

11. Biodiversity

11.1 Introduction

- 11.1.1 This chapter of the Environmental Statement (ES) assesses the likely significant effects of the Proposed Development with reference to Biodiversity, including designated sites and different habitats and species. The chapter should be read in conjunction with **Chapter 2: Description of the Proposed Development** and with reference to relevant parts of **Chapter 8: Air Quality**, **Chapter 7: Noise and Vibration** and **Chapter 12: Surface Water and Flood Risk**, where common receptors have been considered and where there is an overlap or relationship between the assessment of effects.

11.2 Limitations of this assessment

- 11.2.1 There are no notable limitations relating to Biodiversity that affect the robustness of the assessment of the likely significant effects of the Proposed Development.

11.3 Relevant legislation, planning policy and technical guidance

Legislative context

- 11.3.1 The following legislation is relevant to the assessment of effects on Biodiversity receptors:
- *Conservation of Habitats and Species Regulations 2017*¹: Protection of internationally designated sites, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). It also confers protection to animals listed in Schedule 2 (including disturbance) and plants listed in Schedule 5 ('European Protected Species');
 - *The Wildlife and Countryside Act (WCA) 1981* (as amended)²: Statutory protection to Sites of Special Scientific Interest (SSSIs) and protection to Schedule 1 wild bird species (nests and eggs, from disturbance while breeding). Protection is granted for species listed in Schedule 5 and Schedule 8;
 - *Protection of Badgers Act 1992*³: Protection from killing, injury or disturbance; protection of setts from damage or destruction;
 - *The Natural Environment and Rural Communities Act (NERC) 2006*⁴: Section 41 lists flora, fauna and habitats of principal importance. Section 40 requires public bodies and local planning authorities to have regard to the conservation of biodiversity in England when carrying out their normal functions; and

¹ UK Government, 2017. Conservation of Habitats and Species Regulations 2017, [online]. Available at: <https://www.legislation.gov.uk/ukxi/2017/1012/contents/made> [Checked 01/06/18].

² UK Government, 1981 (as amended). The Wildlife and Countryside Act 1981, [online]. Available at: <https://legislation.gov.uk/ukpga/1981/69> [Checked 20/03/2018].

³ UK Government, 1992. The Protection of Badgers Act 1992, [online]. Available at: <https://www.legislation.gov.uk/ukpga/1992/51/contents> [Checked 21/03/2018].

⁴ UK Government, 2005. The Natural Environment and Rural Communities Act (2006), [online]. Available at: <https://www.legislation.gov.uk/ukpga/2006/16/contents> [Checked 21/03/2018].

- *The Hedgerow Regulations 1997*⁵.

Planning policy context

- 11.3.2 There are a number of policies and guidance documents at the national and local level that are relevant to Biodiversity. In addition to policy referenced in **Chapter 5: Legislative and Policy Overview**, policy directly applicable to this technical specialism is listed in **Table**.

Table 11.1 Relevant policies and their implications for Biodiversity

Policy reference	Implications
National Planning Policy Framework (NPPF) 2018⁶	
Paragraph 170	<i>Planning policies and decisions should contribute to and enhance the natural and local environment by:</i> <i>a) 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);</i> <i>b) 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;</i> <i>c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;</i> <i>d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;</i> <i>e) 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 and water quality, taking into account relevant information such as river basin management plans; and</i> <i>f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.</i>
Paragraph 171	<i>Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework⁷; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.</i>
Paragraph 172	<i>Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads⁸ and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and the Broads. The scale and extent of development within these designated areas should be limited. Planning permission should be refused for major development⁹ other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:</i> <i>a) the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;</i> <i>b) the cost of, and scope for, developing outside the designated area, or meeting the need for</i>

⁵ UK Government, 1997. The Hedgerow Regulations 1997. Statutory Instrument 1997 No. 1160, [online]. Available at: <http://www.legislation.gov.uk/uksi/1997/1160/contents/made> [Checked 21/03/2018].

⁶ Ministry of Housing, Communities and Local Government (2018). National Planning Policy Framework, [Online]. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> [Checked 29/08/2018].

⁷ Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.

⁸ English National Parks and the Broads: UK Government Vision and Circular 2010 provides further guidance and information about their statutory purposes, management and other matters.

⁹ For the purposes of paragraphs 172 and 173, whether a proposal is 'major development' is a matter for the decision maker, taking into account its nature, scale and setting, and whether it could have a significant adverse impact on the purposes for which the area has been designated or defined.

Policy reference	Implications
Paragraph 174	it in some other way; and c) any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated. To protect and enhance biodiversity and geodiversity, plans should: a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity¹⁰; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation¹¹ and b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.
Paragraph 175	When determining planning applications, local planning authorities should apply the following principles: a) 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; b) 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; c) 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 d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.
Paragraph 176	The following should be given the same protection as habitats sites: a) potential Special Protection Areas and possible Special Areas of Conservation; b) listed or proposed Ramsar sites; and c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.
Paragraph 177	The presumption in favour of sustainable development does not apply where development requiring appropriate assessment because of its potential impact on a habitats site is being planned or determined.
West of England Joint Spatial Plan 2017¹²	
Policy 5 - Place Shaping Principles	Requires protection and enhancement of the natural environment.
North Somerset Council Core Strategy January 2017¹³	
CS4 – Nature Conservation	Policy states: "North Somerset contains outstanding wildlife habitats and species. These include limestone grasslands, traditional orchards, wetlands, rhynes, commons, hedgerows, ancient woodlands and the Severn Estuary. Key species include rare horseshoe bats, otters, wildfowl and wading birds, slow-worms and water voles. The biodiversity of North Somerset will be maintained and enhanced by: seeking to meet local and national Biodiversity Action Plan targets taking account of climate change and the need for habitats and species to adapt to it;

¹⁰ Circular 06/2005 provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

¹¹ Where areas that are part of the Nature Recovery Network are identified in plans, it may be appropriate to specify the types of development that may be suitable within them.

¹² West of England Partnership (2017). West of England Joint Spatial Plan Publication Document, [Online]. Available at: <https://www.jointplanningwofe.org.uk/consult/ti/JSPPublication/consultationHome> [Checked 29/08/18].

¹³ North Somerset Council (January 2017). Core Strategy, [Online]. Available at: <https://www.n-somerset.gov.uk/wp-content/uploads/2015/11/Core-Strategy-adopted-version.pdf> [Checked 29/08/18].

Policy reference	Implications
	- seeking to ensure that new development is designed to maximise benefits to biodiversity, incorporating, safeguarding and enhancing natural habitats and features and adding to them where possible, particularly networks of habitats. A net loss of biodiversity interest should be avoided, and a net gain achieved where possible; - seeking to protect, connect and enhance important habitats, particularly designated sites, ancient woodlands and veteran trees; - promoting the enhancement of existing and provision of new green infrastructure of value to wildlife; and - promoting native tree planting and well targeted woodland creation, and encouraging retention of trees, with a view to enhancing biodiversity."
North Somerset Council Development Management Policies: Sites and Policies Plan Part 1 July 2016¹⁴	
DM8 – Nature Conservation	Requires protection of statutory and non-statutory sites, legally protected species and species and habitats of principal importance. It sets minimum requirements for biodiversity and information provision when supporting planning applications. The policy emphasises effective lighting design to avoid artificial light spill.
DM9 – Trees and Woodlands	Policy requires consideration to be given to retention, protection and enhancement of tree canopy cover. Impacts of development on trees should be assessed. Existing trees and wooded areas should be incorporated into design proposals, as well as new tree planting, with adequate long-term maintenance plans.
North Somerset Council Supplementary Planning Documents	
Mendip Bats Special Area of conservation (SAC) Guidance on Development January 2018 ¹⁵	Bristol Airport lies predominantly within the Zone B consultation band due to close proximity to important roost sites for greater and lesser horseshoe bats (<i>Hipposideros</i> species). Various requirements on survey and mitigation/provision of replacement habitat therefore apply where there is potential for these species to be adversely impacted by development.
Biodiversity and Trees December 2005	Requires consideration of the potential for developments to contribute to the biodiversity objectives and targets for particular types of habitat and species found in North Somerset. The aim of this supplementary planning document is to ensure no net loss of biodiversity within the North Somerset area and that biodiversity is fully incorporated and best practice observed in all development proposals. Includes trees, protected sites and protected species for all minor and major developments.

Technical guidance

- 11.3.3 There are a number of technical guidance documents that have been used to define the adopted approach to undertaking the Biodiversity aspects of the Environmental Impact Assessment (EIA). These include methods for characterising the Biodiversity baseline and the appropriate interpretation of data, as well as the specific approach to be adopted for Ecological Impact Assessment (EcIA). Technical guidance directly applicable to this technical specialism is listed in **Table 11.2**.

Table 11.2 Technical guidance adopted for assessing the impacts on Biodiversity

Guidance reference	Usage
British Standards Institute (BSI): BS 42020:2013	Provides recommendations on topics such as professional practice,

¹⁴ North Somerset Council (July 2016). Sites and Policies Plan Part 1: Development Management Policies, [Online]. Available at: <https://www.n-somerset.gov.uk/wp-content/uploads/2015/11/Sites-and-Policies-Plan-Part-1-Development-Management-Policies-July-2016.pdf> [Checked 17/05/18]

¹⁵ North Somerset Council (January 2018). Supplementary Planning Document, North Somerset and Mendip Bats SAC Guidance on Development, [Online]. Available at: <http://www.n-somerset.gov.uk/wp-content/uploads/2015/12/North-Somerset-and-Mendip-Bats-SAC-guidance-supplementary-planning-document.pdf> [Checked 17/05/18].

Guidance reference	Usage
Biodiversity – Code of practice for planning and development¹⁶	proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring.
BSI: BS 8596:2015 Surveying for bats in trees and woodland¹⁷	Provides best practice guidance for assessing the presence of bats in trees and woodland.
Chartered Institute of Ecology and Environmental Management (CIEEM): Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine¹⁸	Provides technical guidance for assessing the potential ecological impacts of a development. EcIA is a process of identifying, quantifying and evaluating potential effects of development- related or other proposed actions on habitats, species and ecosystems. EcIA can be used for the appraisal of projects of any scale including the ecological component of EIA. When undertaken as part of an EIA, EcIA is subject to the relevant EIA Regulations. Includes guidance on scoping; establishing the baseline; identifying important ecological features; assessing potential impacts; incorporating measures to avoid, reduce and compensate ecological impacts and the provision of ecological enhancements. Guidance on the consideration of the legal and policy framework throughout the EcIA process is also included.
North Somerset and Mendip Bats SAC Guidance on Development¹⁹	Guidance on development in relation to impacts on the North Somerset and Mendip Bats SAC. Explains how development activities can impact the SAC and the steps required to avoid or mitigate any impacts.
UK Government²⁰	Provides standing advice on assessing the impacts of development on a range of protected species, including bats, great crested newts (GCN), badgers, dormouse, reptiles, wild birds, protected plants, invertebrates and ancient woodland. Includes guidance on survey effort, methods, assessing impacts and mitigation. Incorporates current Natural England (NE) guidance.
Bat survey guidelines for professional ecologists: Good practice guidelines²¹	Guidance on bat surveys, data analysis, interpretation and reporting.
Bats and lighting in the UK²²	Guidance on the impacts of lighting on bats and developing mitigation strategies to minimise those impacts.
Bat tree habitat key²³	Guidance on the use of trees by bats.

¹⁶ British Standards Institute (BSI) (2013). *BS 42020:2013 Biodiversity – Code of practice for planning and development* (First ed.) London. BSI.

¹⁷ BSI., 2015. *BS 8596:2015 Surveying for bats in trees and woodland. Guide*. London. BSI, [online]. Available at: <https://shop.bsigroup.com/ProductDetail/?pid=00000000030273056> [Checked 28/11/18].

¹⁸ Chartered Institute of Ecology and Environmental Management (CIEEM), 2018. *Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine* (September 2018) CIEEM.

¹⁹ North Somerset and Mendip Bats SAC Guidance on Development Supplementary Planning Document (2018).

²⁰ UK Government (2018) Natural environment, [online]. Available at: <https://www.gov.uk/guidance/natural-environment> [Checked 20/11/18].

²¹ Bat Conservation Trust (2016). *Bat survey guidelines for professional ecologists: Good practice guidelines* (Third ed). London. BCT.

²² Bat Conservation Trust (2009). *Bats and lighting in the UK*. London. BCT.

²³ Andrews, H. (2013). *Bat tree habitat key. Andrews Ecology*.

Guidance reference	Usage
Bat Mitigation Guidelines²⁴	Guidance on good practice in relation to land-use planning and development where bats are known or suspected to occur.
The lesser horseshoe bat: Conservation Handbook²⁵	Specific guidance on lesser horseshoe bats.
Bats and Artificial Lighting in the UK²⁶	Specific guidance on the impact of lighting on bats and associated mitigation for different scenarios.
The Dormouse Conservation Handbook²⁷	Guidance on survey techniques and habitat requirements for dormice.
Bird Monitoring Methods²⁸	Guidance on undertaking breeding bird surveys, including methodology.
Herpetofauna Worker's Manual²⁹	Guidance on survey techniques and habitat requirements for amphibian and reptile species.
Advice Sheet 10: reptile survey³⁰	Guidance on survey techniques for reptiles.
Surveying Badgers³¹	Guidance on surveying badgers.
Badgers³²	Guidance on survey techniques and ecology of badgers.
Handbook for Phase 1 Habitat Survey – a technique for environmental audit³³	Standardised system for classifying and mapping wildlife habitats in all parts of Great Britain, including urban areas. The handbook provides information on the planning and execution of habitat surveys, together with definitions of the standard habitat types, alphanumeric reference codes and mapping colour codes.
Environment Agency (EA): Air emissions risk assessment for your environmental permit³⁴	For ecological receptors, the criteria recommended in EA guidance and Institute of Air Quality Management (IAQM) commentary will be used to provide an initial screening of significance. If impacts cannot be screened out as insignificant, they will be reviewed and assessed further by specialist ecologists.
IAQM: Use of a criterion for the determination of an insignificant effect of air quality impacts on sensitive habitats³⁵	

²⁴ Mitchell-Jones, A. J. (2004). Bat Mitigation Guidelines. *English Nature*.

²⁵ Schofield, H. (2008). *The lesser horseshoe bat: Conservation Handbook*. The Vincent Wildlife Trust, Ledbury, UK.

²⁶ Institute of Lighting Professionals and the Bat Conservation Trust (2018). Bats and Artificial Lighting in the UK. *Bats and the Built Environment Series*. Guidance Note 08/18.

²⁷ English Nature (2006). *The Dormouse Conservation Handbook*. (Second ed).

²⁸ Gilbert, G., Gibbons, D.W. and Evans, J. (1998). *Bird Monitoring Methods*. British Trust for Ornithology.

²⁹ Gent, A. H. and Gibson, S. D. (2003). *Herpetofauna Worker's Manual*. Peterborough. Joint Nature Conservation Committee (JNCC).

³⁰ Froglife. (1999). *Advice Sheet 10: reptile survey*. Froglife, Halesworth.

³¹ Harris, S., Cresswell, P. and Jeffries, D. (1989). *Surveying Badgers* (First ed.) London. Mammal Society.

³² Neal, E. and Cheeseman, C. (1996). *Badgers*. London. Poyser Natural History.

³³ JNCC (2010). *Handbook for Phase 1 Habitat Survey – a technique for environmental audit*. London. JNCC.

³⁴ Environment Agency (2016). *Air emissions risk assessment for your environmental permit*, [online] Available at: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit> [Checked 22/03/18].

³⁵ IAQM (2016). *Use of a criterion for the determination of an insignificant effect of air quality impacts on sensitive habitats*.

11.4 Data gathering methodology

Study area

- 11.4.1 Detailed knowledge of the flora and fauna associated with Bristol Airport has been gathered since 2005 and this has been used to inform the study area associated with the multiple receptors under consideration. . The existing Bristol Airport site layout is contained within **Figures 2.2** and the Proposed Development and application site within **Figures 2.3**. The ecological status of the areas affected by the Proposed Development and are detailed below:

Northern Area

- New multi-storey car park (Phase 3) (MSCP) – ecological interest limited (short lengths of species-poor hedge and uniform planted trees - illuminated at night);
- New gyratory road and internal car parking - ecological interest limited and restricted to uniform planted trees, ornamental planting and tightly mown grass which are illuminated;
- Terminal building and service yard - negligible ecological value based on historic surveys and function. Highly illuminated;
- A38 corridor, Downside Road and West Lane highway improvements – a small area of woodland edge, residential gardens and kerbsides. Not previously surveyed prior to this EIA – habitats of likely lower ecological value, partially illuminated;

Central Area

- East Apron and associated maintenance - negligible ecological value based on historic surveys and function. Illuminated;
- Eastern taxiway link and taxi-way widening 'fillets' on species-poor neutral grassland associated with the airfield - limited ecological interest due to its management under the Civil Aviation Authority (CAA) *CAP 772 Wildlife Hazard Management at Aerodromes*³⁶, resulting in a lack of botanical diversity. No development works are proposed elsewhere on the airfield including grassland to the east of the A38 and its landscape boundary features.

Southern Area

- Silver Zone Car Park Extension (Phase 2) - the proposed conversion of cattle-grazed pasture to permanent long-stay block parking. This area is dominated by species-poor semi-improved grassland with scrub and a mature hedgerow boundary. It is used by foraging / commuting bats, and other faunal species - requires detailed survey and assessment.
- Silver Zone Car Park Extension (Phase 1) - current long-stay block parking from seasonal to year-round usage – of limited ecological interest, but hedge and tree-lined perimeter is used by foraging / commuting bats as well as other fauna.
- No works are proposed elsewhere including the nature conservation areas to the south east of the Silver Zone Car Park and the existing landscape boundaries.

- 11.4.2 The key areas of change at the application site arising from the Proposed Development, which also form the key focus of the ecological assessment are:

³⁶ Civil Aviation Authority, 2017. *Wildlife Hazard Management at Aerodromes*, [online]. Available at: <http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=2726> [Checked 21/11/2018].

- A38 highway improvements, which includes Downside Road and West Lane highway (including the adjacent habitats);
- Silver Zone Car Park Extension (Phase 2) area.

11.4.3 Notwithstanding these observations, the study area includes the entire spatial extent of the application site. It also extends beyond this to include off-site areas to enable consideration of certain effects that potentially could occur at more distant locations.

Designated sites

11.4.4 Consideration has been given to potential effects on designated sites and their features of interest, with an examination of statutorily designated sites extended to 5km from Bristol Airport and non-statutorily designated sites to 2km. This allows consideration of potential effects to Biodiversity receptors associated with air quality, water, road transport and noise beyond the Bristol Airport's boundaries.

Habitats

11.4.5 All habitats associated with Bristol Airport and immediately adjacent land have been re-surveyed to inform the planning application and this ES Chapter. Use of Google Earth and other aerial images have also been used to place Bristol Airport's habitats into context within the wider landscape.

Bats

11.4.6 Detailed bat surveys, that are compliant with relevant technical specifications including the requirements of the North Somerset and Mendips Bat Special Area of Conservation Supplementary Planning Document, have been focused on a number of locations at Bristol Airport. These areas are defined by the quality of the habitat associated with the components of the Proposed Development and their suitability to support roosting, foraging or commuting bats. Bat activity has been assessed in detail at the agricultural land to the south-west of Bristol Airport, that is proposed to become long stay block car parking, as well as the habitats associated with the A38 and its junctions with Downside Road and West Lane. The remaining habitats associated with the Proposed Development are considered to offer such limited opportunity for bats (based on historic surveys, habitat suitability and professional judgement) that additional activity surveys are not required. Further investigations included are associated with buildings, trees and other infrastructure that may support roosting bats potentially affected by the Proposed Development.

Dormouse

11.4.7 Detailed dormouse surveys have focused on habitat that has not previously been surveyed for this species: habitat associated with the A38 junction with Downside Road and a re-survey of boundary habitats associated with the agricultural land to the south-west of Bristol Airport, that is proposed to become long stay block car parking. All other areas of potential dormouse habitat are not being affected or have been recently surveyed (no dormouse present) and survey data is still considered to be valid.

Badger

11.4.8 Bristol Airport has been re-surveyed for evidence of badger and badger setts due to the dynamic nature of this species. No changes are proposed to locations where known setts are located or in their immediate proximity.

Great Crested Newt

- 11.4.9 All identified ponds within 500m of the Bristol Airport boundary have been surveyed for great crested newt. These ponds are located to the west and south of the western area of Bristol Airport. Other ponds are present, but further than 500m from the components of the Proposed Development.

Reptiles

- 11.4.10 Large areas of Bristol Airport are typically unsuitable for reptiles, due to the presence of hard standing or other reinforced surfaces, buildings, barriers to movement and high levels of disturbance and illumination. Semi-natural habitats including grassland, hedgerows/hedge banks, small areas of woodland and rock exposure provide improved habitat suitability. Historic surveys across the airport since 2005 have not recorded reptiles on any occasion. No notable changes that would increase the suitability of habitat have been recorded since that time. There are no changes in potential reptile habitat at Bristol Airport, apart from small areas of grassland and woodland edge habitat associated with proposed highway improvements at the A38/Downside Road junction. This area has not previously been surveyed. Other locations associated with the Proposed Development are considered to be unsuitable for these species.

Birds

- 11.4.11 Only the proposed changes associated with the A38 junction with Downside Road and boundary habitats associated with the agricultural land to the south-west of Bristol Airport, that is proposed to become long stay block car parking, have the potential to affect nesting birds and these areas have been subject to survey. No change is proposed to ground nesting conditions associated with the airfield grassland. A desk-based assessment of the potential for aircraft to disturb birds associated with more distant designated sites has also been completed (contained in **Appendix 11G**).

Invertebrates

- 11.4.12 Habitats associated with the Proposed Development are largely associated with the existing highly developed and managed airport land. Only two areas of undeveloped land are associated with the Proposed Development. An evaluation of the habitats associated with the highway improvements along the A38/Downside Road/West Lane junction and the agricultural land to the south west of the airport did not conclude these were sufficiently diverse, extensive or uncommon enough to highlight the need for detailed invertebrate studies. No areas of potentially important habitat for invertebrates are affected by the Proposed Development. Furthermore, the airport is very mindful of limiting invertebrate diversity across the operational parts of the airport in terms of managing birds strike risk under the CAP 772³⁶.

Groundwater-fed watercourses

- 11.4.13 Consideration has been given to the potential for accidental release of pollutants and their transport to groundwater courses with subsequent effects on aquatic ecology. Typically, these relate to spring-fed watercourses associated with the groundwater beneath Bristol Airport. Further details can be found in **Chapter 12: Surface Water and Flood Risk** and **Chapter 13: Groundwater**.

Desk study

- 11.4.14 A desk-based assessment was undertaken by Johns Associates³⁷ in support of the Proposed Development (**Appendix 11A**). The desk study collated existing ecological records for priority habitats and species, controlled and legally protected species and data on statutory and non-statutory designated sites within the likely Zone of Influence (ZoI) of the application site.. In line with the current CIEEM guidance, these are the sites, habitats and species that are of sufficient importance that effects upon them could be significant (**Box 11.1** and **11.2**).

³⁷ Johns Associates, 2018. *Who we are*, [online]. Available at: <http://www.johnsassociates.co.uk/who-we-are/> [Checked 20/11/2018]

Box 11.1 Designated biodiversity sites, priority habitats and species

Statutory biodiversity sites

Internationally important sites (collectively referred to in this Chapter as European sites – whilst recognising that Ramsar sites are designated at a global level):

- ▶ SACs³⁸;
- ▶ Candidate SACs³⁹;
- ▶ Sites of Community Importance (SCIs)⁴⁰;
- ▶ SPAs⁴¹;
- ▶ Listed or proposed Ramsar sites, potential SPAs, possible/ proposed SACs⁴²; and
- ▶ Sites identified or required as compensatory measures for adverse effects on other European sites⁴³.

Nationally important sites:

- ▶ SSSIs⁴⁴; and
- ▶ National Nature Reserves (NNRs).

Locally important sites:

Local Nature Reserves (LNR): Statutory sites that are of importance for recreation and education as well as biodiversity. Their level of importance is defined by their other statutory or any non-statutory designations (e.g. if an LNR is also an SSSI but is not a European site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of borough/district-level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory nature conservation sites

Sites of county importance: Non-statutory nature conservation sites in North Somerset are called Local Wildlife Sites (LWS).

³⁸ SACs are designated under Article 4(4) of Directive 92/43/EEC

³⁹ Candidate SACs are designated under Article 4.1 of Directive 92/43/EEC

⁴⁰ SCIs are sites that have been nominated or submitted by Member States and entered onto the list of sites compiled by the European Commission that form (along with SACs and SPAs) the Natura 2000 network. SCIs are subject to the provisions of Article 6(2) of Directive 92/43/EEC. SCIs are afforded full protection by law under the Conservation of Habitats and Species Regulations 2017 (regulation 8(1)(b))

⁴¹ SPAs are classified pursuant to the requirements of Directive 2009/147/EC (Article 4). As European Sites, they are provided with full protection by law under the Conservation of Habitats and Species Regulations 2010.

⁴² Government policy in England (see paragraph 118 of the NPPF) protects Ramsar sites, potential SPAs and possible SACs as if they were fully classified SPAs or a fully designated SACs.

⁴³ Government policy in England (see paragraph 118 of the NPPF) is that any such compensatory land or water must itself be protected as if it were a fully classified SPA or a fully designated SAC.

⁴⁴ Some SSSIs also wholly or partially fall within a European Site boundary.

Priority Habitats and Species

In this Chapter (and following the CIEEM guidance), the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, habitats and species of principal importance for the conservation of biological diversity in England are identified as of national species or habitat importance reflecting the fact that the importance of these species or habitats has been defined at a national level. The level of importance pertains to the species or habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued (other than for waterfowl, for which thresholds have been defined for national or international 'population' importance).

- International importance: populations of species or areas of habitat for which European sites are designated;
- International importance: populations of birds meeting the threshold for European importance (1% of the relevant international population)⁴⁵;
- National importance: priority habitats and species of principal importance (HPI and SPI⁴⁶) for the conservation of biological diversity in England⁴⁷.
- National importance: species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern (BoCC) Red List;
- National importance: Nationally Rare and Nationally Scarce species, which are species recorded from, 1-15 and 16-100 hectads (10x10km squares of the national grid) respectively;
- National importance: populations of birds comprising at least 1% of the relevant British breeding/wintering population (where data are available); and
- Borough/district importance: habitats and species listed in the Borough or District Biodiversity Action Plan (BAP).

⁴⁵ The JNCC prepared guidelines to assist in the selection of SPAs (The Birds Directive: Selection guidelines for Special Protection Areas). Stage 1 of the two-stage process identifies those areas used regularly by 1% or more of the Great Britain (or in Northern Ireland, the all-Ireland) population of a species listed in Annex I of the Birds Directive in any season. The JNCC undertakes reviews of the SPA network and populations of its qualification species at roughly decadal intervals with the last (third) review published in 2016.

⁴⁶ Habitats and Species of Principle Importance (HPI and SPI).

⁴⁷ Natural England (2018). UK BAP priority species and habitats, [online]. Available at: <http://naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/prioritylist.aspx> [Checked 28/11/18].

Box 11.2 Legally protected and controlled species

Legal Protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this document, legal protection refers to:

- Species included in Schedules 1, 5 and 8 of the WCA (as amended), excluding:
 - ▶ Species that are only protected in relation to their sale (see Section 9(5) and 13(2) of the WCA 1981), given that the Proposed Development does not include any proposals relating to the sale of species; and
 - ▶ Species that are listed in Schedule 1 of the WCA 1981 that are likely to breed on or near the site (given that this schedule is only applicable whilst birds are breeding).
- Species included in Schedules 2 and 5 of the *Habitats Regulations 2017*¹;
- Badgers, which are protected under the *Protection of Badgers Act 1992*; and
- Hedgerows, some of which are protected under *The Hedgerows Regulations 1997*⁵.

Legal Control

Schedule 9 of the WCA 1981 lists species of animal that it is an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild.

11.4.15 Organisations that have supplied data and information on the data and search radius is contained within **Table 11.3** Information sources and data sought.

Table 11.3 Information sources and data sought

Source	Data
Department for Environment, Food and Rural Affairs' (Defra) Multi-Agency Geographic Information for the Countryside (MAGIC) website ⁴⁸	Existing statutorily designated sites of nature conservation interest located within 5km of the application site. Existing non-statutory designated sites within 2km of the application site.
Bristol Regional Environmental Records Centre (BRERC)	Existing non-statutory designated sites of nature conservation interest, Priority habitats, veteran trees and ponds, notable and legally protected species (other than bats), within 2km of the application site. Records of bats and bat roosts located within 5km of the application site.
NSC ¹⁹	Guidance on specific aspects of the North Somerset Bat SAC and value of different habitat typologies supporting its key roosts that could be associated with the application site.
Avon Biodiversity Action Plan ⁴⁹	Habitats and species identified as priorities within the areas specified above.

⁴⁸ Department for Environment, Food and Rural Affairs (Defra) (2017). Multi-Agency Geographic Information for the Countryside (MAGIC), [online]. Available at: www.magic.defra.gov.uk [Checked 20/11/18].

⁴⁹ Hayward, J. (2017). Avon Biodiversity Action Plan, [online]. Available at: http://www.avonwildlifetrust.org.uk/sites/default/files/avonbiodiversityactionplan_0.pdf [Checked 28/11/18].

Source	Data
Google Earth ⁵⁰	Review of satellite imagery for identification of biodiversity interest features (e.g. water bodies, connectivity feature) and wider context.

Survey work

11.4.16 A wide range of ecological surveys have been completed at Bristol Airport⁵¹ since 2005 and have been used, together with consideration of likely significant effects, to inform the extent of ecological surveys that have been identified in the scoping exercise (as outlined in **Section 11.6**). Details of previous survey work undertaken, prior to The Proposed Development, is detailed within **Table 11.4**.

Table 11.4 Previous survey work undertaken at Bristol Airport

Survey Requirement	Survey Area	Survey Date / Completed by
Habitats – Extended Phase 1 and updates with Phase 2 faunal and botanical surveys	Bristol Airport	2005 / Entec UK Ltd
Habitats and Protected Species – All surveys	Bristol Airport	2005 to date / Matt Johns BSc MSc CEnv MCIEEM FGS MIFM
Various	Bristol Airport – specific locations	2009 to date / Johns Associates Ltd
Habitats - Extended Phase 1 Habitat Survey mapping updates	Bristol Airport and fields east of A38	2015 and 2016 / Johns Associates Ltd
Detailed Phase 2 grassland surveys	Main Airfield	2016 / Johns Associates Ltd
Woodland survey	Downside Road meadow and A38 cuttings	2015 / Johns Associates Ltd
	Woodland south of Proposed Development site (owned by BAL)	2015 / Johns Associates Ltd
Hedgerows	Bristol Airport	2015 & 2017 / Johns Associates 2016 / BAL
Dormouse	Within south of Bristol Airport / north of Bristol Airport	2015 & 2016 / Johns Associates Ltd
Reptiles	North and east of airfield	2015 & 2017 / Johns Associates Ltd
Bat roost survey	Buildings, artificial structures and trees	2015 and 2016 / Johns Associates Ltd

⁵⁰ Google Earth is a piece of 3D mapping software, freely available, [online]. Available at: https://www.google.co.uk/intl/en_uk/earth/ [Checked 20/11/18].

⁵¹ Matt Johns BSc MSc CEnv MCIEEM FGS MIFM and Johns Associates Ltd have been associated with all ecological surveys undertaken at the application site since 2005 and 2009 respectively.

Survey Requirement	Survey Area	Survey Date / Completed by
Bat activity surveys (automated bat detector and walked transects)	Northern areas of Bristol Airport	2009 / Johns Associates Ltd
	South of airfield	2015, 2016 and 2017 / Johns Associates Ltd
Great crested newt	Within all identified waterbodies within 500m of Bristol Airport.	2015 / Johns Associates Ltd
Badger (including bait marking exercise)	Surveys across Bristol Airport.	2013, 2015, 2016 and 2017 / Johns Associates Ltd
	Bait marking at Bristol Airport	2016

- 11.4.17 Incidental observations and records collected by Johns Associates including those associated with species listed within **Table 11.4** and birds and mammals, combined with regular records of bird and mammal presence and behaviour collected daily by the Airport Safety Unit (ASU) to support the operational management work associated with aerodrome safeguarding and the strict requirements of CAA CAP772 Wildlife Hazard Management at Aerodromes³⁶.
- 11.4.18 The review of the different components of the Proposed Development set out at the start of **Section 11.4** (Study Area) highlighted where likely significant effects could occur and in combination with existing knowledge of the ecological baseline at Bristol Airport, provided a robust mechanism to determine where detailed investigations were required and where they were not.

Surveys conducted in support of the Proposed Development

- 11.4.19 Ecological data has been collected at Bristol Airport since at least 2005 and this primary knowledge has been developed from this point, including the surveys conducted to support the Proposed Development. The following surveys were conducted in 2018:
- Extended Phase 1 Habitat Survey of the application site was completed in March 2018 (details contained within **Appendix 11B**). This survey was built on and updated surveys conducted since 2005.
 - Bats habitat suitability, roost assessments, emergence / re-entry surveys, automated detector surveys and walked transect surveys were conducted:
 - ▶ Habitat suitability - Assessment of the land use and component habitat matrix and formation data was undertaken in order to complete the Integrated Habitat System (IHS) mapping required to ascertain the value of the habitat to horseshoe bats⁵² (details contained within **Appendix 11B**).
 - ▶ Bats – Potential Building Roost Assessments:
 - ▶ Buildings, artificial structures and trees - All buildings within the Airport Tavern complex (associated with the A38 corridor highway improvements) underwent

⁵² Additional guidance on field data requirements for the purposes of IHS classification were followed as detailed in IHS (v 2.0) Habitat Mapping to GIS and IHS Definitions Version 2-001 (Somerset Environmental Records Centre (SERC), 2006). During the course of the survey, available habitats were assessed for their suitability to support horseshoe bat species for roosting, commuting and foraging purposes.

internal and external inspections for potential bat roost features (PRFs)⁵³. The Proposed Development only affects a limited number of mature trees. Detailed ground and elevated inspections of trees were undertaken. Details of the surveys are contained within **Appendix 11E**.

- ▶ Building and Tree Bat Potential Roost Emergence/ Re-Entry Surveys: Based on the outcome of potential roost suitability assessments, two buildings (and no trees) underwent surveys in June and July 2018. These were a building associated with the current fuel depot and the Airport Tavern at the junction of the A38 and Downside Road highways improvements. The surveys were conducted within industry guidance⁵³ and the details are contained within **Appendix 11B**).
- ▶ Automated Detector Surveys⁵⁴ - Habitats that were assessed as presenting high suitability for bats⁵³ underwent surveys from April to October 2018 inclusive, fully compliant with the relevant technical standards. The application site is located within Bat Consultation Zone B of the North Somerset and Mendips Bat SAC⁵⁵ and the sufficient survey effort undertaken enables calculation of the activity score multiplier used to calculate the Habitat Unit Value of the affected habitats (see **Appendix 11E** for details of the surveys).
- ▶ Transect surveys complied with current industry guidelines⁵⁵. The 10 surveys were conducted each month over April to October 2018 inclusive. The dates and details of the surveys are given in **Appendix 11E**.
- ▶ Road crossing point surveys were designed to determine whether bats are using regular flightpaths to cross the existing A38. These surveys were conducted over July to October 2018 inclusive. Details on the survey, including the methodology are contained within **Appendix 11E**.
- ▶ Bat Call Analysis & Associated Weather Screening – Details on the methodology and analysis are contained within **Appendix 11E**.
- Dormouse: habitat assessed for its quality and suitability for dormice. Nest tubes were deployed and surveyed in two locations associated with the application site and checked a minimum of once every two months over April to October for signs of dormice. The two areas surveyed were associated with the A38 highways improvements and the proposed Operational Extension to the Silver Zone Car Park (Phase 2) area. Details on these surveys and the methodology is contained within **Appendix 11H**.
- Badger: a survey of the land within the application site boundary and in immediately adjacent areas was carried out in March 2018, with an update survey completed in September 2018 (please refer to Confidential **Appendix 11D**). Incidental observations during the intervening period were also noted. The survey involved a search for characteristic signs of badger activity,

⁵³ Conducted in accordance with: Bat Conservation Trust, 2016. Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines, [online]. Available at: <https://www.bats.org.uk/news/2016/02/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition> [Checked 20/11/2018].

⁵⁴ Lighting Surveys - Microdaq HOBO remote data loggers were deployed alongside the automated (static) bat detectors in the proposed Extension to the Silver Zone Car Park (Phase 2) and the Silver Zone seasonal car park (Phase 1) areas and A38 highway improvement areas. These remote data loggers were configured to record lux levels at 30-minute intervals throughout the deployment period to inform the bat data analysis only. A site wide lighting survey has been completed by Hydrock in 2018 (Hydrock. 2018. Bristol Airport 12mppa Extension. Lighting Impact Assessment. A report prepared for Bristol Airport Limited. Reference: 09194-HYD-XX-GF-RP-ME-0001).

⁵⁵ North Somerset Council, 2017. *North Somerset and Mendip Bats Special Area of Conservation (SAC): Guidance on Development*. V1., [online]. Available at: <https://www.n-somerset.gov.uk/wp-content/uploads/2017/02/ED29-Guidance-Note-North-Somerset-and-Mendip-Bats-SAC.pdf> [Checked 22/11/2018].

including setts, latrines/dung pits, paths, fence push-ups, hairs caught on fences or vegetation or in spoil heaps, paw prints and feeding signs.

- Great Crested Newt: eight water bodies were identified within 500m of the application site. Habitat Suitability Index (HSI) assessments were conducted and all ponds were visited in March 2018. All ponds were surveyed a minimum of four times, and the two ponds in which great crested newts were found, were surveyed on a further two occasions. Presence/absence and population size class assessment surveys were carried out between mid-March to mid-June 2018 in accordance with standard guidance. Details of the survey and methodology for great crested newts can be found in **Appendix 11C**.
- Reptiles: these animals have not been recorded at Bristol Airport since surveys commenced in 2005. Only habitat associated with the A38 highways improvements is considered to have the potential to support common reptiles. Presence / absence refugia surveys were undertaken on seven occasions in September 2018. Surveys were conducted in line with guidance from Froglife^{56, 57}. **Appendix 11I** provides full details on reptile surveys.

Birds

- 11.4.20 A breeding bird survey was carried out over five survey visits in April to June 2018, inclusive. Full details can be found in **Appendix 11G**. There is no wintering bird interest of note at the application site and the land is managed carefully under CAP 772³⁶
- 11.4.21 A desk-based evaluation of the potential for aircraft noise/behaviour to disturb birds associated with three statutory sites designated for their bird populations (Blagdon Lake SSSI, Chew Valley Lake SSSI and SPA and the Severn Estuary SPA, Ramsar Site and SSSI) was also completed (this also acts as a surrogate for other similarly designated sites). This involved a combination of literature review, specialist inputs from the Airside Safety Unit at (ASU) at BAL (who undertake continuous monitoring and management of birds at the Bristol Airport), together with a review of aircraft 'track' data over these locations and standing policies on aircraft behaviour away from the application site. Please refer to **Appendix 11G** for more information.

11.5 Overall baseline

Current baseline

- 11.5.1 The application site is located on a flat plateau and is dominated by buildings, car parks, areas of hardstanding (e.g. runway), other airport infrastructure, grassland and small areas of scrub. The surrounding landscape comprises alternating ridges and broad valleys that support wooded slopes and open rolling farmland. To the north and south of Bristol Airport the valleys run east to west and support a relatively high number of designated sites of nature conservation value. A large woodland complex is located west of the application site and includes designated sites of nature conservation value. Quarry exposures, scree, scrub, grassland and woodland support nationally rare and scarce plant species. Woodlands, parklands of conservation value, and species-rich calcareous grasslands are also present in the wider area.
- 11.5.2 The following section contains summary baseline information gained through the contemporary surveys. Further details, including raw data and information pertaining to historic surveys, is

⁵⁶ Froglife, 1999. Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth; and, Gent, A.H. and Gibson, S.D., Eds. (1998). Herpetofauna Workers' Manual. Joint Nature Conservation Committee, Peterborough. Revised and reprinted 2003.

⁵⁷ Froglife, 2015. Surveying for Reptiles: Tips, techniques and skills to help you surveys for reptiles, [online]. Available at: <https://www.froglife.org/wp-content/uploads/2013/06/Reptile-survey-booklet-3mm-bleed.pdf> [Checked 21/11/2018].

contained within the suite of Appendices to this Chapter. Further detailed assessment of likely impacts to those features present within the relevant ZoI from the application site is undertaken in **Section 11.10 to 11.16.**

Statutory sites

- 11.5.3 Please refer to the Figures presented in **Appendix 11A.**
- 11.5.4 There are no statutory sites at Bristol Airport. However, there is one statutory site of international importance within 5km of the application site – North Somerset and Mendip Bats Special Area of Conservation (SAC), located 2km west of the application site and which is designated in part for the populations of lesser horseshoe and greater horseshoe bats it supports.
- 11.5.5 There are fourteen statutory sites of national importance within 5km of the site, including ten SSSIs – four of which are designated for their geological interest, three LNRs and one Area of Outstanding Natural Beauty (AONB). The majority of these sites are located to the west or north-west of the application site. One of these sites, Felton Common LNR is located immediately east of the eastern perimeter of the application site.
- 11.5.6 Please refer to the tables and figures presented in **Appendix 11A** for further information on statutory sites.

Non-statutory sites

- 11.5.7 There are no non-statutory sites located at Bristol Airport. There are 23 non-statutory sites of local nature conservation importance within 2km south, west and north of the boundary of the application site, one of which is adjacent to the Bristol Airport to the east, associated with Felton Common.
- 11.5.8 Please refer to the tables and figures presented in **Appendix 11A** for further information on non-statutory sites.

Priority Habitats

- 11.5.9 There are no Priority Habitats located within the Proposed Development. A small area of mixed woodland is present within land owned by BAL south of the Silver Zone long-stay car park, known as Cornerpool Wood. This area is managed for nature conservation. A small area of calcareous grassland is located within Bristol Airport, but away from the Proposed Development footprint.
- 11.5.10 Lowland dry acid grassland habitat is present within 0-1km east of the application site, and is associated with Fenton Hill and Common Wildlife Site at this location.
- 11.5.11 Mixed deciduous woodland is present within 200m-2km south of the application site and within 500m-2km to the north. Upland mixed ashwoods are present within 500m-2km north and west of the application site. Cornerpool Wood is located at Bristol Airport, south of the Silver Zone long-stay car park. This area is managed for its nature conservation importance and is not affected by the Proposed Development. There is a small area of broadleaved woodland associated with the highway improvement works at the junction of the A38 and Downside Road.
- 11.5.12 Lowland meadows are present within 300m-1km north of the application site.
- 11.5.13 One veteran tree is located within 1.5-2km north west of the application site, within woodland near Backwell. The tree is a hybrid lime *Tilia cordata* *platyphyllos* (*T. x europaea*) and is estimated to be over 100 years old. Other veteran trees are likely to be present in the local area, but have not been recorded within the application site.
- 11.5.14 Eutrophic standing waters are present within 500m to the west and south of the western area of the application site and exist further afield in other directions. One pond is present within the

application site; south west of the agricultural land in the south west of the Silver Zone Car Park Extension (Phase 2). Ponds have been lost from the wider landscape over time, largely through changes in agricultural use/need.

Other Habitats

- 11.5.15 Please refer to the **Appendix 11B** and the figures it contains for further details to those below.
- 11.5.16 Other habitats recorded within the application site and in adjacent land parcels from the Phase 1 Habitat Survey are listed in **Table 11.5**. Those directly associated with the Propose Development are highlighted together with their location.

Table 11.5 Other habitat recorded at or adjacent to the application site

Phase 1 Habitat Type	Within the Proposed Development Footprint?	Location/areas (please refer to Figure 2.2 of Chapter 2: Scheme Description of this ES and Appendix 11B)
Scattered scrub	YES	A38 highway improvements, Silver Zone Car Park Extension (Phase 2)
Broadleaved tree	YES	Gyratory road, Canopies to front of existing terminal building, Multi-storey car park
Coniferous tree	YES	Gyratory road
Intact hedge – native species rich	YES	to Silver Zone Car Park Extension (Phase 2)
Intact hedge – native species poor	YES	Multi-storey car park
Defunct hedge – native species rich	NO	
Defunct hedge - native species poor	YES	A38 highway improvements
Fence	YES	A38 highway improvements, Silver Zone Car Park Extension (Phase 2)
Wall	YES	A38 highway improvements
Broadleaved woodland – semi-natural	YES	A38 highway improvements
Broadleaved woodland – plantation	NO	
Mixed woodland - plantation	NO	
Scrub – dense/continuous	NO	
Scrub - scattered	YES	A38 highway improvements, Silver Zone Car Park Extension (Phase 2)
Neutral grassland – semi-improved	NO	
Calcareous grassland – semi improved	NO	
Improved grassland	YES	Silver Zone Car Park Extension (Phase 1)
Poor semi-improved grassland	YES	to Silver Zone Car Park Extension (Phase 2), Taxiway widening and fillets, Taxiway widening and fillets (Taxiway ALPHA), East Taxiway
Other tall herb and fern – ruderal	YES	Silver Zone Car Park Extension (Phase 1)
Standing water	YES	Silver Zone Car Park Extension (Phase 2)

Cultivated/disturbed land – arable	NO	
Cultivated/disturbed land – amenity grassland	YES	Canopies to front of existing terminal building, Gyratory road
Cultivated/disturbed land – ephemeral/short	YES	Taxiway widening and fillets
Introduced shrub	YES	Canopies to front of existing terminal building, Multi-storey car park, Gyratory road
Earth bank	NO	
Buildings	YES	South terminal extension, West terminal extension, Service yard, Canopies to front of existing terminal building
Bare ground	YES	South terminal extension, West terminal extension, Service yard, East pier with vertical circulation cores & 5no pre-boarding zones, Canopies to front of existing terminal building, Gyratory road, A38 highway improvements
Other habitat	NO	

11.5.17 **Table 11.6** lists those habitat types present within the development footprint that will be modified or lost through the Proposed Development and provides a summary description of what this is and where it is located.

Table 11.6 Habitat Recorded at the application site and Within/Associated with the Development Footprint

Phase 1 Habitat Type	Location/areas (please refer to Figure 2.2 of Chapter 2: Scheme Description of this ES and Appendix 11B)	Summary description
Scattered scrub	A38 highway improvements, Silver Zone Car Park Extension (Phase 2)	Small areas of scattered scrub along the boundary of the A38, Downside Road and West Lane and within open grassland.
Broadleaved tree	Gyratory road, Canopies to front of existing terminal building, Multi-storey car park	Regular planted amenity trees within the north side car park and gardens along the A38.
Coniferous tree	Gyratory road	Small number of regular planted coniferous amenity trees within the north side car park.
Intact hedge – native species rich	Silver Zone Car Park Extension (Phase 2)	Mature hedge forming the boundary to the Silver Zone Car Park Extension (Phase 1)) and car parking associated with Silver Zone Car Park Extension (Phase 1) (existing car parking) and Silver Zone Car Park Extension (Phase 2) (proposed car parking).
Intact hedge – native species poor	Multi-storey car park	Small closely managed lengths of hedge in the north side car park separated by parking bays and roads and the boundary to the Airport Tavern.
Defunct hedge - native species poor	A38 highway improvements	Unmanaged hedge forming boundary to car parking at the Airport Tavern.
Fence	A38 highway improvements, Silver Zone Car Park Extension (Phase 2)	Wire fences associated with car parking (security and stock fencing) and Downside Road (old wire fence)

Wall	A38 highway improvements	Mortared stone wall associated with the A38.
Broadleaved woodland – semi-natural	A38 highway improvements	Small woodland block at the junction of Downside Road and the A38.
Improved grassland	Silver Zone Car Park Extension (Phase 1) A38 highway improvements	Recently established grassland as part of car park surfacing and the A38.
Poor semi-improved grassland	Silver Zone Car Park Extension (Phase 2), Taxiway widening and fillets, Taxiway widening and fillets (Taxiway ALPHA), East Taxiway	Areas of managed airfield grassland (Taxiway widening and fillets, Taxiway widening and fillets, East Taxiway) and cattle grazed grassland (Silver Zone Car Park Extension (Phase 2)).
Other tall herb and fern – ruderal	Silver Zone Car Park Extension (Phase 1)	Recently establishing thistles and nettles on landscape bund forming the southern boundary of existing parking (Silver Zone Car Park Extension (Phase 1)) and the northern boundary of proposed parking (Silver Zone Car Park Extension (Phase 2)).
Standing water	Silver Zone Car Park Extension (Phase 2)	One ephemeral pond adjacent to proposed car parking areas (Silver Zone Car Park Extension (Phase 2)).
Cultivated/disturbed land – amenity grassland	Canopies to front of existing terminal building, Gyratory road	Area of managed landscaped grassland associated with the terminal and north side car park.
Cultivated/disturbed land – ephemeral/short	Taxiway widening and fillets	Small area of ephemeral perennial species associated with a single proposed taxi-way fillet (Taxiway widening and fillets).
Introduced shrub	Canopies to front of existing terminal building, Multi-storey car park, Gyratory road	Landscape planting associated with the terminal area and north side car park.
Buildings	South terminal extension, West terminal extension, Service yard, Canopies to front of existing terminal building, A38 highway improvements	Existing terminal (and associated) buildings, fuel depot building and Airport Tavern.
Bare ground	South terminal extension, West terminal extension, Service yard, East pier with vertical circulation cores & 5 no Pre-boarding zones, Canopies to front of existing terminal building, Gyratory road, A38 highway improvements	Extensive throughout the application site as roads, car parking, walkways, aircraft apron, stands, taxiways, runway as well as small discrete areas (not specifically mapped) of bare soil (or woodchip) in landscape planting beds or temporarily stockpiled aggregate. Small discrete area of bare ground (not mapped) on the edge of the woodland at the A38 highway improvements following historic removal of pedestrian bridge.

Notable Plants

- 11.5.18 Although records of notable plant species exist for an area within 2km of the site, none have been identified within the footprint of the Proposed Development based on the current field surveys or desk study. Details on habitat surveys are contained within **Appendix 11A** and **11B**.

Bats

- 11.5.19 The following species/genus were recorded during the 2018 bat baseline surveys (further details contained within **Appendix 11E**):

- Common pipistrelle (*Pipistrellus pipistrellus*);

- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Nathusius' pipistrelle (*Pipistrellus nathusii*);
- Serotine (*Eptesicus serotinus*);
- Common Noctule (*Nyctalus noctula*);
- Leisler's (Lesser Noctule) (*Nyctalus Leisleri*);
- Greater Horseshoe (*Rhinolophus ferrumequinum*);
- Lesser Horseshoe (*Rhinolophus hipposideros*);
- *Plecotus* species; and
- *Myotis* species.

- 11.5.20 Surveys confirmed that none of the buildings (or other built structures) associated with the Proposed Development support or have the potential to support roosting bats. A small shallow former quarry associated with the woodland adjacent to the Downside Road/A38 junction was also examined in detail using a video endoscope and was confirmed to not offer potential for roosting bats.
- 11.5.21 Surveys confirmed that none of the trees associated with the Proposed Development have the potential to, or support, roosting bats.
- 11.5.22 Two locations were identified as likely crossing points for bats to cross the A38 (Crossing Point1) and Downside Road (Crossing Point 2) that are likely to be affected by the Proposed Development. Figures containing locations of Crossing Points are available in **Appendix 11E**. Surveys recorded a total of 23 crossing events (Crossing Point1 – 10, Crossing Point 2 – 13). Crossings were observed by common pipistrelle, soprano pipistrelle and serotine species with two unknown species due to the lack of emitted calls/interference from traffic. Species recorded crossing are not considered to be light sensitive. Crossing Point 1 is subject to very high and constant traffic and is heavily lit. Crossing Point 2 is currently less disturbed with less volume and speed of traffic and is unlit. No horseshoe bat species were recorded crossing either the A38 or Downside Road at these locations.
- 11.5.23 Activity transect surveys were conducted in Silver Zone Car Park Extension (Phase 2) and A38 Highways Improvements area. A low number of open habitat foraging species were identified in Silver Zone Car Park Extension (Phase 2) area, over the grazed pasture habitat. A cluster of greater horseshoe records were recorded along the western field boundary with additional individual passes recorded to the west of the scrub matrix within the grassland and along the northern bund.
- 11.5.24 A number of open-habitat foraging bat species were identified in the A38 Highways Improvements area, over the Airport Tavern grassland/parking area. Two greater horseshoe bat passes were recorded in the centre and to the south of the woodland parcel in Zone B of the North Somerset and Mendip Bats SAC. No lesser horseshoe bats were recorded during these surveys.
- 11.5.25 Automated detector surveys were conducted at twelve locations covering the habitats identified as having high suitability for foraging or commuting bats. These were broadly identified as:
- Silver Zone Car Park Extension (Phase 2) - all boundary features, scrub matrix and open grazed grassland; and
 - A38 Highway Improvements area – Woodland parcel south of Downside Road and the northern boundary hedgerow along the Airport Tavern grassland area.
- 11.5.26 Of these species, the following were considered to be of interest with respect to the Proposed Development based on the levels of activity recorded during these surveys:

- Common pipistrelle - High levels of activity were recorded throughout the natal period (Silver Zone Car Park Extension (Phase 2) boundary features) implying that the study area could provide a foraging resource for a maternity roost.
- *Myotis* species - High levels of activity were recorded throughout the natal period (A38 Highway Improvements area woodland canopy) implying that the study area could provide a foraging resource for a maternity roost and an important pre-hibernation foraging resource.
- Greater Horseshoe - Activity levels in excess of the North Somerset and Mendip Bat SAC Supplementary Planning Document (SPD) foraging activity threshold were recorded at 11 of the 12 automated detector locations in both Silver Zone Car Park Extension (Phase 2) area (hedgerows and grazed grassland/scrub matrix) and A38 Highway Improvement area (woodland and northern boundary hedgerow) within the natal period implying that the study area could provide a foraging resource for breeding roosts associated with the North Somerset and Mendip Bats SAC
- Lesser Horseshoe - Activity levels in excess of the SPD foraging activity threshold were recorded at all 12 of the automated detector locations, particularly in the post-natal period in the woodland associated with the A38 Highway Improvement area and at lower levels within the natal period implying that the study area could provide a foraging resource for roosts associated with the North Somerset and Mendip Bats SAC.

11.5.27

Lux level surveys of the boundary between the Silver Zone Car Park Extension (Phase 1) and the Silver Zone Car Park Extension (Phase 2) areas and the eastern edge of the northern boundary hedgerow of the A38 highway improvements area were completed between April to October 2018 using data loggers as well as visual observation as part of bat activity surveys. Microdaq HOBO remote light and temperature data loggers were deployed, paired with the automated detectors, and were configured to record lux levels at 30-minute intervals throughout the deployment period. These provided data that supported the subsequent analysis of bat calls, according to lunar phasing as required.

Dormouse

11.5.28

Dormouse has not been recorded at the application site (with surveys commencing in 2005). Based on the historic and the 2018 surveys it is considered reasonable to conclude that dormouse is not currently present at the application site. It is known that dormice are present in the wider local area. Further information on dormouse surveys is contained within **Appendix 11H**.

Badger

11.5.29

Further details on badger can be found within **Appendix 11D**.

Great Crested Newt

11.5.30

Great crested newt was recorded in only three of the water bodies (P) surveyed during 2018: P1, P2 and P3, which are located close together within the eastern margins of Kings Wood and Urchin Wood, approximately 300m west of the western perimeter of the application site. This species has only been recorded within P1 and P2 during historic surveys (P3 is a wheel rut so was not present during historic surveys). None of the other waterbodies located within 500m of the application site (including the pond at the boundary of Silver Zone Car Park Extension (Phase 2) area) supported great crested newt in 2018. Consequently, it is only likely that activities associated with operating the far western end of Bristol Airport (the western end of the runway and airfield) have any potential to interact with great crested newt and are beyond the ZoI associated with the Proposed Development.

- 11.5.31 The combined peak count from the 2018 population size class assessment was eight, based on the Natural England guidance⁵⁸. This represents a small population size class. Surveys from 2005 and 2015 also only recorded a maximum count of two from Pond P2 in 2005 and maximum combined count of nine from Ponds P1 and P2 in 2015.
- 11.5.32 The survey results in 2018 are therefore consistent with previous surveys and the population seems to be stable, with evidence of breeding recorded in 2018 at all three waterbodies. Further details are available on population assessments in **Appendix 11C**.

11.5.33 Reptiles

- 11.5.34 Reptiles have not been recorded at the application site (since surveys commenced in 2005), despite numerous surveys using artificial refugia, searches of natural refugia and potential observations whilst undertaking wider surveys. Based on the historic and the 2018 surveys it is considered reasonable to conclude that common reptiles are not currently present at the application site. It is known that common reptiles are present in the wider local area. **Appendix 11I** contains detailed information on reptile surveys conducted for this assessment.

Birds

- 11.5.35 The Proposed Development will not result in the extensive reduction of foraging or nesting opportunities for birds within the application site. Notable areas of suitable habitat to be retained are located at the boundaries, airfield grassland and a small woodland south of the Silver Zone long-stay car park.
- 11.5.36 Breeding bird surveys were completed within the footprint of the Proposed Development, where more extensive suitable habitat was recorded (A38 Highway Improvement areas and the Silver Zone Car Park Extension (Phase 2) area). In general, only common and ubiquitous bird species were recorded. Only one species of conservation significance was recorded on site (Dunnock, *Prunella modularis*). Other species, also common to the application site, have been recorded on the airfield grassland by the ASU (please refer to **Appendix 11G: Birds**).
- 11.5.37 The majority of bird records associated with the grassland, hedges and scattered scrub associated with Silver Zone Car Park Extension (Phase 2) area, including the majority of dunnock territories, were concentrated along the southern and eastern boundaries and within mature scrub. Dunnock were recorded during all survey visits in this area within the scrub and the hedgerows on the eastern, western and southern boundaries.
- 11.5.38 Disturbance from noise and commercial activity at the Airport Tavern site, within the A38 Highway Improvements area, severely limits the diversity of bird species at this location. Common woodland bird species were recorded throughout the woodland at the A38 Highway Improvements Area. Dunnock were recorded during all survey visits in this area within the woodland.
- 11.5.39 The application site does not offer any notable opportunities for wintering birds.
- 11.5.40 The airfield grassland management with respect to birds and CAP 772³⁶ will not change as a result of the Proposed Development.
- 11.5.41 It has been confirmed by BAL that, at times, some aircraft typically overfly more distant areas that are statutorily designated for their bird populations at more than 3000ft. Based on the conclusions of a desk-based study completed for this ES (see **Appendix 11G**) disturbance to birds from overflying aircraft that would result in a change in the species or population size and function and

⁵⁸ Natural England, 2018. Great Crested Newt EPS Licence Method Statement Excel workbook, [online]. Available at: <https://www.gov.uk/government/publications/great-crested-newts-apply-for-a-mitigation-licence> [Checked 21/11/2018]. Downloadable .xlsm document under the 'Method statement template for great crested newt mitigation licence' hyperlink heading.

the favourable conservation status of the designated features of interest is highly unlikely and further consideration of this topic has been scoped out from further assessment.

Future baseline

- 11.5.42 In a 'do-nothing' scenario, with an increase in passenger numbers up to 10mppa by 2026, no significant changes or trends are predicted to occur to the managed habitats and species populations associated with the application site. Management of habitats within Bristol Airport would continue as currently (in accordance with the CAP 772⁵⁹, existing approaches to biodiversity conservation (including tenant grazing) implemented by BAL and by maintaining an effective Bird Control Management Plan (BCMP)).
- 11.5.43 Elements of the 10 mppa development associated with planning permission 09/P/1020/OT2⁵⁹ which do not form part of the existing baseline and are not delivered under a General Permitted Development Order, for which construction commences prior to November 2018 are considered within the future baseline. All other elements are considered within **Chapter 18: Cumulative Effects Assessment**.
- 11.5.44 Construction of the Proposed Development is anticipated to commence in 2019 and conclude by 2026, As such the temporal difference between the ecological baseline defined in 2018 and that present at the start of construction in 2019 is not expected to vary, even taking into account the construction and operation of existing approved development.
- 11.5.45 Ongoing trends for general warming and the presence of an increase in more frequent high intensity high duration storms as a result of climate change have been taken into account in this Chapter of the ES . Climate change resilience has been considered and incorporated by selecting suitably resilient integrated and embedded mitigation and enhancement measures (please refer to table 11.9). Features such as hedgerow management, grassland woodland management and provision of new planted bunds will all help to provide an increase in green infrastructure around the application site, providing better habitat connectivity and cohesiveness. BAL currently successfully manages its natural assets and this management will be ongoing, be monitored, and will be adapted further where necessary.
- 11.5.46 Integrated/embedded mitigation and enhancement measures will be delivered at an early stage in the Proposed Development, to provide an increase in green infrastructure and added resilience to the effects of climate change, including woodland management and measures associated with greater and lesser horseshoe bats and other species.

11.6 Consultation

- 11.6.1 On-going dialogue and meetings with consultees have informed and influenced this Chapter, the Proposed Development (in relation to Biodiversity) and conclusions drawn. Specifically, meetings to discuss Biodiversity issues have been held with NSC on 7 August, 16 September and 1 October, with NE on 1 October 2018.
- 11.6.2 **Table 11.7** provides a summary of the issues about the Proposed Development that have been raised by consultees and the responses given.

⁵⁹ 09/P/1020/OT2. All application documentation is available online: <https://planning.n-somerset.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=ZZXJLLPJV108> [Checked 01/08/2018].

Table 11.7 Summary of issues raised during consultation regarding Biodiversity

Issue raised	Consultee(s)	Response and how considered in this Chapter	Section Ref
Ensure all relevant locally designated nature conservation sites are considered in the EIA	Wrighton Parish Council	The best practice methodology adopted by the CIEEM for Ecological Impact Assessment has been adopted for this EIA, which includes consideration of all statutory and non-statutory designated sites (and other ecological features of interest) within the ZoI associated with the Proposed Development. This has formed the basis of screening in which designated sites are included.	Section 11.3
Consideration of noise on wildlife and ecology including ground noise and overflying at take-off and landing.	Wrighton Parish Council	Noise modelling, aircraft flight paths, published literature and knowledge of the response to noise by on site wildlife will be used to inform an assessment as part of the EIA.	Sections 11.10 to 11.16 and Appendix 11G.
Interim assessment of ecological mitigation after 5 or 10 years to monitor effects on wildlife.	Wrighton Parish Council	Post construction monitoring including interim assessments will be included.	Section 11.20
Importance of woodland habitats for bats	Wrighton Parish Council	Detailed assessment of habitats, function and use by bats is being considered, with a focus on the ZoI of the Proposed Development. Cornerpool Wood will be unaffected by the proposals but will benefit from increased management/enhancement.	Sections 11.10 and 11.14, Appendices 11B, 11E and 11F
Improvements to green infrastructure, biodiversity and wildlife habitats	Backwell Parish Council	This Biodiversity chapter describes the embedded ecological mitigation and enhancement measures.	Section 11.8 and Appendix 11K
Lighting impacts on wildlife	Backwell Parish Council	The ES will include a detailed lighting assessment. Impacts of lighting on wildlife, in particular bats, is considered in detail.	Sections 11.8, 11.10, 11.14 and 11.16

Issue raised	Consultee(s)	Response and how considered in this Chapter	Section Ref
Impacts on local biodiversity, SSSIs and North Somerset and Mendips Bats SAC.	Backwell Parish Council	This Biodiversity chapter follows the robust and formal procedure for EcIA as defined by the CIEEM. This includes consideration of baseline, embedded ecological mitigation and enhancement measures and assessment of residual effects.	Section 11.3, Sections 11.10 to 11.16.
Use appropriate guidance on how to assessment potential impacts on features of nature conservation interest/opportunities for habitat creation	NE	This Biodiversity chapter follows the robust and formal procedure for EcIA as defined by the CIEEM. This includes consideration of baseline, embedded ecological mitigation and enhancement measures and assessment of residual effects.	Section 11.3 and 11.9, Appendix 11F and 11J.
Proximity of the application site to designated sites, including King's Wood and Urchin Wood SSSI, which is a component of the North Somerset and Mendips Bat SAC	NE	Impacts on designated sites including those mentioned by Natural England is included in the ES Biodiversity Chapter.	Sections 11.8, 11.10, 11.14. Appendix 11F and 11J.
Consideration of impacts on local wildlife and geological sites, impacts of all phases of the proposals on protected species, assess impacts of the proposals on species listed as Habitats and Species of Principal Importance under the requirements of S41 of the Natural England and Rural Communities (NERC) Act 2006.	NE	Potential impacts on these ecological receptors have been considered through this ES Chapter.	Chapter 11 and Appendices 11A to 11K.
Habitat survey (equivalent to Phase 2) is carried out to identify any important habitats present. Ornithological and invertebrate surveys should be carried out at appropriate times to establish whether any scarce or priority species are present.	NE	Habitat surveys have been ongoing since 2005, with recent Phase 2 surveys conducted more recently. This high level of awareness of the ecology of the application site in conjunction with the habitat characteristics of the Proposed Development and the ZoI of the proposals has informed the detailed ecological investigations completed. Baseline surveys, the final scope of assessment, and the rationale for all Phase 2 surveys carried out is presented in this ES Chapter.	Appendices 11A to 11I.
The ES Chapter should include details of: historical data for the site, habitat and species surveys, status of	NE	All elements of this are included in this ES Chapter in	Chapter 11

Issue raised	Consultee(s)	Response and how considered in this Chapter	Section Ref
habitats and species, direct and indirect effects of the development on these habitats and species, full details of mitigation that might be required, consideration on air quality and climate change and cumulative impacts.		accordance with the best practice procedures for EcIA set by the CIEEM.	and Appendices 11A to 11I.
Automated (static) monitoring for bats is necessary during the key maternity period for greater horseshoe bats (July)	NSC	A summary of the results from all bat surveys (including automated (static) monitoring) is included within this chapter of the ES with full details presented within the supporting Appendix 11E (Bat Technical Note) and Appendix 11F (SPD Considerations)	Appendix 11E
Potential disturbance to birds using the Chew Valley SPA, Severn Estuary SPA and Blagdon Lake SSSI from air traffic was not addressed in the Scoping Report (Wood, 2018). Anecdotal evidence has suggested disturbance to wetland birds on the Severn Estuary from aircraft passing overhead. Requirement for this to be addressed within the ES	NSC	Details of a literature review undertaken to address this issue is included in this chapter. Information provided by BAL relating to likely heights of aircraft originating from or flying into Bristol Airport at these nature conservation sites is also included, with an assessment of the likely impact on wetland bird assemblages at each site	Appendix 11G
The survey methodology for proposed climbing inspections of trees with bat roost potential should be as detailed in Bat Surveys for Professional Ecologists – Good Practice Guidelines 3rd Edition (Collins Ed., 2016). This should include multiple visits to high risk trees and emergence/re-entry surveys if features cannot be fully inspected.	NSC	A summary of the results from all bat surveys (including tree climbing surveys) is included within this chapter of the ES with full details presented within the supporting Appendix 11E (Bat Technical Note)	Appendix E
The potential impacts on priority habitats will need to be quantified and specified in the ES. A table showing habitat present, habitat retained, habitat lost, and habitat created/enhanced would be of use. The species-rich A38 verge will need to be included in the survey if this will be impacted.	NSC	On-going habitat mapping, including Bristol Airport wide re-assessment in 2018, alongside recent National Vegetation Classification (NVC) surveys have been used to inform the habitat/botanical baseline. All areas of Priority Habitat to be impacted as a result of the 12mppa proposals have been quantified and are included in this chapter of the ES. A table providing the required information relating to habitat present, habitat retained, habitat lost, and habitat created/enhanced is included	Section 11.13, Table 11.9 and 11.10.
Notable species should include Section 41 priority species and notable species for the Bristol region.	NSC	The results of all Phase 2 ecological surveys have	Sections

Issue raised	Consultee(s)	Response and how considered in this Chapter	Section Ref
Potentially important habitats should be assessed against the Section 41 priority habitat and Local Wildlife Site criteria where relevant		been assessed against the Section 41 list of priority species and habitats and with reference to the notable species for the Bristol region. The desk study information provided by Bristol and Region Environmental Records Centre also included records of notable species in this context. Full details are provided in Appendices 11A – 11K to this chapter (ecological survey and desk study Technical Notes)	11.10 to 11.16 and Appendix 11F and 11J .
Preparation of an Evidence Plan for the Habitats Regulations Assessment/Appropriate Assessment would be welcomed. The scope of the Habitats Regulations Assessment/ Appropriate Assessment may need to consider the Chew Valley SPA and Severn Estuary SPA/SAC if there may be potential impacts on these sites. The recent People Over Wind and Sweetman CJEU judgement will need to be taken into consideration.	NSC	An evidence plan for the Appropriate Assessment is included in this ES Chapter as Appendix 11J . Appendix 11G provides evidence to support the conclusion that aircraft movements are highly unlikely to affect the Chew Valley SPA/SSSI, Severn Estuary SPA/SSSI or Blagden Lake SSSI and this has been subsequently scoped out from further assessment. All relevant case law and guidance has been taken into account by the Evidence Plan for the Appropriate Assessment.	Appendix 11J
Within the North Somerset and Mendip Bats SPD, compensation for loss of horseshoe bat habitat is expected to be provided to ensure that Favourable Conservation Status is maintained. Compensation should be based on the Habitat Evaluation Procedures detailed in Annex 5 of the SPD. As based on the mitigation hierarchy, avoidance (retention) should be considered in the first instance, with mitigation and then compensation if there is no satisfactory alternative. On-site compensation should be considered before off-site compensation. As well as direct removal of habitats, foraging areas or flight lines subject to light spill of more than 0.5 lux or significant fragmentation will need to be considered unsuitable for horseshoe bats for the calculations.	NSC and NE	BAL is fully committed to support and be compliant with the SPD and has undertaken a wide range of work (including consultation with NSC, NE and others) to achieve this. Suitable replacement habitat has been identified and forms part of the embedded mitigation and enhancement proposals. This issue is fully addressed in Appendix 11F to this Chapter of the ES and is summarised in Section 11.8 and 11.10 . Detailed consideration of potential lighting consideration of lighting is also contained in these sections.	Appendix 11F
Consideration of the risk to surface waters from potential impacts on groundwater arising from the Proposed Development.	North Somerset Council	Consideration of potential risk to groundwater fed surface water courses is included within the ES, together with proven measures to avoid this occurring/pollution response.	Section 11.13
Consideration of the interaction between climate change and biodiversity in combination with the project	North Somerset	Consideration of climate change effects and measures	Section

Issue raised	Consultee(s)	Response and how considered in this Chapter	Section Ref
and the vulnerability of the project to climate change and the impacts relevant to adaptation.	Council	to build in resilience of biodiversity to climate change from the Proposed Development are included in this ES Chapter.	11.7, 11.8 and 11.13 . Appendix 11K.

11.7 Scope of the assessment

- 11.7.1 The scope of assessment was established and agreed by: the Scoping Report (**Appendix 1A**) the Scoping Opinion(**Appendix 1B**); the results of the baseline survey work detailed in **Section 11.5** and **Appendices 11A to 11I**); and the Proposed Development design (refer to **Chapter 2: Description of the Proposed Development**).

Approach to Identifying Receptors

- 11.7.2 The identification of receptors is based on relevant guidance and the professional judgement of qualified technical specialists who have undertaken a desk study and a range of ecological field surveys at the application site.
- 11.7.3 In some cases, even without quantified information, it is reasonable to conclude that some potential receptors will not experience significant effects. This is sometimes the result of mitigation measures that have been incorporated into the Proposed Development, which might reasonably be expected to be effective (refer to **Section 11.8**).
- 11.7.4 The following considerations have been taken into account in identifying potential receptors:
- The importance (or value) of the receptor at a local, regional and national level;
 - The extent to which important ecological receptors will be affected by changes that are expected to result from the Proposed Development;
 - The sensitivity of the important ecological receptors to the changes that are likely to occur;
 - The likely magnitude, duration and other characteristics of the effects; and
 - Relevant best practice and guidance where specialist methodologies have been developed as detailed below.

Potential Receptors

- 11.7.5 A key consideration in assessing the effects of the Proposed Development on flora and fauna is to define the habitats and species that need to be included in the assessment. In identifying these receptors, it is important to recognise that a development can affect flora and fauna both within the site (e.g. through the land-take required) as well as beyond the site (e.g. through noise generation, changes in air quality or local hydrology etc.) The approach that has been taken in preparing this Chapter is to identify important Biodiversity resources (the sites, habitats and species of sufficient importance that effects upon them could be significant), as well as considering legally protected species.
- 11.7.6 Assessment of the effects of the Proposed Development on Biodiversity was undertaken with reference to CIEEM's EIA Guidelines⁶⁰. The assessment has focused on legally protected and otherwise important Biodiversity resources (refer to **Boxes 11.1** and **11.2**).
- 11.7.7 The starting point for the assessment was to undertake an exercise, using the baseline data that were collected through the desk study and knowledge of the local area, to subdivide the recorded Biodiversity receptors (i.e. designated sites, together with species populations and habitats) into:

⁶⁰ CIEEM, 2018. *Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine*, [online]. Available at: <https://www.cieem.net/data/files/EIA%20Guidelines.pdf> [Checked 21/11/2018].

- Those that could be significantly affected by the Proposed Development or for which the development could result in the contravention of relevant legislation, and that therefore required more detailed assessment; and
- Those that were assessed as not being likely either to be significantly affected or whose presence was not likely to result in any relevant legislation being contravened, and that did not therefore require further assessment (i.e. that were 'scoped out' of the assessment).

11.7.8

For sites/habitats/species that meet the criteria in **Box 11.1** and/or **11.2**, the next stage of the scoping assessment is to determine whether the identified receptors are likely to be of sufficient 'biodiversity conservation value' that an effect upon them could be significant in EIA terms. In this context:

- Biodiversity conservation value relates to the quality and/or size of sites or habitats, or the size of species populations (see **Box 11.3**); and
- Potential significance means that the effect could be of sufficient concern, or for positive effects, of such substantial benefit that it could influence the decision about whether or not development consent or a specified other consent should be granted.

Box 11.3 Value and importance for biodiversity conservation

The distinction between importance and value can be illustrated by common species such as the house sparrow. This species is important at a national level because it is a priority species (Section 41, NERC Act 2006⁶¹). However, a small population that could be affected by a development would often be assessed as being of insufficient value for an effect (whether adverse or beneficial) to be of potential significance, due to the small size of the population. On this basis, it would not need to be assessed further (i.e. it would be 'scoped out' of the assessment).

Spatial scope

11.7.9

The spatial scope of the assessment of each potential significant effect reflects:

- The area occupied by the receptor that is being assessed; and
- The ZoI associated with the environmental changes that will result from the Proposed Development that are likely to affect the receptor.

11.7.10

Thus, if part of a designated biodiversity site is located within the ecological ZoI relating to a particular environmental change, an assessment is made of the effects on the biodiversity site as a whole. A similar approach has been taken for areas of notable habitat. For species that occur within an ecological ZoI that relates to a change that could significantly affect the species, an assessment has been carried out on the total area that is used by the affected individuals or population of the species (e.g. for foraging or commuting).

11.7.11

Receptors that are of sufficient value that an effect upon them would have the potential to be significant, together with all relevant legally protected species, are taken through to the assessment stage. This involves identifying, for each receptor:

- Any environmental changes that are likely to be caused by the Proposed Development which have the potential to lead to a significant effect and/or to contravene relevant legislation;

⁶¹ UK Government, 2006. Natural Environment and Rural Communities Act 2006, [online]. Available at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41> [Checked 21/11/2018].

- For these environmental changes, determining the area within which each change could cause a likely significant effect or could contravene relevant legislation (i.e. an 'ecological ZoI' - see **Box 11.4**);
- Comparing the area where the receptor occurs with the ecological ZoI; and
- If the receptor occurs or is likely to occur within the ZoI, concluding that either the receptor could be subject to a significant effect and/or the relevant legislation could be contravened, in which case the effects upon the receptor are scoped in, or no significant effect is likely to occur and it is scoped out.

Box 11.4 Defining ecological ZoI

The ecological ZoI that is the most straightforward to define is the area affected by land- take and direct land-cover changes associated with the development. This zone is the same for all affected receptors. By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (e.g. changes in noise associated with development activities within the land-take area), the ZoI may vary between receptors, dependent upon the receptors' sensitivity to the change and the precise nature of the change.

For example, dormouse might be unaffected by noise associated with a development unless the noise is generated very close to where the dormouse nests, while another mammalian species might be disturbed at much greater distances; other species (e.g. of invertebrate) may be unaffected by changes in noise. A further complication is that the response of a receptor to a change associated with one development may differ to the response of the same receptor to a similar change on another development. This can occur as a result of the wide range of variables that influences the precise nature of any change (e.g. for noise this can include: differing baseline noise conditions; specific magnitude, timing or other characteristics of the noise; and the effects of screening and topography).

In view of these complexities, the definition of the zones of influence that extend beyond the land-take area will be based upon professional judgement, informed by discussions with the technical specialists who are working on other chapters of the ES. These specialists will provide information about the environmental changes that they assess within their ES chapters. This information will be combined with available ecological information about receptors' sensitivities to different environmental changes in order to define the extent of each ecological ZoI.

11.7.12 The key issues relating to Biodiversity receptors and the Proposed Development are as follows:

- The effects of temporary and permanent habitat loss from land take by construction and operational areas;
- The effects of pollution (air quality effects associated with changes in air quality and nitrogen deposition leading to enrichment/acidification of habitats, construction dust and pollution from surface water run-off etc.);
- Disturbance (from noise, visual and light) to surrounding habitats and associated species; and
- Any increased risk of animal (typically bird, bat, badger, brown hare) interaction with aeroplanes during take-off and landing and from road traffic.

11.7.13 There are a wide range of Biodiversity receptors at the application site and there is also a wide variation in the spatial influence of different elements of the Proposed Development. For example, the majority of changes in habitat/land cover are localised (e.g. loss of poor semi-improved grassland at the Silver Zone Car Park Extension (Phase 2) area to additional car parking

incorporating improved grassland), in comparison to the consideration of effects from additional aircraft emissions and the associated deposition of nitrogen during future take-off or landing at Bristol Airport.

- 11.7.14 Consequentially, the spatial scope of the assessment varies between different receptors and the ZoI associated with each of the different components of the construction and operational phases of the Proposed Development.
- 11.7.15 The effects of temporary and permanent habitat loss from land take construction and operational phases of the Proposed Development were initially considered across the whole application site, but then refined on the basis of the presence/absence of specific habitats within the development footprint (e.g. extensive undisturbed potential breeding bird habitat within or adjacent to an area of change/development), the affinity of particular species for these habitats (e.g. the targeting of reptile surveys in those areas where potential reptile habitat is present), in combination with the function of the on-site habitat to species that use key habitats located off-site (e.g. great crested newt breeding in ponds up to 500m away, or bats roosting within 5km).
- 11.7.16 In terms of consideration of potential effects arising from aircraft emissions and nitrogen deposition, the ZoI adopted in the air quality assessment presented in this Environmental Statement (please refer to **Chapter 8: Air Quality**). Assessments carried out for the 10mppa planning application⁶², as well as those carried out for other airports, show that total pollutant concentrations approach background levels on a distance scale of a few kilometres (km) or less from key airport sources. Aircraft in the air have a limited impact on ground-level pollutant concentrations, with off-airport concentrations being dominated by emissions on the ground being blown horizontally rather than dispersing downwards from aircraft overhead. Consideration of the principal routes used by airport-related traffic suggests that for air quality purposes, it is sufficient to consider traffic on the A38 and selected minor roads (principally Downside Road) within a few kilometres of Bristol Airport.
- 11.7.17 The **Chapter 8: Air Quality** assessment carried out a detailed evaluation of selected suitable ecological receptors associated with:
- SPAs, SACs or Ramsar sites within 10km of the application site; and
 - SSSIs or local nature sites (including ancient woodlands, local wildlife sites, National Nature Reserves (NNR) and Local Nature Reserves (LNR)) within 2km of the application site.
- 11.7.18 Concentrations of dust, oxides of nitrogen (NO_x) in air and acid deposition are associated with adverse effects on plant growth and will be included in the assessment. In addition, emissions of NO_x and sulphur oxides to the air may result in deposition onto ecological sites, which may be sensitive to both nutrifying nitrogen and acid deposition. The Scoping Report (**Appendix 1A**) identified that emissions of sulphur oxides from the Proposed Development are expected to be negligible, but the impact of dust, NO_x and acid deposition has been included. Emissions of dust from construction activity (including construction or demolition of structures, earth-moving, and track-out of dust due to vehicles leaving dusty sites) are potentially significant and have been included in the assessment. Please refer to **Chapter 8: Air Quality** for full details.
- 11.7.19 Consideration of wider effects from potential accidental pollution to groundwater and groundwater-fed surface watercourses was considered in detail in **Chapter 12: Surface water and Flood Risk** and **Chapter 13: Groundwater**.
- 11.7.20 Consideration of potential disturbance on ecological receptors from noise, visual or light was extended across the application site and surrounding parcels of land (unless extended as a result of

⁶² Entec (2009). Development and enhancement of Bristol International Airport. Environmental Statement Volume 3 Air quality.

modelling work which demonstrated a further spatial extent was required). Consideration has been given to the potential disturbance of birds associated with the Severn Estuary SPA, Ramsar Site and SSSI, Blagdon Lake SSSI and Chew Valley Lake SPA and SSSI, from overflying planes as they take off or approach Bristol Airport for landing. This area extends up to 10km from the application site.

11.7.21 Consideration of the increased risk of birds, bats and large wild mammals colliding with aircraft and road traffic has been concentrated within the airport (for aircraft) and on the local road network.

11.7.22 **Table 11.8** summarises information about the receptors that have been identified through the scoping process as having the potential to be significantly affected by the Proposed Development and/or for which legislation could be contravened. **Table 11.8** also identifies the potential effects that need to be assessed. The Information to Support Appropriate Assessment (**Appendix 11J**) relates to the assessment of those receptors (European sites) covered by the Habitats Regulations¹ and those sites (such as Ramsar sites), which according to national policy (NPPF⁶³), are given the same consideration as European sites.

Table 11.8 Potential Receptors

Potential Biodiversity Receptor	Important/valued and/or legally protected?	Relevant criteria (from Box 11.1) and legislation (from Box 11.2)	Potentially significant effects/ legal contravention and causal changes
North Somerset & Mendip Bats SAC	Biodiversity conservation value Legal status	Internationally and nationally important. Habitats Regulations	There is a potential for direct effects to the foraging and commuting behaviour of greater and lesser horseshoe bats at the application site from the loss of suitable habitat from the construction of the Silver Zone Car Park Extension (Phase 2) and the A38 highway improvement works. There is potential for disturbance effects to foraging and commuting horseshoe bats associated with the retained boundary and wider habitat features associated with the Silver Zone Car Park Extension (Phase 2) area and the A38 highway improvements from newly introduced lighting. There is the potential for emissions to air from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with the application site to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with the SAC, specifically H6210 Semi-natural dry grassland and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>, including the priority feature 'orchid rich sites'), H8310 Caves not open to the public, H9180 <i>Tilio-Acerion</i> forests of slopes, scree and ravines, S1303 Lesser horseshoe bat, <i>Rhinolophus hipposideros</i> and S1304 Greater horseshoe bat, <i>Rhinolophus ferrumequinum</i>.
North Somerset & Mendip Bat SAC constituent SSSIs: Brockley Hall Stables SSSI and King's Wood SSSI, Banwell Caves, Banwell Ochre Caves SSSI, Compton Martin Ochre Mine SSSI, and Wookey Hole SSSI, Cheddar	Biodiversity conservation value Legal status	Internationally and nationally important. Habitats Regulations WCA 1981 NERC Act 2006	There is a potential for direct effects to the foraging and commuting behaviour of greater and lesser horseshoe bats at the application site from the loss of suitable habitat from the construction of the Silver Zone Car Park Extension (Phase 2) and the A38 highway improvement works. There is potential for disturbance effects to foraging and commuting horseshoe bats associated with the retained boundary and wider habitat features associated with the Silver Zone Car Park Extension (Phase 2) and at the A38 highway improvements from newly introduced lighting.

⁶³ Ministry of Housing, Communities & Local Government (2018). National Planning Policy Framework, [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/728643/Revised_NPPF_2018.pdf [Checked 01/08/2018].

Potential Biodiversity Receptor	Important/valued and/or legally protected?	Relevant criteria (from Box 11.1) and legislation (from Box 11.2)	Potentially significant effects/ legal contravention and causal changes
Complex SSSI			There is the potential for emissions to air, from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with the SSSIs and associated SAC (see above).
Goblin Coombe SSSI	Biodiversity conservation value Legal status	Nationally important. Habitats Regulations WCA 1981	There is a potential for direct effects to the foraging and commuting behaviour of greater and lesser horseshoe bats at the application site from the loss of suitable habitat from the construction of the Silver Zone Car Park Extension (Phase 2) and the A38 highway improvement works. There is potential for disturbance effects to foraging and commuting horseshoe bats associated with the retained boundary and wider habitat features associated with the proposed Extension to the Silver Zone Car Park (Phase 2) area and at the A38 highway improvements from newly introduced lighting. There is the potential for emissions to air, from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with the SSSI (see above).
Avon Gorge SAC (and constituent SSSIs) – air quality	Biodiversity conservation value Legal status	Internationally and nationally important. Habitats Regulations. WCA 1981 NERC Act 2006	There is the potential for emissions to air from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associate with the SAC, specifically H6210 Semi-natural dry grassland and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i> , including the priority feature 'orchid rich sites'), and H9180 <i>Tilio-Acerion</i> forests of slopes, scree and ravines.
Mendip Woodlands SAC (and constituent SSSIs) – air quality	Biodiversity conservation value Legal status	Internationally and nationally important. Habitats Regulations. WCA 1981 NERC Act 2006	There is the potential for emissions to air from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associate with the SAC, specifically H9180 <i>Tilio-Acerion</i> forests of slopes, scree and ravines.
Chew Valley Lake SPA (and SSSIs) – air quality			There is the potential for emissions to air from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetation associated with the SAC and SSSI, e.g fringing reedbeds, carr woodland, open water plant communities and surrounding grassland communities. The open water of the reservoir and its margins are of the greatest value for wintering waterbirds which are the main designated features of interest.
Felton Common LNR (acting as a surrogate for all other non-statutorily designated sites due to its position adjacent to the eastern boundary of the application site)	Biodiversity conservation value Legal status	County importance. <i>NERC Act 2006</i> section 41 Habitats and Species of Principal Importance Local BAP Priority Habitats WCA 1981	There is the potential for increased disturbance to fauna associated with Felton Common LNR from a greater number of aircraft taking off and landing over this area. There is the potential for emissions to air, from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated

Potential Biodiversity Receptor	Important/valued and/or legally protected?	Relevant criteria (from Box 11.1) and legislation (from Box 11.2)	Potentially significant effects/ legal contravention and causal changes
			with Felton Common LNR (acidic and calcareous grassland, scrub (including limestone heath), and hedgerows).
Non-statutorily locally designated Sites of Nature Conservation Interest	Biodiversity conservation value	County importance. NERC Act 2006 section 41 Species of Principal Importance Local BAP Priority Habitats	There is the potential for emissions to air, from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with locally designated Sites of Nature Conservation Interest (including woodlands, hedgerows, species-rich grasslands, ponds, wildlife corridors).
Ancient Woodland (acting as a surrogate receptor for all woodland) including ancient woodland at Brockley Combe, Garleys Wood, Hyatts Wood, Oatfield Wood, Lye Wood, Scars Wood, High Wood, Horts Wood, Little Horts Wood, Tuckers Grove and Whitley Coppice, Shippenhays Wood, Prestow Wood and Corporation Woods.)	Biodiversity conservation value	County importance. NERC Act 2006 section 41 Habitat of Principal Importance Local BAP Priority Habitat	There is the potential for emissions to air, from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the local Ancient Woodland.
Groundwater-fed surface watercourses (associated with the aquifer under the application site) (River Kenn, Little River, Land Yeo, River Chew, Winford Brook, Congresbury Yeo)		County importance. NERC Act 2006 section 41 Habitat and Species of Principal Importance Local BAP Priority Habitats	There is the potential for accidental pollution (e.g. hydrocarbon spillages) to be transported through groundwater below the application site and enter groundwater surface watercourses, changing water quality and coming into direct contact with vegetation, sediment and some fauna causing chronic or acute effects.
Bats	Biodiversity conservation value Legal status	Internationally and nationally important. Habitats Regulations NERC Act 2006 section 41 Species of Principal Importance Local BAP Priority Species WCA 1981	There is a potential for direct effects to the foraging and commuting behaviour of greater and lesser horseshoe bats at the application site from the loss of suitable habitat from the construction of the Silver Zone Car Park Extension (Phase 2) and the A38 highway improvement works. There is potential for disturbance effects to foraging and commuting horseshoe bats associated with the retained boundary and wider habitat features associated with the Silver Zone Car Park Extension (Phase 2) area and at the A38 highway improvements from newly introduced lighting. There is the potential for emissions to air, from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of vegetation associated with key habitats and prey species. Potential increased risk of collision with aircraft and road traffic.
Birds	Biodiversity conservation value Legal status	WCA 1981 NERC Act 2006 section 41 Species of Principal	Land take/ land cover change (habitat removal); management changes resulting in a reduction in breeding/nesting habitat.

Potential Biodiversity Receptor	Important/valued and/or legally protected?	Relevant criteria (from Box 11.1) and legislation (from Box 11.2)	Potentially significant effects/ legal contravention and causal changes
		Importance Local BAP Priority Species	Potential direct effects on birds, young and/or eggs due to damage or destruction of active nests. Potential increased risk of collision with aircraft and road traffic.
Badgers	Legal status	<i>Protection of Badgers Act 1992</i>	Potential for disturbance of badgers in nearby setts associated with the construction of Silver Zone Car Park Extension (Phase 2) area. Loss of some foraging habitat associated with the Silver Zone Car Park Extension (Phase 2) area. Potential increased risk of collision with aircraft and road traffic.
Hazel dormouse	Biodiversity conservation value Legal status	<i>Habitat Regulations 2017</i> WCA 1981 <i>NERC Act 2006</i> section 41 Species of Principal Importance Local BAP Priority Species	Loss of potential dormouse habitat associated with the A38 highway improvements and associated injury/killing risk (considered to be very low based on historic surveys and data from the 2018 surveys).
Broadleaved woodland – semi-natural – see bats and dormouse	Biodiversity conservation value	Local BAP Priority Species	Small area (1600m ²) of woodland edge to be removed to form the highway improvement works at the junction of Downside Road and the A38 ranging from up to 10m from the existing road edge on the A38 and up to 8.5m from the edge of Downside Road.
Intact hedge – native species rich with hedgerow trees	Biodiversity conservation value	<i>NERC Act 2006</i> section 41 Habitat of Principal Importance	Construction of new landscape bund with additional trees and wildflower grassland could impinge on the root protection zone of the existing hedgerow/hedgerow trees causing dieback.
Scattered scrub – see bats/dormouse above.	Biodiversity conservation value	Re bats and dormouse (not the habitat itself) <i>Habitat Regulations 2017</i> WCA 1981 Local BAP Priority Species	Loss of matrix habitat in open grassland at the Silver Zone Car Park Extension (Phase 2) area that supports foraging horseshoe bats (see above) and may support hazel dormouse in the A38 highway improvements area and associated injury/killing risk of this species (considered to be very low based on historic surveys and data from the 2018 surveys).
Poor semi-improved grassland (cattle grazed) – see bats above	Biodiversity conservation value	<i>Habitat Regulations 2017</i> WCA 1981 <i>NERC Act 2006</i> section 41 Species of Principal Importance Local BAP Priority Species	Reduction in foraging habitat for lesser and greater horseshoe bat species at the Silver Zone Car Park Extension (Phase 2) area.
Standing water	Biodiversity conservation value	<i>NERC Act 2006</i> section 41 Habitat of Principal Importance	Potential for the development of additional car park at the Silver Zone Car Park Extension (Phase 2) area to cause the loss of or change in quality of a single standing small waterbody on its perimeter.

Climate Change

11.7.23

Greenhouse gas (GHG) emissions contribute to climate change, which could affect the designated features of European, national and local sites, habitats and species considered in this Chapter. For example: climate change may lead to grassland management changes resulting in the loss of foraging habitat for bats and/or badgers. Climate change may also lead to, for example, changes in the distribution of bats due to other areas within the UK and abroad becoming more suitable for the species, leading to decline in the SAC populations.

- 11.7.24 The Climate Change Adaptation Manual⁶⁴ supports practical and pragmatic decision making and guides reasonable judgement on the potential effects of climate change on the key habitats associated with the application site. The habitats that characterise the application site: for example, dry grassland, deciduous woodland, and hedgerows are of low relative vulnerability to climate change.
- 11.7.25 Climate change and its implications for Biodiversity has been incorporated into the design of embedded ecological mitigation and enhancement habitats to reduce the risk of impact on legally protected and other species. Selection of measures that are based on habitats that are known to be more resilient to climate change and provide extended ecological functionality for a wide range of species across the airport have been selected. These embedded measures are listed in **Table 11.9** and illustrated in **Appendix 11K**. Specific Measures that have been included in this table, that will help mitigate the effects of climate change on at Bristol Airport are: Measures A, B, E, F, G, 1, 2, 3, 4, 5, 6, 7, 7, 8, 10, 11, 12, 13, 14, 15 and 16.
- 11.7.26 This has largely been achieved through the creation of additional areas of replacement habitat that are considered to have a low level of sensitivity to climate change (subject to appropriate management). These measures are associated with the provision of trees, hedgerow, scrub and woodland, the improvement of an existing pond, provision of new bat roosts and improvement in grassland species diversity. A landscape and Ecological Management Plan will be produced to guide appropriate long term care of these and existing habitats.
- 11.7.27 Consideration to potential effects on groundwater and groundwater-fed surface watercourses has been given in **Chapter 12: Surface Water** and **Chapter 13: Groundwater**.
- 11.7.28 It is considered that these measures also reduce the impact of climate change on biodiversity at Bristol Airport through the strengthening of habitat connectivity and ecological networks within and adjacent to the application site and the allowance for climate change in drainage systems and protection of ground water surface water (refer to **Chapter 12: Surface Water** and **Chapter 13: Groundwater**).
- 11.7.29 As a result, no further Biodiversity mitigation for climate change as part of the Proposed Development is required beyond that included in the embedded mitigation and enhancements set out in this Chapter (**Table 11.9** and in **Appendix 11K**), including management and monitoring beyond that highlighted in **Table 11.19**.

Temporal scope

- 11.7.30 The temporal scope of the assessment of Biodiversity is consistent with the period over which the Proposed Development would be carried out and therefore covers the construction and operational periods. The construction phase of the Proposed Development comprises a series of phased, but inter-related, activities over a period of eight years (anticipated to be between 2019 and 2026 inclusive). Development will be phased in line with demand and operational requirements and to ensure minimal disruption to the safe operation of Bristol Airport.
- 11.7.31 Work to deliver the Proposed Development will commence in 2019, with proposed changes to operational restrictions (stands/parking) expected to be in place with immediate effect if consent is granted.
- 11.7.32 The construction phase comprises a number of the Proposed Development activities spread over the course of the programme, and effects on Biodiversity receptors have the potential to arise for part of, or the entirety of the construction phase. For Biodiversity receptors, effects on their

⁶⁴ Natural England & Royal Society of the Protection of Birds (RSPB), 2015. Climate Change Adaptation Manual: Evidence to support nature conservation in a changing climate.

favourable conservation status or the site integrity have to be considered. Consequently, the impacts from all construction activities have been considered across the development programme and the assessment has identified which phases and activities are likely to cause an effect on each specific Biodiversity receptor. Specifically, the construction phase associated with the A38 Highway Improvement works associated at the A38/Downside Road/West Lane as well as the land use change associated with the Silver Zone Car Park Extension (Phase 2) (the agricultural grassland in the south-west of the application site) are the key focus of this part of the assessment.

- 11.7.33 The 'completion year' for the Proposed Development is 2026 and will be used as the basis for the start of assessment of operational effects of the built out components on Biodiversity including maintenance activities.
- 11.7.34 The operational activities associated with Bristol Airport are considered to be 'in perpetuity' and therefore no decommissioning activities have been considered.
- 11.7.35 Effects on Biodiversity (designated sites sensitive to air quality effects) associated with emissions (see **Table 11.8** above) from road traffic as a result of the construction and operation of the development (e.g. Heavy Goods vehicle (HGV) movements during construction, additional passenger journeys to and from the application site) are assessed. Assessments occur where such sites fall within 200m of a road meeting one or more of the criteria included in the Highways Agency Advice Note *HA 207/07*⁶⁵ and from dust generation as per the criteria set out in IAQM guidance⁶⁶.
- 11.7.36 The study of associated noise (**Chapter 7: Noise and Vibration**) and air quality (**Chapter 8: Air Quality**) related effects during the construction and operational phases, upon which the Biodiversity assessment is based, has been informed by the outcome of modelling based upon the location of the aircraft flight paths and are based upon worst-case assessments.

Likely significant effects

- 11.7.37 Based on the assessment methodology set out in **Section 11.7**, **Table 11.8** summarises information about the receptors that have been identified (through the scoping process) as having the potential to be significantly affected by the Proposed Development (due to their biodiversity conservation value and/or for which legislation could be contravened). **Table 11.8** also identifies the potential effects that need to be assessed. The identified receptors are taken forward in **Section 11.10** for further, post-scoping assessment.
- 11.7.38 The environmental changes that are likely to be caused by the Proposed Development where a valued receptor is considered sensitive to these and which therefore have the potential to cause significant effects and/or contravention of wildlife legislation, have been identified as:
- Land-take/ land cover change/ construction;
 - Increased light, noise and vibration;
 - Increased vehicle movements (road traffic and aircraft);
 - Pollution (contamination/ eutrophication); and
 - Air quality changes, including dust deposition and emissions.

⁶⁵ Highway Agency, 2007. Environmental Assessment: Environmental Assessment Techniques. Part 1 HA 207/07: Air Quality, [online]. Available at: <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section3/ha20707.pdf> [Checked 22/11/2018].

⁶⁶ IAQM guidance (2016). Guidance on the assessment of dust from demolition and construction. Version 1.1, [online]. Available at: <http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf> [Checked 22/03/2018].

Inter-related effects

- 11.7.39 There are two types of inter-related effect:
- Combined effects: when individual effects of the Proposed Development combine to create a cumulative effect; and
 - Interactive effects: consideration of interactions between different effects in relation to a specific receptor.
- 11.7.40 Combined effects normally occur when different activities associated with a project act upon the same environmental receptor (e.g. the additive effect of physical disturbance from construction activities upon nesting birds may occur at the same time as transport related noise and lighting, that may act upon the same receptor(s) during the construction phase). In determining such effects, consideration would be given to the sensitivity of the receptor and the magnitude of environmental change. This is considered directly within the assessments included in this Chapter and, as such, is not reported separately.
- 11.7.41 Interactive effects are assessed in relation to a specific receptor where the effect could be caused by the interactions of different types of effect from project activities even if individually these are insignificant (e.g. the interaction of noise disturbance and lighting changes on horseshoe bats). Changes in relation to the following topics, as a result of the Proposed Development, have been considered and inter-related effects on Biodiversity receptors are assessed within this Chapter:
- **Chapter 8: Air Quality;**
 - **Chapter 7: Noise and Vibration;**
 - **Chapter 12: Surface Water and Flood Risk;**
 - **Chapter 13: Groundwater;** and
 - Hydrock, Lighting Impact Assessment Report⁶⁷.
- 11.7.42 Where appropriate, interactive cumulative effects across topic areas are assessed, where the nature of the effect allows professional judgment to be applied. Interactive inter-related effects are located at the end of each assessment section.
- 11.7.43 The assessment of effects on Biodiversity receptors has the potential to be exacerbated by climate change, and this has been incorporated into the approach to integrated and embedded mitigation as set out in this Chapter.

Receptors scoped out of further assessment

- 11.7.44 The following receptors have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant:
- Disturbance to the designated features of interest associated with the Severn Estuary SPA, Ramsar and SSSI, Chew Valley SPA and SSSI and Blagdon Lake SSSI from overflying aircraft taking off from and landing at Bristol Airport has been considered through a desk study (refer to **Appendix 11G** for supporting evidence). This demonstrates that where aircraft overfly these sites, the typically recorded altitude is at a notable height (typically greater than 3,000ft). It also takes into account the historic and existing presence of occasional overflying aircraft at these locations, the ability of birds to become habituated to the presence of aircraft at these altitudes. The Bristol Airport, Airport Safety Unit team has also documented the more localised habituation to of birds to aircraft noise/disturbance at much closer distances at Bristol Airport.

⁶⁷ Hydrock, 2018. Bristol Airport 12mppa Extension: Lighting Impact Assessment. Report reference: 09194-HYD-XX-GF-RP-ME-0001.

- Pollution and potential effects from construction and operational dust effects have been taken into account across the application site and beyond its boundary in **Chapter 8: Air Quality**. Emissions of dust from normal airport operations are unlikely to be significant and are scoped out, as there are no significant dust-generating activities (**Chapter 8: Air Quality** contains supporting evidence).
- Temporary and permanent damage/loss of habitats other than broadleaved woodland – semi-natural intact hedge – native species rich, scattered scrub, poor semi-improved grassland (cattle-grazed) and standing water.
- Great crested newt and other amphibians due to the absence of this species from the Proposed Development footprint and associated habitat within 500m.
- Common reptiles due to the absence of the species from the Proposed Development footprint and the associated boundary habitats at the application site.
- Dormouse due to the absence of this species from the Proposed Development footprint and the retention of all suitable boundary habitats at the application site.
- Invertebrates due to an absence of habitats that suggest the presence of any notable or legally protected species within the application site, in combination with the small footprint of any habitat loss and the replacement of this habitat through the integrated/embedded mitigation and enhancement measures (refer to **Section 11.8**).
- Potential increased risk of collision with aircraft and road traffic. Less than a 10% increase in all vehicle or HGV 18hr Annual Average Weekly Traffic (AAWT) flows have been predicted from the modelling work undertaken by the Transport Assessment as reported in **Chapter 6: Traffic and Transport**. A change of less than a 10% in traffic flow is considered unlikely to result in any significant increase in risk of collisions between badgers, bats and birds with road traffic and any associated effects on these species as such variance can occur on a daily basis⁶⁸. BAL's ASU holds no records for bird, bat and badger collisions with aircraft taking off and landing at Bristol Airport as a result of pro-active and ongoing implementation of high quality measures to implement CAP 772³⁶. As such, it is considered reasonable to conclude that an increase in aircraft movements will also be managed in an identical manner, with no associated increase in risk to fauna.

11.8 Environmental measures integrated and embedded into the development proposals

- 11.8.1 A range of environmental measures have been integrated and embedded into the development proposals as outlined in **Section 2.5**. **Table 11.9** outlines how these embedded measures will influence the Biodiversity assessment. A long term Landscape and Ecological Management Plan (LEMP) will be produced via Condition that will set out all appropriate measures for the delivery/aftercare/monitoring and long term management for these measures.
- 11.8.2 Please refer to the Integrated/Embedded Landscape, Visual and Ecological Mitigation Masterplan prepared by Wood (reproduced in **Appendix 11K**).

⁶⁸ Institute of Environmental Assessment, 1993. Guidance Notes No.1 – Guidelines for the Environmental Assessment of Road Traffic, [online]. Available at: <https://www.thenbs.com/PublicationIndex/documents/details?DocId=257892> [Checked 22/11/2018].

Table 11.9 Summary of the integrated and embedded environmental measures

Receptor	Changes and effects	Integrated / embedded measures and influence on assessment (refer to Appendix 11K)
North Somerset & Mendip Bats SAC	Potential for direct effects to foraging and commuting behaviour of greater and lesser horseshoe bats from habitat loss associated with the Silver Zone Car Park Extension (Phase 2) area and the A38 highway improvement works. There is potential for disturbance effects to foraging and commuting horseshoe bats associated with the retained boundary and wider habitat features associated with the Silver Zone Car Park Extension (Phase 2) area and at the A38 highway improvements from newly introduced lighting. There is the potential that emissions from an increased number of aircraft movements and increased road traffic associated with Bristol Airport will result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with the SAC, specifically H6210 Semi-natural dry grassland and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>, including the priority feature 'orchid rich sites'), H8310 Caves not open to the public, H9180 <i>Tilio-Acerion</i> forests of slopes, scree and ravines, S1303 Lesser horseshoe bat, <i>Rhinolophus hipposideros</i> and S1304 Greater horseshoe bat, <i>Rhinolophus ferrumequinum</i>.	A. Full retention and ongoing management of the existing perimeter hedgerows and hedgerow trees. Construction of all bunds/structures outside of root protection area of existing/retained trees. Provision of suitable tree protection fencing during construction to demarcate and protect retained trees. B. Reduced footprint of the Silver Zone Car Park Extension (Phase 2) to a minimum extent (3.73ha), thereby maximising the retention of areas that can provide alternative but equally valuable bat foraging habitat (woodland and grassland) with further positive benefits to the microclimate (increase in sheltered conditions) associated with the retained perimeter features and new planted bund (see Measure 14 below). C. Lighting regime in the Silver Zone Car Park Extension (Phase 1) designed and installed to ensure that lux levels at the security fence perimeter are less than 1 lux and Silver Zone Car Park Extension (Phase 2) designed and installed to ensure that lux levels at the security fence perimeter are less than 0.5lux. This will be achieved through the use of specific lighting design criteria and guidelines (e.g. Institute of Lighting Professionals and the Bat Conservation Trust. 2018. Bats and Artificial Lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18) D. Lighting associated with the highway improvements along the A38/Downside Road junction will be no greater than current levels and <0.5 lux within and above the future woodland boundary/canopy. This will be achieved through the use of specific lighting design criteria and guidelines (e.g. Institute of Lighting Professionals and the Bat Conservation Trust. 2018. Bats and Artificial Lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18) as well the use of planting of holly and yew, and fencing to reinforce the woodland edge/minimise light penetration. E. Provision of parkland trees within Downside Meadow to directly replace the loss of circa 0.16 ha associated with the A38/Downside Road junction (see Measure 3 below). F. Protection and management of existing woodland east of the A38 roundabout and main application site entrance and provision of circa 0.34ha of new broad-leaved woodland (see Measure 4 and 5 below). Both existing and planted woodland will be improved in quality from a current limited level of opportunities for horseshoe and other bat species by thinning the currently very dense woodland interior and provision of small pathways/rides within the existing woodland block. G. Implementation of embedded construction and air quality management measures including: a Dust Management Plan (DMP) as part of a Construction Environmental Management Plan (CEMP) (Appendix 2B), agree and enforce a strict routing agreement for incoming and outgoing Heavy Goods Vehicles (HGV), locating stockpiles away from

Receptor	Changes and effects	Integrated / embedded measures and influence on assessment (refer to Appendix 11K)
		the application site boundary/receptors, covering or damping down stockpiles, stockpile maintenance/management, and removal of materials from the application site. Enforce a "no unnecessary idling" policy for all vehicles on the application site. Implementing a range of operational air quality management measures including planning of aircraft arrival and departure scheduling to avoid over-long idling, taxiing and hold times. The airfield layout has been designed to minimise times for taxiing and holding. Maximise the use of reduced-engine taxiing. Use of Fixed Electrical Ground Power to minimise engine/auxiliary power unit (APU) use.
North Somerset & Mendip Bat SAC constituent SSSIs: Brockley Hall Stables SSSI and King's Wood SSSI, Banwell Caves, Banwell Ochre Caves SSSI, Compton Martin Ochre Mine SSSI, and Wookey Hole SSSI, Cheddar Complex SSSI	Potential for direct effects to foraging and commuting behaviour of greater and lesser horseshoe bats from habitat loss associated with the Silver Zone Car Park Extension (Phase 2) area and the A38 highway improvement works. There is potential for disturbance effects to foraging and commuting horseshoe bats associated with the retained boundary and wider habitat features associated with the Silver Zone Car Park Extension (Phase 2) and at the A38 highway improvements from newly introduced lighting. Potential for emissions from increased numbers of movements and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with the SSSIs and associated SAC (see above).	See measures A to G described above.
Goblin Coombe SSSI	Potential for direct effects to foraging and commuting behaviour of greater and lesser horseshoe bats from habitat loss associated with the Silver Zone Car Park Extension (Phase 2) area and the A38 highway improvement works. There is potential for disturbance effects to foraging and commuting horseshoe bats associated with the retained boundary and wider habitat features associated with the proposed Extension to the Silver Zone Car Park (Phase 2) and at the A38 highway improvements from newly introduced lighting. Potential for emissions from increased numbers of movements and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with the SSSI (see above).	See measures A to G described above.

Receptor	Changes and effects	Integrated / embedded measures and influence on assessment (refer to Appendix 11K)
Avon Gorge SAC (and constituent SSSIs) – air quality	Potential for emissions from increased numbers of aircraft movements and an increase in road traffic associated with Bristol Airport will result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with the SAC, specifically H6210 Semi-natural dry grassland and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i> , including the priority feature 'orchid rich sites'), and H9180 <i>Tilio-Acerion</i> forests of slopes, scree and ravines.	See Measure G described above.
Mendip Woodlands SAC (and constituent SSSIs) – air quality	There is the potential that emissions to air from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with Bristol Airport will result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associate with the SAC, specifically H9180 <i>Tilio-Acerion</i> forests of slopes, scree and ravines.	See Measure G described above.
Chew Valley Lake SPA (and SSSIs) – air quality	Potential emissions from increased number of aircraft movements and an increase in road traffic associated with Bristol Airport will result in nitrogen deposition and a reduction in the favourable conservation status of the vegetation associated with the SAC and SSSI, e.g. fringing reedbeds, carr woodland, open water plant communities and surrounding grassland communities. The open water of the reservoir and its margins are of the greatest value for wintering waterbirds which are the main designated features of interest.	See Measure G described above.
Felton Common LNR (acting as a surrogate for all other non-statutorily designated sites due to its position adjacent to the eastern boundary of the application site)	There is the potential for increased disturbance to fauna associated with Felton Common LNR from an increase in aircraft movements over this area. Potential for emissions from increased numbers of aircraft movements and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with Felton Common LNR (acidic and calcareous grassland, scrub (including limestone heath), and hedgerows).	Increased provision of woodland habitat at Bristol Airport associated with Measure 4 (see below) to provide additional refuge habitat, noting the absence of species highly sensitive to an increase in overflying aircraft, also given the existing levels of disturbance and habituation. See Measure G described above.
Non-statutorily locally designated Sites of Nature Conservation Interest	Potential for emissions from increased numbers of aircraft movements and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associated with locally designated Sites of Nature Conservation Interest (including woodlands, hedgerows, species-rich grasslands, ponds, wildlife corridors).	See Measure G described above.
Ancient Woodland (acting as a surrogate receptor for all	Potential for emissions from increased numbers of aircraft movements and an increase in road traffic	See Measure G described above.

Receptor	Changes and effects	Integrated / embedded measures and influence on assessment (refer to Appendix 11K)
woodland) including ancient woodland at Brockley Combe, Garleys Wood, Hyatts Wood, Oatfield Wood, Lye Wood, Scars Wood, High Wood, Horts Wood, Little Horts Wood, Tuckers Grove and Whitley Coppice, Shippenhays Wood, Prestow Wood and Corporation Woods.	associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of the local Ancient Woodland.	
Groundwater-fed surface watercourses (associated with the aquifer under the application site) (River Kenn, Little River, Land Yeo, River Chew, Winford Brook, Congresbury Yeo)	There is the potential for accidental pollution (e.g. hydrocarbon spillages) to be transported through groundwater below the application site and enter groundwater surface watercourses, changing water quality and coming into direct contact with vegetation, sediment and some fauna causing chronic or acute effects.	Please refer to best practice design and pollution prevention and response measures in Table 13.8 of Chapter 13: Groundwater .
Bats	There is a potential for direct effects to the foraging and commuting behaviour of greater and lesser horseshoe bats at the application site from the loss of suitable habitat from the construction of the car park in the south west of the application site at the Silver Zone Car Park Extension (Phase 2) area and the highway improvement works at the junction of the A38 and Downside Road. There is potential for disturbance effects to foraging and commuting horseshoe bats associated with the retained boundary and wider habitat features associated with the Silver Zone Car Park Extension (Phase 2) and at the A38 highway improvements from newly introduced lighting. Potential for emissions from increased numbers of aircraft movements and an increase in road traffic associated with Bristol Airport, to result in nitrogen deposition and a reduction in the favourable conservation status of vegetation associated with key habitats and prey species.	See integrated/embedded mitigation and enhancement measures A to G described above. Measures set out on the Integrated / Embedded Landscape, Visual and Ecological Mitigation Masterplan prepared by Wood and included in Appendix 11K and listed below (individual measures / numbers relate to the drawing included in Appendix 11K): 1. Reinforce existing tall native hedgerow. Extend scrub planting at northern (Downside Road) end with provision for rides in scrub. Extend existing bat tower roost. 2. Reinforce woodland planting on the top and northern side of bund. Plant climbers (honey suckle, ivy and <i>Clematis vitelba</i>) on trellis along northern side of acoustic wall to soften appearance in views and provide opportunities for pollinators. 3. Provision of limited parkland tree planting in the remainder of the grassland to enhance for area for horseshoe bats and other species of bats. Provision of mown paths and information board (as per Measure F above). 4. Existing woodland copse to have management regime amended to thin internal areas of woodland to enhance habitat for bats, nesting birds and badgers (as per measure G above). 5. Extend woodland copse (4) to east. Scallop eastern edge (as per Measure G above). 6. Enhance species diversity in existing grass sward using BAL supplied mix and CAP 772³⁶ compliant management plan (80% Grass: 7.00% Browntop Bent <i>Argostis castellana</i> 18.5% Red Fescue <i>Festuca rubra</i> 21.00% Crested Dogstail <i>Cynosurus cristatus</i> 28.50% Meadow Fescue <i>Festuca pratensis</i> 25.00% Smooth Stalked Meadow Grass <i>Poa pratensis</i> 20 % Wild Flowers: 5.00% Birdsfoot Trefoil <i>Lotus corniculatus</i> 8.00% Black Knapweed <i>Centaurea nigra</i> 5.00% Black Medic <i>Medicago lupulina</i> Yellow 5.00% Common Vetch <i>Vicia sativa</i> 7.00% Meadow Buttercup <i>Ranunculus acris</i> 4.00% Musk Mallow <i>Malva moschata</i> 12.00% Ox Eye

Receptor	Changes and effects	Integrated / embedded measures and influence on assessment (refer to Appendix 11K)
		Daisy <i>Leucanthemum vulgare</i> 8.00% Red Campion <i>Silene dioca</i> 12.00% Ribwort Plantain <i>Plantago lanceolata</i> 13.00% Self Heal <i>Prunella vulgaris</i> purple 15.00% White Campion <i>Silene alba</i> White 6.00% Yarrow <i>Achillea millefolium</i>. 7. Reinforce and thicken existing hedgerow and allow to grow to a maximum of 1.5m height. 8. Allow hedgerow section to grow out to improve screening effectiveness to a maximum of 1.5m height. 9. Introduce extra heavy standard trees into southern section of A38 boundary hedgerow and allow hedgerow section to grow out to maximum height of 1.5m. 10. Introduce small copses in the south-eastern and south-western corners of Gruffy's (Cornerpool) Field around existing building bat roosts. Ensure that in combination with (11) the total area of scrub/tree cover within field does not exceed 15% of surface area to maximise its attractiveness to horseshoe bats. Extend and enhance existing bat roosts. 11. Introduce parkland trees to Gruffy's (Cornerpool) Field to enhance existing patches of scrub so that the total area of scrub/tree cover within field does not exceed 15% of surface area to maximise its attractiveness to horseshoe bats. 12. Reinforce and thicken existing hedgerow to a maximum height of 1.5m. 13. Existing woodland copse to have management regime amended to enhance habitat for horseshoe bats. Extend and enhance existing horseshoe bat roosts. New building bat roost. 14. The Silver Zone Car Park Extension (Phase 2) area will include a perimeter bund with design, tree planting and seeding to replicate existing bund surrounding the Silver Zone Car Park Extension (Phase 1). Lighting regime in the Silver Sone Car Park Extension (Phase 1) to be maintained at the currently agreed 1 lux and the Silver Zone Car Park Extension (Phase 2) area has perimeter lux levels no greater than 0.5lux. 15. Improve existing pond to enhance conditions for lesser horseshoe bats, other species of bats, badger, common amphibians, birds and invertebrates. 16. Woodland management to improve structure and composition, any necessary tree surgery, remove non-native invasive species and to plant native local species including hazel, yew and holly along the woodland margin to increase ecological functionality and to help reduce light ingress into the woodland.
Breeding birds	Land take/ land cover change (habitat removal); management changes resulting in a reduction in breeding/nesting habitat. Potential direct effects on birds, young and/or eggs due to damage or destruction of active nests.	Provision of extensive replacement bird nesting, foraging, perching etc habitat, introduction of management to areas of potential nesting. Implemented through the delivery of the Measures described above. Avoidance of potential effects on actively nesting birds, young, eggs and nest through the

Receptor	Changes and effects	Integrated / embedded measures and influence on assessment (refer to Appendix 11K)
		avoidance of vegetation clearance between February to August inclusive, or through the use of a suitably qualified ecologist who has confirm no nesting activity present within 48 hours of clearance between February and August.
Badgers	Potential disturbance of badgers in nearby setts associated with the construction of the Silver Zone Car Park Extension (Phase 2). Loss of some foraging habitat associated with the Silver Zone Car Park Extension (Phase 2).	Repeat badger survey as part of CEMP (Appendix 2B) to re-confirm extent of sett and to confirm no additional measures required. Relocation of car park access to the east. Works to be carried out under Natural England badger licence if sett expansion or new setts have been constructed. Use of an Ecological Clerk of Works during construction.
Hazel dormouse	Loss of potential dormouse habitat associated with the A38 highway improvements area and associated injury/killing risk (considered to be very low based on historic surveys and survey data from 2018).	Completion of on-going dormouse monitoring across the airport to reconfirm absence. If subsequently confirmed to be present, all works to be carried out under Natural England dormouse EPS licence. Clearance of above ground vegetation from October until April and below ground vegetative structure and other potential hibernation features from May until October. Provision of additional replacement woodland / arboreal habitat in accordance with Measures 3, 4, 5 and 16 above. Introduction of suitable management regime in woodland associated with the A38 highway improvements area to enhance foraging, overwintering and nesting opportunities for dormouse.
Broadleaved woodland – semi-natural	Small area (1470m ²) of limited quality of woodland edge (dominated by sycamore, with associated scrub and bare ground) to be removed to form the highway improvement works at the junction of Downside Road and the A38 ranging from up to 10m from the existing road edge on the A38 and up to 8.5m from the edge of Downside Road.	Provision of suitable tree protection fencing during construction to demarcate and protect retained trees. Provision of additional replacement woodland habitat in accordance with Measures 3, 4, 5, 14 and 16 above, as well as application site wide measures to maintain/enhance woodland blocks (Measures 4 and 13) and introduce new woodland planting on the landscape bund in the Silver Zone Car Park Extension (Phase 2) (Measure 14 above).
Intact hedge – native species rich with hedgerow trees	Construction of new landscape bund with additional trees and wildflower grassland could impinge on the root protection zone of the existing hedgerow/hedgerow trees causing dieback.	Construction of bund outside of the root protection zone of the hedgerow (at least 3m). Provision of suitable tree protection fencing during construction to demarcate and protect retained hedgerow. Introduction of suitable hedgerow management regime, suitable for multiple species as per Measures listed above.
Scattered scrub – see bats.	Loss of scrub habitat in open grassland at the Silver Zone Car Park Extension (Phase 2) that supports foraging horseshoe bats and other species of bats .	Provision of tree and shrub planting along new landscape bund associated with the perimeter of the Silver Zone Car Park Extension (Phase 2) (Measure 14).
Poor semi-improved grassland (cattle grazed) – see bats above	Reduction in foraging habitat for lesser and greater horseshoe bat species at Silver Zone Car Park Extension (Phase 2).	Provision of wildflower rich grassland on the inside of the bund associated with the perimeter of the Silver Zone Car Park Extension (Phase 2) and its immediate vicinity (Measure 18). Provision of other extensive areas of species

Receptor	Changes and effects	Integrated / embedded measures and influence on assessment (refer to Appendix 11K)
		rich grassland as defined by Measure 6).
Standing water	Potential for the development of additional car park at the Silver Zone Car Park Extension (Phase 2) area to cause the loss of or change in quality of a single standing small waterbody on its perimeter.	The pond will be protected by the landscape bund and car park SuDS ⁶⁹ system. The pond will be improved through initial desilting in the winter 2020 (and repeated if necessary every 5 years) and by increasing light levels and provision of additional runoff to it from local elevated vegetated ground (Measure 15).
Hedgerows	Lengths of hedgerows will be removed to facilitate the Proposed Development, with likely adverse effects on species that commute along the hedgerows.	The scheme layout has been optimised to enable the retention of nearly all existing hedgerows with only very short sections of defunct hedgerow being lost within the internal part of the north side car park and the edge of the car park at the Airport Tavern/A38. Measures 1, 7, 8, and 12 more than mitigate for the loss of hedgerow elsewhere. Provision of suitable tree protection fencing during construction to demarcate and protect retained trees.

11.8.3 **Table 11.10** Provides a summary comparison of areas of habitat lost through the development footprint and delivered through the integrated/embedded landscape/visual/ecology mitigation and enhancement proposals. Please also refer to **Appendix 11K** for the drawing that shows the location and extent of the integrated/embedded landscape/visual/ecology mitigation and enhancement proposals.

Table 11.10 Comparison of areas/lengths of receptor habitat loss/replacement through the development and the integrated and embedded environmental measures

Receptor	Habitat lost through development	Area of associated habitat delivered through the development proposals (refer to the Integrated / Embedded Landscape, Visual and Biodiversity Mitigation Masterplan located in Appendix:11K)
North Somerset & Mendip Bats SAC	3.73ha of cattle grazed species poor semi-improved grassland associated with the proposed Silver Zone Car Park Extension (Phase 2) 0.16ha of sycamore dominated broadleaved woodland edge along the junction of Downside Road and the A38	3. Provision of parkland tree planting in the grassland to enhance for area for horseshoe bats and other species of bats. Provision of mown paths and information board (as per Measure F above). 4. Existing woodland copse to have management regime amended to thin internal areas of woodland to enhance habitat for bats, nesting birds and badgers (as per measure G above). 5. Extend woodland copse (4) to east. Scallop eastern edge (as per Measure G above). 6. Enhance species diversity in existing grass sward using BAL supplied mix and CAP 77217 compliant management plan. 7. Reinforce and thicken existing hedgerow and allow to grow to a maximum of 1.5m height. 8. Allow hedgerow section to grow out to improve screening effectiveness to a maximum of 1.5m height. 9. Introduce extra heavy standard trees into southern section of A38 boundary hedgerow and allow hedgerow section to

⁶⁹ "Sustainable Drainage Systems"

Receptor	Habitat lost through development	Area of associated habitat delivered through the development proposals (refer to the Integrated / Embedded Landscape, Visual and Biodiversity Mitigation Masterplan located in Appendix:11K)
		grow out to maximum height of 1.5m. 10. Introduce small copses in the south-eastern and south-western corners of Gruffy's (Cornerpool) Field around existing building bat roosts. Ensure that in combination with (11) the total area of scrub/tree cover within field does not exceed 15% of surface area to maximise its attractiveness to horseshoe bats. Extend and enhance existing bat roosts. 11. Introduce parkland trees to Gruffy's (Cornerpool) Field to enhance existing patches of scrub so that the total area of scrub/tree cover within field does not exceed 15% of surface area to maximise its attractiveness to horseshoe bats. 12. Reinforce and thicken existing hedgerow to a maximum height of 1.5m. 13. Existing woodland copse to have management regime amended to enhance habitat for horseshoe bats. Extend and enhance existing horseshoe bat roosts. New building bat roost. 14. The proposed Extension to the Silver Zone Car Park (Phase 2) area will include a perimeter bund with design, tree planting and seeding to replicate existing bund surrounding the Silver Zone seasonal car park (Phase 1). Lighting regime in the Silver Zone seasonal car park (Phase 1) to be maintained at the currently agreed 1 lux and the proposed Extension to the Silver Zone Car Park (Phase 2) area has perimeter lux levels no greater than 0.5lux. 15. Improve existing pond to enhance conditions for lesser horseshoe bats, other species of bats, badger, common amphibians, birds and invertebrates. 16. Woodland management to improve structure and composition, any necessary tree surgery, remove non-native invasive species and to plant native local species including hazel, yew and holly along the woodland margin to increase ecological functionality and to help reduce light ingress into the woodland.
North Somerset & Mendip Bat SAC constituent SSSIs: Brockley Hall Stables SSSI and King's Wood SSSI, Banwell Caves, Banwell Ochre Caves SSSI, Compton Martin Ochre Mine SSSI, and Wookey Hole SSSI, Cheddar Complex SSSI	As above	See habitat provision described above.
Goblin Coombe SSSI	As above	See habitat provision described above.
Avon Gorge SAC (and constituent SSSIs) – air quality	Not applicable	Not applicable
Mendip Woodlands SAC (and constituent SSSIs) – air quality	Not applicable	Not applicable
Chew Valley Lake SPA (and SSSIs) – air quality	Not applicable	Not applicable
Felton Common LNR (acting as a	Not applicable	Not applicable – N.B. BAL has committed to the planting of

Receptor	Habitat lost through development	Area of associated habitat delivered through the development proposals (refer to the Integrated / Embedded Landscape, Visual and Biodiversity Mitigation Masterplan located in Appendix:11K)
surrogate for all other non-statutorily designated sites due to its position adjacent to the eastern boundary of the application site)		new boundary hedgerow features adjacent to Felton Common as part of a separate planning permission (17/P/5105/FUL).
Non-statutorily locally designated Sites of Nature Conservation Interest	Not applicable	Not applicable
Ancient Woodland (acting as a surrogate receptor for all woodland) including ancient woodland at Brockley Combe, Garleys Wood, Hyatts Wood, Oatfield Wood, Lye Wood, Scars Wood, High Wood, Horts Wood, Little Horts Wood, Tuckers Grove and Whitley Coppice, Shippenhays Wood, Prestow Wood and Corporation Woods.	Not applicable	Not applicable
Groundwater-fed surface watercourses (associated with the aquifer under the application site) (River Kenn, Little River, Land Yeo, River Chew, Winford Brook, Congresbury Yeo)	Not applicable	Not applicable
Bats	3.73ha of cattle grazed species poor semi-improved grassland associated with the Silver Zone Car Park Extension (Phase 2) area. 0.16ha of sycamore dominated broadleaved woodland edge along the junction of Downside Road and the A38	1. Reinforce 250m of existing tall native hedgerow. Extend scrub planting at northern (Downside Road) end with provision for rides in scrub. Extend existing bat tower roost. 2. Reinforce 70m of woodland planting on the top and northern side of bund. Plant climbers (honey suckle, ivy and <i>Clematis vitelba</i>) on trellis along northern side of acoustic wall to soften appearance in views and provide opportunities for pollinators. 3. Provision of limited parkland tree planting in the 0.3ha grassland of the Downside Road Meadow to enhance for area for bats. Provision of mown paths and information board (as per Measure F above). 4. Existing 0.35ha woodland copse to have management regime amended to thin internal areas of woodland to enhance habitat for bats, nesting birds and badgers. 5. Extend woodland copse (4) to east by 0.3ha. Scallop eastern edge. 6. Enhance species diversity in existing 3.8ha of grass sward using BAL supplied mix and CAP 772³⁶ compliant management plan (80% Grass: 7.00% Browntop Bent <i>Argostis castellana</i> 18.5% Red Fescue <i>Festuca rubra</i> 21.00% Crested Dogstail <i>Cynosurus cristatus</i> 28.50% Meadow Fescue <i>Festuca pratensis</i> 25.00% Smooth Stalked Meadow Grass <i>Poa pratensis</i> 20 % Wild Flowers: 5.00% Birdsfoot Trefoil <i>Lotus corniculatus</i> 8.00% Black Knapweed <i>Centaurea nigra</i> 5.00% Black Medic <i>Medicago lupulina</i> Yellow 5.00% Common Vetch <i>Vicia sativa</i> 7.00% Meadow Buttercup <i>Ranunculus acris</i> 4.00% Musk Mallow <i>Malva moschata</i> 12.00% Ox Eye Daisy <i>Leucanthemum vulgare</i> 8.00% Red Campion <i>Silene dioca</i> 12.00% Ribwort Plantain <i>Plantago lanceolata</i> 13.00% Self Heal <i>Prunella vulgaris</i> purple 15.00% White Campion <i>Silene alba</i> White 6.00% Yarrow <i>Achillea millefolium</i>

Receptor	Habitat lost through development	Area of associated habitat delivered through the development proposals (refer to the Integrated / Embedded Landscape, Visual and Biodiversity Mitigation Masterplan located in Appendix:11K)
		7. Reinforce and thicken 120m of existing hedgerow and allow to grow to a maximum of 1.5m height. 8. Allow 300m of hedgerow section to grow out to improve screening effectiveness to a maximum of 1.5m height. 9. Introduce minimum of 20 extra heavy standard trees into southern section of A38 boundary hedgerow and allow hedgerow section to grow out to maximum height of 1.5m. 10. Introduce 0.5ha of small copses in the south-eastern and south-western corners of Gruffy's (Cornerpool) Field around existing building bat roosts. Ensure that in combination with (11) the total area of scrub/tree cover within field does not exceed 15% of surface area to maximise its attractiveness to bats. Extend and enhance existing bat roosts. 11. Introduce minimum of 16 parkland trees, protected from grazing, to Gruffy's (Cornerpool) Field to enhance existing patches of scrub so that the total area of scrub/tree cover within field does not exceed 15% of surface area to maximise its attractiveness to bats. 12. Reinforce and thicken 235m of existing hedgerow to a maximum height of 1.5m. 13. Existing 1.1ha of woodland copse to have management regime amended to enhance habitat for horseshoe bats. Extend and enhance existing horseshoe bat roosts. New building bat roost. 14. Silver Zone Car Park Extension (Phase 2) area to have 600m long x minimum 10m perimeter bund with design, tree planting and seeding to replicate existing bund surrounding the Silver Zone Car Park Extension (Phase 1). Lighting regime at the boundary of the Silver Car Park Extension (Phase 1) to remain at 1lux and the perimeter lighting of the Silver Zone Car Park Extension (Phase 2) to be 0.5lux. 15. Restore existing pond to enhance conditions for lesser horseshoe bats, other species of bats, badger, common amphibians, birds and invertebrates. 16. Woodland management within retained 0.33ha to improve structure and composition, any necessary tree surgery, remove non-native invasive species and to plant native local species including hazel, yew and holly along the woodland margin to increase ecological functionality and to help reduce light ingress into the woodland.
Breeding birds	Circa 0.3ha of scrub within cattle grazed species poor semi-improved grassland associated with Silver Zone Car Park Extension (Phase 2) area – scattered scrub being suitable for nesting for some species. 0.16ha of sycamore dominated broadleaved woodland edge along the junction of Downside Road and the A38	See habitat measures set out above and in Appendix 11K .
Badgers	3.73ha of cattle grazed species poor semi-improved grassland associated with Silver Zone Car Park Extension (Phase 2) area 0.16ha of sycamore dominated	See habitat measures set out above and in Appendix 11K

Receptor	Habitat lost through development	Area of associated habitat delivered through the development proposals (refer to the Integrated / Embedded Landscape, Visual and Biodiversity Mitigation Masterplan located in Appendix:11K)
	broadleaved woodland edge along the junction of Downside Road and the A38	
Hazel dormouse	Not applicable	Not applicable
Broadleaved woodland – semi-natural	0.16ha of sycamore dominated broadleaved woodland edge along the junction of Downside Road and the A38	4. Existing 0.35ha of woodland copse to have management regime amended to enhance habitat for horseshoe bats. Extend and enhance existing horseshoe bat roosts. New building bat roost. 5. Extend woodland copse (4) to east by 0.3ha. Scallop eastern edge. 16. Woodland management within retained 0.33ha to improve structure and composition, any necessary tree surgery, remove non-native invasive species and to plant native local species including hazel, yew and holly along the woodland margin to increase ecological functionality and to help reduce light ingress into the woodland.
Intact hedge – native species rich with hedgerow trees	5m of defunct hedgerow adjacent to the A38	Reinforcement/gap-filling of circa 600m of existing hedge and allow circa 300m to thicken and grow out as per measures specified above.
Scattered scrub	Loss of 3151m² of scrub/matrix habitat in open grassland at the Silver Zone Car Park Extension (Phase 2). Loss of 220m² of scrub along the A38 corridor	Provision of circa 3000m ² of tree and shrub planting along new landscape bund associated with the perimeter of the Silver Zone Car Park Extension (Phase 2) (Measure 14).
Poor semi-improved grassland	Loss of 3.73ha of cattle grazed poor semi-improved grassland associated with the Silver Zone Car Park Extension (Phase 2). Loss of 2.93ha of poor semi-improved airfield grassland associated with the Taxiway widening and fillets, Taxiway widening and fillets (Taxiway ALPHA) and East Taxiway areas.	Provision of circa 3000m² ha wildflower rich grassland on the inside of the bund associated with the perimeter of the Silver Zone Car Park Extension (Phase 2) and its immediate vicinity (Measure 18). Provision of other extensive areas of species rich grassland as defined by Measure 6). 6. Enhance species diversity in existing 3.8ha of grass sward using BAL supplied mix and CAP 772³⁶ compliant management plan
Standing water	No habitat lost	Restoration of 1 existing pond within the application site.
Hedgerows	Loss of 85m of poor quality hedgerow within existing north side car park	Reinforcement/gap-filling of circa 600m of existing hedge and allow circa 300m to thicken and grow out as per measures specified above.

11.9 Assessment methodology

- 11.9.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to preparing the Environmental Statement**, and specifically in **Sections 4.5 to 4.7**.

However, whilst this has informed the approach that has been used in this Biodiversity assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this Biodiversity assessment.

- 11.9.2 Information for the assessment derives from the results of the desk study, baseline surveys, traffic, air quality and noise modelling, supplemented by published information (e.g. on potential Biodiversity receptors' status, distribution, sensitivity to environmental changes and ecology) and professional knowledge of ecological processes and functions.
- 11.9.3 For each scoped-in receptor, effects have been assessed against the predicted future baseline conditions for that receptor (assumed to be no notable difference to the current baseline as noted in **Section 11.5**) during construction and operation. This future baseline has been defined using information as defined in **Section 11.7** about the likely future use and management of the application site in the absence of the Proposed Development, known population trends (for species) and any other proposed developments (consented or otherwise) that may act cumulatively with the Proposed Development to affect Biodiversity receptors. Modelling of air quality (**Chapter 8**), noise (**Chapter 7**) and traffic and transport effects (**Chapter 6**) have been based upon a worst-case scenario. A precautionary basis has also been taken where appropriate, in this Chapter.
- 11.9.4 Throughout the assessment process, findings about potential for significant effects were used to inform the definition of requirements for additional baseline data collection and the identification of environmental measures to be incorporated into the Proposed Development design (in order to avoid or reduce adverse effects or to deliver enhancements). Measures to comply with relevant policies and legislation have also been included. The results of the assessment reflect the final design (i.e. incorporating the environmental measures).
- 11.9.5 For each receptor, the assessment deals with the effects of construction, and the effects of the operational airport. As more information has become available about the Proposed Development and about the populations of important and legally protected species, the scope of the assessment has been refined to focus on those receptors that have the potential to be significantly affected. Each scoped-in receptor has then been subject to further assessment of how it was likely to be affected by the Proposed Development, allowing for environmental changes that could affect the receptor during construction and operation.
- 11.9.6 A worst-case scenario has been used for the assessment, based upon the extensive existing baseline and expert opinion, to ensure that the predicted impacts are not underestimated. The environmental measures have been identified based on the worst-case scenario to ensure that any effects upon valued receptors avoided where possible and minimised where this is not possible so that residual effects are not significant.
- 11.9.7 The results from additional monitoring will confirm whether the worst-case scenario is present or, whether the effects are actually less severe. If the effects are less severe than the worst-case mitigation, compensation and habitat provision (which has been designed based on worst-case assessment) can be refined and targeted at the actual effects.

Methodology for prediction of effects

- 11.9.8 The method for the prediction of effects is based on Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines⁷⁰; these guidelines are widely regarded by the ecology profession as the 'industry standard'.

⁷⁰ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland, [online]. Available at: <https://www.cieem.net/data/files/ECIA%20Guidelines.pdf> [Checked 04/12/2018].

- 11.9.9 The assessment is based upon not only the results of the desk study and field surveys, but also relevant published information (on potential Biodiversity receptors' status, distribution, sensitivity to environmental changes and ecology), and professional knowledge of ecological processes and functions.
- 11.9.10 The effects on each scoped-in receptor have been assessed against the predicted future baseline conditions for that receptor during construction and operation. The future baseline has been defined using information about the likely future use and management of the area within the Bristol Airport landholding in the absence of the Proposed Development, known population trends (for species where available) and any other proposed developments (consented or otherwise) that may act cumulatively with the Proposed Development to affect Biodiversity receptors.
- 11.9.11 Throughout the assessment process, findings about potential likely significant effects were used to inform the definition of requirements for additional baseline data collection and the identification of embedded environmental measures that are incorporated into the Proposed Development design (in order to avoid or reduce adverse effects or to deliver required enhancements as necessary for receptors where legislation has been derogated). The results of the assessment, as set out later in this Chapter, reflect the final proposed scheme design (i.e. incorporating the embedded environmental measures, which include construction methodology and design) as well as location specific embedded environmental measures.
- 11.9.12 The spatial extent of the assessment of each potential likely significant effect reflects the area occupied by the receptor that is being assessed and the ZoI associated with the environmental changes that are likely to affect the receptor (refer to **Box 11.4**). Thus, if part of a designated Biodiversity site is located within the ecological ZoI relating to a particular environmental change, an assessment was made of the effects on the site as a whole. A similar approach was taken for areas of notable habitat. For species that occur within an ecological ZoI that relates to a change that could significantly affect that species, an assessment was carried out on the total area that is used by the affected individuals or population of the species (e.g. for foraging).
- 11.9.13 Where appropriate, for each receptor, the assessment deals in an integrated way, with the effects of all phases of the development. Effects within each of the phases have been detailed, where there are distinct differences between those phases. The level of magnitude of change is subsequently concluded. It is a consequence of the levels of change within each phase, taking into account transitions between those changes, and the length of time over which those changes persist.

Significance evaluation methodology

- 11.9.14 The assessment has been informed by the specific details of all works associated with the Proposed Development and embedded environmental mitigation. The evaluation of effects on receptors are considered following the methodology presented below, and in the context of the construction programme set out in **Chapter 2: Description of the Proposed Development**, which describes the delivery of construction and operation of the Proposed Development. Integrated and embedded environmental measures consist of those described in **Section 11.8**.
- 11.9.15 For some environmental topics, published guidance is available with regard to significance evaluation. Where such guidance exists, even if in draft, it has been utilised to inform the development of the significance evaluation methodologies contained within this ES. This is applicable to **Chapter 11: Biodiversity** which uses *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*⁷⁰; and *North Somerset and Mendip Bats Special Area of Conservation (SAC) Guidance on Development Supplementary Planning Document*.
- 11.9.16 Using information about the way in which sites/habitats/species are likely to be affected by the Proposed Development, each change (change from the baseline situation) that is assessed has been assigned a level of 'magnitude', based on the definitions set out in **Table 11.11**.

Table 11.11 Guidelines for the assessment of change magnitude

Magnitude of change	Criteria and resultant effect
High	The change permanently (or over the long-term) negatively affects the conservation status of a habitat/species, reducing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised. There may be a decrease in the level of biodiversity conservation value of the receptor.
Medium	The change permanently (or over the long-term) negatively affects the conservation status of a habitat/species reducing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected. There may be a decrease in the level of biodiversity conservation value of the receptor. Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations would experience little or no reduction. Any changes are likely to be within the range of natural variability and there would be no short-term or long-term change to the conservation status of habitat/species receptors or the integrity of designated sites.
Low	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction. These changes are likely to be within the range of natural variability and there is not expected to be any permanent change in the conservation status of the species/habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the receptor in terms of its biodiversity conservation value.
Very Low/ Neutral	A change to the level of which is so low, it is not discernible on designated sites or habitats or the sizes of species' populations, or changes that balance each other out over the lifespan of a project.

11.9.17 The criteria in **Table 11.11** refer to the terms 'integrity' and 'conservation status'. For habitat areas and species, an effect is assessed as being significant if the favourable conservation status of a receptor would be changed by the Proposed Development. Conservation status is defined by the CIEEM guidelines⁷⁰ as follows:

- For habitats - the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and
- For species - the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.

Negative Effects

11.9.18 A negative effect is considered to be significant if the favourable conservation status of a receptor is compromised by the Proposed Development.

11.9.19 A similar procedure has been used for designated sites that are affected by the development, except that the focus is on the effects on the integrity of each site, defined by the CIEEM guidelines⁷⁰ as:

"...the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified."

The assessment of effects on integrity draws upon the assessment of effects on the conservation status of the features for which the site has been designated.

- 11.9.20 The decision as to whether the favourable conservation status has been compromised is made using informed judgement based on the findings of the assessment of how the resource would be affected.

Positive Effects

- 11.9.21 A positive effect is assessed as being significant if development activities are predicted to cause:
- An improvement in the condition of a habitat/species population from unfavourable to unfavourable recovering or favourable (noting that condition data are only available for SSSIs but that professional judgement has been used to apply the same principle to habitats/species elsewhere); or
 - Partial or total restoration of a site's favourable condition.
- 11.9.22 If a species population, habitat or site is already in favourable condition, it is still possible for there to be a significant positive effect. There is, however, no simple formula for determining when such effects are significant and decisions about significance therefore have to be made on a case by case basis using professional judgement.

11.10 Assessment of effects: North Somerset and Mendips Bat SAC and Constituent SSSIs

Baseline conditions

- 11.10.1 The North Somerset and Mendips Bat SAC comprises a number of associated Sites of Special Sites. The individual sites, together with a summary of their condition (as specified by NE⁷¹) is listed below:
- Banwell Caves SSSI, 100% of the SSSI Units are in favourable condition;
 - Banwell Ochre Caves SSSI, the ecological SSSI Units are in favourable condition;
 - Brockley Hall Stables SSSI, 100% of the SSSI Units are in favourable condition;
 - Compton Martin Ochre Mine SSSI, bat numbers in early 2007 were such that this feature is considered favourable. The SSSI is in unfavourable condition, because the mine is considered unsafe to visit, hence the earth science feature is effectively obstructed;
 - King's Wood and Urchin Wood SSSI, 78.23 % of the SSSI Units are in favourable condition, 11.25% of the Units are unfavourable recovering and 10.52% are unfavourable due to woodland management including cherry laurel and sycamore in the ground flora;
 - The Cheddar Complex SSSI, 54.33 % of the SSSI Units are in favourable condition with 45.67 of the Units in unfavourable recovering, but with scrub management continuing to be an issue; and
 - Wookey Hole SSSI, 100% of the SSSI Units are in favourable condition.

⁷¹ Natural England, 2018. Designated Sites View, [online]. Available at: <https://designatedsites.naturalengland.org.uk/> [Checked 22/11/2018].

Predicted effects and their significance

- 11.10.2 NE has identified key objectives that need to be met in order to maintain or restore the integrity of the site, and that contributes to achieving the Favourable Conservation Status of its Qualifying Features of Interest by maintaining or restoring:
- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
 - The structure and function (including typical species) of qualifying natural habitats;
 - The structure and function of the habitats of qualifying species;
 - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
 - The populations of qualifying species; and
 - The distribution of qualifying species within the site.
- 11.10.3 Consideration of how the Proposed Development could affect these objectives and therefore cause a negative effect on the Favourable Conservation Status of the SAC is set out below, separated into construction and operational effects.

Construction

- 11.10.4 There is the potential for direct effects to the foraging and commuting habitat and behaviour of greater and lesser horseshoe bats at the application site from the loss of 3.7ha of suitable habitat from the construction of the Silver Zone Car Park Extension (Phase 2) and 0.16ha of suitable habitat associated with the A38 Highway Improvement Works.
- 11.10.5 Taking a precautionary approach, it has been assumed that a component of the population of greater and lesser horseshoe bats associated with the internationally/nationally important North Somerset and Mendips Bat SAC have been recorded foraging and commuting across these areas. As such, it has been assumed that these areas of Bristol Airport will currently be contributing to the overall function and viability of the bat populations and the Favourable Condition of the SAC itself.
- 11.10.6 The Measures set out in the Integrated and Embedded Landscape, Visual and Ecology Mitigation Masterplan (refer to **Appendix 11K**) provide a wide range of additional habitat features on land owned by Bristol Airport that will help support greater and lesser horseshoe bat including new/improved commuting/foraging habitat as well as enhanced/new building roosts. This includes the full attention to the boundary habitats associated with the Silver Zone Car Park Extension (Phase 2) and the majority of the A38 Highway Improvements area, provision of significant new/enhanced species rich grassland, trees, hedgerow, woodland management, new woodland and extended/additional building roosts. Furthermore, there remains extensive suitable habitat in the adjacent and wider landscape that can also provide this function (including land owned by BAL and managed for horseshoe bats).
- 11.10.7 Construction phase impacts on the Silver Zone Car Park Extension (Phase 2) and potential effects on the North Somerset and Mendips SAC have been examined and successfully managed previously during the construction of the car parking associated with the adjacent elements of Silver Zone at Bristol Airport. A high level of confidence on the process and success of embedded mitigation and enhancement measures has therefore been given.
- 11.10.8 Notwithstanding this, there remains a net loss of foraging habitat for greater and lesser horseshoe bats under the footprint of the car park and A38 Highway Improvements. There is a formal policy requirement, supported by Bristol Airport, to be compliant with the North Somerset and Mendip

Bat SAC SPD (and to clearly demonstrate no adverse effect on integrity to the SAC in accordance with the Habitats Regulations 2017¹) to provide suitable replacement habitat.

- 11.10.9 Refer to **Section 11.18** where the replacement habitat is discussed as Additional Mitigation, before the Conclusions of Significance Evaluation is discussed in **Section 11.19**.
- 11.10.10 In the absence of Additional Mitigation, it is considered that the loss of the 3.7ha of grassland and 0.16ha of woodland will result in a medium magnitude of change to a small-medium proportion of the wider species population associated with the SAC which, in the absence of Additional Mitigation would result in a probably significant effect. The loss of this foraging habitat could result in effects to some individuals of lesser and greater horseshoe bats because of a reduction in the availability or quality of foraging habitat at Bristol Airport. It is likely, however, that the quality or extent of the SAC, or the overall size of lesser and/or greater horseshoe bat populations would only experience little or no reduction. It is considered that any changes are likely to be within the range of natural variability and there would be no short-term or long-term change to the conservation status of habitat/species receptors or the integrity of designated sites.
- 11.10.11 No artificial lighting that will illuminate the retained foraging/commuting habitat will be used during the construction of the Silver Zone Car Park Extension (Phase 2) and the A38 Highway Improvement Works.
- 11.10.12 Consequently, the retained and planted perimeter of the new car parking and the woodland associated with the A38 Highway improvement works will remain suitable for foraging and commuting greater and lesser horseshoe bats resulting in only a low magnitude of change and negligible/no significant effects.
- 11.10.13 The construction work associated with the proposals to use the adjacent car parking at the Silver Zone Car Park Extension (Phase 1) Location ZZ in a permanent year-round operation will not have any effects on lesser and greater horseshoe bat habitat or individual animals. The construction works are limited to the installation of permanent lighting (the use of which is assessed in the consideration of operational effects below), resulting in only a low magnitude of change (if not very low) and negligible / no significant effects.
- 11.10.14 No air quality effects from emissions associated with construction (including dust) are predicted as a result of the implementation of embedded mitigation and management measures as set out in the CEMP (**Appendix 2B**) and as documented in **Chapter 8: Air Quality**. Consequently, no likely significant construction effects will occur to the habitats or species (greater and lesser horseshoe bat) that comprise the designated features of interest of the SAC (or constituent SSSIs) as a result of changes in air quality.

Operation

- 11.10.15 Potential operational effects on the North Somerset and Mendips Bat SAC and constituent SSSIs relate to maintaining and managing habitats so they are suitable for greater and lesser horseshoe bat, lighting of retained bat habitat associated with the Silver Zone Car Park Extension (Phase 2), the A38 Highway Improvements, and the changes to Silver Zone Car Park Extension (Phase 1).
- 11.10.16 Detailed management prescriptions will be implemented for all embedded mitigation and management features, including the trees planted along the northern boundary of the north side Bristol Airport car park (Measure 3), and the management and enhancement of the grassland, woodland and planting of new woodland associated with Measures 5, 6 and 7. These will all be completed, monitored and reported on in accordance with the requirements of a proposed planning condition.
- 11.10.17 Notwithstanding this, in the absence of Additional Mitigation, it is considered that the maturing new habitat on site is insufficient to comply with the SPD policy and will continue to result in a

medium magnitude of change affecting a small-medium proportion of the wider species population associated with the SAC, which, in the absence of Additional Mitigation would result in a probably significant effect. However, whilst the loss of the foraging habitat could result in effects to some individuals of lesser and greater horseshoe bats due to a reduction in the availability or quality of foraging habitat at Bristol Airport it is likely that the quality or extent of the SAC, or the overall size of lesser and/or greater horseshoe bat populations would only experience little or no reduction. It is considered that any changes are likely to be within the range of natural variability and there would be no short-term or long-term change to the conservation status of habitat/species receptors or the integrity of designated sites.

- 11.10.18 Please refer to **Sections 11.18** where the replacement habitat is discussed as Additional Mitigation before the Conclusions of Significance Evaluation is discussed in reach in **Section 11.19**.
- 11.10.19 The permanent lighting will be operated, monitored and managed in accordance with best practice measures including those provided by Institute of Lighting Professionals and the Bat Conservation Trust²⁶ Lux level at the perimeter of the car park, at the location of the security fence at the Silver Zone Car Park Extension (Phase 1) will not exceed the current agreed level of 1 lux and at 0.5 lux (vertical and horizontal), for the perimeter of Silver Zone Car Park Extension (Phase 2) with light levels decreasing beyond this. Only a low magnitude of change from current conditions is predicted resulting in no likely significant effects.
- 11.10.20 Lighting associated with the highway improvements along the A38/Downside Road junction will be no greater than current levels and <0.5 lux within and above the future woodland boundary/canopy. As such no change in suitability of the road for bat crossing or use of the retained woodland and other features by bats is likely to change. This will be achieved through the use of specific lighting design criteria and guidelines (e.g. Institute of Lighting Professionals and the Bat Conservation Trust. 2018. Bats and Artificial Lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18) as well the use of planting and fencing to reinforce the margins avoiding woodland /light penetration if necessary. Therefore, only a low magnitude of change from current conditions is predicted, resulting in no likely significant effects.
- 11.10.21 There is the potential for emissions to air from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with the application site to result in nitrogen deposition and a reduction in the favourable conservation status of the vegetative designated features of interest associate with the SAC, specifically H6210 Semi-natural dry grassland and scrubland facies: on calcareous substrates (Festuco-Brometalia, including the priority feature 'orchid rich sites'), H8310 Caves not open to the public, H9180 Tilio-Acerion forests of slopes, scree and ravines, and any associated effects on S1303 Lesser horseshoe bat, *Rhinolophus hipposideros* and S1304 Greater horseshoe bat, *Rhinolophus ferrumequinum* that may be using these habitats.
- 11.10.22 The results of the detailed air quality modelling work reported in **Chapter 8: Air Quality** concludes that no environmental air quality standards for the protection of vegetation will be exceeded from either ground transport emissions or from aircraft. Only a low magnitude of change from current conditions is predicted resulting in no likely significant effects.
- 11.10.23 A summary of the results of the assessment of the North Somerset and Mendip Bat SAC is provided in **Table 11.12**.

Table 11.12 Summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (important orchid sites) European Dry Heaths <i>Tilio-Acerion</i> forests of slopes, screes and ravines Caves not open to the public				
Temporary habitat loss / damage during construction	Very High	Very Low	Negligible – not significant	No change to construction emissions to air and subsequent deposition on vegetation (e.g. nitrogen or construction dust) in excess of air quality standards for the protection of vegetation are predicted from the Proposed Development.
Permanent habitat loss / damage during construction	Very High	Very Low	Negligible – not significant	No change to nitrogen deposition in excess of air quality standards for the protection of vegetation are predicted from the Proposed Development.
Greater horseshoe bat (<i>Rhinolophus ferrumequinum</i>)				
Temporary loss / disturbance of roostsites during construction	Very High	Very Low	Negligible – not significant	No roosts are present within or adjacent to the construction site boundary and no change to roost sites for this species are therefore predicted from the Proposed Development.
Temporary loss / degradation of foraging habitat during construction	Very High	Medium	Moderate – probably significant	Embedded mitigation and enhancement measures will retain commuting habitat and deliver suitable replacement foraging habitat on site, although this is not sufficient to be compliant with the North Somerset and Mendip Bat SAC SPD. In addition, ongoing management of alternative suitable habitat within the application

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
				site will continue, there remains the presence of extensive suitable habitat in the adjacent and surrounding countryside, and the delivery of wider integrated/embedded mitigation measures that will improve connectivity across the application site and to/from the surrounding area. Additional Mitigation is required (See Section 11.18).
Temporary severance of flight lines during construction	Very High	Low	Low – not significant	Embedded mitigation and enhancement measures will ensure that existing flight lines are retained and protected during construction. The provision of the new planted landscape bund in the Silver Zone Car Park Extension (Phase 2), as part of the construction period, will further enhance the functionality of the perimeter habitats. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures that will improve connectivity across the application site and to/from the surrounding area. The removal of the woodland edge habitat and improvements to the A38 are not predicted to reduce the ecological functionality of connected bat habitats across the A38 at this location due to the absence of commuting horseshoe bat species recorded during the crossing point surveys and the continuation of existing lighting conditions along the A38.
Temporary noise and vibration disturbance during construction	Very High	Low	Negligible – not significant	No vulnerable roost features are present in the vicinity of the construction works. No night time working when bats will be active.
Temporary light disturbance during construction	Very High	Low	Negligible – not significant	No night time construction lighting.
Permanent loss / disturbance of roost sites during operation	Very High	Very Low	Negligible – not significant	No change to roost sites for this species are predicted from the operation of the Proposed Development.
Permanent loss / degradation of foraging habitat during operation	Very High	Medium	Moderate – probably significant	Embedded mitigation and enhancement measures will retain commuting habitat and create new foraging habitats whilst ongoing management will retain suitable replacement foraging habitat on site, although this is not sufficient to be compliant with the North Somerset and Mendip Bat SAC SPD. In addition, ongoing management of alternative suitable habitat within the application site will continue, and there will also be the presence of extensive suitable habitat in the adjacent and

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
				surrounding countryside, and the management of wider integrated/embedded mitigation measures that will maintain connectivity across the application site and to/from the surrounding area. Additional Mitigation is required (See Section 11.18).
Permanent severance of flight lines during operation	Very High	Low	Negligible – not significant	Embedded mitigation and enhancement measures will ensure that existing flight lines are retained and protected during operation. The provision of the new planted landscape bund in the Silver Zone Car Park Extension (Phase 2), as part of the construction period, will further enhance the functionality of the perimeter habitats and provide enhanced alternative flight lines. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures that will improve connectivity across the application site and to/from the surrounding area. No change in the ecological functionality of connected bat habitat across the A38 is predicted as a result of operational usage of the road because of the lack of recorded light sensitive bat crossings at this location and continuation of high levels of lighting.
Permanent noise and vibration disturbance during operation	Very High	Low	Negligible – not significant	No vulnerable roost features are present in the vicinity of the operational works. Greater and lesser horseshoe bat roosts associated with the SAC and constituent SSSIs are characterised with buildings and caves/mines and are well insulated from external noise.
Permanent light disturbance during operation	Very High	Low	Negligible – not significant	The permanent lighting will be operated, monitored and managed in accordance with best practice measures including Institute of Lighting Professionals and the Bat Conservation Trust. 2018. Bats and Artificial Lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18. Lux levels at the perimeter of the car parks at the Silver Zone Car Park Extension (Phase 2) will not exceed 0.5 lux (vertical and horizontal) and no greater than the currently agreed 1 lux at the location of the security fence of the Silver Zone car park Extension (Phase 1), with light levels decreasing beyond this. Lighting associated with the highway improvements along the A38/Downside Road junction will be no greater than current levels and <0.5 lux within and above the future woodland boundary/canopy.
Lesser horseshoe bat				

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
(<i>Rhinolophus hipposideros</i>)				
Temporary loss / disturbance of roost sites during construction	Very High	Very Low	Negligible – not significant	No roosts are present within or adjacent to the construction site boundary and no change to roost sites for this species are therefore predicted from the Proposed Development.
Temporary loss / degradation of foraging habitat during construction	Very High	Medium	Moderate – probably significant	Embedded mitigation and enhancement measures will retain commuting habitat and deliver suitable replacement foraging habitat on site, although this is not sufficient to be compliant with the North Somerset and Mendip Bat SAC SPD. In addition, ongoing management of alternative suitable habitat within the application site will continue, there remains the presence of extensive suitable habitat in the adjacent and surrounding countryside, and the delivery of wider integrated/embedded mitigation measures that will improve connectivity across the application site and to/from the surrounding area. Additional Mitigation is required (refer to Section 11.18).
Temporary severance of flight lines during construction	Very High	Low	Low – not significant	Embedded mitigation and enhancement measures will ensure that existing flight lines are retained and protected during construction. The provision of the new planted landscape bund in the Silver Zone Car Park Extension (Phase 2), as part of the construction period, will further enhance the functionality of the perimeter habitats. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures that will improve connectivity across the application site and to/from the surrounding area. The removal of the woodland edge habitat and improvements to the A38 are not predicted to reduce the ecological functionality of connected bat habitats across the A38 at this location due to the absence of commuting horseshoe bat species recorded during the crossing point surveys and the continuation of existing lighting conditions along the A38.
Temporary noise and vibration disturbance during construction	Very High	Low	Negligible – not significant	No vulnerable roost features are present in the vicinity of the construction works. No night time working when bats will be active.
Temporary light disturbance during construction	Very High	Low	Negligible – not significant	No night time construction lighting.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Permanent loss / disturbance of roost sites during operation	Very High	Very Low	Negligible – not significant	No change to roost sites for this species are predicted from the operation of the Proposed Development.
Permanent loss / degradation of foraging habitat during operation	Very High	Medium	Moderate – probably significant	Embedded mitigation and enhancement measures will retain commuting habitat and create new foraging habitats whilst ongoing management will retain suitable replacement foraging habitat on site, although this is not sufficient to be compliant with the North Somerset and Mendip Bat SAC SPD. In addition, ongoing management of alternative suitable habitat within the application site will continue, and there will also be the presence of extensive suitable habitat in the adjacent and surrounding countryside, and the management of wider integrated/embedded mitigation measures that will maintain connectivity across the application site and to/from the surrounding area. Additional Mitigation is required (refer to Section 11.18).
Permanent severance of flight lines during operation	Very High	Low	Negligible – not significant	Embedded mitigation and enhancement measures will ensure that existing flight lines are retained and protected during operation. The provision of the new planted landscape bund in the Silver Zone Car Park Extension (Phase 2), as part of the construction period, will further enhance the functionality of the perimeter habitats and provide enhanced alternative flight lines. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures that will improve connectivity across the application site and to/from the surrounding area. No change in the ecological functionality of connected bat habitat across the A38 is predicted as a result of operational usage of the road because of the lack of recorded light sensitive bat crossings at this location and continuation of high levels of lighting.
Permanent noise and vibration disturbance during operation	Very High	Low	Negligible – not significant	No vulnerable roost features are present in the vicinity of the operational works. Greater and lesser horseshoe bat roosts associated with the SAC and constituent SSSIs are characterised with buildings and caves/mines and are well insulated from external noise.
Permanent light disturbance during operation	Very High	Low	Negligible – not significant	The permanent lighting will be operated, monitored and managed in accordance with best practice measures including from the Institute of Lighting Professionals and the Bat Conservation Trust. ²⁶ levels at the perimeter of the car parks at Silver

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
				Zone Car Park Extension (Phase 2) will not exceed 0.5 lux (vertical and horizontal) and no greater than the currently agreed 1 lux at the location of the security fence of the Silver Zone Car Park Extension (Phase 1), with light levels decreasing beyond this. Lighting associated with the highway improvements along the A38/Downside Road junction will be no greater than current levels and <0.5 lux within and above the future woodland boundary/canopy.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.9**.

11.11 Assessment of effects: Other Statutorily Designated Sites

Baseline conditions

- 11.11.1 The most recent assessment of the condition of Goblin Combe SSSI (2009) confirmed both SSSI units were in favourable condition.
- 11.11.2 Approximately 47% of the Avon Gorge Woodlands SAC (as defined through its constituent SSSI) was recorded as being in a favourable condition on the Natural England Designated Sites View website (designatedsites.naturalengland.org.uk) whilst just over 53% was recorded as being in an unfavourable condition.
- 11.11.3 The most recent assessment of the condition of Mendip Woodland SAC (as defined through its constituent SSSI) in 2010 confirmed all SSSI units were in favourable condition.
- 11.11.4 The most recent assessment of the condition of Chew Valley Lake SPA (as defined through its constituent SSSI) in 2010 confirmed all SSSI units were in favourable condition.
- 11.11.5 Felton Common LNR supports a wide range of plants, birds, invertebrates and mammals. The most recent management plan⁷² identifies the following key features of interest and their importance:
- Acidic grassland: High County, District, and Local Importance;
 - Calcareous grassland: Moderate County, High District and High Local Importance;
 - Dwarf shrub: Moderate County, Moderate/Potentially High District, High Local Importance
 - Bird Populations: Moderate County, Moderate District, High Local Importance
 - Invertebrate: Potentially High County, Potentially High District, High Local Importance

Predicted effects and their significance

Construction

- 11.11.6 No air quality effects from emissions associated with construction (including dust are predicted) as a result of the implementation of embedded mitigation and management measures set out in **Chapter 8: Air Quality**. Specifically, as part of the CEMP the contractor will produce and implement a Dust Management Plan (DMP); this will include details of measures to identify and reduce the risk, monitoring any dust and identify appropriate clean-up measures. Consequently, only a low magnitude of change is predicted that generates no likely significant effects.
- 11.11.7 No notable disturbance or other related effects are predicted from the construction phase associated with the widening of the A38 to create a dedicated right turn at the A38 northbound at the junction of West Lane or the signalised left turn from the junction of West Lane onto the A38 (adjacent to the boundary of the Common) because of implementation of measures set out in the CEMP (**Appendix 2B**). Consequently, only a low magnitude of change is predicted that generates no likely significant effects.
- 11.11.8 **Chapter 8: Air Quality** (paragraph 8.10.16 and 8.10.17) concludes that *"Therefore, with embedded mitigation, there will be no significant effects as a result of dust generated during construction. As the IAQM Guidance states, "with the implementation of effective site-specific mitigation measures the*

⁷² Wessex Ecological Consultancy. 2015. Felton Common Management Plan v2 Dec 2015. A report prepared for Winford Parish Council

environmental effect will not be significant in most cases". Consequently, only a low magnitude of change is predicted that generates no likely significant effects.

Operation

- 11.11.9 The detailed air quality modelling work reported in **Chapter 8: Air Quality** has evaluated potential effects on ecological receptors from changes in operational air quality. For completeness, summary information is reproduced below.
- 11.11.10 Ecological effects: Annual mean nitrogen oxides (NO_x) concentrations in air
- Summary: Parts of Felton Common close to the A38 are predicted to exceed the limit value for annual mean NO_x, largely due to the existing baseline. At all other receptors, concentrations are well below the limit value. Under EA criteria, the impact at all ecological receptors, including Felton Common, is not significant. Consequently, only a low magnitude of change is predicted that generates no likely significant effects.
- 11.11.11 Ecological effects: Maximum daily mean NO_x concentrations in air
- Summary: It is likely that parts of Felton Common close to the A38 will exceed the target for daily mean NO_x, largely due to the existing baseline. At all Felton Common receptors, the PC is less than 100% of the AQAL, so under EA guidance, the impact is not significant. At all other receptors, concentrations are not expected to exceed the target. Notwithstanding this, under EA guidance, the impact at these receptors is not significant. Consequently, only a low magnitude of change is predicted that generates no likely significant effects.
- 11.11.12 Ecological effects: nutrient nitrogen deposition
- Summary: While exceedances of the critical loads for nitrogen are predicted at all receptors, these are due to existing deposition rates and the additional contribution from the Proposed Development is not significant at any receptor. Consequently, only a low magnitude of change is predicted that generates no likely significant effects.
- 11.11.13 Ecological effects: acid deposition
- Summary: While exceedances of the critical loads for acidity are predicted at two receptors, these are due to existing deposition rates and the additional contribution from the Proposed Development is insignificant at all receptors. Consequently, only a low magnitude of change is predicted that generates no likely significant effects.
- 11.11.14 Please refer to **Chapter 8: Air Quality** for full details.
- 11.11.15 Consequently, **no significant operational effects** will occur to the habitats or associated species that comprise the designated features of interest of the other statutorily designated sites listed above, which in turn will ensure that no adverse effect on the favourable conservation status of the features of interest and the SAC/SPA/SSSI as a whole is likely to occur. Consequently, only a low magnitude of change is predicted that generates no likely significant effects.
- 11.11.16 A summary of the results of the assessment of other statutorily designated sites is provided in **Table 11.13**.

Table 11.13 Summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Other Statutorily Designated Sites: Goblin Combe SSSI, Avon Gorge Woodlands SAC (and constituent SSSIs), Mendip Woodlands SAC (and constituent SSSIs), Chew Valley Lake SPA (and constituent SSSIs), Felton Common LNR	International, National, County			
Ecological effects: Annual mean NO_x		Very low	Negligible – not significant	Some parts of Felton Common exceed the AQAL, largely due to the existing background. However, under EA criteria, the impacts at this site can be considered insignificant. At all other ecological sites, the PEC is well below the AQAL and again the impacts can be considered insignificant under EA criteria.
Ecological effects: Daily mean NO_x		Very low	Negligible – not significant	At all ecological sites, the PEC is well below the AQAL and under EA criteria the impacts can be considered insignificant.
Ecological effects: Nutrient nitrogen deposition		Very low	Negligible – not significant	All ecological sites modelled exceed the critical load for nutrient nitrogen deposition, due to existing background. However, the additional contribution from the Proposed Development is small, and under EA criteria, the impacts at all ecological sites can be considered insignificant.
Ecological effects: Acid deposition		Very low	Negligible – not significant	Two ecological receptors are modelled to exceed the critical load for acid deposition, due to existing background. However, the additional contribution from the Proposed Development is small, and under EA criteria, the impacts at all ecological sites can be considered insignificant.
Air quality effects: construction dust		Very low	Negligible – not significant	Embedded mitigation measures will be designed and implemented to ensure that the potential significant adverse effects will not occur, so the effect with embedded mitigation will be not significant.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium and high.

3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.9**.

11.12 Assessment of effects: Non-Statutory Designated Sites

Baseline conditions

11.12.1 There are 23 non-statutory sites of local nature conservation importance located within 2km south, west and north of the boundary of the application site. There are no non-statutory sites located within the application site itself. The individual sites are listed below. No information pertaining to their current condition was available to inform this assessment and therefore a 'worst-case' scenario position has been adopted and it has been assumed that all are currently in unfavourable condition.

- Felton Hill and Common: semi-improved and unimproved acidic grassland, with unimproved calcareous grassland and scrub.
- Garley's Wood: Ancient semi-natural broad-leaved woodland with smaller areas of semi-improved neutral and improved grassland. Diverse ancient woodland ground flora.
- Oatfield Wood: Ancient semi-natural broadleaved woodland and semi-improved neutral grasslands. Diverse ancient woodland ground flora.
- Brockley Combe, Cleeve Hill and Goblin Combe: Ancient semi-natural broadleaved woodland much of which qualifies as Priority Habitat Upland Mixed Ashwoods with smaller areas of Priority Habitat Lowland Calcareous Grassland and Lowland Heathland.
- Heall's Scars: Semi-natural broadleaved woodland much of which qualifies as Priority Habitat Upland Mixed Ashwoods with semi-improved neutral grassland. Diverse ancient woodland ground flora.
- Woodland south of Broadfield Farm: Semi-natural broadleaved woodland, possible areas of Priority Habitat Lowland Mixed Deciduous Woodland, coniferous plantation, diverse limestone grassland. Includes part of Goblin Combe RIGS.
- High Wood, Lulsgate: Ancient semi-natural broadleaved woodland, part of which may be Priority Habitat Lowland Mixed Deciduous Woodland.
- Oatfield Pool: Semi-natural broadleaved woodland (carr) and swamp, with standing water and scrub.
- Hyatt's Wood: Ancient semi-natural broadleaved woodland, which may include some areas of Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.
- May's Grove Coppice and adjacent field: Semi-natural broadleaved woodland with diverse ground flora that may qualify as Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.
- Lye Wood: Semi-natural broadleaved woodland with diverse ground flora that may qualify as Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.
- Little Horts Wood and Horts Wood: Semi-natural broadleaved woodland with diverse ground flora that may qualify as Priority Habitat Lowland Mixed Deciduous Woodland.
- Scars Wood and adjacent field: Ancient semi-natural broadleaved woodland on Ancient Woodland Inventory and qualifying as Priority Habitat Lowland Mixed Deciduous Woodland, with unimproved, semi-improved neutral and limestone grassland.

- Tucker's Grove and Whitley Coppice: Ancient semi-natural broadleaved woodland, most of it on AWI (some as PAWS) and including areas of Priority Habitat Lowland Mixed Deciduous Woodland. Ancient woodland ground flora.
- Prestow Wood and Shippenhay's Wood: Ancient semi-natural broadleaved woodland, the majority of which is on AWI, and may include areas of Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.
- Littler Plantation: Semi-natural mixed woodland which may qualify as Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.
- Ball Wood and Corporation Woods: Ancient semi-natural broadleaved woodland, with mixed woodland plantation. Contains Priority Habitat Upland Mixed Ashwoods. Diverse ancient woodland ground flora. Wide variety of invertebrates; at least two Red Data Book (RDB) and three Nationally Notable moths. Lesser and greater horseshoe bats, Daubenton's and brown long-eared bat and common dormouse.
- Chelvey Wood: Ancient semi-natural broadleaved woodland which may qualify as Priority Habitat Upland Mixed Ashwoods. Diverse ancient woodland ground flora.
- Cheston Combe and Backwell Hill: Semi-natural broadleaved woodland with semi-improved neutral grassland.
- Bourton Combe: Ancient semi-natural broadleaved woodland with mixed deciduous plantation and scrub. Diverse ancient woodland ground flora. Dark green fritillary present, plus other butterflies and moths.
- Batches Wood: Ancient semi-natural and semi-natural broadleaved woodland. Diverse ancient woodland ground flora.
- Steven's Farm Fields: Neutral grassland.
- Barrow Rock Lane Fields: Semi-improved neutral grassland.

Predicted effects and their significance

- 11.12.2 Potential effects associated with the Proposed Development has on non-statutory designated sites could occur in the following ways:
- The extent and distribution of the natural habitats and species for which the site was designated;
 - The structure and function (including typical species) of habitats for which the site was designated;
 - The structure and function of the habitats of species for which the site was designated;
 - The supporting processes on which the habitats and species rely (for example, maintenance of current hydrological conditions); and
 - The populations of the species for which the site was designated and the distribution of those species within the site.
- 11.12.3 Consideration of how the Proposed Development could affect these sites and therefore cause a negative effect on their ecological status is set out below, separated into construction and operational effects.
- 11.12.4 There will be no temporary or permanent habitat loss within any of the non-statutory sites as a result of the proposals. Therefore, only potential effects arising from changes to air quality, noise

(disturbance effects), surface water/ flood risk or groundwater have been considered further in the remainder of this section.

Construction

- 11.12.5 No air quality effects from emissions associated with construction (including dust) are predicted as a result of the distance of all sites (other than Felton Common) from the construction and operational activities and the implementation of embedded mitigation and management measures set out in the CEMP (**Appendix 2B**) and as documented in **Chapter 8: Air Quality**. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant** effects on Biodiversity.
- 11.12.6 Similarly, no receptors have been identified that will be subject to significant noise or vibration effects during the construction phase of the development, that are not already habituated to existing and ongoing noise and vibration associated with operational airport activities or traffic associated with the A38, and/or as a result of the implementation of the integrated mitigation measures set out in the CEMP (**Appendix 2B**) and as documented in **Chapter 7: Noise and Vibration**. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.
- 11.12.7 No significant effects on local groundwater arising from construction activities have been predicted as a result of the Proposed Development after taking into account the embedded mitigation measures as set out in **Chapter 13: Groundwater** that could contribute to the quality and ecological condition of groundwater supported habitats. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.
- 11.12.8 **Chapter 12: Surface Water and Flood Risk** also concludes that there will be no significant effects on groundwater fed surface water courses and/or standing waters during construction as a result of the implementation of embedded mitigation and management measures. Consequently, only a low magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.
- 11.12.9 A wide range of integrated/embedded Biodiversity mitigation and enhancement measures will provide additional ecological functionality of habitats in the wider local area and these measures will be implemented as part of the Proposed Development. These are summarised in **Section 11.8** and illustrated on the Integrated / Embedded Landscape, Visual, Ecological Mitigation drawing location in **Appendix 11K**. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.
- 11.12.10 In summary, **no significant construction effects** are likely to occur on non-statutory designated sites as a result of the Proposed Development.

Operation

- 11.12.11 The results of the detailed air quality modelling work reported in **Chapter 8: Air Quality** conclude that no environmental air quality standards for the protection of vegetation will be exceeded from either ground transport emissions or from aircraft. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.
- 11.12.12 Similarly, potential impacts arising from noise/ vibration, changes to groundwater and surface water and/or flood risk have all been assessed as not significant in other chapters of this ES. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.
- 11.12.13 A wide range of further integrated/embedded mitigation and enhancement measures that will provide addition ecological functionality and long-term habitat suitability and will be implemented

as part of the Proposed Development. These are summarised in **Section 11.8** and illustrated on the Integrated / Embedded Landscape, Visual, Ecological Mitigation drawing location in **Appendix 11K**. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.

- 11.12.14 In summary, **no likely significant operational effects** will occur to non-statutory designated sites within 2km of the application site as a result of the Proposed Development.
- 11.12.15 A summary of the results of the assessment of non-statutory designated sites is provided in **Table 11.14**.

Table 11.14 Summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Non-Statutory Designated Sites				
Temporary loss/ disturbance to habitats and/or species during construction	High	Very Low	Negligible – not significant	No loss of any habitats. The only site local to the construction works is Felton Common. No notable disturbance or other related effects are predicted from the construction phase associated with the widening of the A38 to create a dedicated right turn at the A38 northbound at the junction of West Lane or the signalised left turn from the junction of West Lane onto the A38 (adjacent to the boundary of the Common) because of implementation of measures set out in the CEMP (Appendix 2B).
Impacts to the habitats and/or species assemblage which comprise the reason for designation of the non-statutory site due to changes in air quality (including dust deposition) during construction.	High	Very Low	Negligible – not significant	Embedded mitigation measures will be designed and implemented to ensure that the potential significant adverse effects will not occur, so the effect with embedded mitigation will be not significant.
Impacts to the habitats and/or species assemblage which comprise the reason for designation of the non-statutory site due to increases in noise and/or vibration during construction.	High	Very Low	Negligible – not significant	No loss of any habitats. The only site local to the construction works is Felton Common. No notable disturbance or other related effects are predicted from the construction phase associated with the widening of the A38 to create a dedicated right turn at the A38 northbound at the junction of West Lane or the signalised left turn from the junction of West Lane onto the A38 (adjacent to the boundary of the Common) because of implementation of measures set out in the CEMP (Appendix 2B).
Impacts to the habitats and/or species assemblage which comprise the reason for designation of the non-statutory site due to changes to groundwater quality or quantity during construction.	High	Very Low	Negligible – not significant	No significant changes predicted to groundwater within Chapter 13: Groundwater , after taking into account embedded mitigation.
Impacts to the habitats and/or species assemblage which comprise the reason for designation of the non-statutory site due to	High	Very Low	Negligible – not significant	No significant changes predicted to surface water quality or flooding within Chapter 12: Surface Water and Flood Risk , after taking into account embedded mitigation.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
changes in surface water (quality and/or quantity) or flood risk during construction.				
Permanent loss/ disturbance to habitats and/or species during operation	High	Very Low	Negligible – not significant	No habitat loss will occur.
Impacts to the habitats and/or species assemblage arising from changes in air quality (including dust deposition) during operation.	High	Very Low	Negligible – not significant	Chapter 8: Air Quality confirms that under EA guidance, the impact at these receptors from changes in NO _x is not significant. While exceedances of the critical loads for nitrogen are predicted at all receptors, these are due to existing deposition rates and the additional contribution from the Proposed Development is not significant at any receptor. While exceedances of the critical loads for acidity are predicted at two receptors, these are due to existing deposition rates and the additional contribution from the Proposed Development is insignificant at all receptors.
Impacts to the habitats and/or species assemblage arising from changes in noise and/or vibration levels during operation.	High	Very Low	Negligible – not significant	The changes in noise and vibration associated with the operational aspects Proposed Development will not introduce any variation in exposure to operational noise from airport-related activity. Although there will be an increase in road traffic and aircraft movements, this is an extension of existing conditions that have been encountered by any noise sensitive species over many decades, particularly in the last decade. Surveys of e.g. birds and mammals at the application site show that these species are habituated to noise and vibration with badgers creating and extended setts under active operational areas and the Airport Safety Unit having to continue its regular process of bird scaring activities. It is therefore considered reasonable to conclude that no significant effects will occur at these sites.
Impacts to the habitats and/or species assemblage arising from changes in groundwater quality or quantity during operation.	High	Very Low	Negligible – not significant	No significant changes predicted to groundwater within Chapter 13: Groundwater , after taking into account embedded mitigation.
Impacts to the habitats and/or species assemblage arising from changes in surface water quality or quantity or increased flood risk during operation.	High	Very Low	Negligible – not significant	No significant changes predicted to surface water quality or flooding within Chapter 12: Surface Water and Flood Risk , after taking into account embedded mitigation.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.9**.

11.13 Assessment of effects: Priority Habitats

Baseline conditions

Lowland calcareous grassland

- 11.13.1 Two small areas of species-rich calcareous grassland has been recorded at the application site (please refer to **Appendix 11B**) and is located outside of the Proposed Development footprint. This habitat is considered to be in reasonable condition and is subject to no nutrient inputs and annual management (cutting). This habitat type has a 'low' climate change sensitivity⁷³.

Lowland acid grassland

- 11.13.2 It is understood that areas of acid grassland are located on Felton Common, to the east of the application site. These areas are subject to management (cutting) although recreational disturbance may cause low levels of poaching along desire lines. This habitat type has a 'low' climate change sensitivity⁷³.

Ancient woodland

- 11.13.3 Areas of Ancient Woodland are located away from the application site and include Brockley Combe, Garleys Wood, Hyatts Wood, Oatfield Wood, Lye Wood, Scars Wood, High Wood, Horts Wood, Little Horts Wood, Tuckers Grove and Whitley Coppice, Shippenhays Wood, Prestow Wood and Corporation Woods. This habitat type has a 'low' climate change sensitivity (Natural England and RSPB. 2014. Climate Change Adaptation Manual).
- 11.13.4 Groundwater-fed surface watercourses are associated with the aquifer under the application site
- 11.13.5 These include the River Kenn (good ecological and good chemical status under the Water Framework Directive), Land Yeo (moderate ecological and good chemical status under the Water Framework Directive), River Chew (moderate ecological and good chemical status under the Water Framework Directive), Winford Brook (poor ecological and good chemical status under the Water Framework Directive), and Congresbury Yeo (moderate ecological and chemical status under the Water Framework Directive). This habitat type has a 'high climate change sensitivity'⁷³.

Predicted effects and their significance

- 11.13.6 Potential effects on Priority Habitats associated with changes in air quality have been addressed in **Chapter 8: Air Quality**. This has concluded that **no significant effects** from construction or operational activities will arise, taking into account embedded mitigation and enhancement measures. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.
- 11.13.7 Whilst calcareous grassland has been recorded at the application site, this habitat is outside of the development footprint. Other areas of calcareous grassland are present in the wider area.
- 11.13.8 There is no Ancient Woodland directly affected by the Proposed Development footprint or directly adjacent to the application site. Other areas of Ancient Woodland are present in the wider area. Potential effects associated with changes in air quality have been addressed in **Chapter 8: Air Quality**. This has concluded that **no significant effects** from construction or operational activities

⁷³ Natural England (2014). Climate Change Adaptation Manual, [online]. Available at: <http://publications.naturalengland.org.uk/publication/5629923804839936> [Checked 05/12/2018].

will arise, taking into account embedded mitigation and enhancement measures. Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on Biodiversity.

- 11.13.9 Lowland acid grassland has been recorded at Felton Common, adjacent to the application site. However, this habitat is outside of the development footprint. Other areas of acid grassland are present in the wider area. Potential effects associated with changes in air quality have been addressed in **Chapter 8: Air Quality**. This has concluded that **no significant effects** from construction or operational activities will arise, taking into account embedded mitigation and enhancement measures.
- 11.13.10 Groundwater-fed surface watercourses (and any watercourse) are not directly associated with the application site, although the aquifer under the application site feeds into a number of watercourses. Detailed assessments of potential changes and effects arising from the construction and operational activities (**Chapters 12: Surface Water and Flood Risk** and **Chapter 13: Groundwater**) have concluded that **no likely significant effects** will occur, accounting for embedded mitigation and enhancement measures.
- 11.13.11 A summary of the results of the assessment of the effects on Biodiversity is provided in **Table 11.15**.

Table 11.15 Summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Lowland calcareous grassland	High	Very low	Negligible – not significant	This habitat is not present within the development footprint. Detailed assessments and the use of integrated mitigation and enhancement measures have led to the conclusion (as detailed elsewhere in this ES) that no construction of operational significant effect is likely.
Lowland acid grassland	High	Very low	Negligible – not significant	This habitat is not present within the development footprint. Detailed assessments and the use of integrated mitigation and enhancement measures have led to the conclusion (as detailed elsewhere in this ES) that no construction of operational significant effect is likely.
Ancient woodland	High	Very low	Negligible – not significant	This habitat is not present within the development footprint. Detailed assessments and the use of integrated mitigation and enhancement measures have led to the conclusion (as detailed elsewhere in this ES) that no construction of operational significant effect is likely.
Groundwater-fed surface watercourses	High	Very low	Negligible – not significant	This habitat is not present within the development footprint. Detailed assessments and the use of integrated mitigation and enhancement measures have led to the conclusion (as detailed elsewhere in this ES) that no construction of operational significant effect is likely.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.9**.

11.14 Assessment of effects: Bats

Baseline conditions

- 11.14.1 Large areas across the application site are generally of low suitability for bats including the terminal and associated car parking and infrastructure and the Silver Zone parking areas. Large areas of managed grassland exist across the airside grasslands but these are of limited suitability due to the increased level of lighting and noise disturbance and the management of the sward in accordance with CAP:772 to reduce the appeal of the grassland for wildlife. A number of small, isolated habitats are also present within and surrounding these areas that exhibit suitability for bats but this is very limited by the levels of disturbance within the operational airside and landside areas of the application site.
- 11.14.2 The main areas of importance for bats are limited to the areas on the current boundary of the application site, specifically:
- Cornerpool Wood;
 - Cornerpool Field;
 - Downside Woodland (located near the A38 Highway improvements area); and
 - The Silver Zone Car Park Extension (Phase 2) area.
- 11.14.3 The only known active bat roosts are located within Cornerpool Woodland, supporting low numbers of lesser horseshoe bats (hibernation and day roosts) and in an artificial roost on the north western boundary of the application site close to Downside Road.
- 11.14.4 The surveys conducted in 2018 in Silver Zone Car Park Extension (Phase 2) area and A38 highway improvements recorded the following species:
- Common pipistrelle (*Pipistrellus pipistrellus*);
 - Soprano pipistrelle (*Pipistrellus pygmaeus*);
 - Nathusius' pipistrelle (*Pipistrellus nathusii*);
 - Serotine (*Eptesicus serotinus*);
 - Common Noctule (*Nyctalus noctula*);
 - Leisler's (Lesser Noctule) (*Nyctalus Leisleri*);
 - Greater Horseshoe (*Rhinolophus ferrumequinum*);
 - Lesser Horseshoe (*Rhinolophus hipposideros*);
 - *Plecotus* species; and
 - *Myotis* species.
- 11.14.5 Further assessment of the survey results concluded the following:
- Common pipistrelle - High levels of activity were recorded throughout the natal period (the Silver Zone Car Park Extension (Phase 2) areas boundary features) implying that the study area could provide a foraging resource for a maternity roost

- *Myotis* species. - High levels of activity were recorded throughout the natal period (A38 highway improvements area woodland canopy) implying that the study area could provide a foraging resource for a maternity roost and an important pre-hibernation foraging resource.
- Greater Horseshoe - Activity levels in excess of the SPD foraging activity threshold were recorded at 11 of the 12 automated detector locations in both the Silver Zone Car Park Extension (Phase 2) (hedgerows and grazed grassland/scrub matrix) and A38 highway improvements area (woodland and northern boundary hedgerow) within the natal period implying that the study area could provide a foraging resource for breeding roosts associated with the North Somerset and Mendip Bats SAC
- Lesser Horseshoe - Activity levels in excess of the SPD foraging activity threshold were recorded at all 12 of the automated detector locations, particularly in the post-natal period in the woodland adjacent to the A38 and Downside Road junction where A38 highway Improvements are proposed, and also at lower levels within the natal period implying that the study area could provide a foraging resource for roosts associated with the North Somerset and Mendip Bats SAC.

11.14.6 **Appendix 11E** provides a further detailed description of the baseline conditions relating to bats.

Predicted effects and their significance

11.14.7 The Proposed Development has the potential to affect the local bat population, comprising a number of different species in the following ways:

- The extent and distribution of supporting habitats (e.g. roosts, foraging, flight-lines/commuting);
- The structure and function of bat habitats;
- The supporting processes on which bat habitats rely;
- The populations of bats; and
- The distribution of bats within the application site.

11.14.8 Consideration of how the Proposed Development could affect bats is set out below, separated into construction and operational effects.

Construction

11.14.9 There is the potential for direct effects to the foraging and commuting habitat and behaviour of all species of bats at the application site from the loss of 3.7ha of suitable habitat from the construction of the Silver Zone Car Park Extension (Phase 2) and 0.16ha of suitable habitat associated with the A38 Highway Improvement Works.

11.14.10 The Measures set out in the Integrated and Embedded Landscape, Visual and Ecology Mitigation Masterplan (refer to **Appendix 11K**) provide a wide range of additional habitat features on land owned by Bristol Airport that will help support all species of bat including new/improved commuting/foraging habitat as well as enhanced/new building roosts. This includes the full retention of the boundary habitats associated with the Silver Zone Car Park Extension (Phase 2) and the majority of the A38 Highway Improvements area, provision of significant new/enhanced species rich grassland, trees, hedgerow, woodland management, new woodland and extended/additional building roosts. Furthermore, there remains extensive suitable habitat in the adjacent and wider landscape that can also provide this function (including land owned by BAL and managed for horseshoe bats).

- 11.14.11 Consequently, the retained and planted perimeter of the new car parking and the woodland associated with the A38 Highway Improvement Works will remain suitable for foraging and commuting bats resulting in only a **low** magnitude of change and **negligible/no significant effects**.
- 11.14.12 No artificial lighting that will illuminate the retained foraging/commuting habitat will be used during the construction of the Silver Zone Car Park Extension (Phase 2) and the A38 Highway Improvement Works.
- 11.14.13 The construction work associated with the proposals to use the adjacent car parking at the Silver Zone Car Park Extension (Phase 1) in a permanent year-round operation will not have any notable effects on retained bat habitat or individual animals. The construction works are limited to the installation of permanent lighting (the use of which is assessed in the consideration of operational effects below), resulting in only a **low** magnitude of change (if not **very low**) and **negligible / no significant effects**.
- 11.14.14 No air quality effects from emissions associated with construction (including dust) are predicted as a result of the implementation of embedded mitigation and management measures as set out in the CEMP (**Appendix 2B**) and as documented in **Chapter 8: Air Quality**. Consequently, **no significant construction effects** as a result of changes in air quality are likely to occur to bat habitats or species, which in turn will ensure that there are no likely significant effects on the local bat populations as a whole.

Operation

- 11.14.15 Potential operational effects on bats relate to maintaining and managing habitats so they are suitable for continued use, lighting of retained bat habitat associated with the Silver Zone Car Park Extension (Phase 2), the A38 Highway Improvements, and the Silver Zone Car Park Extension (Phase 1).
- 11.14.16 Detailed management prescriptions will be implemented for all embedded mitigation and management features, including the trees planted along the northern boundary of the north side Bristol Airport car park (Measure 3), and the management and enhancement of the grassland, woodland and planting of new woodland associated with Measures 5, 6 and 7. These will all be completed, monitored and reported on in accordance with the requirements of a proposed planning condition.
- 11.14.17 The permanent lighting will be operated, monitored and managed in accordance with best practice measures including those provided by the Institute of Lighting Professionals and the Bat Conservation Trust.²⁶ Lux level at the perimeter of the car park, at the location of the security fence at the Silver Zone Car Park Extension (Phase 1) will not exceed the current agreed level of 1 lux and at 0.5 lux (vertical and horizontal), for the Silver Zone Car Park Extension (Phase 2) with light levels decreasing beyond this. Only a **low** magnitude of change from current conditions is predicted resulting in **no significant effects**.
- 11.14.18 Lighting associated with the highway improvements along the A38/Downside Road junction will be no greater than current levels and <0.5 lux within and above the future woodland boundary/canopy. As such no change in suitability of the road for bat crossing or use of the retained woodland and other features by bats is likely to change. This will be achieved through the use of specific lighting design criteria and guidelines²⁶) as well the use of planting and fencing to reinforce the margins avoiding woodland light penetration if necessary. Therefore, only a **low** magnitude of change from current conditions is predicted, resulting in **no likely significant effects**.

- 11.14.19 There is the potential for emissions to air from an increased number of aircraft taking off and landing at Bristol Airport and an increase in road traffic associated with the application site to result in nitrogen deposition and a reduction in the condition of vegetated habitats used by bats.
- 11.14.20 The results of the detailed air quality modelling work reported in **Chapter 8: Air Quality** concludes that no environmental air quality standards for the protection of vegetation will be exceeded from either ground transport emissions or from aircraft. Only a **low** magnitude of change from current conditions is predicted resulting in **no likely significant effects**.
- 11.14.21 A summary of the results of the assessment on bats is provided in **Table 11.12**.

Table 11.12 Summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
All species of bat				
Temporary loss / disturbance of roost sites during construction	Very High	Very Low	Negligible – not significant	No roosts are present within or adjacent to the construction site boundary and no change to roost sites for this species are therefore predicted from the Proposed Development.
Temporary loss / degradation of foraging habitat during construction	Very High	Medium	Moderate – probably significant	Embedded mitigation and enhancement measures will retain commuting habitat and deliver suitable replacement foraging habitat on site. In addition, ongoing management of alternative suitable habitat within the application site will continue, there remains the presence of extensive suitable habitat in the adjacent and surrounding countryside, and the delivery of wider integrated/embedded mitigation measures that will improve connectivity across the application site and to/from the surrounding area. Additional Mitigation is also proposed for greater and horseshoe bats, but this will also be of benefit to other bat species (See Section 11.17).
Temporary severance of flight lines during construction	Very High	Low	Low – not significant	Embedded mitigation and enhancement measures will ensure that existing flight lines are retained and protected during construction. The provision of the new planted landscape bund in the Silver Zone Car Park Extension (Phase 2), as part of the construction period, will further enhance the functionality of the perimeter habitats. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures that will improve connectivity across the application site and to/from the surrounding area. The removal of the woodland edge habitat and improvements to the A38 are not predicted to reduce the ecological functionality of connected bat habitats across the A38 at this location due to the absence of commuting horseshoe bat species recorded during the crossing point surveys and the continuation of existing lighting conditions along the A38.
Temporary noise and vibration disturbance during construction	Very High	Low	Negligible – not significant	No vulnerable roost features are present in the vicinity of the construction works. No night time working when bats will be active.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Temporary light disturbance during construction	Very High	Low	Negligible – not significant	No night time construction lighting.
Permanent loss / disturbance of roost sites during operation	Very High	Very Low	Negligible – not significant	No change to roost sites for this species are predicted from the operation of the Proposed Development.
Permanent loss / degradation of foraging habitat during operation	Very High	Medium	Moderate – probably significant	Embedded mitigation and enhancement measures will retain commuting habitat and create new foraging habitats whilst ongoing management will retain suitable replacement foraging habitat on site. In addition, ongoing management of alternative suitable habitat within the application site will continue, and there will also be the presence of extensive suitable habitat in the adjacent and surrounding countryside, and the management of wider integrated/embedded mitigation measures that will maintain connectivity across the application site and to/from the surrounding area. Additional Mitigation is also proposed for greater and horseshoe bats, but this will also be of benefit to other bat species (refer to Section 11.17).
Permanent severance of flight lines during operation	Very High	Low	Negligible – not significant	Embedded mitigation and enhancement measures will ensure that existing flight lines are retained and protected during operation. The provision of the new planted landscape bund in the Silver Zone Car Park Extension (Phase 2), as part of the construction period, will further enhance the functionality of the perimeter habitats and provide enhanced alternative flight lines. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures that will improve connectivity across the application site and to/from the surrounding area. No change in the ecological functionality of connected bat habitat across the A38 is predicted as a result of operational usage of the road because of the lack of recorded light sensitive bat crossings at this location and continuation of high levels of lighting.
Permanent noise and vibration disturbance during operation	Very High	Low	Negligible – not significant	No vulnerable roost features are present in the vicinity of the operational works.
Permanent light disturbance during operation	Very High	Low	Negligible – not significant	The permanent lighting will be operated, monitored and managed in accordance with best practice measures including from the Institute of Lighting Professionals and the Bat Conservation Trust. ²⁶ Lux levels at the perimeter of the car parks at the

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
				Silver Zone Car Park Extension (Phase 2) will not exceed 0.5 lux (vertical and horizontal) and no greater than the currently agreed 1 lux at the location of the security fence of the Silver Zone Car Park Extension (Phase 1), with light levels decreasing beyond this. Lighting associated with the highway improvements along the A38/Downside Road junction will be no greater than current levels and <0.5 lux within and above the future woodland boundary/canopy.

4. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium, high and very high.
5. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium and high.
6. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.9**.

11.15 Assessment of effects: Breeding Birds

Baseline conditions

- 11.15.1 Only common and ubiquitous bird species have been recorded from within the application site, with only one species of conservation significance (dunnock) having been recorded during the course of recent surveys.
- 11.15.2 The majority of bird records associated with the grassland, hedges and scattered scrub associated with the Silver Zone Car Park Extension (Phase 2) area, including the majority of dunnock territories, were concentrated along the southern and eastern site boundaries and within the mature scrub within the grazed pasture. Dunnock were recorded during all survey visits in this area within the scrub and the hedgerows on the eastern, western and southern boundaries.
- 11.15.3 The highly-disturbed nature of the A38 and car parking associated with the A38 highway improvements area, both in terms of noise and the operation of a commercial car parking facility on the Airport Tavern site, would appear to severely limit the diversity of bird species at this location. Common woodland bird species were recorded throughout the woodland at the A38 highway improvements area. Dunnock were recorded during all survey visits in this area within the woodland. Other species have been recorded on the airfield grassland by the ASU.

Predicted effects and their significance

- 11.15.4 The Proposed Development has the potential to affect local breeding birds, comprising several different species in the following ways:
- The extent and distribution of suitable habitats;
 - The structure and function of suitable habitats;
 - The populations of breeding birds; and
 - The distribution of breeding birds within the application site.
- 11.15.5 Consideration of how the Proposed Development could affect breeding birds is set out below, separated into construction and operational effects.

Construction

- 11.15.6 Construction phase impacts on birds relate to the potential loss of foraging and nesting habitat and the potential for damage to active nests and breeding birds/eggs and young. This relates to the removal of a small area (circa 0.3ha) of potential nesting habitat in scrub associated with the footprint of the proposed Extension to the Silver Zone Car Park (Phase 2).
- 11.15.7 Consideration of these potential effects have been examined and successfully managed previously during the construction of the car parking associated with the Silver Zone Car Park Extension (Phase 1). A high level of confidence on the process and success of embedded mitigation and enhancement measures can therefore be given.
- 11.15.8 Grass and scrub will be removed prior to a top soil strip and re-profiling of the surface of the field. The topsoil will be moved and shaped to form a bund around the perimeter of the field. The bund will be positioned to ensure sufficient off-set is granted from the fully retained trees, hedgerow and their associated root protection areas. The bund will be subsequently seeded and planted with a species rich wildflower grass mix with trees and shrubs planted on the top and rear.

- 11.15.9 Consequently, the retained and planted perimeter of the car parking will be designed to provide suitable replacement breeding bird habitat (circa 0.3ha).
- 11.15.10 Whilst there remains extensive suitable habitat in the adjacent and wider landscape (including land owned by BAL), embedded mitigation and enhancement measures will provide additional habitat for breeding birds within the proposed Extension to the Silver Zone Car Park (Phase 2) area, including: new perimeter bund with design, planting and seeding to replicate existing bund adjacent to the Silver Zone seasonal car park (Phase 1); existing woodland copse (south of the Silver Zone long-stay car park) to have management regime enhanced; introduction of parkland trees and small areas of scrub habitat to Gruffy's Field to enhance habitat for a range of species, including bats and birds; and reinforcing existing hedgerows.
- 11.15.11 **Section 11.8** describes the integrated mitigation and enhancement measures which form part of the Proposed Development. These are shown in the Integrated/Embedded Landscape, Visual and Ecological Mitigation Masterplan prepared by Wood (reproduced in **Appendix 11K**).
- 11.15.12 The construction work associated with the Silver Zone seasonal car park (Phase 1) to facilitate permanent, year-round operation of the Silver Zone seasonal car park (Phase 1) will not have any effects on breeding birds. The construction works are limited to the installation of permanent lighting.
- 11.15.13 The construction phase of the highway improvement works associated with the A38 and Downside Road will result in the removal of an estimated 0.16ha of the edge of the sycamore dominated woodland, that is used by a small numbers of common bird species, and the conservation notable dunnoek.
- 11.15.14 The construction work will involve the careful felling and removal of a limited number of trees and scrub. At the same time, woodland management works encompassing any necessary tree surgery, improving structure and removal of invasive non-native species, together with additional planting of native evergreens including holly and yew will occur, including along the new woodland edge.
- 11.15.15 Consequently, there is a net loss of 0.16ha of suitable nesting habitat under the footprint of the highway improvement works. Whilst there remains extensive suitable habitat in the adjacent and wider landscape (including land owned by BAL), embedded mitigation and enhancement measures will provide additional habitat for breeding birds within the A38 highway improvements area, including: woodland management to improve structure and composition comprising the removal of non-native invasive species and planting of native local species including yew and holly along the woodland margin to increase ecological functionality and habitat suitability for a range of species including breeding birds. A further area of new woodland will be planted close to the main A38 entrance to Bristol Airport.
- 11.15.16 Hedgerows will be reinforced and scrub planting extended in other areas of the site to further enhance existing habitats and to provide additional habitat for breeding birds away from the operational areas of the application site.
- 11.15.17 No air quality effects from emissions associated with construction (including dust) are predicted as a result of the implementation of embedded mitigation and management measures as set out **Chapter 8: Air Quality**.
- 11.15.18 A wide range of further integrated/embedded mitigation and enhancement measures that will provide addition ecological functionality and long-term habitat suitability will be implemented as part of the Proposed Development. These are summarised in **Section 11.8** and illustrated on the Integrated / Embedded Landscape, Visual, Ecological Mitigation Masterplan located in **Appendix 11K**.

- 11.15.19 Consequently, only a **low** magnitude of change is predicted that generates **no likely significant effects** on birds.

Operation

- 11.15.20 Potential operation effects on breeding birds relate to the potential increase in nesting habitat availability as the integrated landscape and ecological mitigation measures associated with tree and hedge planting begin to mature, and from improvements in existing habitats as management measures mature.
- 11.15.21 The proposals associated with the permanent year-round use of car parking at the Silver Zone Car Park Extension (Phase 1) and the Silver Zone Car Park Extension (Phase 2) area will not result in any change in operational use, car park surfacing, character of the perimeter planted landscape bund, the retained hedgerow or tree lined perimeter.
- 11.15.22 Detailed management prescriptions will be implemented for all embedded mitigation and management features, including the off-site woodland management proposals, the tree planting along the northern boundary of the north side Bristol Airport car park (Measure 3), the management and enhancement of the grassland, woodland and planting of new woodland associated with Measures 4, 5, 6 and 7.
- 11.15.23 The results of the detailed air quality modelling work reported in **Chapter 8: Air Quality** conclude that no environmental air quality standards for the protection of vegetation will be exceeded from either ground transport emissions or from aircraft.
- 11.15.24 A wide range of further integrated/embedded mitigation and enhancement measures that will provide additional ecological functionality and long-term habitat suitability will be implemented as part of the Proposed Development. These are summarised in **Section 11.8** and illustrated on the Integrated / Embedded Landscape, Visual, Ecological Mitigation Masterplan in **Appendix 11K**.
- 11.15.25 Consequently, only a **low-very low** magnitude of change is predicted and **no likely significant operational effects** will occur to the local breeding bird population.
- 11.15.26 A summary of the results of the assessment of breeding birds is provided in **Table 11.17**.

Table 11.17 Summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Breeding Birds				
Temporary loss/ disturbance of nesting bird habitat during construction	High	Very Low	Negligible – not significant	Any vegetation clearance works likely to impact nesting birds will be undertaken outside the bird breeding season, i.e. during the period September – mid-February. No impacts are therefore predicted from the Proposed Development.
Temporary noise and vibration disturbance during construction	High	Low	Negligible – not significant	Any works likely to cause disturbance to breeding birds as a result of noise or vibration will be undertaken outside the breeding season. Birds commonly using the application site will be habituated to certain levels of noise and disturbance by human activity due to the operational nature of Bristol Airport. No impacts are therefore predicted as a result of the proposals.
Permanent loss/ disturbance of nesting habitat during operation	High	Very Low	Negligible – not significant	No change to nesting habitat is predicted from the operation of the Proposed Development.
Permanent noise and vibration disturbance during operation	High	Low	Negligible – not significant	No nesting habitat are present in the vicinity of operational works.
Increase in the quality and extent of available nesting habitat	High	Low	Minor – not significant	Integrated mitigation and enhancement measures will provide additional areas of suitable nesting habitat for a range of bird species.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.9**.

11.16 Assessment of effects: Badgers

Baseline conditions

- 11.16.1 Badger are present at Bristol Airport and they are known to use areas associated with the application site. Badgers can access the airfield, and to date, no conflict between badger foraging and the safe operation of Bristol Airport/aircraft has been recorded.

Predicted effects and their significance

- 11.16.2 The Proposed Development has the potential to affect local badger clans in the following ways:
- The extent and distribution of suitable foraging habitat;
 - Access to foraging habitat;
 - The extent and distribution of habitats suitable for sett excavation; and
 - The distribution of badgers within the application site.
- 11.16.3 Consideration of how the Proposed Development could affect badgers is set out below, separated into construction and operational effects.

Construction

- 11.16.4 Construction phase effects on badger relate to the loss of circa 3.73ha of suitable foraging habitat associated with the footprint of the Silver Zone Car Park Extension(Phase 2).
- 11.16.5 Potential effects on badger from Silver Zone Car Park Extension (Phase 2) area have been considered in detail and are considered to be very similar to issues successfully addressed during the construction of car parking elsewhere at Bristol Airport. A high level of confidence in the process and success of embedded mitigation and enhancement measures can therefore be given.
- 11.16.6 Grass and scrub will be removed prior to a top soil strip and re-profiling of the surface of the field. The topsoil will be moved and shaped to form a bund around the perimeter of the field. The bund will be positioned to ensure sufficient off-set is granted from the fully retained trees, hedgerow and their associated root protection areas. The bund will be subsequently seeded and planted with a species rich wildflower grass mix with trees and shrubs planted on the top and rear, which will provide additional foraging habitat for badgers, together with opportunities for sett creation.
- 11.16.7 Consequently, the retained and planted perimeter of the car parking will be designed to provide suitable badger habitat, something that has been very successful elsewhere at Bristol Airport.
- 11.16.8 Whilst there remains extensive suitable habitat in the adjacent and wider landscape (including land owned by BAL), embedded mitigation and enhancement measures will provide additional habitat for badgers within Silver Zone Car Park Extension (Phase 2) area, including:
- Restoration of an existing pond to the south-west of Silver Zone Car Park Extension (Phase 2) area, which will provide an additional water supply for badgers;
 - Installation of two-way badger gates along the bund between the Silver Zone Car Park Extension (Phase 1) and Silver Zone Car Park Extension (Phase 2) area to maintain access to foraging habitat and areas suitable for sett creation within the wider landscape to the south;
 - Management of woodland areas and additional scrub planting to enhance habitat diversity within the application site; and

- Reinforcement of existing hedgerows.

- 11.16.9 **Section 11.8** describes the integrated mitigation and enhancement measures which form part of the Proposed Development. These are shown in the Integrated/Embedded Landscape, Visual and Ecological Mitigation Masterplan (reproduced in **Appendix 11K**).
- 11.16.10 The construction work associated with Silver Zone Car Park) to facilitate permanent, year-round operation of the Silver Zone Car Park Extension (Phase 1) will not have any effects on badgers. The construction works are limited to the installation of permanent lighting (the use of which is assessed in the consideration of operational effects below).
- 11.16.11 The construction phase of the highway improvement works at the Downside Road and the A38 area will result in the removal of an estimated 0.16ha of the edge of the sycamore dominated woodland. To date, no evidence of badgers has been recorded from within this area of woodland, nor that adjacent to the A38 roundabout.
- 11.16.12 Construction will involve the careful felling and removal of a limited number of trees and scrub. At the same time, woodland management works encompassing any necessary tree surgery, improving structure and removal of invasive non-native species, together with additional planting of native evergreens including holly and yew will occur, including along the new woodland edge.
- 11.16.13 Consequently, there is a net loss of 0.16ha of habitat under the footprint of the A38 highway improvement works. Whilst there remains extensive suitable habitat in the adjacent and wider landscape (including land owned by BAL), embedded mitigation and enhancement measures will provide additional habitat opportunities for badgers at the A38 highway improvements area and immediately adjacent areas, including:
- Woodland management in two areas close to the A38 highway improvement areas to improve structure and composition comprising the removal of non-native invasive species and planting of native local species including yew and holly along the woodland margin to increase ecological functionality and habitat suitability for a range of species including badgers;
 - Planting of parkland trees within an area of grassland which will enhance foraging opportunities;
 - Planting of new areas of woodland and scrub;
 - Enhancement of grassland to the east of the A38 by increasing species diversity through the use of a suitable seed mix and implementation of an appropriate management regime which will provide enhanced foraging habitat for badgers; and
 - Reinforcement of existing hedgerows.
- 11.16.14 Hedgerows will be reinforced and scrub planting extended in other areas of the application site to further enhance existing habitats and to provide additional foraging habitat for badgers away from the operational areas of the application site.
- 11.16.15 No air quality effects from emissions associated with construction (including dust) are predicted as a result of the implementation of embedded mitigation and management measures as set out in **Chapter 8: Air Quality**.
- 11.16.16 A wide range of further integrated/embedded mitigation and enhancement measures that will provide additional ecological functionality and long-term habitat suitability will be implemented as part of the Proposed Development. These are summarised in **Section 11.8** and illustrated on the Integrated / Embedded Landscape, Visual, Ecological Mitigation drawing location in **Appendix 11K**.
- 11.16.17 Consequently, only a **low-very low** magnitude of change is predicted and **no significant construction effects** will occur to the local badger population.

Operation

- 11.16.18 **No likely significant operational effects** will occur to the local badger population.
- 11.16.19 The proposals associated with the permanent year-round use of car parking at the Silver Zone Car Park Extension (Phase 1) and the Silver Zone Car Park Extension (Phase 2) will not result in any change in operational use, car park surfacing, character of the perimeter planted landscape bund, the retained hedgerow or tree lined perimeter.
- 11.16.20 Detailed management prescriptions will be implemented for all embedded mitigation and management features, including the off-site woodland management proposals, the tree planting along the northern boundary of the north side Bristol Airport car park (Measure 3), the management and enhancement of the woodland and planting of new woodland associated with Measures 5, 6 and 7.
- 11.16.21 Lighting levels will be carefully modelled and designed to mitigate impacts on rare horseshoe bats (refer to **Section 11.14**). This will also serve to mitigate potential impacts to local badger clans using the adjacent bund so that emergence and foraging behaviours will not be significantly affected.
- 11.16.22 The results of the detailed air quality modelling work reported in **Chapter 8: Air Quality** conclude that no environmental air quality standards for the protection of vegetation will be exceeded from either ground transport emissions or from aircraft.
- 11.16.23 A wide range of further integrated/embedded mitigation and enhancement measures that will provide addition ecological functionality and long-term habitat suitability will be implemented as part of the Proposed Development. These are summarised in **Section 11.8** and illustrated on the Integrated / Embedded Landscape, Visual, Ecological Mitigation drawing location in **Appendix 11K**.
- 11.16.24 Consequently, only a **low-very low** magnitude of change is predicted and **no significant operational effects** will occur to the local badger population.
- 11.16.25 A summary of the results of the assessment of badgers is provided in **Table 11.18**.

Table 11.18 Summary of significance of adverse and beneficial effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Badgers				
Temporary loss/ degradation of suitable badger foraging habitat during construction	Low	Very Low	Negligible – not significant	Embedded mitigation and enhancement measures will deliver the commencement of suitable replacement habitat both on site and off site, some of which will be in place prior to construction commencing. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures.
Temporary access restrictions to areas of suitable habitat (for foraging and/or sett construction)	Low	Very Low	Negligible – not significant	Embedded mitigation and enhancement measures will ensure that access to suitable habitat in the wider local area is maintained throughout the construction period. The provision of the new planted landscape bund in the Silver Zone Car Park Extension (Phase 2), as part of the construction period, will further enhance the functionality of the perimeter habitats. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures that will improve connectivity across the application site and to/from the surrounding area. The removal of the woodland edge habitat and improvements to the A38 are not predicted to impact badgers as they have not previously been recorded from this location.
Temporary noise and vibration disturbance during construction	Low	Low	Negligible – not significant	Any construction works within the vicinity of the artificial main sett will be carried out under an appropriate licence issued by NE. No night time working when badgers will be active.
Temporary light disturbance during construction	Low	Low	Negligible – not significant	No night-time construction lighting
Permanent loss/ disturbance of suitable badger habitat during	Low	Very Low	Negligible – not	No change to areas of suitable badger habitat are predicted from

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
operation			significant	the operation of the Proposed Development.
Permanent access restrictions to areas of suitable badger habitat (for foraging and/or sett construction)	Low	Very Low	Negligible – not significant	Embedded mitigation and enhancement measures will ensure that access to suitable habitat in the wider local area is maintained during operation. The provision of the new planted landscape bund in the e Silver Zone Car Park Extension (Phase 2) area, as part of the construction period, will further enhance the functionality of the perimeter habitats and provide enhanced areas of habitat. This is in combination with ongoing management of alternative suitable habitat within the application site, presence of extensive suitable habitat in the adjacent and surrounding countryside, and wider mitigation measures that will improve connectivity across the application site and to/from the surrounding area.
Permanent noise and vibration disturbance during operation	Low	Very Low	Negligible – not significant	Badgers holding territories within the application site are considered to be habituated to the operational activities of Bristol Airport and its supporting infrastructure. Integrated mitigation and enhancement measures will provide additional areas of suitable habitat for badgers whilst access to the wider local area for this species will be maintained. Consequently, significant impacts are not predicted.
Permanent light disturbance during operation	Low	Low	Negligible – not significant	The permanent lighting will be operated, monitored and managed in accordance with best practice measures including Institute of Lighting Professionals. Lux levels at the perimeter of the car parks at the Silver Zone Car Park Extension (Phase 2) area will not exceed 0.5 lux and will not exceed 1 lux at the perimeter of the Silver Zone Car Park Extension (Phase 1), at the location of the security fence (vertical and horizontal), with light levels decreasing beyond this. Lighting associated with the highway improvements along the A38/Downside Road junction will be no greater than current levels and <0.5 lux within and above the future woodland boundary/canopy.
Increase in the quality and extent of available habitat for foraging and/	Low	Low	Negligible – not	Integrated mitigation and enhancement measures will provide

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
or sett construction			significant	additional areas of suitable habitat for both foraging and sett construction.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.9** above and is defined as very low, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.9**.

11.17 Consideration of optional additional mitigation or compensation

- 11.17.1 BAL has recognised the policy need to comply with the North Somerset and Mendip Bat SAC SPD and has therefore proposed suitable off-site replacement habitat as a fundamental part of the application submitted. In doing so, BAL has committed to the inclusion of a planning condition to secure delivery of the required replacement habitat in advance of the commencement of any development resulting in habitat loss. This will ensure that any adverse impacts as a result of habitat loss are avoided before they occur. However, for the purposes of this assessment, the replacement habitat has been treated as additional mitigation rather than as embedded mitigation. This approach has been taken to enable a robust and transparent assessment of the impacts of the Proposed Development in the absence of off-site replacement habitat being provided. This also enables a consistent approach to Habitats Regulation Assessment, by ensuring that the potential for a likely significant effect is not screened out at an early stage and that a full Appropriate Assessment is undertaken and any necessary mitigation to avoid adverse effects on integrity is secured.
- 11.17.2 **Appendix 11F** provides a detailed summary of how the replacement habitat has been defined, examined, and agreed in principal through discussion with NSC and NE, and is fully taken into account in the Information to Support Appropriate Assessment in **Appendix 11J**.
- 11.17.3 In summary BAL will deliver either of the following compliant SPD replacement habitat options in advance of bat habitat loss occurring as a result of the Proposed Development:
- 4.38ha of existing coniferous plantation (WC0) with canopy cover 75-90%(WF111) currently unmanaged located in SAC Band A managed to become mixed woodland (WB0) with canopy cover <20% (WF114) delivered before any loss of cattle grazed grassland associated with the Silver Zone Car Park Extension (Phase 2) area and nor sycamore dominated woodland associated with the A38 Highway Improvement Works (but no longer than over 10 years); or
 - 8.11ha of existing mixed plantation (WB1) with canopy cover 50-75% (WF113) currently unmanaged located in SAC Band B managed to become mixed woodland (WB0) with canopy cover <20% (WF114) delivered before any loss of cattle grazed grassland associated with the Silver Zone Car Park Extension (Phase 2) area and/or sycamore dominated woodland associated with the A38 Highway Improvement Works (but no longer than over 10 years).
- 11.17.4 Although a 10 year target period has been used for the purposes of the calculation, the years to target condition is considered (in reality) to be less than one year due to the specific nature of the SPD replacement habitat option (reduction in canopy cover). The effective delivery of the replacement habitat will be secured through a planning condition supported by a robust management and monitoring plan. This will reduce the magnitude of change to low/very low and no significant likely effects will occur as a result of the Proposed Development.

11.18 Conclusions of significance evaluation

- 11.18.1 Taking into account the:
- Detailed ecological baseline;
 - Consultee feedback;
 - The integrated and embedded ecological mitigation and enhancement measures;
 - The additional mitigation; and

- The assessment of likely significant effects as set out in **Tables 11.12 to 11.18** (and other Chapters of this ES)

11.18.2 it is considered reasonable to conclude that no significant likely effects will occur to important Biodiversity receptors, including legally protected species and designated sites, from either the construction or operational stages of the Proposed Development.

11.19 Implementation of environmental measures

11.19.1 **Table 11.19** describes the environmental measures embedded within the Proposed Development and the means by which they will be implemented, i.e. they will have been secured through the planning conditions, Section 106 agreements etc.

Table 11.19 Summary of environmental measures to be implemented – relating to Biodiversity

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
Production and implementation of a Construction Ecological Management Plan (CEMP)	Developer/Contractor	Planning condition	Appendix 2B
Production and implementation of a Landscape and Ecology Management Plan	Developer/Contractor	Planning condition	Section 11.8
Ecological tool box talk and register of attendance for all persons working in ecologically sensitive area	Developer/Contractor	Planning condition and CEMP (Appendix 2B)	Appendix 2B
Suitably Qualified Ecologist / Ecological Clerk of Works / Ecological Contractors to manage, monitor and implement all ecological aspects of the development.	Developer/Contractor	Planning condition and CEMP (Appendix 2B)	Section 11.8 and Appendix 11K
Construction of landscape perimeter soil mounds	Developer/Contractor	Planning condition and CEMP/Landscape and Ecological Management Plan (LEMP)	Section 11.8 and Appendix 11K
Retention and protection of all boundary habitats and trees (apart from those specifically identified as being removed through the development) with suitable offsets and barriers	Developer/Contractor	Planning condition and CEMP (Appendix 2B)	Section 11.8 and Appendix 11K
Use of dust suppression techniques	Developer/Contractor	Planning condition and CEMP (Appendix 2B)	Section 11.8 and Appendix 11K
Use of pollution control and response methods during construction and operation	Developer/Contractor/Operator	CEMP and Bristol Airport Operational Procedures	Section 11.8 and Appendix 11K
Implementation of all on site landscape/habitat measures in accordance with CEMP/LEMP and the Integrated/Embedded	Developer/Contractor/Operator	Planning Condition, CEMP (Appendix 2B), LEMP	Section 11.8 and Appendix 11K

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
Mitigation and Enhancement Plan submitted with the Planning Application.			
Implementation of all off-site woodland enhancement measures, management, monitoring reporting and intervention in woodland located west of the application site and in either Band A or Band B of the North Somerset and Mendips Bat SAC and in accordance with the North Somerset and Mendips Bat SAC SPD	Developer/Contractor	Management Agreement/Condition/Woodland Management Plan	Section 11.8 and Appendix 11K
Lighting to not exceed 0.5 lux at the boundary of the Silver Zone Car Park Extension (Phase 2) area and within or above the woodland adjacent to the A38/Downside Road Junction associated with the A38 Highway Improvement Works. Lighting to not exceed 1 lux at the boundary of the Silver Zone Car Park (Phase 1)	Developer/Contractor/Operator	Planning condition and CEMP (Appendix 2B)/LEMP	Section 11.8 and Appendix 11K
Implementation of a programme of robust ecological monitoring, reporting and intervention to ensure all integrated and embedded mitigation and enhancement measures are successful in the short and long term.	Developer/Contractor/Operator	Planning condition and CEMP (Appendix 2B)/LEMP	Section 11.8 and Appendix 11K