispersing away from populations may use them. The overall impact on the GCN populations, which are of local value, would be negligibly beneficial resulting in a **negligible** significance of effect and therefore not significant.

Common Toad

9.9.354 Newly created grassland habitats within the flood compensation areas and mitigation areas would continue to increase the habitat resource for common toad resulting in a long term, low beneficial impact on a receptor of local value. This would result in an overall **negligible** effect.

9.9.355 The failure or delay in new areas of habitat establishing would have a medium term low negative impact which would also have a **negligible** effect and therefore not significant.

Badger

9.9.356 No works would be undertaken in this period within close proximity of the new badger sett.

9.9.357 The amount of construction traffic and associated movements would have significantly reduced due to much of the Project works being complete. However, there would continue to be construction traffic in areas around setts on site which would mean that there would be the potential for a corresponding increase in road mortality for badgers using the site. However, it is not expected that badger movement (principally at night) and construction would overlap significantly. There is also the risk of badgers accessing construction areas. The measures designed into the Project, as described in Table 9.8.1, would ensure that no badgers are harmed within the construction areas.

9.9.358 Implementation of these best-practice measures would ensure that any impact on the badger population, which is of local value, during construction would be negligible. This would result in a continued **negligible** effect and therefore not significant.

Otter

9.9.359 There would be no aspects of the Project that would directly affect the river corridors during this assessment period or works in close proximity to them.

9.9.360 The implementation of best-practice methods for pollution prevention (as set out in Table 9.8.1) would continue to reduce potential effects on otter. The aspects of the Project being constructed during this period would be more distant from the watercourses further reducing the risk of effects occurring. This would reduce the minor adverse effects identified in the previous assessment to negligible. This would give rise to a **negligible** effect to a receptor of local value and therefore not significant.

Assemblage of Bat Species

9.9.361 The establishment of grassland and scrub habitats within mitigation and flood compensation areas and along the realigned River Mole would be providing new foraging opportunities for bats. Tree planting along the surface access improvements would be maturing and starting to be of some value as a foraging resource and commuting route. However, the trees would be far from mature.

9.9.362 The Operational Lighting Framework, as set out in Table 9.8.1, would continue to ensure any lighting from the Project had a long-term negligible impact. The overall habitat resource within the Project site would have increased in the period 2033 to 2038 but would not be present at the baseline levels and therefore there would continue to be a long-term, high impact on a receptor of local importance resulting in a **moderate** significance of effect and therefore considered

significant. However, this should be seen in the context of the significance of impacts for later assessment years.

9.9.363 Flight numbers would have increased in this period. However, the improvements to the River Mole corridor, Brook Farm habitat creation area and Museum Field FCA will also have further matured, improving their foraging value for bats in this area, to the north of the airport. This maturing enhanced foraging habitat will attract bats away from the risk zones for collision. This would ensure that any impact from increased aircraft collision risk on the bat assemblage which is of local value would be negligible. This would result in a **negligible** effect and therefore not significant.

Bats (Bechstein's Bat and Barbastelle Bat)

9.9.364 There would be no additional or ongoing construction works between 2033 and 2038 that would affect Bechstein's bat and barbastelle bat. The surface access improvements would be complete and the replacement woodland planting would have been undertaken. The mitigation areas would also have been completed. The habitats would be starting to develop some value for foraging and commuting bats but would not have fully matured. There would be an ongoing long-term low impact on the populations of national value due to the ongoing reduction in habitat availability. This would give rise to a continued **minor adverse** significance of effect and therefore not significant.

9.9.365 Flight numbers would have increased in this period. However, the improvements to the River Mole corridor, Brook Farm habitat creation area and Museum Field FCA will also have further matured, improving their foraging value for bats in this area, to the north of the airport. This maturing enhanced foraging habitat will attract bats away from the risk zones for collision. This would ensure that any impact from increased aircraft collision risk on the Bechstein's bat and barbastelle populations which are of National value would be negligible. This would result in a **negligible** effect and therefore not significant.

Hedgehog

9.9.366 There would be no new impacts on hedgehogs from new or continuing construction works during this period. Newly created habitats would be providing a new habitat resource for hedgehogs compensating for previous habitat losses and resulting in an overall increase in habitat for hedgehogs.

9.9.367 In the long-term, there would be a low beneficial impact to a receptor of local value resulting in an increase from the previously assessed negligible effect to a **minor beneficial** significance of effect and therefore not significant.

Terrestrial Invertebrate Assemblage

9.9.368 No further works to areas that might support terrestrial invertebrate assemblages of conservation interest are proposed in this period. This would result in the same long-term, low beneficial impact and continued **minor beneficial** significance of effect identified previously and therefore not significant.

Fish

9.9.369 During this period, the new River Mole diversion would have been created and would be establishing. No further works to areas that might support fish are proposed in this period.

Ongoing implementation of pollution and sediment control measures (as set out in Table 9.8.1) would ensure water quality is maintained. This would result in the same long-term, low beneficial impact and continued **negligible** effect identified previously and therefore not significant.

9.9.370 Surface water runoff (including potentially polluted water from de-icer/aviation fuel) during operational activities from the increased area of impermeable surface will continue to be managed through the various attenuation features and water treatment facilities to ensure that any impacts from such activities would be **no change** and therefore not significant.

Aquatic macroinvertebrates

9.9.371 There will be no additional impacts on macroinvertebrate communities during the period. Based on the predicted impacts from climate change some of the more pollution sensitive taxa may be lost during the summer period. The new channel diversion will provide new habitat niches for macroinvertebrates in the River Mole resulting in a low beneficial impact and **negligible beneficial** effect and therefore not significant.

9.9.372 Surface water runoff (including potentially polluted water from de-icer/aviation fuel) during operational activities from the increased area of impermeable surface will continue to be managed through the various attenuation features and water treatment facilities to ensure that any impacts from such activities would be **no change** and therefore not significant.

Further Mitigation

9.9.373 No further mitigation is proposed at this stage.

Future Monitoring

9.9.374 In 2033 to 2038, the success of habitat creation and measures for bats, GCN and grass snake would continue to be monitored. As set out in Table 9.8.1, the LEMP would detail the frequency of the monitoring and would include mechanisms to allow for alterations to be made to ensure habitat creation was successful.

9.9.375 Pre-construction surveys for birds would also be required to provide up to date data on their activity to better inform potential effects as a result of construction and inform where mitigation measures could be required, such as avoidance of active birds' nests.

9.9.376 Continued monitoring of the populations of bats, GCN and grass snake would be carried out to determine the success of the measures implemented, as set out in Table 9.8.1. This would assess how the relevant populations were performing against baseline levels and identify if any additional measures would be required if there were signs that populations were declining, such as changes to habitat creation or enhancement areas to ensure the measures were successful.

Significance of Effects

9.9.377 The project would continue to have a significant effect on semi-natural broadleaved woodland and mature trees and the bat assemblage (excluding Bechstein's bat and barbastelle). This would be due to new woodland planting not having reached full maturity during this period.

9.9.378 There would no longer be a significant effect on broadleaved plantation woodland and associated scrub or breeding birds (excluding Schedule 1 and Annex 1 species) as new woodland planting would have established sufficiently to start to compensate for those areas lost and would be

sufficiently mature to start to provide new nesting sites. The effects would not have been fully removed during this period and there would continue to be a minor adverse effect (not significant).

9.9.379 All other effects on Important Ecological Features would continue to be not significant.

Design Year: 2038

9.9.380 The majority of impacts on ecology would be associated with the construction of the Project and would therefore have occurred by 2038 when all construction works would be completed. Whilst there would be no additional effects from construction during this period, habitat creation would continue to be maturing and therefore the assessment of effects would have improved by 2038 in relation to grass snake, GCN, otter, breeding birds and hedgehog. Due to the continued absence of mature woodland and reduction in habitat connectivity from the surface access improvement works, there would continue to be significant effects on semi-natural broadleaved woodland and the assemblage of bat species.

9.9.381 There is the potential for impacts to occur on some ecological receptors during the operational period of the Project and these are assessed in this section.

Designated Sites

9.9.382 The Project is anticipated to be fully built out by 2038. This would result in an increase in road vehicle emissions and aviation emissions from an increase in passengers travelling to the airport and taking flights.

9.9.383 Changes to air quality through emissions of various chemical species can impact habitats and the animals/plants they support through direct toxicity and through indirect effects such as eutrophication of the soil and associated changes in species composition. Operational emissions for 2038 have been modelled following standard good practice guidelines at a selection of discrete receptor points at the closest point of the statutory designated sites within 5 km of the Project. As reported in Chapter 13 Air Quality, no impacts to statutory designated sites within 5 km of the Proposed Development are anticipated with all emissions levels below the screening thresholds.

9.9.384 Impacts to international designated sites from operational emissions to air in 2038 are considered in Appendix 9.9.1 Habitats Regulations Assessment Report. The conclusion of that assessment is that there would be no adverse effects on the integrity of any of the sites assessed.

Ancient Woodland

9.9.385 As set out in Chapter 13 Air Quality (see Appendix 13.4.1), modelling of aerial emissions from operational traffic with respect to gaseous nitrogen oxides (NO_x) and ammonia (NH_3) along with corresponding nitrogen deposition from both gases has been undertaken for the operational year 2038. These identified a small number of exceedances of a 1% threshold of the critical level for NO_x (30 $\mu g.m^{-3}$) within ancient woodland during the operational phase. However, there is no material difference to the results from 2032. As such, the impact of changes in NO_x due to operational emissions on the ancient woodland is considered to be **no change** with respect to both impact and significance.

9.9.386 The impact of nutrient nitrogen deposition on habitats occurs over a long time period with deposition measured in kilograms of nitrogen per hectare per year. Therefore, in order to determine the long-term impact of nitrogen deposition from operational emissions to air from the Project on ancient woodland receptors, the modelled deposition with the Project in 2038 has been compared to that in 2029 without the Project. This illustrates those areas where the resulting deposition in 2038 exceeds that currently experienced by the habitats. Only four of the modelled locations were found to have higher rates of nitrogen deposition in 2038 than those experienced in 2029: Eco_125, Eco_143, Eco_217 (Titsey Woods SSSI) and Eco_218 (Westerham Wood SSSI). For all other parcels of ancient woodland, the rate of nitrogen deposition will be lower in the 2038 assessment year with the Project than in 2029 without it. Set against this improvement in overall background deposition, contributions from the Project are considered to be negligible therefore not significant.

9.9.387 All of the four locations where the nitrogen deposition in 2038 with the Project is greater than in 2029 without the Project are located adjacent to the M25 and are already subject to significant deposition rates (>70kgN.h^{-1}.yr^{-1}, greater than seven times the critical load). Given their locations adjacent to one of the busiest stretches of road in the country, the modelling predicts either very small improvements in nitrogen deposition rate between 2029 and 2038 of between 0.1 and 0.3kgN.h^{-1}.yr^{-1}, or increases of 0.6 to 1.0kgN.h^{-1}.yr^{-1}, in the absence of the Project. The maximum change in these locations arising from the Project is 0.7kgN.h^{-1}.yr^{-1} at Titsey Woods SSSI; the background in this location in 2038 is predicted to be >90kgN.h^{-1}.yr^{-1}. In all locations the change associated with the Project is <1% of the predicted background in 2038. Therefore, in the context of habitats already subject to very significant deposition rates, the contributions from the Project at these four sites is considered to be of negligible magnitude on a receptor of National importance which is of **minor adverse** significance and therefore not significant.

Watercourses, Aquatic Invertebrates and Fish

9.9.388 Operational surface water management and associated discharge would continue to be regulated by the airport's Environment Agency discharge consent (see Chapter 11 Water Environment). Nevertheless, there would be increases in surface water discharges to the River Mole from the Museum field and Car Park X flood alleviation areas during periods of intense rainfall. The occurrence of these events may have increased by 2038 under the climate change scenario being considered. There woould be some scour of bank and channel habitats as a result of these events, which may help to clear accumulated sediment, although new accretion areas may develop downstream. Oil interceptors in Car Park X will minimise the risk of the discharge of polluting substances such as metals and hydrocarbons. Given that these events will only occur during high flows the risk of pollution events is considered to be low. Effects on fish and macroinvertebrates are considered to be negligible to **minor** and therefore not significant.

9.9.389 The discharge from the proposed treatment works for the de-icer pollution storage lagoons may increase water levels in the Gatwick Stream and result in some localised scour**.**

Bats

9.9.390 The increased passenger throughput of the airport during this period would result in an increase in the number of vehicles on the roads travelling to and from it. The revised highway layout would also result in the creation of a flyover at the South Terminal roundabout moving vehicles from ground level to above ground level.

9.9.391 Crossing point and activity surveys for bats at the Riverside Garden Park and along the A23 found that the main commuting route used by bats was the River Mole corridor with the road not being used significantly, possibly due to the high light levels and existing levels of disturbance present.

9.9.392 The habitats around the South Terminal roundabout were not found to be as well used by bats and the introduction of a flyover would therefore not affect any significant flightlines.

9.9.393 As a result, the use of the road network during the operational period is unlikely to have any impact on bat foraging or commuting routes. The magnitude of impact and significance of effect would therefore be **no change** and therefore not significant.

9.9.394 Radio tracking of Bechstein's and other bat species has shown that they mainly use the periphery of the airport, where habitats are of higher quality, with only occasional use of the airfield and more disturbed areas. Further, the improvements to the River Mole corridor, Brook Farm habitat creation area and Museum Field FCA will be fully mature, improving their foraging value for bats in this area, to the north of the airport. This enhanced foraging habitat will attract bats away from the risk zones for collision. Therefore, impacts on bats of national importance from the changes to air traffic movements is anticipated to be of **negligible** magnitude giving rise to a continued minor adverse significance of effect and significance and therefore not significant.

Badger

9.9.395 The increase in operational traffic surrounding the Project site would mean that there would be the potential for a corresponding increase in road mortality for badgers. However, the main traffic increases would be associated with movements along the A23, well away from any existing badger population. Therefore, it is likely that the impact of the operational period of the Project on badgers would be negligible. This would result in a **negligible** effect and therefore not significant.

Otter

9.9.396 The increase in operational traffic surrounding the Project site would mean that there would be the potential for a corresponding increase in road mortality for otters using the watercourse corridors. However, the river bridges would be maintained with sufficient room beneath to enable safe passage along the rivers for otters. Therefore, it is likely that the impact of the operational period of the Project on otter would be negligible. This would result in a **negligible** effect and therefore not significant.

9.9.397 No other operational activities would have an effect on ecology and nature conservation.

Further Mitigation

9.9.398 No further mitigation measures are proposed for this period.

Future Monitoring

9.9.399 It is anticipated that species monitoring would be complete by 2038. However, if the findings of the previous monitoring found that populations had not recovered sufficiently or that additional measures were required that had not fully established, additional monitoring for bats, GCN and grass snake would be required, as set out in Table 9.8.1.

9.9.400 Habitat creation would continue to be monitored to determine its success and to inform whether any remediation works were required. As set out in Table 9.8.1, the relevant LEMP would detail the frequency of the monitoring and would include mechanisms to allow for alterations to be made to ensure habitat creation was successful.

Significance of Effects

9.9.401 No effects that are significant have been identified for this period and no additional measures are proposed. Therefore, the significance of effects would remain as presented above.

Long-term forecast year; 2047

9.9.402 It is anticipated that by 2047, Gatwick's passenger throughput could have increased to approximately 80.2 million passengers per annum (mppa), compared to a maximum potential passenger throughput based on existing facilities (with future baseline projects) of 67.2 mppa. This represents an anticipated increase in throughput of approximately 13 mppa. There is the potential for impacts to occur on some ecological receptors during the future operational period of the Project and these are assessed in this section. Other receptors that are unlikely to be affected during this operational period have not been included in the assessment below. These include receptors that would have been affected by construction activities only, and receptors affected by operational activities that have been assessed in the Design Year (2038) assessment period where the assessment of effects is considered to remain the same in 2047.

9.9.403 The majority of newly created habitats would have established by 2047 and would be resulting in beneficial effects on the species that would use them. However, the woodland creation would not have fully matured.

Designated sites

9.9.404 The increase in passenger throughput would result in an increase in road vehicle emissions and aviation emissions from an increase in passengers travelling to the airport and taking flights.

9.9.405 No specific air quality assessment on ecology receptors for 2047 has been completed as by this period, it is anticipated that the vehicle fleet will be almost fully electrified. As such, the previous assessment years are considered to be the worst case scenarios and no further impacts are likely.

Habitats; semi-natural broadleaved woodland and broadleaved plantation woodland

9.9.406 Tree planting to create new areas of woodland within land west of the River Mole and within Pentagon Field would be close to reaching maturity. The tree planting along the surface access improvements would be semi-mature. Therefore, neither area would have fully compensated for the loss of the baseline habitat by 2047. However, the new planting would have substantially increased in habitat value since it was planted and would be sufficiently tall and dense to have strengthened habitat connectivity along the highway.

9.9.407 The long-term impact on the national value semi-natural broadleaved woodland would have reduced to low resulting in a **minor adverse** and therefore insignificant effect.

9.9.408 The woodland planting would aim to provide higher value woodland than the broadleaved plantation lost and therefore even though it had not reached maturity, the higher value woodland would be delivering benefits to the species that would utilise it. Therefore, by 2047 the long-term

impact would be low to the local value receptor, resulting in a **negligible effect** that would not be significant.

Bats

9.9.409 The increased capacity of the airport would result in an increase in the number of vehicles on the roads travelling to and from it. The revised highway layout would also result in the creation of a flyover moving vehicles from ground level to above ground level. The effects of this were assessed for the year of operation; 2038 and would not have significantly changed in 2047.

9.9.410 The areas of woodland planting would have substantially matured and would be providing a more valuable habitat resource closer to the value of the baseline habitat value. However, until the woodlands had fully matured there would continue to be a loss in the value of the woodland habitats for bats. When considered in combination with the other habitats that would have been created as part of the Project which would have increased foraging opportunities, the overall impact of the Project in 2047 would be negligible to a receptor of county value, resulting in a **negligible** effect that would not be significant.

9.10. Potential Changes to the Assessment as a Result of Climate Change

9.10.1 The measures designed into the Project, for ecology and nature conservation and other disciplines, take into account potential changes associated with climate change. For example, the plant species used in landscaping proposals would be tolerant of changes to the climate and would not include species that would be readily susceptible to decline. The flood risk modelling considered changes to climate and the design of the flood attenuation areas would consider this ensuring there is sufficient storage of flood waters so that they do not affect drier habitats. The potential for the success of measures to be affected by climate change is therefore low as they have been designed to be resilient.

9.10.2 Whilst the Project has designed new habitats to be resilient to climate change which would reduce the negative effects on fauna, it would not be possible to offset all effects. Changes to seasonal timings and extreme changes to rainfall would continue to have the potential to affect the species present resulting in a possible reduction of some species or species groups. It is difficult to assess the effects this would have due to the uncertainties around what the effects would be and when they would occur. However, the majority of the impacts on ecology receptors due to the Project would happen early in the Project timeline when the effects of climate change may be considered to be less severe. Climate change would therefore not significantly change the effects on most receptors.

9.10.3 Due to the amount of time it takes for new woodland to establish, the effects of woodland loss resulting from the Project would potentially increase due to the effects of climate change in the period 2032-2038. There is potential for retained areas of woodland to be declining in condition prior to the new woodland having matured sufficiently resulting in a further loss of the overall area of woodland. However, in the long-term (by 2047), the new woodland would provide beneficial effects due to it being more resilient to climate change.

9.11. Cumulative Effects

Zone of Influence

9.11.1 The zone of influence (ZoI) for ecology and nature conservation has been identified based on the spatial extent of likely effects. The extent of the ZoIs for different receptors are listed below:

- European statutory designated sites within 20 km;
- Nationally and locally designated sites and priority habitat within 5km;
- Nationally and locally designated sites within 200 metres of significant surface access routes or where other pathways exist;
- Bats and otters within 10km; and
- Other protected and notable species within 2 km.

Screening of Other Developments and Plans

9.11.2 The Cumulative Effect Assessment (CEA) takes into account the impact associated with the Project together with other development proposals and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise undertaken as part of the 'CEA short list' of developments (see Appendix 20.4.1). Each development on the CEA long list has been considered on a case-by-case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

9.11.3 In undertaking the CEA for the Project, it is important to bear in mind that the likelihood of other developments and plans being constructed varies depending on how far along the planning process they are. For example, relevant developments and plans that are already under construction are likely to contribute to a cumulative impact with the Project (providing impact or spatial pathways exist), whereas developments and plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors. For this reason, all relevant development and plans considered cumulatively alongside the Project have been allocated into 'Tiers', reflecting their current stage within the planning and development process. Appropriate weight is therefore given to each Tier in the decision-making process when considering the potential cumulative impact associated with the Project (eg it may be considered that greater weight can be placed on the Tier 1 assessment relative to Tier 2). Further details of the screening process for the inclusion of other developments and plans in the short list and a description of the Tiers is provided in Chapter 20: Cumulative Effects and Inter-relationships.

9.11.4 The specific developments scoped into the CEA for ecology and nature conservation and the Tiers into which they have been allocated, are outlined in Table 9.11.1. Full details of each of the developments is provided in Appendix 20.4.1.

9.11.5 Note that due to the uncertainty regarding when Heathrow's third runway will come forward, it has not been included in the cumulative assessment for ecology. However, discussion about potential cumulative effects, should the Heathrow third runway project come forward during the timescale for this Project, is provided in Chapter 20: Cumulative Effects and Inter-relationships.

Table 9.11.1: List of Other Developments and Plans considered within CEA

ID	Description of Development/Plan	Planning Phase	Distance from the Project	Likely period of Construction (if applicable)	Overlap with the Project?
	Tier 1				
66	CR/2017/0810/FUL the temporary use (for a period of 5 years) of the site as a Park and Ride car park, comprising 892 car parking spaces (814 long stay) and associated infrastructure	Awaiting decision	1.2 km	2024-2029	Construction
233	22/01989/F Demolition of existing buildings and erection of 33 homes, including affordable housing, with access from Haroldslea Drive, associated parking, open space and associated works.	Approved with conditions	1 km	2024-2029	Construction
338	DM/19/3549 - Land West of Copthorne - Reserved matters application for 9,290sqm B8 warehouse building pursuant to condition 1	Application granted (14/07/2020). Under construction	6.7 km	2024-2029	Construction
342	DM/19/4636 - Land east of Brighton Road, Pease Pottage phase 3 Under construction - Reserved matters application for approval of the appearance, layout, scale and landscaping of phases 4 and 5 pursuant to Outline Planning Permission DM/15/4711 comprising a total of 277 dwellings	Application granted (26/05/2021). Under construction	6.4 km	2024-2029	Construction

ID	Description of Development/Plan	Planning Phase	Distance from the Project	Likely period of Construction (if applicable)	Overlap with the Project?
239	22/02783/F - Land Parcel at Reigate Road, Sidlow, Surrey - installation and operation of a ground-mounted solar farm and energy storage system	Application Validated	3.93 km	2024-2029	Construction
290	DC/17/2481/OUT; DC/20/2223/REM Kilnwood Vale-Colgate.Reserved Land Phase 6 - Permitted Outline for up to 250 units. Reserved matters for 168 units	Application Permitted	5.3 km	2024-2029	Construction
291	DC/21/2246/FUL; Erection of 116 dwellings with associated parking, landscaping and drainage infrastructure - Phase 6B Kilnwood Vale, Faygate, Horsham RH12 0AQ	Application Validated	5.3 km	2024-2029	Construction
	Tier 2				
235	22/01743/F Development of a Sustainable Urban Extension at Land at Hillsbrow, comprising the erection of 161 new residential dwellings (Use Class C3) (including provision of homes for over 55s), and associated earthworks, landscaping, highways works, infrastructure and open spaces.	Awaiting Decision	8.12 km	Unknown	Unknown
	Tier 3				
356	DC/16/1677 Land North of Horsham, comprising the	Application Permitted	8.72 km	2023 - 2031	Construction and Operation

ID	Description of Development/Plan	Planning Phase	Distance from the Project	Likely period of Construction (if applicable)	Overlap with the Project?
	area north of the A264 (between Langhurst Road and Wimlands Road) - Strategic Site allocated for mixed use strategic development to accommodate at least 2,500 homes and a business park				
381	Steers Lane, Forge Wood – 185 dwellings	Outline planning permitted.	0.68 km	Unknown	Unknown
405	Forge Wood, Pound Hill (1,900 dwellings)	In draft local plan (Future Mole Valley Local Plan) but not adopted local plan	0.7 km	Unknown	Unknown
406	Forge Wood Masterplan Area, Pound Hill - 1,083 dwellings	In draft local plan (Future Mole Valley Local Plan) but not adopted local plan	0.7 km	Construction due to be complete 2020	Completed prior to project
436	SA19: Land south of Crawley Down Road, Felbridge - Housing allocation for 200 dwellings	Housing Allocation	8 km	Unknown	Unknown
437	SA20: Land south and west of Imberhorne Upper School, Imberhorne Lane, East Grinstead -Housing allocation (550) with Local Centre and Care Community	Housing Allocation	8.4 km	Unknown	Unknown

ID	Description of Development/Plan	Planning Phase	Distance from the Project	Likely period of Construction (if applicable)	Overlap with the Project?
449	DP10: Strategic allocation to the east of Pease Pottage - Strategic development is allocated to the east of Pease Pottage for: approx. 600 new homes	Strategic Housing Allocation	7.32 km	Unknown	Unknown
450	DPSC3: Land at Crabbet Park - Site is capable of delivering 2,300 new homes, but is estimated that only 1,500 will be deliverable within the Plan period.	District Plan Allocation (Reg 18)	4.61 km	Unknown	Unknown
452	DPH13: Land to west of Turners Hill Road, Crawley Down - Housing allocation of 350 dwellings	Housing Allocation	7.1 km	Unknown	Unknown
453	Land west of Balcombe Road, Horley Strategic Business Park - 83ha with 200,000 sq m office space.	Development Management Plan 2018-2027 (Reg 22 Submission)	0.4 km	Unknown	Unknown
501	DS42 Land at Povey Cross Farm, Hookwood: Site identified in Reg 19 consultation draft local plan for 84 dwellings	Proposed Submission Local Plan (Reg 19)	0.4 km	Unknown	Unknown
502	Land west of Reigate Road, Hookwood - Site identified in Reg 19 consultation draft local plan for 446 dwellings	Proposed Submission Local Plan (Reg 19)	0.5	Unknown	Unknown
503	Three Acres – Hookwood – site for 20 dwellings identified in local plan.	In draft local plan (Future Mole Valley Local Plan) but not	0.7 km	Construction due for completion 2026	Partial construction overlap (2024-2029)

ID	Description of Development/Plan	Planning Phase	Distance from the Project	Likely period of Construction (if applicable)	Overlap with the Project?
		adopted local plan.			
504	Kennel Road – Hookwood – site for 13 dwellings identified in local plan	In draft local plan (Future Mole Valley Local Plan) but not adopted local plan.	0.8 km	Unknown	Unknown

Cumulative Effects Assessment

9.11.6 A description of the significance of cumulative effects upon ecology and nature conservation receptors arising from each identified impact is given below.

Initial Construction Period: 2024-2029

9.11.7 Of the seven Tier 1 developments within 10km of the Project site, two are within 2km of it and were therefore identified as having the potential to have cumulative effects on more receptors. The remaining Tier 1 sites are more than 5 km from the Project site and therefore cumulative effects were only considered for European statutory designated sites (addressed in Appendix 9.9.1), bats and otters.

9.11.8 The Tier 1 developments would result in the permanent loss of existing habitats and would have effects on protected and notable species, although losses would be compensated for. Construction of these developments could give rise to disturbance impacts, which have potential to result in greater disturbance to species if construction overlaps with the construction of the Project and these are described in more detail below for the relevant receptors.

9.11.9 There is less certainty on the potential effects of some of the Tier 2 and 3 developments due to the absence of ecology survey information and therefore an assessment conclusion cannot be made. However, Horley Strategic Business Park and Land West of Reigate Road, Hookwood are in close proximity or connected to the Project site and have greater potential to affect the same receptors as those identified on it, and therefore a precautionary approach has been taken in considering the potential for cumulative effects to occur.

Breeding Birds (Annex 1 EU Birds Directive and/or Listed under Schedule 1 of the WCA)

9.11.10 No Schedule 1 or Annex 1 birds were recorded within the Tier 1 developments and therefore no cumulative effects are foreseen. There is no information about whether Tier 2 or 3 sites could potentially support them. Two of the Annex 1/Schedule 1 birds identified as potentially breeding on the Project site (peregrine and little ringed plover) utilise habitats predominantly absent from the Tier 2 and 3 sites within the ZoI.

9.11.11 Woodland is present at Forge Wood which could have the potential to support firecrest but it is unlikely that significant areas of woodland would be lost within the developments. There is

potential for increased disturbance resulting from both construction activities and from increased visitor pressure once developments were complete which could overlap with the construction phase of the Project. Given the small areas of woodland that could potentially affected and the wider resource of woodland within the wider area, any effect on the firecrest population would be considered to remain low.

Breeding Birds (NERC Species of Principal Importance and BoCC Red or Amber Listed Species)

9.11.12 The majority of the developments would result in the loss of nesting sites for breeding birds and Red and Amber listed species would be likely to present on some sites. The Tier 1 developments have shown how they would compensate for this loss through habitat retention and new landscape planting and the provision of bird boxes which are shown on supporting planning documents. Therefore, in combination with the proposed mitigation on the Project site, there would be a long-term, negligible impact.

9.11.13 Should nesting habitat be lost from all developments at the same time and no mitigation put in place until the end of the developments, there is potential for there to be an overall decrease in nesting sites and increased competition to win suitable territories. This could potentially have a medium-term, medium impact on the bird assemblage, which is of local value, resulting in a **minor adverse** significance of effect.

Grass Snake

9.11.14 Grass snake was recorded on two developments (Haroldslea Drive and Forge Wood) within 2 km of the Gatwick Project site. There is also potential for them to be present on Tier 3 allocated sites that currently do not have survey information available. Grass snake ranges have been estimated to be between 1.29 hectares and 3.56 hectares but can extend up to 9.41 hectares (Reading and Jofre, 2009) so there is potential for the grass snake populations in the east and west of the Project site to be connected to the grass snake populations on the other development sites. Forge Wood includes the Gatwick Stream within its boundary which strengthens the habitat connectivity between the two areas. Should the Hookwood allocated site support grass snake there is potential for an overlap with the population recorded within the Project boundary (at the NWZ).

9.11.15 The Project would not affect the grass snake population in the east of the Project site and therefore there would be no combined effect with the Forge Wood development. The habitats on the Project site nearest Haroldslea Drive and Horley Business Park allocation were of low suitability to grass snake and therefore no effects on grass snake from the Project have been predicted.

9.11.16 Mitigation measures would also be required on the other development sites to comply with protected species legislation, reducing potential impacts on the grass snake populations present. However, if the same grass snake population was present within all areas, the loss of habitat and potential stress caused to individual grass snakes could result in a medium magnitude, medium-term impact. The significance of the cumulative effect on the grass snake population which is of local value would be **minor adverse**.

Great Crested Newt

9.11.17 Populations of GCN were identified on one other development site within 2 km of the Project site; Forge Wood (0.7 km away to the south).

9.11.18 Whilst GCN have been recorded travelling up to 1.3 km from breeding ponds, they typically stay within the area approximately 250 metres from breeding ponds (English Nature, 2001). It is therefore considered unlikely that GCN would commute from the known GCN breeding ponds on site to those at Forge Wood.

9.11.19 If there was movement between the two areas, it is likely that GCN would be travelling through areas outside of parts of the Project site that would be affected by construction as the breeding ponds are to the east of them.

9.11.20 Horley Strategic Business Park and Hookwood are not located near to parts of the Project site that have the potential to support GCN and therefore no cumulative effects are foreseen.

9.11.21 The impact of the Project with the developments/site allocations within 2 km would therefore be negligible over a medium-term. The cumulative effect on GCN (a receptor of local value) would therefore be **negligible**.

Common Toad

9.11.22 The combined area of the developments would account for a relatively small loss of terrestrial habitat for common toad within the wider geographical area. There would therefore be no change to the medium-term, low impact that the Project would have in isolation. This would result in a cumulative **negligible** effect on a receptor of local value.

Badger

9.11.23 Signs of badger activity were identified within one Tier 1 development atHaroldslea Drive. Badger setts have also been recorded on previous phases of Forge Wood so there is potential for the allocated site being considered here to fall within the same badger territory. Given the distance between the other developments and the known badger territories within the Project site boundary it is considered unlikely that the same social group of badgers would be present within other developments. Therefore, the Project would not contribute to any cumulative effect greater than the effect of the Project individually.

9.11.24 Badger presence is not known within the other Tier 3 sites but given their close proximity to the Project site there is potential for the badger social groups present to also use these sites.

9.11.25 Horley Strategic Business Park and Hookwood adjoin parts of the Project site where levels of badger activity were low and therefore the badger social groups would be unlikely to be affected by the developments once suitable mitigation measures were in place to protect them during construction. No cumulative effects are anticipated on that basis.

Otter

9.11.26 No signs of otter were identified on other development sites. No cumulative effects are therefore envisaged.

Assemblage of Bat Species (including Bechstein's bat and barbastelle)

9.11.27 No confirmed bat roosts were identified on any of the other developments. Bat activity was recorded with species assemblages being similar to those recorded on the Project site at Land North of Horsham and Land West of Copthorne. *Myotis* bats were recorded on these sites but were not identified to species so it was not clear if Bechstein's bat was present. Barbastelle was

recorded in low numbers on Land North of Horsham. Other sites that had data on bat activity showed lower species diversity. Many Tier 3 sites had no survey data available for so their value to bats is unknown.

9.11.28 Bats are highly mobile species and, therefore, there is potential for the same bats to be utilising foraging habitat within more than one proposed development site. There is also potential for bats displaced from one development site to use habitats on another and therefore be affected by habitat loss at more than one location.

9.11.29 The proposed developments at Haroldslea Drive, the temporary park and ride and Horley Business Park were located within 1 km of the Project site to the north or east and either adjoining it or separated from it by fields, hedgerows and woodland. There is good connectivity between the developments for bats and it is likely that the local populations would use all sites. However, the northern and eastern sections of the Project site were found to support relatively low levels of bat activity. Bat activity was predominantly from common and soprano pipistrelles both on the Project site and on the other sites.

9.11.30 There is potential for the other sites to affect suitable foraging and commuting habitat at the same time as the Project site thereby increasing the effects on bats using them. However, none of the sites would result in the complete loss of habitat. Given the relatively low numbers of common and widespread species recorded in this part of the Project site and the availability of other commuting routes and foraging habitat within the vicinity, it is considered unlikely the cumulative effect of the three developments would substantially change the foraging or commuting behaviour of the bats using them.

9.11.31 The proposals at Haroldslea Drive and the park and ride included mitigation for any impacts on bat activity in the design which included retaining, creating and enhancing foraging and commuting habitat and using sensitive lighting.

9.11.32 The areas of highest value on the Project site were the woodlands and the River Mole corridor in the west and north-west of the site. Radio trapping and tracking found the adjoining habitats to the west were also of value. The Tier 3 Land at Hookwood allocated sites, located 0.4 km to 0.8 km to the north west of the Project site, comprised agricultural fields, hedgerows and trees, and woodland. It could therefore form part of the wider landscape found to be of value to bats and part of the core habitat area for Bechstein's bat.

9.11.33 Any loss of suitable foraging, commuting or roosting habitats for bats that occurred at the same time as the lead in surface access improvement works on the Project site could result in an overall greater loss of habitat at the same time. However, it is unlikely that all suitable habitat on the Hookwood site would be lost and that most of the hedgerows and trees around the outer boundary would be retained as a minimum. Connectivity would be maintained to the wider landscape by the surrounding landscape.

9.11.34 The proposed creation of new foraging habitat early in the Project programme in the west of the Project site, as set out in Table 9.8.1, would help to reduce the effects of habitat loss.

9.11.35 The remaining sites were found to be a greater distance from the Project site, with habitat connectivity reduced due to the M23 motorway and urban areas. However, all sites were found to support bat activity and there is potential for movement between them and the Project site.

9.11.36 All of the other developments combined account for a relatively small area with substantial areas of suitable habitat being retained within the wider landscape, including high value habitats such as woodland. All Tier 1 applications include measures to mitigate potential effects on bat activity.

9.11.37 The **moderate adverse** effects already predicted for the general bat assemblage due to the loss of habitat along a linear corridor in the north of the Project site would not significantly increase due to adjoining or nearby habitats resulting in large, additional areas of habitat loss. The cumulative effect of all developments happening at the same time could result in a temporary reduction in foraging resource until habitat creation or enhancement had matured. However, there would still be a significant habitat resource retained within development sites and in the wider landscape so the overall effects would be unlikely to increase.

9.11.38 The Project was found to have a **minor adverse** effect on Bechstein's bat due to links between core habitat being slightly reduced. The Hookwood site could result in a slight reduction in foraging and commuting habitat which would not significantly increase the overall effect. Links to the wider landscape would be maintained.

9.11.39 Barbastelle was recorded at two developments, Forge Wood and Land north of Horsham, both large residential-lead developments. The low detection rate of barbastelle both within the Project site and the allocation sites suggests these areas do not form an area of core habitat. Larger areas of woodland within the surrounding landscape would predominantly not be affected by proposed developments. The cumulative effects of barbastelle would not increase the minor adverse effect predicted for the Project.

Harvest Mouse

9.11.40 The combined area of the Tier 1, 2 and 3 developments would account for a relatively small loss of terrestrial habitat for harvest mouse within the wider geographical area. There would therefore be no change to the effect that the Project would have in isolation.

Hedgehog

9.11.41 There is potential for the local hedgehog population to use the sites of other developments or allocations, particularly those within 1 km, and therefore be affected by habitat loss in all locations. However, there would continue to be a significant habitat resource within the area and new, high value habitats would be created on the Project site and on other sites in the long-term, so no additional effects on the hedgehog population are foreseen.

2030-2032

9.11.42 One development (Land North of Horsham 8.7 km to the south west of the site) would be potentially under construction during the first full year of operation when parts of the Project would still be under construction. This site was found to support a similar assemblage of bats to those on the Project site and there is some potential for the same populations to be using both sites, including Bechstein's bats; whose core habitat was to the west of the Project site.

9.11.43 However, the substantial area of suitable habitat that would remain present between the two sites and the measures in both designs to create new habitats would ensure any cumulative effects were negligible.

9.11.44 There is potential for other Tier 3 projects to also be under construction. No detailed ecology assessments have been undertaken for these other developments and therefore an informedassessment of cumulative effects cannot be undertaken at this stage.

9.11.45 A number of developments would be operational, and any habitat creation committed to through the planning process, would be complete thereby compensating for any construction phase cumulative effects and potentially offering additional habitats to more mobile species.

2033-3038

9.11.46 The construction of all developments with known timescales are anticipated to be complete by 2033. Any habitat creation would be complete thereby compensating for any construction phase cumulative effects and potentially offering additional habitats to more mobile species.

9.11.47 Tier 3 developments could be under construction but without detailed ecology assessments it is not possible to determine cumulative effects at this stage.

Design Year: 2038

9.11.48 Tier 3 developments could be under construction but without detailed ecology assessments it is not possible to determine cumulative effects at this stage.

Long-term forecast year: 2047

9.11.49 Tier 3 developments could be under construction but without detailed ecology assessments it is not possible to determine cumulative effects at this stage.

9.12. Inter-Related Effects

9.12.1 The assessment for ecology and nature conservation has been undertaken with consideration of inter-relationships between topics. This has included the inter-relationships with Chapter 13: Air Quality, Chapter 11: Water Environment and Chapter 12: Traffic and Transport and are reported on where relevant above.

9.12.2 No other inter-relationships have been identified.

9.12.3 Further information on inter-related effects is provided in Chapter 20: Cumulative Effects and Inter-relationships.

9.13. Summary

9.13.1 The Project site largely comprises low value habitats associated with the airport and its infrastructure. The site consists of large areas of hard standing and amenity grassland with areas of ornamental shrub and tree planting. These areas are predominantly located within the centre of the Project site with areas of higher value habitats to the east and west.

9.13.2 The Gatwick biodiversity area (LERL) east of the airport comprises a variety of grasslands with trees, woodland and hedgerows. The Gatwick Stream flows through the site and larger areas of semi-natural broadleaved woodland surround it, including areas of ancient woodland. Existing car parking areas to the north include linear strips of woodland which connect to the woodland to the south.

9.13.3 The River Mole corridor (NWZ biodiversity area) comprises the river itself and a variety of associated damp and dry grasslands and wetland areas. Semi-natural broadleaved woodland is present in the western part of the site including an area of ancient woodland, Brockley Wood.

9.13.4 Smaller areas of higher value habitat are present to the north and south of the airport and include Riverside Garden Park which comprises semi-natural broadleaved woodland interspersed with areas of grassland and tall ruderal vegetation. The Gatwick Stream flows through it.

9.13.5 Crawter's Field to the south of the airport comprises grassland and semi-natural broadleaved woodland. Crawter's Stream flows through this area but is heavily managed, reducing its ecological value.

9.13.6 An assessment of the effects found that the Project would have no effect on statutory or non-statutory designated sites or areas of ancient woodland. The effects on habitats and species are generally found to be not significant. However, the initial construction period (2024-2029) of the Project would require the removal of species-poor hedgerow and loss of plantation woodland and scrub habitat. The loss of these habitats would result in moderate adverse and significant effects that would not be mitigated for until the end of the construction period, or later for woodland habitats. Additional hedgerow planting would be undertaken early in the construction period on parts of the Project site, which would enhance habitat connectivity in these areas. This would result in a moderate beneficial and significant effect in the longer term.

9.13.7 The Project would require the removal of habitats in the initial construction period which would result in the temporary displacement of breeding birds. The loss of suitable breeding sites would result in a moderate adverse and significant effect during the initial construction period (2024-2029). The habitat loss would also result in a temporary moderate adverse effect on the bat and invertebrate assemblages. This would be a temporary effect until new tree, grassland and shrub planting had established.

9.13.8 New areas of higher value habitats would be created within two mitigation areas located in the west and north west of the Project boundary. Landscaping undertaken as part of the construction works would also reinstate and introduce new habitats across the Project. This would include the diverted River Mole, which would increase the length of the water course and the riparian habitat along it, and the Museum Field flood compensation area which would create a variety of damp and dry grasslands.

9.13.9 Tree planting would be undertaken along the new highway alignment to contribute to compensation for the woodland that would be lost, and flood mitigation features would be created along it introducing more damp and wet habitats to the Project site.

9.13.10 Overall, the Project provides circa 20% Biodiversity Net Gain (as set out in Appendix 9.9.2 of the ES) when considering the area of the Project Site where physical development would take place.

Table 9.13.1: Summary of Effects

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Construction Period 2024-2029 (Construction Effects up to first opening of Northern Runway)							
Statutory designated sites	International	No impact	No Change	No Change	No Change	Not significant	Due to the distance of international, national and local statutory designated sites and the mitigation measures designed into the Project there would be no impact from construction.
Statutory designated sites	National	No impact	No Change	No Change	No Change	Not significant	
Statutory designated sites	County	No impact	No Change	No Change	No Change	Not significant	
Non-statutory designated sites (Horleyland Wood LWS and The Withy SNCI)	County	Risk of habitat degradation due to close proximity of works/ sensitivity of habitats.	Short to long term	Negligible	Negligible	Not significant	The mitigation measures designed into the Project would ensure impacts from construction were negligible.
Non-statutory designated sites (The Roughs SNCI, Bridges Fields pSNCI and Bridges Wood pSNCI)	County	No impact	No Change	No Change	No Change	Not significant	The mitigation measures designed into the Project would ensure there was no impact from construction.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Ancient woodland	National	No impact	No Change	No Change	No Change	Not significant	The mitigation measures designed into the Project would ensure there was no impact from construction.
Semi-natural broadleaved woodland and mature broadleaved trees	National	Loss of woodland	Long term	Medium	Moderate adverse	Significant	Long-term loss of woodland and some loss of connectivity.
Hedgerows	National	Reconfiguration of airport facilities	Long term	Medium	Moderate beneficial	Significant	Initial loss compensated for by additional, greater value replacement planting.
Watercourses (River Mole and Gatwick Stream)	County (River Mole)	Construction of new channels for flood compensation resulting in a small loss of bankside habitat.	Short term	Negligible	Negligible	Not significant	The effects would be negligible due to very short sections of river being affected and being replaced with higher value habitat.
		The creation of new bankside	Long term	Low	Minor beneficial	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
		habitats and channels (associated with flood compensation areas) that are intermittently wet would increase the overall habitat resource					
		Increase in sediment and decrease in water quality	Short-term	Negligible	Negligible	Not significant	The effects would have a minimal effect on the ecology of the watercourse.
		Diversion of the River Mole	Medium term	Low	Minor adverse	Not significant	A relatively short section of stream would be affected meaning the effects would not be significant.
		Creation of a new section of river channel providing high value habitats	Long term	Medium	Moderate beneficial	Significant	Successful creation of the new channel and establishment of native flora and fauna would have a beneficial effect.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
		Failure or delay in creating new habitat	Medium term	Low	Minor adverse	Not significant	Delays or the need for remediation work could result in the impact from construction being extended.
Ponds (NERC S.41 Habitat)	National	No impact	No Change	No Change	No Change	Not Significant	The mitigation measures designed into the Project would ensure there was no impact from construction.
Ponds (not NERC S.41 Habitat)	Local (Pond A, FFJ and F)	Loss of two ponds	Medium term	Low	Minor adverse	Not significant	There would be a long-term reduction in the amount of pond habitat within the Project boundary.
Semi-improved neutral grassland	Local	Loss of grassland	Long term	Medium	Minor adverse	Not significant	The area of loss would be relatively small and only until new habitats had established. There would be a net increase in the amount of semi-improved neutral grassland on the Project site post construction.
		Grassland creation	Long-term	Medium	Minor beneficial	Not significant	
Marshy grassland	Local	Loss of grassland	Medium term	Low	Minor adverse	Not significant	The loss of grassland would be mitigated for through new

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
		Grassland creation	Long-term	Medium	Minor beneficial	Not significant	grassland creation at the end of the construction period resulting in a long-term increase in area.
Broadleaved plantation woodland and associated scrub	Local	Loss of woodland and scrub and loss of habitat connectivity	Long-term	High	Moderate adverse	Significant	The long-term loss of woodland and scrub habitat would reduce habitat connectivity across the landscape until new woodland planting had established.
		New woodland creation and improved connectivity	Long-term	Low	Minor beneficial	Not significant	
Flora: Bluebell and pennyroyal	Local (Bluebell)	Loss of small areas of woodland habitat and translocation to new habitat	Long-term	Low	Minor adverse	Not significant	Some bluebells would be translocated and some would survive but there would be some loss.
	Local (Pennyroyal)	Disturbance to Pond F	Medium-term	Medium	Minor adverse	Not significant	Pennyroyal would be protected from physical damage but could be affected by changes to water quality of Pond F.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Flora: Lesser quaking grass, narrow-lipped helleborine, ragged robin and Solomon's seal	Local	No impact	No Change	No Change	No change	Not significant	Measures to protect habitats of value from pollution events would ensure the plants were not affected.
Breeding birds (Listed under Schedule 1 of the WCA)	Up to Regional	No current impacts identified. Further surveys are required to determine any future impacts	Short-term	No change	No change	Not significant	No Annex 1 or Schedule 1 birds confirmed to be breeding in 2019 so no effects are foreseen. However, as birds can change their nesting sites year on year repeat surveys would be required during construction to assess potential future effects.
Breeding bird assemblage including species of conservation interest	County (reed bunting)	Loss of nesting sites and foraging habitat	Medium term	Low	Minor adverse	Significant	The medium term loss of habitat would be compensated for through new habitats being created in the long-term.
		Increase in nesting sites and foraging habitat	Long-term	Low	Minor beneficial	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
(confirmed or possible);							
	County (skylark)	Loss of nesting sites	Short-term	Low	Minor adverse	Not significant	The short term loss of habitat would be compensated for through new habitats being created.
	County (other)	Loss of suitable nesting sites for a range of species	Long-term	Medium	Moderate adverse	Significant	There would be a loss of nesting sites between habitats being lost and new habitats being sufficiently established to provide alternative nest sites which would have a significant effect on nesting birds. This would be reduced once new habitats were created and had established.
Wintering bird assemblage	Local	Loss of foraging habitat	Medium term	Low	Negligible	Not significant	No wintering bird species were recorded in numbers of national or international significance
Grass snake	Local (Mole corridor (NWZ))	Loss and disturbance to habitat	Medium term	Low	Minor adverse	Not significant	Mitigation measures to move reptiles from construction areas and to create new

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
							habitat would ensure no effects were significant.
	Local (LERL)	No impact	No Change	No Change	No Change	No change	The grass snake population in this part of the site would not be affected
Great crested newt	Local (Western population)	No impact	No Change	No Change	No Change	No change	The GCN population to the West of the River Mole would not be affected by construction activities.
	Local (Eastern population)	Loss and disturbance to habitat	Medium term	Low	Negligible	Not significant	Mitigation measures to move GCN from construction areas would ensure no significant effect occurred.
Common toad	Local	Loss and disturbance to habitat	Long-term	Low	Negligible	Not significant	Substantial areas of suitable habitat would be retained and new habitats would be created meaning the temporary loss of habitat would not have a significant effect.
Badger	Local	Closure of main sett	Medium term	Low	Minor adverse	Not significant	An artificial sett would be created to compensate for the loss of a main sett.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Badger	Local	Risk of injury from construction works	Long-term	Negligible	Negligible	Not significant	Mitigation limiting vehicle speeds and making construction team aware of risks would reduce any effects.
Otter	County	Potential for disturbance if present	Long-term	Minor	Minor adverse	Not significant	No otters have been recorded within the Project site boundary but monitoring would be undertaken during the construction period and mitigation would be included, as set out in Table 9.8.1.
Assemblage of other bat species	Local	Diversion of River Mole and lead-in works for the surface access improvements Construction of Surface access satellite contractor compound, South Terminal	Long-term	High	Moderate Adverse	Significant	The long-term loss of woodland and shrubs that form a linear corridor through the north of the Project site would affect bat behaviour until new planting had established.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
		and North and South Terminal improvement works					
Bats (Bechstein's bat, barbastelle bat and alcathoe)	County	Loss of woodland and construction work in close proximity to high value habitat	Long-term	Low	Minor Adverse	Not significant	Links between core habitat would be slightly reduced but core areas would be retained.
Harvest mouse	Local	Loss and disturbance to habitat followed by the creation of new habitats	Medium term followed by long-term	Low	Negligible	Not significant	Areas of suitable habitat would be retained and new habitats would be created meaning the temporary loss of habitat would not have a significant effect.
Hedgehog	Local	Loss and disturbance to habitat	Long term	Low	Minor adverse	Not significant	Areas of suitable habitat would be retained and new habitats would be created meaning the temporary loss of habitat would not have a

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
							significant effect on the population.
Terrestrial Invertebrate assemblage	County	Habitat loss	Medium term	Medium	Moderate adverse	Significant	Habitat creation would compensate for the initial significant impact and result in a long-term beneficial effect.
		Habitat creation	Long-term	Low	Minor beneficial	Not Significant	
		Habitat creation	Long-term	Low	Negligible	Not significant	
Fish	County	Habitat loss, water quality	Long-term	Low	Minor	Not significant	Creation of the River Mole diversion will improve the flow characteristics of the river.
Aquatic invertebrates	Local	Habitat loss, water quality	Long term	Low	Negligible	Not significant	
2030-2032 (Construction and Operational Effects)							
Statutory designated sites	International	No impact	No Change	No Change	No Change	Not significant	Due to the distance of internationally, nationally and locally designated sites and proposed mitigation measures there would be no impact from construction. The increase in vehicles accessing the site would not result in the predicted nitrogen oxides (NO_x)
Statutory designated sites	National	No impact	No Change	No Change	No Change	Not significant	
Statutory designated sites	County	No impact	No Change	No Change	No Change	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
							concentration exceeding the critical level set for vegetation.
Non-statutory designated sites (The Withy SNCI)	County	Risk of habitat degradation due to close proximity of works/sensitivity of habitats.	Medium term	Negligible	Negligible	Not significant	The mitigation measures designed into the Project would ensure impacts from construction were negligible.
Non-statutory designated sites (Horleyland Wood LWS, The Roughs SNCI, Bridges Fields pSNCI and Bridges Wood pSNCI)	County	No impact	No Change	No Change	No Change	Not significant	The mitigation measures designed into the Project would ensure there was no impact from construction.
Ancient woodland	National	No impact	No Change	No Change	No Change	Not significant	The mitigation measures designed into the Project would ensure there was no impact from construction. There would be no operational effects, including

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
							any from changes to air quality.
Semi-natural broadleaved woodland and individual broadleaved trees	National	Continued absence of woodland due to new planting being immature	Long-term	Medium	Moderate adverse	Significant	The Project would result in a significant long-term loss of woodland that is mitigated for through new woodland planting at the end of construction. The combined effect on habitat connectivity is significant.
Hedgerows	National	Loss of species-poor hedgerow at location of Pier 7 and aircraft hanger	Medium term	Negligible	Negligible	Not significant	Species-poor hedgerows would be lost and replaced with a species-rich hedgerows.
Watercourses	County	Highway improvement in close proximity to both watercourses	Medium term	Negligible	Negligible	Not significant	Pollution control measures would reduce impacts on watercourses during construction.
Ponds (NERC S.41 Habitat)	National	No impact	No Change	No Change	No Change	Not significant	The mitigation measures designed into the Project would ensure there was no impact from construction.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
							There would be no operational effects.
Ponds (not NERC S.41 Habitat)	Local (Pond D)	Increase in surface water discharge	Long-term	Negligible	Negligible	Not significant	The impacts would not have a significant effect on the pond.
Semi-natural neutral grassland	Local	No impact	No Change	No Change	No Change	Not significant	No impact predicted.
Marshy grassland	Local	Creation of new grassland	Long-term	Medium	Minor beneficial	Not significant	The construction of the flood attenuation areas would result in an increase in the amount of marshy grassland present on the site above pre-construction amounts
		Failure or delay in creating new habitat	Medium term	low	Minor adverse	Not significant	Delays or the need for remediation work could result in the impact from construction being extended.
Broadleaved plantation woodland and associated scrub	Local	Continued absence	Long-term	High	Moderate adverse	Significant	New planting would yet to have matured.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Flora: Bluebell	Local	No impact	No Change	No change	No change	Not significant	This species would not be affected.
Flora: Lesser quaking grass, narrow-lipped helleborine, ragged robin and Solomon's seal	Local	No impact	No Change	No change	No change	Not significant	These species would not be affected.
Breeding birds (Listed under Schedule 1 of the WCA)	Up to Regional	No current impacts identified. Further surveys are required to determine any future impacts	Short-term	No change	No change	Not significant	No Annex 1 or Schedule 1 birds confirmed to be breeding in 2019 so no effects are foreseen. However, as birds can change their nesting sites year on year repeat surveys would be required during construction to assess potential future effects.
Breeding birds (NERC Species of Principal Importance and BoCC Red or	County	Loss of suitable nesting sites for a range of species	Long term	Medium	Moderate adverse	Significant	There would be a loss of nesting sites in addition to those already lost to highway related work between habitats being lost

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Amber listed species)							and new habitats being sufficiently established to provide alternative nest sites.
Wintering bird assemblage	Local	No impact	No Change	No Change	No Change	Not significant	There were no wintering bird species recorded in any numbers which were considered to be of national or international significance
Grass snake	Local	No impact	No Change	No Change	No Change	Not significant	Grass snake would not be affected by construction activities being undertaken at this stage of the Project
Great crested newt	Local	No impact	No Change	No Change	No Change	Not significant	Great crested newt would not be affected by construction activities being undertaken at this stage of the Project
Common toad	Local	No impact	No Change	No Change	No Change	Not significant	Common toad would not be affected by construction activities being undertaken at this stage of the Project
Badger	Local	Increased construction	Medium term	Negligible	Negligible	Not significant	Mitigation measures would ensure risks from

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
		traffic and associated movements					construction traffic were minimised.
Otter	County	Disturbance and reduced quality of habitat	Medium term	Low	Minor adverse	Not significant	Implementation of best-practice methods for pollution prevention (as set out in Table 9.8.1). Continued loss of woodland along Mole corridor resulting in loss of seclusion
Assemblage of Bat Species	Local	Loss of semi-natural broadleaved woodland due to Longbridge roundabout improvements	Long-term	High	Moderate adverse	Significant	The long-term loss of woodland resulting from all highway improvements in combination would have a significant effect on bat behaviour until new woodland planting had established.
		Increased artificial lighting from decked parking and hotels and loss	Long-term	Negligible	Negligible	Not significant	Mitigation designed into the lighting schemes for car parking and hotels would prevent excessive light spill onto adjoining habitats of value to bats.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
		of hedgerow at Pier 7					
Bats (Bechstein's bat)	National	Loss of some habitats and a reduction in connectivity from Longbridge roundabout improvements	Long-term	Low	Minor adverse	Not significant	Potential effects on commuting behaviour due to loss of woodland. New woodland planting would create new areas of foraging habitat for Bechstein's bats and restore habitat connectivity, though these new habitats would take time to establish and mature
Harvest mouse	Local	New habitats would have compensated for loss of existing habitat	Long-term	Low	Minor beneficial	Not significant	There would be an increase in habitat availability to compensate for any previous losses.
Hedgehog	Local	New habitats would have started to compensate for loss of existing habitat	Medium-term	Negligible	Negligible	Not significant	There would be an increase in habitat in some areas.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Terrestrial invertebrate assemblage	County	New habitats would have compensated for loss of existing habitat	Long-term	Low	Minor beneficial	Not significant	There would be an increase in habitat availability to compensate for any losses.
Fish	County	New habitats would have compensated for loss of existing habitat	Long-term	Low	Minor	Not significant	There would be an increase in habitat availability to compensate for any losses.
Aquatic macroinvertebrates	Local	New habitats would have compensated for loss of existing habitat	Long-term	Low	Negligible	Not significant	There would be an increase in habitat availability to compensate for any losses.
2033-2038 (Construction and Operational Effects)							
Statutory designated sites	International	No impact	No Change	No Change	No Change	Not significant	Due to the distance of internationally, nationally and locally designated sites there would be no impact fromconstruction.
Statutory designated sites	National	No impact	No Change	No Change	No Change	Not significant	
Statutory designated sites	County	No impact	No Change	No Change	No Change	Not significant	

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Non-statutory designated sites	County	No impact	No Change	No Change	No Change	Not significant	There would be no new or continuing operational effects.
Ancient woodland	National	No impact	No Change	No Change	No Change	Not significant	There would be no construction activities that could have an impact. There would be no operational effects.
Semi-natural broadleaved woodland and mature broadleaved trees	National	Continued absence of habitat	Long term	Medium	Moderate	Significant	New areas of semi-natural broadleaved woodland would not have established yet.
Hedgerows	National	New hedgerow planting would be establishing	Medium term	Low	Negligible	Not significant	New hedgerows would not have reached maturity.
Watercourses	County	No impact	No Change	No change	No change	Not significant	No new or existing works that would impact watercourses.
Broadleaved plantation woodland and	Local	Continued absence of habitat	Long-term	Medium	Minor adverse	Not significant	Woodland planting would be starting to mature offering some benefits to the species

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
associated scrub							that use them and starting to improve habitat connectivity.
Semi-improved neutral grassland	Local	Establishment of new areas of grassland	Long-term	Negligible	Negligible	Not significant	New grassland created to compensate for any that was lost.
	Local	Failure or delay in creating new habitat	Medium term	Low	Minor adverse	Not significant	Delays or the need for remediation work could result in the impact from construction being extended.
Marshy grassland	Local	Marshy grassland would have established prior to 2033	Long-term	No change	No change	Not significant	Newly created marshy grassland would continue to be present.
		Failure or delay in creating new habitat	Medium term	Low	Minor adverse	Not significant	Delays or the need for remediation work could result in the impact from construction being extended.
Breeding birds (all non-Schedule 1 species)	County	Continued reduction of nesting sites	Long-term	Low	Minor adverse	Not significant	Some new habitats would have established and some would be establishing but the overall amount of nesting habitat would continue to be below the baseline level.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Wintering bird assemblage	Local	Loss of foraging sites	Medium term	Negligible	Negligible	Not significant	The loss of habitat would be small and new habitats would have developed.
Grass snake	Local	Habitat creation	Long-term	Low	Minor beneficial	Not significant	Habitat creation would increase the amount of habitat available to grass snake.
		Failure or delay in creating new habitat	Medium term	Low	Minor adverse	Not significant	Delays or the need for remediation work could result in the impact from construction being extended.
Great crested newt	Local (Eastern population)	Terrestrial habitat creation far from existing populations	Long-term	Negligible	Negligible	Not significant	There is a low likelihood of GCN using new habitats.
Common Toad	Local	Creation of new terrestrial habitat within Flood Compensation Area	Long-term	Low	Negligible	Not significant	The increase in the amount of terrestrial habitat for common toad would not have a significant effect on the population.
	Local	Failure or delay in new areas	Medium term	Low	Negligible	Not significant	The failure or delay in new areas of habitat establishing

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
		habitat establishing					could have a negligible effect.
Badger	Local	Impacts from construction traffic and activities	Medium-term	Negligible	Negligible	Not significant	Mitigation measures would reduce the potential effects on badgers
Otter	Local	Loss of habitat and disturbance to otters	Medium-term	Negligible	Negligible	Not significant	Mitigation measures would reduce the potential effects on otters
Assemblage of other bat species	Local	Continued reduced area of habitat and reduced connectivity from surface access improvements	Long-term	High	Moderate	Significant	New woodland would not have matured sufficiently.
Bats (Bechstein's bat)	County	Small loss of foraging habitat for flood compensation area	Long-term	Negligible	Negligible	Not significant	The majority of the tree lines within this area would be retained.
Hedgehog	Local	Creation of new habitats	Long-term	Low	Minor beneficial	Not significant	New habitats would be created to compensate for

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
							those lost reducing the significance of any effect.
Terrestrial invertebrate assemblage	County	New habitats would have compensated for loss of existing habitat	Long-term	Low	Minor beneficial	Not significant	There would be an increase in habitat availability to compensate for any losses.
Fish	Local	New habitats would have compensated for loss of existing habitat	Long-term	Low	Negligible	Not significant	There would be an increase in habitat availability to compensate for any losses.
Aquatic macroinvertebrates	Local	New habitats would have compensated for loss of existing habitat	Long-term	Low	Negligible	Not significant	
Design year 2038 (Operational effects)							
Watercourses, aquatic invertebrates	Up to County	Changes to water quality from surface water discharge	Long-term	No Change	No Change	Not significant	Discharge of surface water will continue to be regulated by the EA to ensure that water quality is the same as current permits.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Fish	County	New habitats would have compensated for loss of existing habitat	Long-term	Low	Minor beneficial	Not significant	There would be an increase in habitat availability to compensate for any losses.
Bats (all species)	County	Increased collision risk from road and air traffic	Long-term	No Change	No Change	Not significant	The A23 corridor is not used by significant numbers of bats.
Badger	Local	Increased collision risk from road traffic	Long-term	Negligible	Negligible	Not significant	Badger population is located a considerable distance from main areas of traffic increase (A23).
Otter	Local	Increased collision risk from road traffic	Long-term	Negligible	Negligible	Not significant	Otters will still be able to pass beneath the roads along the river corridors.
Long-term forecast year; 2047							
Designated sites	Up to International	Increase in road vehicle emissions and aviation emissions from an increase in passengers	Long-term	No Change	No Change	Not significant	By 2047, the fleet will be almost fully electrified meaning there will be no impacts from emissions to air.

Receptor	Receptor Sensitivity	Description of Impact	Short / medium / long term / permanent	Magnitude of Impact	Significance of Effect	Significant / not significant	Notes
Semi-natural broadleaved woodland	National	Continued absence of habitat	Long term	Low	Minor	Not Significant	New areas of semi-natural broadleaved woodland would be semi-mature.
Broadleaved plantation woodland	County	Continued absence of habitat	Long term	Low	Minor	Not Significant	New areas of semi-natural broadleaved woodland would be semi-mature.
Bats (all species)	County	Increased foraging and commuting resource	Long-term	Negligible	Negligible	Not Significant	Some areas of woodland would be near maturity and younger woodland would still be of some value.

9.14. References

Legislation

Countryside and Rights of Way Act 2000

Natural Environment and Rural Communities (NERC) Act 2006

Protection of Badgers Act 1992

The Conservation of Habitats and Species Regulations 2017

The Hedgerows Regulations 1997

Wildlife and Countryside Act 1981

Wild Mammals (Protection) Act 1996

Published Documents

Airports Commission (2014) Additional airport capacity: Gatwick Airport second runway. https://www.gov.uk/government/publications/additional-airport-capacity-gatwick-airport-second-runway

Bat Conservation Trust (2016) Good Practice Guidelines, Third Edition.

Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000). *Bird Census Techniques, second edition*. Academic Press, London.

Bicker, R (2018) Gatwick Biodiversity Action Plan Five Year Review 2012-2017. Gatwick Airport

Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014) Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

Bright, P., Morris, P. and Mitchell-Jones, T. (2006) The Dormice Conservation Handbook, 2nd Edition. English Nature.

British Standards (2003). BS EN 14011:2003 Water Quality: Sampling of Fish with Electricity

British Standards Institution (BSI) (2013) Biodiversity – Code of Practice for Planning and Development: BS 42020:2013.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2018, updated 2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. [Online] Available at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf

Civil Aviation Authority (CAA) (2017) Wildlife Hazard Management at Aerodromes. CAP772.

Crawley Borough Council (2015) Crawley 2030: Crawley Borough Local Plan 2015 – 2030. [Online] Available at: https://crawley.gov.uk/sites/default/files/documents/PUB271853.pdf

Crawley Borough Council (2021) Crawley Local Plan: Draft Crawley Borough Local Plan 2021-2037, January 2021. For Submission Publication Consultation: January-February 2021. Available at: https://crawley.gov.uk/sites/default/files/2021-01/Submission%20Draft%20Local%20Plan%20January%202021.pdf

Department for Communities and Local Government (2012) National Planning Practice Guidance.

Department for Environment, Food and Rural Affairs (Defra) (2007) Hedgerow Survey Handbook: A Standard Procedure for Local Surveys in the UK, 2nd Edition. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69285/pb11951-hedgerow-survey-handbook-070314.pdf

Department for Environment, Food and Rural Affairs (Defra) (2011) Biodiversity 2020: A strategy for England's wildlife and ecosystem services

Department for Transport (2014) National Policy Statement for National Networks. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387223/npsnn-web.pdf

Department for Transport (2018) Airports National Policy Statement: New Runway Capacity and Infrastructure at Airports in the South East of England. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/714106/airports-nps-new-runway-capacity-and-infrastructure-at-airports-in-the-south-east-of-england-web-version.pdf

Department of Levelling Up, Housing and Communities (2021) National Planning Policy Framework (NPPF). [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf

Eaton, M. *et al* (2021) Birds of Conservation Concern 5: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man.

English Nature (2001) Great Crested Newt Mitigation Guidelines, First Edition.

Froglife (1999) Reptile Survey: An Introduction to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation. Froglife Advice Sheet 10.

Froglife (2001). Great Crested Newt Conservation Handbook.

Gatwick Airport Limited (GAL) (2019) Environmental Impact Assessment Scoping Report [Online] Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR020005/TR020005-000005-GTWK%20-%20Scoping%20Report%20(Vol%201%20Main%20Text).pdf

Gent, T. & Gibson, S. (2003) Herpetofauna Workers' Manual. Joint Nature Conservation Committee.

Gilbert, G., Gibbons, D.W. and Evans, J. (1998). *Bird Monitoring Methods: A manual of techniques for key species.* RSPB/BTO/JNCC/WWT/ITE/The Seabird Group. RSPB/BTO, Sandy, Beds.

Highways England, Transport Scotland, Welsh Government and the Department for Infrastructure Northern Ireland (2019) Design Manual for Roads and Bridges, LD 105: Air Quality. [Online] Available at: https://www.standardsforhighways.co.uk/search/10191621-07df-44a3-892e-c1d5c7a28d90

Highways England, Transport Scotland, Welsh Government and the Department for Infrastructure Northern Ireland (2020a) Design Manual for Roads and Bridges, LD 118: Biodiversity Design. [Online] Available at: https://www.standardsforhighways.co.uk/dmrb/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT

Highways England, Transport Scotland, Welsh Government and the Department for Infrastructure Northern Ireland (2020b) Design Manual for Roads and Bridges, LA104. Environmental assessment and monitoring. [Online] Available at: https://www.standardsforhighways.co.uk/dmrb/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT

Highways England, Transport Scotland, Welsh Government and the Department for Infrastructure Northern Ireland (2020c) Design Manual for Roads and Bridges, LA108. Biodiversity. [Online] Available at: https://www.standardsforhighways.co.uk/search/af0517ba-14d2-4a52-aa6d-1b21ba05b465

Horsham District Council (2007) Site Specific Allocations of Land (2007). [Online] Available at: https://www.horsham.gov.uk/__data/assets/pdf_file/0003/66882/Site-Specific-Allocations-of-Land-Document-2007.pdf

Horsham District Council (2015) Horsham District Planning Framework, November 2015. [Online] Available at: https://beta.horsham.gov.uk/__data/assets/pdf_file/0016/60190/Horsham-District-Planning-Framework-2015.pdf

Horsham District Council (2020) Draft Horsham District Local Plan 2019-2036. Available at: https://strategicplanning.horsham.gov.uk/consult.ti/LocalPlanReview/viewCompoundDoc?docid=10336756

Institute of Environmental Assessment (1995) Guidelines for Baseline Ecological Assessment.

Inter-Agency Climate Change Forum (IAACCF) (2010) Biodiversity and Climate Change – a summary of impacts in the UK. [Online] Available at: http://archive.jncc.gov.uk/PDF/Pub10_Bio_&_CC_IACCF_2010_Web.pdf

International Union for Conservation of Nature (IUCN) (2017)

Jelmer, M *et al* (2018) Phenological sensitivity to climate change is higher in resident than in migrant bird populations among European cavity breeders. *Global Change Biology* 24, Issue 8, 3780-3790.

Joint Nature Conservation Committee (JNCC) (2010) Handbook for Phase 1 Habitat Survey - A Technique for Environmental Audit.

Joint Nature Conservation Committee (JNCC) (2016) Conservation Designations Spreadsheet. Peterborough, JNCC.

Joint Nature Conservation Committee (JNCC) (2006) National Vegetation Classification (NVC) User's Handbook. J.S, Rodwell. JNCC.

Joint Nature Conservation Committee (JNCC) and Defra (2012) UK Post-2010 Biodiversity Framework.

Martay, B *et al* (2016) Impacts of Climate Change on National Biodiversity Population Trends. *Ecography* 40, 1138-1151..

Met Office (2019) UK Climate Projections: Headline Findings September 2019. (UKCP18 - The UK Climate Projections 2018). Exeter.

Mid Sussex District Council (2004) Mid Sussex Local Plan, Adopted May 2004. [Online] Available at: https://www.midsussex.gov.uk/planning-building/local-plan-2004/

Mid Sussex District Council (2018) Mid Sussex District Plan 2014-2031, Adopted March 2018. [Online] Available at: https://www.midsussex.gov.uk/media/3406/mid-sussex-district-plan.pdf

Mid Sussex District Council (2020) Mid Sussex Site Allocations Development Plan Document Regulation 19 Submission Draft – Jul7 2010. Online] Available at: https://www.midsussex.gov.uk/media/5706/dpd1-site-allocations-dpd-submission-draft-regulation-19.pdf

Ministry of Housing, Communities & Local Government (2019) Planning Practice Guidance. [Online] Available at: https://www.gov.uk/government/collections/planning-practice-guidance Natural Environment (Biodiversity, Ecosystems and Green Infrastructure).

Mole Valley District Council (2000) The Mole Valley Local Plan. [Online] Available at: http://www.planvu.co.uk/mvdc/contents_written.htm

Mole Valley District Council (2009) The Mole Valley Local Development Framework: Core Strategy, adopted October 2009. [Online] Available at: https://www.molevalley.gov.uk/media/pdf/6/s/Core_Strategy_DPD_(Adopted).pdf

Mole Valley District Council (2020) Future Mole Valley 2018-2033: Consultation Draft Local Plan. [Online] Available at: https://molevalley.gov.uk/sites/default/files/2020-05/Future%20Mole%20Valley%20draft%20Local%20Plan%20-%202020%20consultation%20version.pdf

Moorcroft, M.D. & Speakman, L. (2015) Biodiversity Climate Change Impacts Summary Report. Living With Environmental Change. ISBN 978-0-9928679-6-6 copyright © Living With Environmental Change. Available at: https://nerc.ukri.org/research/partnerships/ride/lwec/reportcards/biodiversity/. Accessed 4th October 2019.

National Trust Climate Hazards Open Data (updated 2022). [Online[Available at: https://open-data-national-trust.hub.arcgis.com/maps/9a237ac9c548495083e56ba986a100f0/about

Office of the Deputy Prime Minister (ODPM) and Defra (2005) Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System. ODPM Circular 06/2005, Defra Circular 01/2005. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf

Pearce-Higgins, JW *et al* (2015) Drivers of climate change impacts on bird communities. *British Ecological Society* 84, Issue 4, 943-954..

Planning Inspectorate (2019). Proposed Gatwick Airport Northern Runway: Scoping Opinion. TR020005-000043-GTWK-Scoping Opinion.pdf

Price S *et al* (2019) Effects of historic and projected climate change on the range and impacts of an emerging wildlife disease. *Global Change Biology* 25, Issue 8, 2648-2660.

Reading, C. J. and Jofre, G. M. (2009) Habitat selection and range size of grass snake *Natrix natrix* in an agricultural landscape in southern England. *Amphibia-Reptilia* 30, 379-388.

Reigate and Banstead Borough Council (2014) Reigate and Banstead Local Plan: Core Strategy, Adopted July 2014. [Online] Available at: http://www.reigate-banstead.gov.uk/info/20380/current_planning_policy/24/core_strategy

Reigate and Banstead Borough Council (2019) Reigate and Banstead Local Plan Development Management Plan, Adopted September 2019. [Online] Available at: http://www.reigate-banstead.gov.uk/info/20380/current_planning_policy/888/development_management_plan

Stace, C. (2010) New Flora of the British Isles. Cambridge University Press.

Strachan, Moorhouse and Gelling (2011). Water Vole Conservation Handbook. WildCRU, Oxford.

Tandridge District Council (2008) Tandridge District Core Strategy, Adopted October 2008. [Online] Available at: https://www.tandridge.gov.uk/Portals/0/Documents/Planning%20and%20building/Planning%20strategies%20and%20policies/Current%20and%20adopted%20planning%20policies/Core%20strategy/Core-Strategy.pdf

Tandridge District Council (2014) Tandridge Local Plan – Part 2: Detailed Policies 2014-2029, Adopted October 2008. [Online] Available at: https://www.tandridge.gov.uk/Portals/0/Documents/Planning%20and%20building/Planning%20strategies%20and%20policies/Current%20and%20adopted%20planning%20policies/Core%20strategy/Local-Plan-part-2-Detailed-policies.pdf

Tandridge District Council (2019) Our Local Plan: 2033 (Regulation 22 Submission), January 2019. [Online] Available at: https://www.tandridge.gov.uk/Portals/0/Documents/Planning%20and%20building/Planning%20strategies%20and%20policies/Local%20plan/Local%20plan%202033/Examination%20library/MAIN%20DOCUMENTS/MD1-Our-Local-Plan-2033-Submission-2019.pdf

The Government Office for Science (2021) Guidance. Trend Deck 2021: Climate change. Available from: https://www.gov.uk/government/publications/trend-deck-2021-climate-change/climate-change

Thomas, T (2010). Climate, change and range boundaries. Diversity and Distributions, 16, Issue 3, 488-495.

United Nations Convention on Biological Diversity (2010) Nagoya Biodiversity Conference COP10

Wadsworth, B. (2016) Natural England EPS Mitigation – Report of action taken under licence EPSM2012-4097 C. Natural England.

WHO Regional Office for Europe, Copenhagen, Denmark, 2000. Air Quality Guidelines – Second Edition. Chapter 11 Effects of nitrogen containing air pollutants: critical levels

Woodland Trust (2008) Ancient tree guide 4: What are ancient, veteran and other trees of special interest? Woodland Trust

Zakaria, Nurulhuda Binti (2017) Long-term population ecology of the great crested newt in Kent. Doctor of Philosophy (PhD) thesis, University of Kent.

9.15. Glossary

Table 9.15.1: Glossary of Terms

Term	Description
BAP	Biodiversity Action Plan
BDIR	Birds Directive
BOA	Biodiversity Opportunity Area
BoCC	Birds of Conservation Concern
CAA	Civil Aviation Authority
CARE	Central Area Recycling Enclosure
CEA	Cumulative Effects Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CoCP	Code of Construction Practice
CP	Country Park
CRoW	Countryside and Rights of Way
DMRB	Design Manual for Roads and Bridges
DRV	Designated Road Verge
eDNA	Environmental DNA (Deoxyribonucleic acid)
EIA	Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
GAL	Gatwick Airport Limited
GCN	Great Crested Newt
HRA	Habitats Regulations Assessment

Term	Description
HSI	Habitat Suitability Index
IAACCF	Inter-agency Climate Change Forum
IEF	Important Ecological Feature
ILS	Instrument Landing System
JNCC	Joint Nature Conservation Committee
LERL	Land East of the Railway Line
LNR	Local Nature Reserve
LWS	Local Wildlife Site
NERC	Natural Environment and Rural Communities
NNR	National Nature Reserve
NOx	Nitrogen Oxides
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
NVC	National Vegetation Classification
NWZ	North West Zone
ODPM	Office of the Deputy Prime Minister
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
SAC	Special Area of Conservation
SNCI	Site of Nature Conservation Importance
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TN	Technical Note
UKCP18	UK Climate Predictions 2018
WCA	Wildlife and Countryside Act
WHPT	Whalley Hawkes Paisley Trigg method
ZoI	Zone of Influence