

Bristol Airport Limited

## **Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum**

Environmental Impact Assessment:  
Scoping Report





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# 1. Introduction

This Scoping Report has been prepared to support a request for a Scoping Opinion from North Somerset Council (NSC), in accordance with Part 4, Regulation 15 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017<sup>1</sup>.

## 1.1 Background to the proposals

- 1.1.1 Bristol Airport is located on the A38, approximately seven miles southwest of Bristol city centre (**Figure 1.1**) and within the local authority administrative area of North Somerset Council (NSC). Operated by Bristol Airport Limited (BAL), it is the principal airport and main international gateway for the South West of England and South Wales<sup>2</sup>.
- 1.1.2 In 2017, Bristol Airport handled over 8.2 million passengers making it the ninth busiest UK airport and the third largest regional airport in England<sup>3</sup>. Leading low cost, charter and full service airlines currently fly from Bristol Airport to over 120 destinations across 34 countries<sup>4</sup>.
- 1.1.3 BAL was granted outline planning permission by NSC on 16<sup>th</sup> February 2011 for the expansion of Bristol Airport to handle 10 million passengers per annum (mppa)<sup>5</sup>. Between 2010 and 2017, investment totalling over £160 million has been made in a significant upgrade of facilities and infrastructure at Bristol Airport and passenger numbers have grown by over 40 percent (%), from 5.8 mppa to 8.2 mppa. BAL currently forecasts that passenger demand will reach 10 mppa by 2021, beyond which passenger traffic is projected to rise further to 15 mppa by the mid-2030s and 20 mppa by the mid-2040s<sup>2</sup>.
- 1.1.4 To ensure that Bristol Airport can continue to meet passenger demand both now and into the future, BAL is currently preparing a new Master Plan. The Master Plan will set out a strategy for phased growth to meet the forecast level of passenger demand by the mid-2040s and in doing so, it will ensure that Bristol Airport contributes fully to enhancing national airport capacity, delivers increased connectivity and supports economic prosperity in the South West and South Wales regions. The issues Bristol Airport currently faces and BAL's broad approach to addressing these through the masterplanning process were set out in an initial discussion document, 'Your Airport, your views'<sup>4</sup>, which was subject to public consultation between November 2017 and January 2018. A further public consultation<sup>6</sup> on the emerging Master Plan proposals is currently taking place between May and July 2018 with publication of Draft Master Plan expected in the winter 2018/19. Further details of the consultation are provided in **Section 4.6**.
- 1.1.5 As part of an approach to meeting future passenger demand to ensure that projected passenger growth beyond 2021 can be accommodated, BAL is seeking planning consent for an initial phase of

<sup>1</sup> Ministry of Housing, Communities & Local Government, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.SI 571. Available online <http://www.legislation.gov.uk/uksi/2017/571/contents/made> [Checked 23/03/2018]

<sup>2</sup> York Aviation, 2017. Bristol Airport Limited, Part 1 (Strategic) Economic Impact Assessment of Bristol Airport. Final Report.

<sup>3</sup> Civil Aviation Authority, 2017. Size of Reporting Airport January 2017 – December 2017. Comparison with previous year. Available online [https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard\\_Content/Data\\_and\\_analysis/Datasets/Airport\\_stats/Airport-data-2017-12/Table\\_01\\_Size\\_of\\_UK\\_Airports.pdf](https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport-data-2017-12/Table_01_Size_of_UK_Airports.pdf) [Checked 01/03/2018]

<sup>4</sup> Bristol Airport, 2017. Your airport: your views. A world of opportunities. Preparing a new Master Plan: Public consultation.

<sup>5</sup> Application reference 09/P/1020/OT2.

<sup>6</sup> Bristol Airport, 2018. Your airport: your views. Towards 2050: Master Plan Consultation – Stage II Development Proposals and Options. Available online <https://www.bristolairportfuture.com/> [Checked 13/06/2018].

growth beyond the current cap of 10 mppa to 12 mppa. This will allow for growth in passenger numbers up to at least the mid-2020s.

- 1.1.6 Full details of the proposals for the expansion of Bristol Airport to accommodate 12 mppa are provided in **Chapter 2: The Proposed Development**.

## 1.2 The need for an Environmental Impact Assessment

- 1.2.1 Environmental Impact Assessment (EIA) is a process required by European and UK law which brings together information about any likely significant environmental effects of a proposed development. It provides decision-makers, stakeholders and the public with the environmental information needed to make decisions when determining applications for certain developments. For the applicant, the EIA process follows three stages; screening, scoping and preparation of the Environmental Statement (ES).
- 1.2.2 The legal basis for EIA is European Community Directive 85/337/EEC<sup>7</sup> (as amended by Directives 97/11/EC<sup>8</sup>, 2003/35/EC<sup>9</sup>, 2011/92/EU<sup>10</sup>, and 2014/52/EU<sup>11</sup>) which is transposed into UK legislation. The regulations specific to applications made under the Town and Country Planning Act (1990) (TCPA) are the Town and Country Planning (Environmental Impact Assessment) Regulations 2017<sup>12</sup> (the EIA Regulations).
- 1.2.3 The first stage of the EIA process is to screen whether a proposed development triggers the need for full EIA, screening against the descriptions given in Schedule I<sup>13</sup> and II<sup>14</sup> of the EIA Regulations. For developments listed under Schedule 1 of the EIA Regulations, EIA is mandatory. If a project is listed in Schedule 2, EIA is required where it is likely to have significant effects on the environment by virtue of factors such as its nature, size or location.
- 1.2.4 The proposed expansion of Bristol Airport has the potential to have significant effects on the environment, due to the characteristics, location and potential impact of developing and operating Bristol Airport to serve 12 mppa, and therefore falls under Schedule 2 (paragraph 13b) of the EIA Regulations.
- 1.2.5 By following the full EIA process, BAL will ensure that any potentially significant effects on the environment resulting from the expansion of Bristol Airport to accommodate 12 mppa are considered and, where appropriate, mitigated.
- 1.2.6 During the scoping stage of the EIA process, BAL request the opinion of NSC as to the scope and level of detail of the information to be provided in the ES. NSC, responsible for determining the planning application, will use the information presented in the ES in making its decision.

<sup>7</sup> Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment

<sup>8</sup> Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment

<sup>9</sup> Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/E

<sup>10</sup> Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification)

<sup>11</sup> Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

<sup>12</sup> The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (SI 2017/571). Available online <http://www.legislation.gov.uk/uksi/2017/571/contents/made>. [Checked 16/03/2018]

<sup>13</sup> Schedule 1 - descriptions of development for the purposes of the definition of "schedule 1 development"

<sup>14</sup> Schedule 2 - descriptions of development and applicable thresholds and criteria for the purposes of the definition of "schedule 2 development"



## 1.3 Purpose of the EIA Scoping Report

- 1.3.1 This Scoping Report has been prepared to meet the requirements of Part 4, Regulation 15 of the EIA Regulations and is being issued with a request for a Scoping Opinion from NSC. It provides the information required to enable NSC, and those consulted by NSC, to give their opinion on the scope and level of detail to be provided in the ES.
- 1.3.2 In accordance with Regulation 15(2) of the EIA Regulations, this EIA Scoping Report includes a plan sufficient to identify the land, a brief description of the nature and purpose of the development, and an explanation of the likely significant effects of the proposed development on the environment, as well as those potential effects scoped out from further assessment. It also outlines the proposed scope and methodology for the assessment of those effects.

## 1.4 Developer and project team

- 1.4.1 BAL as developer has engaged a team of specialists to produce the necessary documentation associated with the EIA process for the proposed expansion of Bristol Airport to accommodate 12 mppa. The details of the EIA project team are provided in **Table 1.1**.

Table 1.1 EIA Project team

Role	Project Team
<b>Developer / Applicant</b>	Bristol Airport Limited
<b>Legal Advisors</b>	Womble Bond Dickinson
<b>EIA consultant team</b>	Wood (lead and all disciplines not listed below) Johns Associates (ecology) Ben Cave Associates (health) Bickerdike Allen Partners LLP (noise) Peter Brett Associates LLP (transport)
<b>Architects</b>	TODD Architects C-TAS

## 1.5 Structure of the EIA Scoping Report

- 1.5.1 The report is structured as follows:
- **Chapter 1 – Introduction:** Outlines the background to the proposed expansion of Bristol Airport to accommodate 12 mppa and the need for EIA.
  - **Chapter 2 – The Proposed Development:** Outlines information on the proposed expansion of Bristol Airport to accommodate 12 mppa including the need for the development and a description of the proposals.
  - **Chapter 3 – Planning overview:** Outlines the relevant national, regional and local planning policy and the other consents and assessments required, relevant to the proposed expansion of Bristol Airport to accommodate 12 mppa.

- **Chapter 4 – Approach to EIA Scoping:** Summarises the approach to identifying the scope of and proposed methodology for the assessment.
- **Chapters 5 to 18 – Technical topic chapters:** Outlines the proposed scope of the assessment for each relevant environmental topic.
- **Chapter 19 - Summary of effects scoped out from further consideration:** Provides a summary of the effects scoped out from further consideration.
- **Chapter 20 – Proposed structure of the ES:** Outlines the proposed structure and contents for the ES.
- Glossary.
- Appendices.

## 2. The Proposed Development

As part of an approach to meeting passenger demand, Bristol Airport Limited (BAL) is seeking planning permission to increase the permitted passenger cap from 10 million passengers per annum (mppa) to 12 mppa. To accommodate the additional 2 mppa, existing infrastructure will be improved, new infrastructure delivered and current operations amended (the Proposed Development).

This chapter describes the current Bristol Airport site, recent development history and ongoing development before defining the need for, and the components of, the Proposed Development.

### 2.1 The Bristol Airport site

- 2.1.1 Bristol Airport is located approximately seven miles south west of Bristol city centre and within the local authority administrative area of North Somerset Council (NSC). Bristol Airport is situated immediately adjacent to the A38, Bristol to Bridgewater Road, with two roundabout junctions providing access to the airport site (see **Figure 1.1** and **Figure 2.1**).
- 2.1.2 The northern roundabout provides access to the northern parts of the airport including the main terminal building, passenger pick up and drop off areas, current airport administration buildings, hotel and operational facilities, and both short and long-stay parking areas. This is also the main access for public transport links to Bristol Airport. The southern roundabout, meanwhile, provides access to (inter alia) Silver Zone long-stay car parking, aircraft maintenance areas, the Bristol and Wessex Aeroplane Club, Bristol Flying Centre and Western Power Distribution Helicopter Unit.
- 2.1.3 Bristol Airport is situated on a ridge of high ground called Broadfield Down, with the A370 Bristol to Weston-super-Mare road and M5 motorway situated 4km and 11km respectively to the north and west. The area surrounding Bristol Airport is predominately open, undulating countryside with extensive woodland areas to the east and open farmland and settlements to the north, east and south. To the north east is the settlement of Felton and associated Felton Common. Immediately to the north are properties along the A38 and extending along Downside Road, with the properties on the southern side of this road sharing a boundary with Bristol Airport.

#### Bristol Airport operation

- 2.1.4 The Bristol Airport site is open 24 hours a day, 365 days a year. Flight operations are split according to day time (0600 to 2330) and night time (2330 to 0600) operational periods, with the majority of flights occurring in the day time (0600 to 2330).
- 2.1.5 The 2011 planning permission for expansion of Bristol Airport to accommodate 10 mppa<sup>15</sup> includes a condition limiting the number of aircraft movements in the night period to no more than 3,000 in the summer season<sup>16</sup> and no more than 1,000 in the winter<sup>17</sup>. The number of aircraft movements in the 'shoulder periods' of 0600 to 0700 and 2300 to 2330 is limited to no more than 10,500 a year.

<sup>15</sup> 09/P/1020/OT2. All application documentation is available online: <https://planning.n-somerset.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=ZZZXJLLPJV108> [Checked 02/03/18].

<sup>16</sup> The summer season is the same time period as British Summer Time (BST) (also referred to as Daylight Saving Period).

<sup>17</sup> The winter season is the time period when the UK is not in BST.

## Existing operational facilities

- 2.1.6 **Figure 2.1** shows the layout of Bristol Airport's main facilities within the BAL land holding, both landside and airside<sup>18</sup> as at June 2018 (the date this Scoping Report was prepared).
- 2.1.7 The Bristol Airport site is split by the runway and taxiways creating three main areas: the northern, central and southern areas. The following sections outline the components of the three areas, reflecting the existing site layout.

### Northern area – existing operational facilities

- 2.1.8 The northern area is the most heavily developed part of the Bristol Airport site and accommodates the main passenger facilities. The terminal building consists of a large modern flat roof and glass structure lying on the ridgeline. Extending west of the terminal building, on its southern face, is the western walkway.
- 2.1.9 To the west of the terminal are several large buildings, also located on the ridge of Broadfield Down, that are used for administration, flight catering and motor transport engineering. Also in this location is the air traffic control tower and a security check point (airside access point).
- 2.1.10 The old terminal building, which now acts as the administrative centre for Bristol Airport (but is to be relocated to the southern area, see **Section 2.2**), and staff car parking are located to the east of the terminal together with airline services buildings.
- 2.1.11 The main approach road to Bristol Airport extends westward from the northern entrance roundabout. A number of internal roundabouts and junctions along the approach road provide access to passenger car parking areas. The majority of car parking areas are surface parking comprising impermeable access roads and predominantly permeable crushed stone parking bays. At the western end of the access road, there is a hotel and chiller compound. Immediately north east of the hotel, a three storey (including ground level) multi-storey car park provides a total of 1,162 spaces (a second phase of development will provide a further 716 spaces). To the north of the hotel are car rental facilities.
- 2.1.12 The Bristol Airport access road extends to the northern boundary of the airport where it forms a junction with Downside Road, adjacent to Cooks Farm.

### Central area - existing operational facilities

- 2.1.13 The central area of the Bristol Airport site is characterised by the runway, apron (east and west), taxiways and hold points, together with a significant expanse of grassland. The runway (2,011m long) is aligned east/west and located at the eastern and western ends are the instrument landing systems.
- 2.1.14 Immediately north of the runway and taxiways are apron areas which include aircraft stands, located on concrete hardstanding. The majority of aircraft stands can accommodate aircraft up to a Code C aircraft and there is a single stand that can accommodate aircraft up to Code E. The fuel farm is also located in this area.

<sup>18</sup> Airside – areas of the airport, terminal and other buildings where access is restricted to processed passengers and authorised personnel.

Landside – those areas of the airport open to the public. In more general terms, the access roads, car parks and terminal building areas open to both passengers and non-passengers.

### Southern area - existing operational facilities

- 2.1.15 To the south of the runway lie ancillary areas including the Bristol Flying Centre, Bristol and Wessex Flying Club, Western Power Distribution Helicopter Unit, a hangar and car parking, light aircraft and helicopter parking with associated taxiways
- 2.1.16 The Silver Zone long stay car park, accessed off the southern A38 roundabout, occupies the majority of the southern area. Within the car park is the two storey (including ground floor) Silver Zone car park reception building and bus transfer facilities.
- 2.1.17 To the west of the Silver Zone long stay car park is a fire station and training area, which includes a disused aircraft used for training, hard standing and drains to collect runoff, and the Snow Base<sup>19</sup>. To the south of the fire training ground is the Silver Zone seasonal car park ('Cogloop' Phase 1), consisting of surface parking on Netpave cellular paving.

### Land ownership

- 2.1.18 The area of land within the current site of Bristol Airport covers 196 hectares (ha) (see **Figure 2.1**). In addition to its existing site, BAL owns some 16ha of land immediately to the south of the southern area. This land is currently used for agriculture, dominated by improved grassland used for grazing and a small area of woodland.

## 2.2 Overview of recent development history

### Bristol International Airport Master Plan 2006 to 2030

- 2.2.1 In 2006, Bristol International Airport (now BAL) published its first Master Plan<sup>20</sup> setting out how the airport should develop. The Master Plan outlined specific plans to cater for up to 9 mppa by 2015 as well as setting out early ideas for a 12.5 mppa capacity airport by 2030.

### 2011 planning permission

- 2.2.2 In 2011, BAL obtained planning permission<sup>21</sup> from NSC for the major expansion of Bristol Airport to accommodate 10 mppa. The 2011 planning permission consists of a number of project components; these components are listed in **Table 2.1** (with their status indicated). BAL is continuing to implement the existing 10 mppa permission through reserved matters applications. In addition, some non-material amendments (NMA) have been made to the extant 10 mppa consent and additional planning permissions have been issued for related development. It should be noted that the phasing indicated in **Table 2.1** may be subject to change.

<sup>19</sup> Snow Base is the storage area for snow clearing equipment.

<sup>20</sup> Bristol International Airport, 2006. Bristol International Airport Master Plan 2006 to 2030.

<sup>21</sup> 09/P/1020/OT2. All application documentation is available online: <https://planning.n-somerset.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=ZZZXJLLPJV108> [Checked 02/03/18].

Table 2.1 Components of the 10 mppa planning permission (09/P/1020/OT2)

10 mppa project component– general description	Individual elements	Completed	To be completed by Q1 2020	To be completed post Q1 2020
<b>East and west extensions to terminal building</b>	East extension phase 1	✓		
	East extension phase 2 ( <i>potential to be taken forward as part of the Proposed Development with a revised design</i> )			
	West extension phase 1	✓		
	West extension phase 2 ( <i>now being taken forward as part of the Proposed Development with a revised design</i> )			
<b>Erection of two-storey walkway providing access and associated facilities to two-storey pier serving aircraft stands</b>	<i>Now being taken forward as part of the Proposed Development with a revised design.</i>			
<b>Expansion to aircraft parking areas providing 9 new stands giving 33 stands in total</b>	Nine aircraft stands (partially complete). East apron to also include drainage on land to east.		✓	
<b>Erection of two multi-storey car-parks (including transport interchange)</b>	Multi-storey car park (Phase 1) and interchange Multi-storey car park (Phase 2a) Multi-storey car park (Phase 2b)	✓	✓	✓
<b>A covered pedestrian link bridge</b>				✓
<b>Erection of three-storey administration building north-west of terminal with associated parking following demolition of existing administration building</b>	Administration building (to be located to the south of the airport)		✓	
	Demolition of existing administration building		✓	
<b>Construction of replacement underground aviation-fuel storage depot and chiller compound comprising 3no 1,200m<sup>3</sup> tanks</b>	Fuel storage depot Chiller compound	✓		✓
<b>Security control-post</b>			✓	
<b>Alterations to runways and taxiways</b>	Phase 1 to be completed in Q4 2018. Phase 2 to be completed post 2021.			✓
<b>Re-configure internal access roads and widen access at A38 junction</b>	Internal access roads (partially complete) Access at A38 Junction	✓		✓
<b>Upgrade north side surface car-park</b>				✓
<b>Extend Silver Zone car-park to 12,000 car capacity to include staff-parking within an extension outside the airport boundary to south including replacement reception building</b>	Silver Zone Car Park extension (final phase to be completed)		✓	
	Replacement reception building	✓		



10 mppa project component– general description	Individual elements			
		Completed	To be completed by Q1 2020	To be completed post Q1 2020
<b>Additional car-parking area to south to include relocation of car-hire, valet service and associated reception building (car rental consolidation centre (CRCC))</b>	Additional car-parking		✓	
	Relocated car-hire		✓	
	Relocated valet service		✓	
	Relocated reception building		✓	
<b>Replace buildings to south of airfield for flying-club, mail-handling and snow-clearing</b>	Replacement flying club building	✓		
	Replacement snow clearing building	✓		
<b>Erection of 5m high noise-reduction wall (a revised design is being taken forward)</b>			✓	
<b>3m high acoustic fence around extended Western Apron</b>		✓		
<b>12no. 5m high wind-turbines</b>				✓
<b>Landscaping</b>		✓		

- 2.2.3 Those components of the 10 mppa consent that are either implemented or are to be completed in advance of the commencement of the Proposed Development (currently anticipated to be in 2019) will form the existing site layout for the purposes of the assessment that will be presented within the ES (discussed further in **Sections 2.2.8 to 2.2.15**). Those elements of the 10 mppa consent that will be constructed at the same time as the Proposed Development will be considered as part of the cumulative impact assessment presented in the ES.

## Ongoing operational development

- 2.2.4 In addition to the above consented development (and unrelated to the Proposed Development), other on-site infrastructure and facilities will be required to respond to Bristol Airport's ongoing operational needs. Some elements have been identified as being needed in the short term to ensure the continued, efficient operation of the airport, and are to be delivered under BAL's permitted development rights, pursuant to Part 8 (Class F) of the Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended) (GPDO).
- 2.2.5 In accordance with the GPDO, BAL will consult NSC of its intention to carry out this permitted development. In order to proceed in this manner, the permitted development must not constitute 'EIA Development' under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017<sup>22</sup> (the EIA Regulations)..

<sup>22</sup> Ministry of Housing, Communities & Local Government, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.SI 571. Available online <http://www.legislation.gov.uk/uksi/2017/571/contents/made> [Checked 23/03/2018]

- 2.2.6 **Table 2.2** lists expected, short-term proposals that are to be progressed under BAL's permitted development rights together with anticipated completion dates. This list may be subject to change depending on operational requirements.

Table 2.2 Proposals to be progressed under BAL's permitted development rights

Proposal	Status
New airline office building	To be completed by Q1 2020
Extension to checkpoint building and new bypass lane	To be completed by Q1 2020
Reconfiguration of access road (southern area)	To be completed by Q1 2020
New administration building with visitor and staff car parking (relocation)	To be completed by Q1 2020
Two new coaching gates extension to existing forward coaching lounge	To be completed by Q1 2020
Stone Farm car parking (130 spaces) and new bus access	To be completed post Q1 2020
New perimeter road (central area)	To be completed post Q1 2020
Radar site car parking	To be completed by Q1 2020
Silver Zone staff waiting area	To be completed by Q1 2020
Strategic sequential radar (SSR) monopole tower	To be completed by Q1 2010
West walkway coaching gates (4 no.) and associated new bussing pick up road (existing substation to be repositioned).	To be completed post Q1 2020

- 2.2.7 It is anticipated that the majority of components being delivered under the GPDO, listed in **Table 2.2**, will be completed before work commences for the Proposed Development. Components anticipated to be completed by Q1 2020 will be considered as part of the existing site layout for the purposes of the assessment presented within the ES. Those components that will be constructed at the same time as the Proposed Development will be considered as part of the cumulative impact assessment presented in the ES.

## Future operational facilities

- 2.2.8 Taking into account the continuing implementation of the 2011 planning permission (outlined in **Table 2.1**) and ongoing operational development (detailed in **Table 2.2**), the future operational facilities at the time work commences to construct the Proposed Development are outlined in the following sections and the main elements detailed within **Figure 2.1**. This is the layout that will be used as the 'existing site layout' for the purposes of the assessment presented within the ES.
- 2.2.9 Much of Bristol Airport's future facilities and airport layout will remain the same as that detailed in **Sections 2.1.6 to 2.1.17**. Changes required to deliver the future facilities and airport layout are detailed below.

### Northern area

- 2.2.10 A new modular airline office building is to be located to the west of the terminal building together with an extension to the existing checkpoint.

- 2.2.11 To the east of the terminal, new/extended coaching gates are to be constructed. Immediately south west of the main entrance roundabout, the old terminal building and staff car park will be removed and replaced by apron, aircraft stands and associated drainage. An acoustic wall/fence will be built along the entrance roadway, between the roundabout, road and the aircraft stands.
- 2.2.12 To the north of the terminal, phase 2 of the existing multi-storey car park will be completed providing an additional 716 spaces.

### Central and Southern areas

- 2.2.13 The southern area of apron is to have a new southern taxiway link, additional apron and aircraft stands together with an extension to the Silver Zone car parking.
- 2.2.14 By the A38 roundabout that provides access to the southern half of the Bristol Airport site, a car rental consolidation centre (CRCC) together with monopole tower including Surface Movement Radar are to be constructed. To the south west of the roundabout, a new (relocated) BAL administration building is planned. The access road in this area is to be reconfigured.
- 2.2.15 In the south east corner of the Bristol Airport site, a Silver Zone staff waiting area building is to be developed.

## 2.3 The need for the Proposed Development

- 2.3.1 The Aviation Policy Framework 2013<sup>23</sup> (APF) sets out the Government's high-level objectives and policy on aviation. The APF supports the growth of regional airports across the UK and in this context, recognises the vital role Bristol Airport plays in the economic success of the South West region. The APF states that the *"Government wants to see the best use of existing airport capacity"* and that in the short term, a key priority for Government is to continue to work with the aviation industry and other stakeholders to make better use of existing runways at all UK airports to improve performance, resilience and the passenger experience.
- 2.3.2 The Government is currently preparing an Aviation Strategy that will set out the long term direction for aviation policy to 2050 and beyond. A call for evidence<sup>24</sup> was published in July 2017 which invited views on the proposed aims, objectives, policy priorities and timetable for the Strategy. The call for evidence affirms the Government's support for the growth of airports outside the South East of England and for making the best use of existing infrastructure. In this regard, the Government states that they *"are aware that a number of airports have plans to invest further, allowing them to accommodate passenger growth over the next decade using their existing runways, which may need to be accompanied by applications to increase existing caps. The government agrees with the Airports Commission's recommendation that there is a requirement for more intensive use of existing airport capacity and is minded to be supportive of all airports who wish to make best use of their existing runways"*. This government commitment to the growth of regional airports was recently reaffirmed in the Secretary of State for Transport's June 2018 statement concerning the proposed expansion of Heathrow<sup>25</sup>; recognising that a new operational runway at Heathrow is still a number of years away,

<sup>23</sup> Department for Transport, 2013. Aviation Policy Framework. Available online <https://www.gov.uk/government/publications/aviation-policy-framework> [Checked 19/03/2018]

<sup>24</sup> Department for Transport, 2017. Beyond the Horizon – the Future of UK Aviation: a Call for Evidence on a New Aviation Strategy. Available online <https://www.gov.uk/government/consultations/a-new-aviation-strategy-for-the-uk-call-for-evidence> [Checked 19/03/2018]

<sup>25</sup> Secretary of State for Transport, 2018. Statement by the Secretary of State for Transport about the proposed expansion of Heathrow airport. Oral statement to Parliament. Available online <https://www.gov.uk/government/speeches/proposed-heathrow-expansion> [Checked 14.06.18].

and consistent with the Airports Commission's recommendations, he states that *"the government is supportive of airports beyond Heathrow making best use of their existing runways"*.

- 2.3.1 In its emerging Aviation Strategy<sup>26</sup>, the Government recognises that there is a growing national need for additional airport capacity, and that regional airports across the UK, like Bristol Airport, provide a vital contribution to the economic wellbeing of the whole country.
- 2.3.2 Bristol Airport is the principal airport and main international gateway for the South West of England and South Wales, supporting an estimated 15,000 local jobs and generating £1.3 billion in Gross Value Added (GVA)<sup>27</sup>. Ensuring that Bristol Airport is able to meet current and forecast passenger demand is therefore essential if the airport is to continue to fully support local, regional and national economic growth.
- 2.3.3 Despite the global financial crisis resulting in a fall in passenger numbers in 2009, an upward trend has continued every year since with passenger numbers growing by over 40 per cent (%), from 5.8 mppa to 8.2 mppa since 2011. The 2011 planning permission for expansion of Bristol Airport to accommodate 10 mppa, and the subsequent investment (totalling over £160 million between 2010 and 2017) to upgrade facilities and infrastructure, has enabled Bristol Airport to continue to meet demand. However, BAL expects demand to reach 10 mppa by 2021, if not sooner, and beyond 2021, passenger traffic is projected to rise further to 15 mppa by the mid-2030s and 20 mppa by the mid-2040s<sup>27</sup>. Current facilities at Bristol Airport are not capable of accommodating an increase in passenger numbers beyond 10 mppa and throughput is limited to 10 mppa by the 2011 planning permission.
- 2.3.4 To ensure that the projected increase in passenger numbers can be met and to deliver the infrastructure and facilities necessary to accommodate this growth, BAL is seeking permission for its next stage of growth beyond 10 mppa to 12 mppa. This will enable Bristol Airport to continue to support the economic development of the region whilst the Master Plan is developed.

## 2.4 Alternatives Considered

- 2.4.1 Schedule 4, paragraph 2 of the EIA Regulations<sup>22</sup> requires that reasonable and relevant alternatives considered should be described and an indication of the main reasons for selecting the chosen option given, including a comparison of the environmental effects.
- 2.4.2 An assessment of the reasonable and relevant alternatives considered will be presented within the ES.

## 2.5 The Proposed Development

- 2.5.1 To support the increase in passenger numbers and ensure safe and efficient passenger movement to and around the airport site, BAL is proposing new infrastructure, improvements to existing facilities and operational changes which together form the Proposed Development. The components of the Proposed Development are detailed in the following sections.

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<sup>26</sup> HM Government, 2017. Beyond the horizon, the future of UK aviation, a call for evidence on a new strategy and Department for Transport, 2018. Beyond the Horizon – the future of UK Aviation: Next Steps Towards an Aviation Strategy. Available online [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/698247/next-steps-towards-an-aviation-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/698247/next-steps-towards-an-aviation-strategy.pdf) [Checked 23.04.18].

<sup>27</sup> York Aviation, 2017. Bristol Airport Limited, Part 1 (Strategic) Economic Impact Assessment of Bristol Airport. Final Report.

## Flight operations

- 2.5.2 The increase of 2 mppa will result in, approximately, an additional 23,800 flights per year once 12 mppa is reached. These flights will be managed using existing facilities.

### Night flights

- 2.5.3 As outlined in **Section 2.1.5**, night flights are restricted to a maximum of 3,000 flights in the summer and 1,000 flights in the winter. Through the application for the Proposed Development, BAL wish to remove the seasonal constraint on night flights, but without increasing the maximum number of flights, and therefore will seek permission for an annual cap of 4,000 night flights.

## Northern area components

### Terminal building

- 2.5.4 The existing terminal building does not have sufficient capacity to accommodate a throughput of 12 mppa and alterations are required to provide additional floorspace. The proposed alterations to the existing terminal building are shown on **Figure 2.1**.
- 2.5.5 The alterations include a proposed four storey, 13.5m high extension to the existing terminal building on the western side, with a footprint of 0.48 ha and finished total floorspace of circa 10,400m<sup>2</sup>.
- 2.5.6 A two storey (8.5m high) extension to the existing terminal building is proposed on its southern side, with a footprint of 0.20 ha and finished total floorspace of circa 3,600m<sup>2</sup>.
- 2.5.7 An extension to the east of the existing terminal building (12.5m in height) is proposed with a finished total floorspace of approximately 855m<sup>2</sup>.
- 2.5.8 The terminal extensions will be designed to ensure that both the passenger facilities (such as departure lounges and retail areas) and processing areas (such as check-in, boarding gates and baggage reclaim) are optimised for enhanced passenger experience and operational efficiency. A new canopy over the forecourt of the main terminal building is also proposed in order to improve the passenger approach to the front of the main terminal.
- 2.5.9 A new arrivals area with vertical circulation cores for airside buses is to be located to the south of the terminal. This will provide updated and larger facilities to address the increase in passenger numbers. A total of three areas comprising two levels are proposed with heights ranging from 7.5m to 9m and a total floorspace of 473m<sup>2</sup>.

### Pier and walkway

- 2.5.10 A new walkway to the east pier with circulation cores and one pre-board zone is required. This will represent a revised alignment to that approved under the 2011 consent for expansion of the airport to 10 mppa. The walkway will have a total floorspace of circa 3,000m<sup>2</sup> and height of approximately 10.1m.
- 2.5.11 A new, 10.6m high pier connected to the eastern walkway for passenger access to the eastern stands is required. It will have vertical circulation cores and five pre-board zones and have a total floorspace of circa 3,900m<sup>2</sup>.

### Service yard

- 2.5.1 A new service yard is proposed to the north of the western walkway and east of the current airside access security building. This will be principally used for the delivery of goods and as a waste management area including compactors, refuse bins etc. The footprint of the service yard is approximately 0.4 ha.

### Multi-storey car park

- 2.5.2 A multi-storey car park (MSCP) to provide approximately 2,150 spaces over 5 levels will be constructed in the northern area of the Bristol Airport site (**Figure 2.1**) adjacent to the current MSCP. The MSCP will occupy a footprint of around 1.12 ha and be a maximum of 16m above Ordnance Datum (AOD) in height.

### Gyratory road

- 2.5.3 To accommodate vehicle movements resulting from an additional 2 mppa and improve flows within the Bristol Airport site and on to the A38, the scheme includes a proposed new, two lane (one way) gyratory within the northern area. The route is shown on **Figure 2.1** and will deliver additional capacity on to North Side Road.
- 2.5.4 The new circular route would be constructed in a phased manner, ensuring vehicle circulation throughout the works are managed to minimise disturbance.

### Central area components

- 2.5.5 Changes to airside infrastructure and facilities are required to support aircraft movements, passenger transportation and aircraft servicing for an additional 2 mppa. The associated airside components are shown on **Figure 2.1**.

### Eastern taxiway link

- 2.5.6 A new eastern taxiway link at the far eastern end of the runway will be constructed to allow improved and efficient access to the runway for aircraft. This will be a continuation of the current surfacing and will have a footprint of approximately 0.51 ha.

### Taxiway widening (and fillets)

- 2.5.7 Taxiway widening (and fillets) to the southern edge of the northern most taxiway (Taxiway GOLF) is required to provide a parallel taxiway system for improved access and movement of aircraft. This will be a continuation of the current surfacing and the area covered by this improvement is approximately 1.81 ha.

### Aircraft stands 37 and 38

- 2.5.8 Through the planning application for the Proposed Development, BAL is seeking changes to the current restrictions with respect to the operation of Stands 37 and 38. The proposed changes will allow for:
- the use of mobile power generators;
  - installation and use of aircraft auxiliary power units; and
  - use of aircraft engines for taxiing (as opposed to towing).



- 2.5.9 These changes will enable the full and efficient use of these stands, supporting a passenger throughout of 12 mppa.

## Southern area components

### Operational extension to the Silver Zone Car Park (Phase 1)

- 2.5.10 Currently, use of the Silver Zone car park extension located on land known as 'Cogloop' is prohibited outside of the period 1<sup>st</sup> May to 31<sup>st</sup> October. In order to ensure that there is sufficient provision to meet increased demand for long term car parking associated with passenger growth to 12 mppa, BAL is seeking to remove this restriction, allowing for the year-round use of the car park.
- 2.5.11 Changes to the operation of the car park will require the provision of permanent (fixed) lighting and CCTV.

### Extension to the Silver Zone Car Park (Phase 2)

- 2.5.12 An extension to the existing area of Silver Zone car parking is proposed. The additional circa 2,700 spaces will be located immediately south of the existing Silver Zone car park extension area on the Cogloop land and will occupy a footprint of circa 5.1ha. Surfacing will be Netpave cellular paving for car parking areas, and areas of impermeable surface for access roads. This proposed car park would be in year-round operation.

## Highway improvements

- 2.5.13 Local improvements to the A38 are needed to accommodate the additional traffic generated by an extra 2 mppa. BAL is currently developing the proposals for this element of the Proposed Development which are likely to include enhancements at the Downside Road and West Lane junctions as well as carriageway improvements to a section of the existing A38.

## Decommissioning

- 2.5.14 Bristol Airport is assumed to operate in perpetuity and it is anticipated that arisings associated with any future decommissioning/demolition of elements of the Proposed Development would be reused where possible. In consequence, decommissioning including demolition, is excluded from the scope of the assessment.

## Programme for delivery

- 2.5.15 Work to deliver the Proposed Development will commence in late 2019, with changes to operational restrictions (e.g. stands/parking) expected to be in place with immediate effect once consent is obtained. Construction will take place in a phased manner to ensure minimal disruption to the safe operation of Bristol Airport. The programme for delivery is still being developed and will be detailed within the ES.

## 3. Planning Policy

This chapter sets out the national, regional and local policy context relevant to Bristol Airport Limited's (BAL) proposals for an increase in passenger numbers to 12 million passengers per annum (mppa).

### 3.1 National planning and aviation policy

#### National Planning Policy Framework

- 3.1.1 The National Planning Policy Framework (NPPF) was published in March 2012<sup>28</sup>. It sets out the Government's planning policies for England and is a material consideration in determining planning applications.
- 3.1.2 At the heart of the NPPF is a presumption in favour of sustainable development through plan-making and decision-taking. Paragraph 14 sets out that this is taken to mean:
- *"approving development proposals that accord with the development plan without delay; and*
  - *where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless:*
    - ▶ *any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole; or*
    - ▶ *specific policies in this Framework indicate development should be restricted."*
- 3.1.3 Section 4 (paragraph 31) of the NPPF ('Promoting Sustainable Transport') specifically refers to development at airports and states:
- "Local authorities should work with neighbouring authorities and transport providers to develop strategies for the provision of viable infrastructure necessary to support sustainable development, including large scale facilities or transport investment necessary to support strategies for the growth of airports."*
- 3.1.4 At paragraph 33, the NPPF further states that:
- "When planning for airports and airfields that are not subject to a separate national policy statement, plans should take account of their growth and role in serving business, leisure, training and emergency service needs. Plans should take account of the Framework as well as the principles set out in the relevant national policy statements and the Government Framework for UK Aviation."*
- 3.1.5 The NPPF includes a range of other policies that are potentially relevant to the Proposed Development. These policies relate to (inter alia): the economy; design; health; Green Belt; climate change; the natural environment; and the historic environment. Where appropriate, these policies are referred to in the topic chapters of this report (**Chapters 5 to 18**) and are therefore not repeated here.

<sup>28</sup> Ministry of Housing, Communities & Local Government, 2012. National Planning Policy Framework. Available online <https://www.gov.uk/government/publications/national-planning-policy-framework--2> [Checked 19/03/2018]

- 3.1.6 In March 2018, the Ministry of Housing, Communities and Local Government (MHCLG) published a draft revised NPPF for consultation.<sup>29</sup> The draft NPPF strengthens policy guidance in respect of aviation and at paragraph 105 sets out that planning policies should *"recognise the importance of maintaining a national network of general aviation facilities – taking into account their economic value in serving business, leisure, training and emergency service needs, and the Government's General Aviation Strategy"*.

### National Planning Practice Guidance

- 3.1.7 The National Planning Practice Guidance (NPPG) was first published in March 2014<sup>30</sup> and, together with the NPPF, sets out the Government's overall planning policy framework. The two documents are intended to be read together.
- 3.1.8 NPPG is available as a web-based resource and is updated as and when required. With specific regard to aviation and airport planning, the NPPG does not introduce any additional guidance beyond that which is already captured by the NPPF.

### Aviation Policy Framework

- 3.1.9 The Aviation Policy Framework 2013<sup>31</sup> (APF) sets out the Government's high-level objectives and policy on aviation. The APF supports the growth of regional airports across the UK and highlights that investment in *"new or more frequent international connections attract business activity, boosting the economy of the region and providing new opportunities and better access to new markets for existing businesses"*. The APF identifies that further to their regional importance, airports outside the South East of England also have an important role in helping to accommodate wider forecast growth in demand for aviation in the UK and that the availability of direct air services locally from these airports can reduce the need for air passengers and freight to travel long distances to reach larger UK airports. In this context, the APF recognises the vital role Bristol Airport plays in the economic success of the South West region.
- 3.1.10 The APF states that the *"Government wants to see the best use of existing airport capacity"* and that in the short term, a key priority for Government is to continue to work with the aviation industry and other stakeholders to make better use of existing runways at all UK airports to improve performance, resilience and the passenger experience.
- 3.1.11 Section 5 (Planning) sets out that all proposals for airport development must be accompanied by clear surface access proposals which demonstrate how the airport will ensure easy and reliable access for passengers, increase the use of public transport by passengers to access the airport, and minimise congestion and other local impacts.

### Beyond the Horizon: The Future of UK Aviation

- 3.1.12 The Government is currently preparing an Aviation Strategy that will set out the long-term direction for aviation policy to 2050 and beyond. Recognising the strong and continuing growth in demand for air services, the Strategy will look to address what should constitute a framework for future

<sup>29</sup> Ministry of Housing, Communities & Local Government, 2018. Draft Revised National Planning Policy Framework. Available online <https://www.gov.uk/government/consultations/draft-revised-national-planning-policy-framework> [Checked 19/03/2018]

<sup>30</sup> Ministry of Housing, Communities & Local Government, 2014. Planning Practice Guidance. Available online <https://www.gov.uk/government/collections/planning-practice-guidance> [Checked 19/03/2018]

<sup>31</sup> Department for Transport, 2013. Aviation Policy Framework. Available online <https://www.gov.uk/government/publications/aviation-policy-framework> [Checked 19/03/2018]

sustainable growth and consider how the UK can balance environmental costs with the economic benefits of aviation.

- 3.1.13 A call for evidence<sup>32</sup> was published in July 2017 which invited views on the proposed aims, objectives, policy priorities and timetable for the Strategy. The call for evidence affirms the Government's support for the growth of airports outside the South East of England. It also states that the Government's declared preferred option for one new runway in the South East (by 2030) *"will not open for at least 10 years and it is vital that the UK continues to grow its domestic and international connectivity in this period, which will require the more intensive use of existing airport capacity."*
- 3.1.14 In considering the approach to be taken for the expansion of regional airports, the Government states that they *"are aware that a number of airports have plans to invest further, allowing them to accommodate passenger growth over the next decade using their existing runways, which may need to be accompanied by applications to increase existing caps. The government agrees with the Airports Commission's recommendation that there is a requirement for more intensive use of existing airport capacity and is minded to be supportive of all airports who wish to make best use of their existing runways"*.
- 3.1.15 The Government has now considered the responses received to the consultation and has set out<sup>33</sup> how it will address these in the next stages of the Strategy's development. The Government's commitment to the growth of regional airports was recently reaffirmed in the Secretary of State for Transport's June 2018 statement concerning the proposed expansion of Heathrow<sup>34</sup>; recognising that a new operational runway at Heathrow is still a number of years away, and consistent with the Airports Commission's recommendations, he states that *"the government is supportive of airports beyond Heathrow making best use of their existing runways"*.
- 3.1.16 The emerging Aviation Strategy aims *"To achieve a safe, secure and sustainable aviation sector that meets the needs of consumers and of a global, outward looking Britain"*. This aim is underpinned by the following six objectives:
- Help the aviation industry work for its customers;
  - Ensure a safe and secure way to travel;
  - Build a global and connected Britain;
  - Encourage competitive markets;
  - Support growth while tackling environmental impacts; and
  - Develop innovation, technology and skills.

<sup>32</sup> Department for Transport, 2017. Beyond the Horizon – the Future of UK Aviation: a Call for Evidence on a New Aviation Strategy. Available online <https://www.gov.uk/government/consultations/a-new-aviation-strategy-for-the-uk-call-for-evidence> [Checked 19/03/2018]

<sup>33</sup> Department for Transport, 2018. Beyond the Horizon – the future of UK Aviation: Next Steps Towards an Aviation Strategy. Available online [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/698247/next-steps-towards-an-aviation-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/698247/next-steps-towards-an-aviation-strategy.pdf) [Checked 23.04.18]

<sup>34</sup> Secretary of State for Transport, 2018. Statement by the Secretary of State for Transport about the proposed expansion of Heathrow airport. Oral statement to Parliament. Available online <https://www.gov.uk/government/speeches/proposed-heathrow-expansion> [Checked 14.06.18].

## Draft Airports National Policy Statement

- 3.1.17 The draft Airports National Policy Statement<sup>35</sup> (NPS) was published for consultation in October 2017 with a final version<sup>36</sup> subsequently published for Parliamentary approval in June 2018. Once designated, the NPS will provide the primary basis for decision making on development consent order (DCO) applications for nationally significant aviation-related development and, specifically, a Northwest Runway at Heathrow Airport. Whilst the Proposed Development is not of a scale considered to be nationally significant and does not relate to additional capacity in the South East of England, it is important to consider the proposals in the context of this emerging national policy on aviation.
- 3.1.18 In light of the findings of the Airports Commission on the need for more intensive use of existing infrastructure, the NPS states the Government accepts that it may well be possible for existing airports to demonstrate sufficient need for their proposals, additional to (or different from) the need which is met by the provision of a Northwest Runway at Heathrow.

## 3.2 Regional and sub-regional policy

### West of England Joint Spatial Plan

- 3.2.1 The unitary authorities of Bath and North-East Somerset, Bristol, North Somerset and South Gloucestershire are currently preparing the West of England JSP. The JSP will, once adopted, form part of the Development Plan, providing the strategic overarching development framework for the West of England to 2036 and guiding the review and future preparation of local plans in the sub-region.
- 3.2.2 The November 2017 JSP Publication Document<sup>37</sup> identifies Bristol Airport as a key strategic infrastructure employment location (Policy 4). It recognises the employment growth potential of Bristol Airport and in this regard, the supporting text to Policy 4 states: "*Growth at Bristol Airport has the potential to create a range of new employment opportunities*".
- 3.2.3 Consultation on the Publication Document closed in January 2018 and the JSP has now been submitted to the Secretary of State for Examination in Public prior to adoption.

### West of England Joint Local Transport Plan 3 2011 - 2026

- 3.2.4 The Joint Local Transport Plan (JLTP)<sup>38</sup> covers a fifteen-year period between 2011 and 2026 and sets out the transport strategy for the sub-region. The plan aims to deliver an affordable, low carbon, accessible, integrated, efficient and reliable transport network to achieve a more competitive economy and better connected, more active and healthy communities.
- 3.2.5 The JLTP recognises the significant positive impact that Bristol Airport has on the region's economy as one of the fastest growing regional airports in the UK and aims to support its growth. In this

<sup>35</sup> Department for Transport, 2017. Revised Draft Airports National Policy Statement: New Runway Capacity and Infrastructure at Airports in the South East of England. Available online

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/654123/revised-draft-airports-nps-web-version.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/654123/revised-draft-airports-nps-web-version.pdf) [Checked 15/03/2018]

<sup>36</sup> Department for Transport, 2018. Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England. Available online <https://cached.offlinehbpl.hbpl.co.uk/NewsAttachments/RLP/airports-nps-new-runway-capacity2.pdf> [Checked 14/06/2018].

<sup>37</sup> West of England Partnership, 2017. West of England Joint Spatial Plan Publication Document. 2017. Available online <https://www.jointplanningwofe.org.uk/consult/ti/JSPPublication/consultationHome> [Checked 19/03/2018]

<sup>38</sup> West of England Partnership, 2011. West of England Joint Local Transport Plan 3 2011 – 2026 (2011). Available online <https://s3-eu-west-1.amazonaws.com/travelwest/wp-content/uploads/2015/05/joint-local-transport-plan.pdf>. [Checked 02/03/2018]

context, the JLTP seeks to achieve improved access to Bristol Airport by public transport and through the delivery of the South Bristol Link (completed in January 2017).

- 3.2.6 A West of England Joint Transport Study (JTS)<sup>39</sup> has been prepared by the four West of England authorities. The JTS is intended to provide a clear direction for the long-term development of the transport system in the sub-region to 2036 and beyond and will form the basis for the next JLTP and transport investment programme.
- 3.2.7 The JTS sets out that there is a strong case to significantly improve surface connectivity to Bristol Airport, both by public transport and road, and identifies two major investment proposals. The first is for a new mass transit route between Bristol Airport and Bristol, to form part of a mass transit network for the urban area. The second proposal is for major improvements to the A38 between Bristol and Weston-super-Mare including a new M5 Junction 21A at Weston-super-Mare, a new highway link connecting from the M5 to the A38 at Langford and improvements on the A38 between Langford and Bristol Airport. The JTS highlights that this investment in local transport schemes will significantly improve connectivity and capacity to south Bristol, and will unlock capacity for growth and new development in the area as part of the emerging Spatial Strategy.

### Strategic Economic Plan 2015 - 2030

- 3.2.8 The West of England Local Enterprise Partnership Strategic Economic Plan (SEP)<sup>40</sup> contains a vision for economic growth which is managed sustainably to ensure all those within the sub-region benefit and that the environment is protected and enhanced.
- 3.2.9 The SEP identifies the future aspirations to expand Bristol Airport and the potential for that growth to play a major role in the economic prosperity of the region. The document also includes a vision for easier local, national and international travel with improved strategic connections by 2030, supported by Bristol Airport.

## 3.3 Local policy

### The Development Plan

- 3.3.1 Section 70(2) of the Town and Country Planning Act 1990 requires local planning authorities in determining planning applications to have regard to the development plan, so far as material to the applications, and to any other material considerations. Section 38(6) of the Planning and Compulsory Purchase Act 2004 (as amended) requires planning decisions to be made in accordance with the development plan unless material considerations indicate otherwise.
- 3.3.2 The adopted Development Plan<sup>41</sup> for the Proposed Development currently comprises:
- North Somerset Core Strategy (adopted 2017)<sup>42</sup>;

<sup>39</sup> West of England Partnership, 2017. West of England Joint Transport Study: Final Report. Available online <https://www.jointplanningwofe.org.uk/consult/ti/JTSTransportVision> [Checked 23/04/2018].

<sup>40</sup> West of England Local Enterprise Partnership. West of England Strategic Economic Plan 2015-2030. Available online <http://westofenglandlep.co.uk/about-us/strategicplan>. [Checked 19/03/2018].

<sup>41</sup> As detailed in Section 3.2, the JSP will, once adopted, form part of the Development Plan and will provide the sub-regional framework for the new North Somerset Local Plan. As the JSP has not yet been adopted, it does not currently form part of the Development Plan for the Proposed Development.

<sup>42</sup> North Somerset Council. North Somerset Core Strategy, adopted 2017. Available online <http://www.n-somerset.gov.uk/my-services/planning-building-control/planningpolicy/core-strategy/corestrategy/> [Checked 19/03/2018]



- The Sites and Policies Plan Part 1: Development Management Policies (adopted July 2016)<sup>43</sup>; and
- Sites and Policies Development Plan Part 2: Site Allocations Plan (adopted April 2018)<sup>44</sup>.

3.3.3 The principal Development Plan policies relating to Bristol Airport are outlined below. It should be noted that there are a number of other detailed, topic-specific Development Plan policies potentially relevant to the Proposed Development concerning (inter alia) design, transport, cultural heritage, landscape and biodiversity. Where appropriate, these policies are referred to in the topic chapters of this report (**Chapters 5 to 18**) and will also be detailed within the planning statement submitted alongside the planning application.

### North Somerset Core Strategy

3.3.4 The North Somerset Core Strategy was adopted in January 2017<sup>45</sup> and sets out the long-term vision, objectives and strategic planning policies for North Somerset up to 2026. The Core Strategy contains a suite of spatial visions that are intended to provide a clear, strategic planning context underpinned by a set of priority objectives. With specific regard to Bristol Airport, the overarching vision for North Somerset (Vision 1) sets out that: *"The future planning of...Bristol Airport will be guided by the need to balance the advantages of economic growth with the need to control the impacts on those who live nearby and on the natural environment."* Priority Objective 3, meanwhile, supports and promotes major employers in North Somerset including Bristol Airport to ensure continued employment security and economic prosperity.

3.3.5 Policy CS23 is the principal Core Strategy policy relating to development proposals at Bristol Airport and aims to support the delivery of Priority Objective 3. It states:

*"Proposals for the development of Bristol Airport will be required to demonstrate the satisfactory resolution of environmental issues, including the impact of growth on surrounding communities and surface access infrastructure."*

3.3.6 The Development Plan proposals map defines an inset that excludes the northern side of Bristol Airport's operational area from the Green Belt. Core Strategy Policy CS6 sets out that amendments to the Green Belt boundary at Bristol Airport will only be considered once long-term development needs have been identified and exceptional circumstances demonstrated.

### Site and Policies Plan Part 1: Development Management Policies

3.3.7 The Sites and Policies Plan Part 1 brings forward the detailed development management policies which complement the strategic context set out in the Core Strategy.

3.3.8 Policy DM50 refers specifically to proposals for development within the Green Belt inset at Bristol Airport and aims to ensure that, if further development of Bristol Airport is required, proposals demonstrate the satisfactory resolution of environmental issues, including the impact of growth on surrounding communities and surface access infrastructure. It states:

<sup>43</sup> North Somerset Council. Development Management Policies - Sites and Policies Plan, Part 1, adopted 2016. Available online <http://www.n-somerset.gov.uk/my-services/planning-building-control/planningpolicy/sites-policies-development-plan-document/sitesandpolicies/> [Checked 19/03/2018].

<sup>44</sup> North Somerset Council. Sites and Policies Plan Part 2: Site Allocations Plan adopted 2018. Available online <http://www.n-somerset.gov.uk/wp-content/uploads/2015/11/Site-Allocations-Plan.pdf> [Checked 23/04/18].

<sup>45</sup> The Core Strategy was originally adopted in April 2012. Following a High Court challenge, nine Core Strategy policies were remitted for re-examination. Following re-examination, the fully re-adopted Core Strategy incorporating changes recommended to the remitted policies was approved by NSC on 10<sup>th</sup> January 2017.

*"Development within the Green Belt inset at Lulsgate as shown on the Proposals Map will be permitted provided that:*

- *it is required in connection with the movement or maintenance of aircraft, or with the embarking, disembarking, loading, discharge or transport of passengers, livestock or goods;*
- *environmental impacts such as emissions are minimised, and there is no unacceptable noise impact;*
- *it is suitably sited, designed and landscaped so as not to harm the surrounding landscape; and*
- *appropriate provision is made for surface access to the airport, including highway*

*improvements and/or traffic management schemes to mitigate the adverse impact of airport traffic on local communities, together with improvements to public transport services."*

### Sites and Policies Plan Part 2: Site Allocations Plan

- 3.3.9 The Site Allocations Plan was adopted by NSC in April 2018. The Plan identifies the detailed allocations required to deliver the North Somerset Core Strategy covering, for example, residential and employment uses, as well as designations to safeguard or protect particular areas such as Local Green Space or Strategic Gaps. It should be noted that the Site Allocations Plan does not include a specific allocation in respect of Bristol Airport.

### New North Somerset Local Plan 2036

- 3.3.10 NSC has commenced work on a new Local Plan. The new Local Plan will review and roll-forward policies and allocations in existing development plan documents and plan for the housing, jobs and infrastructure set out in the JSP to 2036. Initial consultation to generate ideas and discussion with regard to strategic developments proposed in Banwell, Churchill, Nailsea and Backwell took place in November 2017<sup>46</sup>.
- 3.3.11 It should be noted that the new Local Plan is unlikely to be at an advanced stage at the time the planning application for the Proposed Development is determined.

### Supplementary Planning Documents

- 3.3.12 NSC has adopted a number of Supplementary Planning Documents (SPD) of potential relevance to the Proposed Development. These SPD include:
- Biodiversity and Trees (December 2005);
  - North Somerset Landscape Character Assessment (December 2005);
  - Travel Plans (November 2010);
  - Creating Sustainable Buildings and Places in North Somerset (March 2015); and
  - North Somerset and Mendip Bats Special Area of Conservation (SAC) Guidance on Development (January 2018).

<sup>46</sup> See <http://www.n-somerset.gov.uk/my-services/planning-building-control/planningpolicy/local-plan/new-local-plan-2036/about-the-new-local-plan-for-2036/> [Checked 23/04/18]

- 3.3.13 Where relevant, the guidance contained in the SPD above has been drawn upon in the detailed topic chapters of this report (**Chapter 5 to 17**).

### North Somerset's Economic Plan 2017-2036

- 3.3.14 The Economic Plan<sup>47</sup> recognises the important role of Bristol Airport to the economy and connectivity of North Somerset. It highlights that the airport provides an opportunity to support the retention and expansion of the area's most cutting edge and innovative companies as a driver of productivity growth, as well as to attract inward investment. The Plan states that a key challenge is to ensure that the airport is developed to provide the necessary space for growing businesses.
- 3.3.15 In this context, the Economic Plan includes a number of actions related to Bristol Airport, including to:
- Work with partners to maximise the role of the airport as a strategic employment location;
  - Work with BAL to develop a campaign to encourage exporters/importers to use the airport's facilities;
  - Attract high value inward investment, capitalising on identified niche clusters, supply chains and strategic transport connectivity; and
  - Build on the role of Bristol Airport as a gateway to the North Somerset region, developing targeted support packages for international investors.

### Bristol Airport Master Plan

- 3.3.16 British International Airport (now Bristol Airport or BAL) published its first Master Plan<sup>48</sup> in 2006. The Master Plan covered the period up to 2030 and in 2011, BAL subsequently obtained planning permission<sup>49</sup> from NSC for the major expansion of Bristol Airport to accommodate 10 mppa.
- 3.3.17 The 2013 APF recommends that airport master plans are updated every five years to "*provide a clear statement of intent on the part of an airport operator to enable future development of the airport to be given due consideration in local planning processes*". In this context, BAL is currently preparing a new Master Plan for Bristol Airport, with the early stages having been subject to very extensive public consultation.
- 3.3.18 As set out in **Chapter 2: The Proposed Development**, the new Master Plan will provide a strategy for the long-term growth of Bristol Airport to meet the forecast level of passenger demand by the mid-2040s, which is expected to be circa 20 mppa. BAL's broad approach to long-term growth was set out in an initial discussion document, 'Your Airport, your views'<sup>50</sup>, which was subject to public consultation between November 2017 and January 2018.
- 3.3.19 The second stage of non-statutory consultation on the emerging Master Plan commenced in May 2018. Following best practice this includes, and seek views on, BAL's proposals for development at Bristol Airport to accommodate 12 mppa, as a first phase of planned growth in passenger capacity. BAL is committed to an open and transparent consultation process, allowing key stakeholders and the community an opportunity to comment and shape BAL's long term plans.

<sup>47</sup> North Somerset Council (2017) North Somerset's Economic Plan. Available online <http://innorthsomerset.co.uk/about-us/economic-plan> [Checked 16.05.18].

<sup>48</sup> Bristol International Airport, 2006. Bristol International Airport Master Plan 2006 to 2030.

<sup>49</sup> 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 02/03/18].

<sup>50</sup> See [www.bristolairport.co.uk/future](http://www.bristolairport.co.uk/future). [Checked 02/03/18].

### 3.4 Other consents needed

- 3.4.1 To enable the Proposed Development at Bristol Airport, additional consents, permits and licences may be required. These will be identified, where relevant, during the course of the Environmental Impact Assessment (EIA) process. Appropriate consultation will take place with relevant organisations, such as NSC, Natural England (NE) and the Environment Agency to determine the scope of such requirements, if they are deemed necessary.

#### Habitats Regulations Assessment

- 3.4.2 Two internationally designated sites are located within 10km of the Proposed Development:
- North Somerset and Mendip Bats Special Area of Conservation (SAC): and
  - Chew Valley Lake Special Protection Area (SPA).
- 3.4.3 In addition to the assessment of potential effects on these European sites that will need to be addressed in the Environmental Statement (ES), there is a requirement under The Conservation of Habitats and Species Regulations 2017 (SI 2017 No. 1012) (the 'Habitats Regulations') to undertake a screening exercise to determine whether these (or any other) European sites are likely to be significantly affected by the Proposed Development, either alone or in combination with other plans and projects and, if so, whether these effects will result in any adverse effects on the European site's integrity. If significant effects are likely, there will be a need for an Appropriate Assessment to be carried out. The screening, and any subsequent Appropriate Assessment, form part of what is known as the Habitats Regulations Assessment (HRA) process.
- 3.4.4 Screening and any subsequent Appropriate Assessment will be undertaken by NSC (as the 'competent authority' for HRA), drawing upon information about the likely effects of the Proposed Development on European sites that will be provided by BAL. In undertaking its assessment, NSC is required to consult with NE and to facilitate the HRA process, BAL will also liaise with NE, and other interested parties as appropriate.

## 4. Approach to Environmental Impact Assessment Scoping

The scoping phase of the Environmental Impact Assessment (EIA) process seeks to determine the extent of the issues to be considered in the assessment and reported in the Environmental Statement (ES). This chapter sets out the proposed approach to the assessment of impacts, how this is outlined within this Scoping Report and how it will ultimately be presented within the ES.

### 4.1 Establishing the scope of the assessment

- 4.1.1 Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017<sup>51</sup> (the EIA Regulations) details the information that should be included in an ES. Paragraph 4 requires that the ES includes a description of environmental factors likely to be significantly affected by a development.
- 4.1.2 This Scoping Report sets out the environmental factors likely to be significantly affected by the Proposed Development (described in **Chapter 2**), determined based on the assessment methodologies presented. This establishes the proposed scope of the assessment to be presented within the ES.
- 4.1.3 **Table 4.1** lists the environmental factors outlined in Schedule 4 (paragraph 4) of the EIA Regulations as requiring consideration and highlights where these have been considered in this Scoping Report.

Table 4.1 Environmental factors, as listed in Schedule 4 (paragraph 4) of the EIA Regulations, to be addressed in the ES and where they are considered within this Scoping Report

Factor	Where considered within this Scoping Report
<b>Population</b>	Socio-economics [Chapter 14] Health [Chapter 15]
<b>Human Health</b>	Health [Chapter 14]
<b>Biodiversity</b>	Biodiversity [Chapter 9]
<b>Land</b>	Land quality [Chapter 12]
<b>Soil</b>	Land quality [Chapter 12]
<b>Water</b>	Surface water and flood risk [Chapter 10] Groundwater [Chapter 11]
<b>Air</b>	Air quality [Chapter 7]
<b>Climate</b>	Greenhouse gases [Chapter 17] Climate change [Chapter 18]

<sup>51</sup> The Town and Country Planning (Environmental Impact Assessment) Regulations (2017) Ministry of Housing, Communities & Local Government. Available online from <https://www.gov.uk/guidance/environmental-impact-assessment>. Accessed on 28/02/2018

Factor	Where considered within this Scoping Report
<b>Material assets</b>	Traffic and transport [Chapter 5] Land quality [Chapter 12] Archaeology and cultural heritage [Chapter 13]
<b>Cultural heritage</b>	Archaeology and cultural heritage [Chapter 13]
<b>Landscape</b>	Landscape and visual [Chapter 8]
<b>Interaction between the above factors</b>	Discussed in chapters as appropriate

## Presentation of information within the technical chapters

4.1.4 This EIA Scoping Report includes the following information within the chapter for each topic:

- A review of the legislation, policies and guidance relevant to the topic that will guide the scope of the assessment;
- A summary of main data sources used to inform the definition of the current baseline conditions;
- A summary of the engagement with consultees that has occurred to-date or is planned;
- An overview of the baseline conditions including:
  - ▶ Defining the zone of influence for the topic;
  - ▶ Identifying factors influencing baseline conditions; and
  - ▶ Outlining any additional information requirements.
- A summary of the scope of the assessment to be carried out and definition of the potential likely significant effects identified. This includes:
  - ▶ Identification of the receptors that could be subject to potential likely significant effects;
  - ▶ A summary of the likely significant effects requiring further assessment;
  - ▶ A summary of the potential effects assessed as not requiring further assessment, with explanation as to why not; and
  - ▶ The proposed assessment methodology.

4.1.5 The technical chapters will provide information to enable North Somerset Council (NSC) to determine if the scope of the assessment and the proposed approach is appropriate. The following sections outline the overarching approach that will be taken for the assessment presented within this Scoping Report and subsequently the ES.

## 4.2 Defining the Zones of Influence

4.2.1 Once the development parameters have been established to a reasonable degree of certainty, each environmental topic will need to define a topic specific Zone of Influence (ZOI) over which a baseline will be established and the assessment carried out. This is carried out to a reasonable degree of certainty within each of the technical chapters of the Scoping Report; however, as the process of scoping and assessment moves forward and the scheme evolves, the ZOI will need to be reviewed alongside those changes.



- 4.2.2 The ZOI of the Proposed Development is defined as the geographical area over which the potentially significant effects, both direct and indirect, could extend. Accurate definition of these ZOIs requires information about the predicted magnitude or other characteristics of environmental changes and information about relevant individual receptor sensitivity to these changes. Technical guidance, where relevant, and professional judgement are also used. Consequently, there is considerable variation in the spatial extent of the ZOIs both within and between relevant topics. Therefore, a ZOI is defined for each topic.
- 4.2.3 To ensure that the subsequent assessment presented is robust whilst design work continues, the ZOIs for each topic cover the likely maximum geographical area of influence. This approach is being used to minimise the possibility that extensions to the ZOIs will be required and will also ensure that the assessment is inclusive of all geographical areas potentially significantly affected by the Proposed Development.

## 4.3 Approach to defining the baseline for the assessment

- 4.3.1 The assessment of potentially significant effects requires a comparison to be made between the likely environmental conditions in the presence of the Proposed Development and in its absence (i.e. the 'baseline'). As the various elements of the Proposed Development would be built over a period of approximately eight years and then operated indefinitely, it cannot be assumed that the baseline conditions in the absence of the Proposed Development will remain the same.
- 4.3.2 Changes from human influences, such as new development or increased traffic, have the potential to modify the current environmental conditions. It is therefore necessary to undertake the assessment in relation to the baseline conditions that are likely to occur in the years that are selected for assessment, referred to as the future baseline.

### Current baseline

- 4.3.3 To establish the current baseline for each topic and to facilitate the identification of potential likely significant effects, a summary description of the aspects of the environment likely to be significantly affected by the Proposed Development is presented in **Chapters 5 to 18**. Where available, existing desk top studies, field surveys and consultation have been used to identify the current conditions and environmental character of the area and ZOI.
- 4.3.4 The baseline as outlined in each Scoping Report topic chapter will be described within the corresponding ES chapter, drawing upon the information sources noted.

### Factors influencing the baseline

- 4.3.5 When considering a long-term development, it is often appropriate to take into account the changing nature of the environment in the event that the Proposed Development is not constructed or operated or when the life of the construction period may be sufficiently long that changes to the baseline environment could occur. These changes are captured by considering the influencing factors on the existing Bristol Airport site, resulting in a future baseline.
- 4.3.6 The nature of the future baseline varies between topics and is influenced by a combination of natural and man-made processes. For some topics, the future baseline may be the same as the current baseline.
- 4.3.7 Factors that could influence the future baseline and that are outside of the scope of the Proposed Development are summarised in **Chapters 5 to 18**.

## 4.4 Approach to identifying likely significant effects

- 4.4.1 Guidance issued by the Ministry of Housing, Communities and Local Government in 2017<sup>52</sup> outlines the information that an ES should contain and advises on the need to focus on significant environmental effects. The Guidance states:

*"Whilst every Environmental Statement should provide a full factual description of the development, the emphasis should be on the "main" or "significant" environmental effects to which a development is likely to give rise. The Environmental Statement should be proportionate and not be any longer than is necessary to assess properly those effects. Where, for example, only one environmental factor is likely to be significantly affected, the assessment should focus on that issue only. Impacts which have little or no significance for the particular development in question will need only very brief treatment to indicate that their possible relevance has been considered."*

- 4.4.2 Following this Guidance, and to ensure that legislative requirements are met, this Scoping Report outlines how the baseline will be established, the approach that has been taken in identifying potential significant effects and the approach that will be adopted for the assessment of significant effects to be presented in the ES.
- 4.4.3 Professional judgement, the project description and information on the site informs decisions about likely significant effects and therefore the scope of the assessment. Reference is also made to the following information if it is available at this stage:
- Available information about the magnitude and other characteristics of the potential changes that are expected to be caused by the Proposed Development;
  - Receptors' sensitivity to these changes;
  - The effects of these changes on relevant receptors; and
  - Where relevant, the value of receptors.
- 4.4.4 If the information that is available at the Scoping Report stage does not enable a robust conclusion to be reached that a potential effect is not likely to be significant, the effect is carried forward for further assessment, which will be presented within the ES.
- 4.4.5 All assessments carried out and presented within each topic chapter are based on the best available information at the time. The Proposed Development will be refined as the design process progresses and as new environmental information is received, potentially necessitating modifications to the scope of the ES. However, these modifications will be within the bounds of the description of the Proposed Development (**Chapter 2**). Changes will be documented within the ES. The Scoping Report will not therefore be revised and reissued.

## 4.5 Cumulative effects assessment

- 4.5.1 There is a requirement under the EIA Regulations to consider the cumulative effects of the Proposed Development. This element of the assessment will identify whether any of the individual effects of the Proposed Development would combine to create a cumulative effect greater than the sum of the individual effects.

<sup>52</sup> Ministry of Housing, Communities and Local Government, 2017. Guidance Environmental Impact Assessment. Explains requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Available online: <https://www.gov.uk/guidance/environmental-impact-assessment#Preparing-an-Environmental-Statement1> [Checked 02/03/2018]

4.5.2 The cumulative effects assessment process considers this in two ways:

- **Intra-project effects:** Typically, these effects occur when different activities associated with a project act upon the same environmental receptor. In determining such effects, consideration would be given to the sensitivity of the receptor and the magnitude of environmental change. Consideration is given to both the interaction of significant effects and the interaction of different impacts from project activities even if individually they are not significant.
- **Inter-project effects:** Consideration will be given to whether there is the potential for the effects of the Proposed Development and effects of other 'major' developments to combine and result in a significant environmental effect.

### Intra-project cumulative effects assessment

- 4.5.3 The approach to the intra-project cumulative effects assessment that will be adopted and presented within the ES will be consistent across all receptor groups. Each technical discipline will assess effects individually against topic-specific criteria that are well established within standard EIA methodologies.
- 4.5.4 Where the assessment concludes that either the effect is not significant or mitigation can be applied that ensures the effect is not significant, the significance level of the effect will not change when considered collectively with other non-significant effects from other topics assessed, in the majority of cases. This is because such effects do not together, for the most part, actually cause combined effects. For example, increases in noise do not make adverse effects on views any worse for a human receptor.
- 4.5.5 Where it is apparent that the assessment concludes that there is a residual effect, even after the consideration of mitigation, or that a number of effects within a technical discipline combine to result in significant effects, these will be taken forward into the intra-project assessment of effects.

### Inter-project cumulative effects assessment

- 4.5.6 The EIA will consider the potential for cumulative effects associated with other development, i.e. whether the effects from the Proposed Development could be combined with similar effects from other schemes to result in significant cumulative effects. It is important to recognise that the existing Bristol Airport site layout used for the assessments in the EIA will include all components outlined in **Section 2.1**. In EIA terms, it is good practice to consider the future baseline situation by including schemes which are not included in the existing baseline but which are likely to be constructed or operating (if appropriate) at the same time as the Proposed Development. As such, proposed schemes which are the subject of a planning application (at the time of preparing the ES) or which have an extant planning permission and which are not included in the baseline will also be considered.
- 4.5.7 An inter-project cumulative effects assessment has a number of stages. The stages that will be followed for the assessment presented within the ES are:
- **Stage 1:** Identify a comprehensive list of 'other development';
  - **Stage 2:** Identify a short list of 'other development' for the inter-project assessment by reference to schemes which could give rise to a significant effect cumulatively with the Proposed Development, in consultation with NSC;
  - **Stage 3:** Information gathering; and
  - **Stage 4:** Assessment.

- 4.5.8 Once identified, the details of other developments will be assessed to confirm whether the scale of the development will result in effects which will occur within the same spatial and temporal scope as the Proposed Development, and which could give rise to significant cumulative effects. Those developments identified as having the potential for inter-project significant cumulative effects will be added to the short list of projects, taken forward into the inter-project assessment, following consultation with NSC.

## 4.6 Consultation

- 4.6.1 Consultation specific to the Proposed Development includes the submission of the formal request for an EIA Scoping Opinion to NSC. A Consultation Strategy has been prepared to co-ordinate pre-application consultation and engagement for the Proposed Development.
- 4.6.2 The Consultation Strategy proposes regular pre-application meetings with NSC and wider stakeholder engagement. This includes the second stage of consultation on the Master Plan which provides details of, and seek views on, the expansion proposals to 12 mppa and a Consultation Report will subsequently be prepared to support the planning application. The Consultation Report will describe the consultation methods employed, summarise the responses received and identify how issues raised by consultees have been taken into account in the design of the Proposed Development (where appropriate).
- 4.6.3 In addition to the wider consultation outlined in the Consultation Strategy topic specific consultation will be undertaken. The proposed consultation for each topic is noted in the relevant topic chapter.

## 5. Traffic and Transport

### 5.1 Introduction

- 5.1.1 The purpose of the traffic and transport chapter of the Environmental Statement (ES) is to describe (and, where possible, quantify) the likely impact that the Proposed Development will have on the surrounding transport networks.
- 5.1.2 This chapter of the ES will sit alongside a Transport Assessment (TA), the scope of which North Somerset Council (NSC), Bristol City Council (BCC), Bath and North East Somerset (BANES) Council and Highways England (HE) will be consulted upon. It is anticipated that the TA will include a full multi-modal impact assessment, which will consider the impact of the Proposed Development on all relevant transport infrastructure surrounding Bristol Airport.

### 5.2 Relevant legislation, policy and guidance

#### Legislation

- 5.2.1 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 are relevant to traffic and transport and the assessment that will be presented within the ES.

#### Policy

##### National Planning Policy Framework

- 5.2.2 The National Planning Policy Framework (NPPF)<sup>53</sup> sets out the Government's economic, environmental and social planning policies for the country. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.
- 5.2.3 The NPPF recognises the importance that transport policies have, not only in facilitating development, but also in contributing to wider sustainability and health objectives.
- 5.2.4 The ES Chapter will review the NPPF, including revisions likely to be made in 2018, with regards to the key relevant policies relating to traffic and transport, namely at paragraphs 17, 32 and 34-36.

##### Planning Practice Guidance

- 5.2.5 The Planning Practice Guidance<sup>54</sup> (PPG) provides the overarching framework within which the transport implications of development should be considered. It provides advice on the preparation of Transport Assessments, Transport Statements and Travel Plans. The key advice set out within the PPG relating to the Proposed Development will be summarised in the ES.

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<sup>53</sup> Department for Communities and Local Government, 2012. National Planning Policy Framework. Available online <https://www.gov.uk/government/publications/national-planning-policy-framework> [checked 06/03/28]

<sup>54</sup> Ministry of Housing, Communities & Local Government, 2014. Travel Plans, Transport Assessments and Statements. Available online <https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements> [checked 06/03/18]

## Local Planning Policy

- 5.2.6 Local planning documents that are relevant with regards to transport in the vicinity of the Proposed Development include:
- West of England Joint Local Transport Plan 3 (2011-2026)<sup>55</sup>; and
  - North Somerset Local Plan: Core Strategy (2017)<sup>56</sup>, Sites and Policies Plan Part 1 (2016)<sup>57</sup>.
- 5.2.7 A summary will be provided of the most up to date publications of the emerging West of England Joint Spatial Plan and the supporting Joint Transport Study with regards to transport within the study area. Emerging local plan documents, including Sites and Policies Plan Part 2, will also be considered.

## Guidance

- 5.2.8 The methodology utilised in this ES will be drawn from the Guidelines for the Environmental Assessment of Road Traffic' (1993) published by the Institute of Environmental Assessment (IEA)<sup>58</sup>, and, where appropriate, Volume 11 of the 'Design Manual for Roads and Bridges' (DMRB) 'Environmental Assessment'<sup>59</sup> (2008) published by the former Department of Environment, Transport and the Regions, now Department for Transport (DfT).

## 5.3 Main sources of data

- 5.3.1 The EIA scoping exercise presented in this Scoping Report has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the following sources of data:
- Bristol Airport Limited (BAL) 2009 planning application TA and ES (Application ref 09/P/1020/OT2);
  - Sutrans National Cycle Network information;
  - Travel West bus service information;
  - Ordnance Survey Maps;
  - Google Maps; and
  - Information and guidance outlined in the documents presented in **Section 5.2**.

## 5.4 Engagement with statutory consultees

- 5.4.1 The relevant local planning and highway authorities will be consulted on the scope of the TA, assessment methodology, any modelling work and the scope of any mitigation measures proposed by BAL. Initial consultation with these groups has already commenced.

<sup>55</sup> West of England, 2011. Joint Local Transport Plan 3 (2011-2026). Available online <https://travelwest.info/> [checked 06/03/18]

<sup>56</sup> North Somerset Council, 2017. Core Strategy. Available online <http://www.n-somerset.gov.uk/my-services/planning-building-control/planningpolicy/core-strategy/corestrategy/> [checked 06/03/18]

<sup>57</sup> North Somerset Council, 2016 Sites and Policies Plan Part 1 Development Management Policies. Available online <https://www.n-somerset.gov.uk/my-services/planning-building-control/planningpolicy/sites-policies-development-plan-document/sitesandpolicies/> [checked 06/03/18]

<sup>58</sup> Institute of Environmental Assessment, 1993. Guidance Notes No.1 –Guidelines for the Environmental Assessment of Road Traffic.

<sup>59</sup> Highways Agency, 2008. Volume 11 - Design Manual for Roads and Bridges. Department of Environment, Transport and the Regions

## 5.5 Overview of baseline conditions

### Zones of influence

- 5.5.1 The TA will undertake an assessment of a wide study area which will be established following consultation with the surrounding local councils and HE. A more localised study area for the assessment of traffic and transport effects may be considered appropriate for the EIA based on the area where significant effects are considered likely to arise.
- 5.5.2 The IEA guidelines suggest two broad rules to identify the appropriate extent of the study area:
- Links with all vehicle or Heavy Vehicles traffic flow increases in any assessment year of +30%; and
  - Links with Medium or High sensitivity receptors with flow increases greater than 10%.

### Current baseline

- 5.5.3 This section will present the baseline conditions for local transport infrastructure and networks in the area, including:
- Existing site conditions;
  - Committed infrastructure to be delivered at the site, both as part of the extant airport consents and other operational requirements;
  - Highway network including the Strategic Road Network (SRN), under the management of HE, and local highway network under the management of NSC and BCC.
  - Personal injury collision analysis undertaken within the local area on the most recent three years of data, to be supplied by NSC;
  - Public transport:
    - ▶ Bus services including routes A1, A2, A3, and A4; and
    - ▶ Rail services from surrounding stations including Nailsea and Backwell, Yatton, Worle Parkway, Weston-super-Mare, Bristol Temple Meads and Bristol Parkway;
  - Pedestrian and cycle provision in the vicinity of Bristol Airport, particularly public rights of way (PROW) including footpaths and bridleways and the National Cycle Route 401 (Avon Cycleway).

### Factors influencing baseline conditions

- 5.5.4 The 2018 baseline traffic and transport conditions are likely to be influenced by future traffic growth (e.g. as a result of development) and also by road network and infrastructure improvements to be provided in the surrounding area. Therefore, a future baseline year (completion year) is more appropriate to use to assess the potential impacts of the Proposed Development and provide a comparison between the environmental conditions that would be anticipated with and without the Proposed Development.

### Additional baseline information requirements

- 5.5.5 Personal injury traffic data for the past three years will be required from NSC to establish baseline accident and road safety conditions.



- 5.5.6 Further to this, during scoping for the TA it may be identified that traffic surveys are required to inform and verify baseline traffic flows and inform traffic modelling which may be undertaken.

## 5.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

- 5.6.1 The sensitive receptors will primarily comprise locations where people live or congregate, such as residential dwellings, hospitals and parks, as well as links and junctions of the local highway with high levels of pedestrian or cyclist activity; including PRowWs within the study area, and pedestrian and cycle facilities such as footways and crossing points.

### Potential significant effects requiring further assessment

- 5.6.2 The potential effects of the Proposed Development likely to be significant with regards to traffic and transport, and which will be subject to further assessment (to be presented within the ES) are related to the construction and operation of the Proposed Development.

#### Construction

- 5.6.3 Construction of the Proposed Development may generate traffic associated with movement of materials in addition to car trips generated by the workforce. There is potential for temporary disruption where any necessary proposed access improvement works are undertaken.
- 5.6.4 It is proposed that this is assessed qualitatively given the relatively low anticipated vehicle trips associated with this and its temporary nature, particularly in relation to the operational phase which would, be likely to generate more traffic.

#### Operational

- 5.6.5 The operation of the development will generate traffic associated with increased passenger and staff numbers, while there could also be alterations to the local highway network and accessibility to the airport.
- 5.6.6 The majority of impacts are likely to affect the immediate local area, including the A38. The impact assessment will also consider the cumulative transport-related impacts from committed developments (e.g. approved development schemes and surrounding allocated development sites). The relevant local authorities and HE will be consulted on the committed schemes to be included in the cumulative assessment.
- 5.6.7 The main transport impacts during the operational phase are likely to be on the local highway, pedestrian and cycle networks that may arise due to increased vehicle trips to and from Bristol Airport.
- 5.6.8 Consideration will also be given to the effect of the proposed development on public transport, including the effect on existing services and any upgrades proposed as part of the development.

### Potential effects not requiring further assessment

- 5.6.9 Within the IEA guidance, it is noted that 'Dust and Dirt' should be assessed, however, this will be covered within the Air Quality Chapter of the ES.

- 5.6.10 IEA guidance also indicates that the impact of hazardous loads should be considered. Hazardous loads which could potentially be generated by the Proposed Development will be managed in accordance with the relevant legislation and best practice guidance, it is therefore not anticipated that the generation of such loads will result in significant effects and this aspect is therefore scoped out of the assessment.

### Proposed assessment methodology

- 5.6.11 The methodology outlined in this section is based on IEA and DMRB guidance and will be followed when completing the impact assessment presented in the ES. Mitigation and enhancement measures will be identified as appropriate through the assessment and discussed with statutory consultees.

### Assessment scenarios

- 5.6.12 Scenarios to be considered within the assessment are:
- 2018 Baseline (Do Nothing);
  - Completion year (Do Minimum);
  - Completion year (Do Something); and
  - Completion year (Do Something with Mitigation)
- 5.6.13 'Do Minimum' represents the 'without development' scenario and 'Do Something' represents the 'with development' scenario. Future year background travel growth will be determined based on the DfT's forecasting tool TEMPro.

### Assessment Criteria

- 5.6.14 The assessment criteria are based on the IEA Guidelines and are as follows:
- Severance;
  - Driver Delay;
  - Pedestrian Delay and Amenity;
  - Fear and Intimidation; and
  - Accidents and Road Safety.

### Magnitude of Effects

- 5.6.15 A scale of magnitude will be outlined in the transport chapter for relevant effects. The magnitude of effects will be assessed, where appropriate, against a scale divided into 'very high', 'high', 'medium', 'low' and 'very low' magnitude.

### Sensitivity of Receptors

- 5.6.16 The identified sensitive receptors will be rated, as appropriate, in terms of their sensitivity on a scale of 'very high', 'high', 'medium', 'low' and 'very low' as outlined in **Table 5.1** based on the IEA Guidelines.

Table 5.1 Receptor Sensitivity

Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity	Very Low
<ul style="list-style-type: none"> <li>road safety – Locations with patterns of serious or fatal collisions</li> </ul>	<ul style="list-style-type: none"> <li>schools, colleges and other educational institutions (nurseries have been assumed to be included in this category)</li> <li>retirement / care homes for the elderly or infirm</li> <li>roads used by pedestrians with no footways</li> <li>road safety – locations with patterns of slight collisions</li> </ul>	<ul style="list-style-type: none"> <li>hospitals, surgeries and clinics</li> <li>parks and recreation areas</li> <li>shopping areas</li> <li>roads used by pedestrians with narrow footways</li> </ul>	<ul style="list-style-type: none"> <li>tourist / visitor attractions</li> <li>historical buildings</li> <li>churches</li> <li>other roads with active frontages and dwellings</li> </ul>	<ul style="list-style-type: none"> <li>open space</li> </ul>

## Significance of Effects

- 5.6.17 The significance of transport effects will generally be determined based on the magnitude of impact, receptor sensitivity and professional judgement. This is shown in **Table 5.2**.

Table 5.2 Significance Matrix

		Magnitude of change				
		Very high	High	Medium	Low	Very low
Sensitivity	Very high	Major (Significant)	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)
	High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

## Assumptions

- 5.6.18 The ES Chapter will be based on the TA and will therefore be based on the assumptions included within the TA.
- 5.6.19 Likely significant effects during the construction phase of the Proposed Development will also be considered within the ES. It is recognised that the transport effects will vary through the

construction programme. Assessment at this stage will be limited by the information available and will provide an indication of likely construction traffic commensurate with the level of information

## 6. Noise

### 6.1 Introduction

- 6.1.1 This chapter sets out the proposed approach to assessing the likely significant effects arising from noise and vibration associated with the Proposed Development. High exposure to noise is an annoyance and can cause sleep disturbance which can also affect people's health. This chapter will consider noise emissions due to airborne aircraft operations, the largest noise source at Bristol Airport. Consideration will also be given to noise and its effects arising from aircraft ground operations, surface transport and from construction works associated with the Proposed Development.

### 6.2 Relevant legislation, policy and guidance

- 6.2.1 The effects from the Proposed Development will be assessed taking account of current Government guidance on noise as set out in the National Planning Policy Framework (NPPF)<sup>60</sup> and the Noise Policy Statement for England (NPSE)<sup>61</sup>. Consideration will also be given to current Government guidance as contained within the Aviation Policy Framework<sup>62</sup> and most recent advice contained within the Government's consultation response to air space change<sup>63</sup>.
- 6.2.2 Taking account of on-going noise mapping requirements within the UK under the Environmental Noise (England) Regulations<sup>64</sup>, guidance on aircraft noise matters emerging from Europe will also be taken into account.
- 6.2.3 Consideration will also be given to the guidance in the Government's revised draft Airports National Policy Statement<sup>65</sup> regarding new runway capacity and infrastructure at airports in the South East of England in respect of noise assessment and mitigation, as well as the approach to noise assessment undertaken as part of the Airports Commission<sup>66</sup>.
- 6.2.4 This topic will be described, having regard to relevant noise related bodies, policies and documents as described below (list not necessarily exhaustive), under the following headings:
- International Regulation:
    - ▶ International Civil Aviation Organisation.

<sup>60</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. Available online [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Accessed 12/03/2018].

<sup>61</sup> Defra, March 2010. Noise Policy Statement for England (NPSE). Available online [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69533/pb13750-noise-policy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf) [Accessed 10/04/2018].

<sup>62</sup> Department for Transport, 2013. Aviation Policy Framework. Available online <https://www.gov.uk/government/publications/aviation-policy-framework> [Accessed 19/03/2018].

<sup>63</sup> Department of Transport, 2017. Consultation Response on UK Airspace Policy: A Framework for Balanced Decisions on the Design and Use of Airspace. Available online [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf) [Accessed 21/02/2018]

<sup>64</sup> The Environmental Noise (England) Regulations 2006 (SI 2006/2238).

<sup>65</sup> Department of Transport, 2017. Beyond the Horizon – the Future of UK Aviation: a Call for Evidence on a New Aviation Strategy. Available online <https://www.gov.uk/government/consultations/a-new-aviation-strategy-for-the-uk-call-for-evidence> [Accessed 19/03/2018]

<sup>66</sup> Airport Commission, 2015. Airports Commission: Final Report. Available online [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/440316/airports-commission-final-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf) [Accessed 24/04/2018]

- European Regulation:
  - ▶ Directive 2006/93/EC;
  - ▶ Directive 2002/30/EC, repealed by Regulation 598/2014; and
  - ▶ Directive 2002/49/EC.
- National Regulation:
  - ▶ Aeroplane Noise Regulations 1999;
  - ▶ Civil Aviation Act 2012;
  - ▶ Environmental Noise (England) Regulations 2006 (as amended);
  - ▶ Noise Policy Statement for England (NPSE);
  - ▶ National Planning Policy Framework (NPPF);
  - ▶ Aviation Policy Framework;
  - ▶ Airports Commission Final Report, 2015;
  - ▶ Survey of Noise Attitudes (2014), CAP 1506;
  - ▶ Consultation Response on UK Airspace Policy, 2017;
  - ▶ Air Navigation Guidance 2017; and
  - ▶ Airports National Policy Statement, 2018.
- Local Planning Framework:
  - ▶ Bristol Local Plan;
  - ▶ Bristol Airport; and
  - ▶ Aeronautical Information Package (AIP).

## 6.3 Main sources of data

6.3.1 The EIA scoping exercise presented in this Scoping Report, with respect to noise, has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the following sources of data:

- 12 million passengers per annum (mppa) Interim Infrastructure Plan;
- Current (2017) aircraft movements;
- Provisional aircraft movement forecast for 12 mppa; and
- Complaint data for the previous three years.

6.3.2 Data that will be used for the ES assessment is listed below:

- Finalised aircraft movement forecast schedule;
- Road traffic schedules and forecast;
- Construction noise phasing plans and plant equipment lists; and

- Results of unattended Baseline Noise Monitoring Survey undertaken in March 2018 (already completed). Further attended monitoring will be agreed with NSC.

### Air noise

- 6.3.3 Noise contours will be prepared in terms of the usual UK noise indicator for daytime airborne noise, the  $L_{Aeq,16h}$  index, and the night-time airborne noise, the  $L_{Aeq,8h}$  index, using the Federal Aviation Administration Aviation Environmental Design Tool (AEDT).
- 6.3.4 Consideration will also be given to other sources of aircraft performance data, such as those available from the Civil Aviation Authority on the performance of future aircraft types, as well as aircraft performance information relating to operations of relevant aircraft types.

### Ground noise

- 6.3.5 A ground noise assessment will be undertaken, concentrating on localities in close proximity to Bristol Airport where aircraft ground operations, such as engine running on stands and at hold positions, taxiing, manoeuvring and the operation of auxiliary power units (APU's) while on stands, will give rise to the greatest potential noise effects. As a result, as part of the ambient noise survey, noise monitoring will be undertaken in the vicinity of the west stands where additional stand capacity is proposed to be built as part of the Proposed Development.
- 6.3.6 The ground noise assessment will involve the preparation of ground noise contours using CADNA noise modelling software around Bristol Airport to investigate the noise levels generated by aircraft operating on the ground both now and in the future.

### Road traffic noise

- 6.3.7 Road traffic noise calculations at representative noise sensitive receptors will be undertaken using the UK recognised method of assessment set out in the Department of Transport's Calculation of Road Traffic Noise (CRTN)<sup>67</sup>. Current and forecast traffic flow data will be provided and used to predict current and future road traffic levels and to determine the resulting expected impacts.

### Construction noise

- 6.3.8 The construction plant noise emission details as set out in tables within BS 5228-1:2009+A1:2014<sup>68</sup> along with the associated described methodologies will be used to assess and predict construction noise for different phases of the Proposed Development at key noise sensitive receptors.
- 6.3.9 For vibration assessment, information from BS 5228-2:2009+A1:2014<sup>68</sup> will be used where relevant to predict vibration levels at key noise and vibration sensitive receptors.

## 6.4 Engagement with consultees

- 6.4.1 Consultation is at an early stage and engagement with relevant organisations regarding the proposed noise assessment has not yet been undertaken prior to the issue of this Scoping Report.

<sup>67</sup>. Department of Transport, 1988. Calculation of Road Traffic Noise. Department of Transport Welsh Office. London: HMSO.

<sup>68</sup>. British Standards Institute, 2008BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1 - Noise. London: BSI.



The noise monitoring undertaken to date has considered positions representative of the closest noise sensitive locations to Bristol Airport.

- 6.4.2 Consultation will be held with relevant officers of North Somerset Council (NSC) to agree the extent and scope of the noise and vibration assessment.

## 6.5 Overview of baseline conditions

### Zones of influence

- 6.5.1 Aircraft operations have the potential to affect areas distant from the actual airport and it is necessary to consider the zone of land over which noise will be assessed. The purpose of an environmental statement is to identify where significant effects may occur as a result of the development and this concept assists in identifying the key zone of influence. People's perception of noise varies however, and while at a given level of noise, most people may not be significantly affected, some people will be affected due to their specific circumstances. To account for this, the noise assessment will ensure that it considers effects at a level described in the Noise Policy Statement<sup>61</sup> as the "Lowest Observed Adverse Effect Level", (LOAEL). This will be determined for noise from aircraft operations, surface transport and construction activities. The zone of influence will therefore extend to where the LOAEL is identified for each of these specific noise sources. This represents current best practice.

### Current baseline

- 6.5.2 The current baseline year for the purposes of the noise assessment is 2017. Noise contours will be prepared describing the air noise and ground noise effects based on aircraft operations during the year. Special consideration will be given to operations during the summer months when Bristol Airport is at its busiest. Daytime and night-time noise contours will be prepared using the Government's recommended noise metric for assessing community response to aircraft noise in the UK as well as a series of other supplementary indices which assist in describing the likely effects of aircraft noise in the locality.

### Factors influencing baseline conditions

- 6.5.3 Noise from aircraft operations at Bristol Airport has an influence on the baseline conditions in the area around the airport and also at some distance away from the airport. Noise from vehicular traffic, both airport and non-airport related, will also affect the baseline conditions around Bristol Airport.
- 6.5.4 In the absence of the Proposed Development, the existing noise baseline is likely to change for a number of reasons.
- 6.5.5 Aircraft operations at Bristol Airport will continue to grow in the future through natural growth associated with economic demands. This growth will ultimately be constrained as a result of Bristol Airport reaching its permitted capacity. In parallel to this, airlines will continue to update their aircraft fleets incorporating over time an increasing percentage of the more modern twin turbofan aircraft that are now emerging, such as the Airbus 320/321neo and the Boeing 737Max. These aircraft are noticeably quieter than their existing counterparts.
- 6.5.6 The baseline noise conditions will therefore change over time and the magnitude of any changes will depend on the rate at which aircraft operations increase at Bristol Airport and also on the rate at which fleet replacement by airlines takes place.

## Additional baseline information requirements

- 6.5.7 Noise monitoring has been undertaken around Bristol Airport at key receptor locations for the purposes of providing a baseline assessment of the prevailing ambient and background noise conditions during both the daytime and night-time. The survey involves a combination of long term, unattended monitoring and short term, attended monitoring to obtain both an indication of noise trends and information on the sources contributing to the prevailing noise climate. Long term noise monitoring has taken place over a continuous three-week period (13 March to 5 April 2018) simultaneously at four monitoring stations at the locations shown on **Figure 6.1**.

Figure 6.1 Noise monitoring locations



- 6.5.8 The results of the long-term monitoring are summarised in **Table 6.1**.

Table 6.1 Baseline Noise Levels recorded over the period 13 March to 5 April 2018

Location	16 Hour daytime			8 hour night			Dominant daytime noise source
	L <sub>Aeq</sub> (dB)	L <sub>AFmax</sub> (dB)	L <sub>AF90</sub> (dB)	L <sub>Aeq</sub> (dB)	L <sub>AFmax</sub> (dB)	L <sub>AF90</sub> (dB)	
A	53	62	38	49	53	37	Aircraft
B	58	66	49	54	61	47	Aircraft
C	59	67	47	54	59	42	Aircraft
D	50	59	42	47	53	37	Road traffic

- 6.5.9 The output of this baseline survey work will assist in the validation of aircraft ground noise predictions, as well as those of road traffic noise. The prevailing ambient noise at receptors A, B, C and D around Bristol Airport will be used in rating the significance of construction noise impacts from the Proposed Development.

## 6.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

- 6.6.1 Agreement on the location of key receptors will be sought with NSC for all noise assessments. For ground noise, road traffic and construction noise, this is expected to concentrate on receptors and areas in close proximity to Bristol Airport including properties to the north side of Downside Road, isolated properties to the east in Downside and near Tall Pines Golf Club as well as properties to the south, off the A38. For air noise, the zone of receptors that could experience significant effects will be identified with regards to a boundary around Bristol Airport determined using the 54 dB  $L_{Aeq,16h}$  noise contour band for daytime and the 48 dB  $L_{Aeq,8h}$  for night-time, based on an average summer day of future traffic. Noise contours will also be evaluated down to 51 dB  $L_{Aeq,16h}$  for daytime and 45 dB  $L_{Aeq,8h}$  night-time to ensure those receptors that might be adversely affected by noise are included, in line with recommendations within the Government's recent response to a Consultation on air space changes within the UK<sup>63</sup>.

### Potential significant effects requiring further assessment

- 6.6.2 Potential noise and vibration effects to be assessed are:
- Construction Effects: The effects of noise and vibration from plant and activities associated with the construction phase of the Proposed Development on existing noise sensitive receptors;
  - Operational Effects: The effects resulting from changes to the number and type of aircraft in terms of noise produced while aircraft depart and are airborne (air noise). The effects of changes to the number and type of aircraft and how they operate when on the ground, in light of changed parking positions, taxi routes and additional stand locations (West Stand) (ground noise); and
  - Transportation Effects: The effects of any changes expected in road traffic noise as a result of the Proposed Development, particularly on roads close to Bristol Airport.

### Potential effects not requiring further assessment

- 6.6.3 At this point in time, no aspects of noise or vibration from operational activities by aircraft at Bristol Airport, or from road traffic or construction activities related to the Proposed Development are considered to not require further assessment.

## Proposed assessment methodology

### Air noise

- 6.6.4 Air noise contours will be produced to take account of the current aircraft types operating at Bristol Airport and also those envisaged in 2026 when the airport is forecast to achieve a throughput of

12mppa should the Proposed Development be permitted. Specifically, air noise contours will be produced for the following scenarios:

- Current (baseline) – 2017/2018;
- Future (without development) – 2026 (Currently Permitted – 10 mppa); and
- Future (with development) – 2026 (Non-Constrained – 12mppa).

- 6.6.5 Noise contours will be prepared in terms of the usual UK noise indicator for daytime airborne noise, the  $L_{Aeq,16h}$  index, and the night-time airborne noise, the  $L_{Aeq,8h}$  index, using the Federal Aviation Administration Aviation Environmental Design Tool (AEDT).
- 6.6.6 Daytime noise contours will be prepared in 3 dB steps commencing at 51 dB, which the Government now considers to represent the LOAEL, up to 69 dB which presents the threshold level at which the Government expects an airport to offer assistance to affected residents with the cost of re-location should they request it.
- 6.6.7 Night-time noise contours will be prepared in 3 dB steps commencing from 45 dB to 63 dB for the three scenarios above.
- 6.6.8 Average mode summer daytime and night-time noise contours will be produced for rating community impact, taking account of recent Government policy advice that 54 dB  $L_{Aeq,16h}$  now represents the onset of significant community annoyance.
- 6.6.9 In keeping with the requirements of the Aviation Policy Framework<sup>62</sup>, consideration will be given to describing noise in terms of other indicators, rather than the average mode summer  $L_{Aeq}$  contours, to supplement the assessment and understanding of any potential changes in airborne noise. Such indices would include:
- Single mode contours (westerly and easterly);
  - N60 and N70 noise contours; and
  - SEL and  $L_{Amax}$  noise contours.
- 6.6.10 In view of continuing developing guidance from Europe, and the need for major UK airports to undertake regular noise mapping and noise action planning under the Environmental Noise (England) Regulations 2006<sup>64</sup>, noise contours will also be prepared in terms of the  $L_{den}$  and  $L_{night}$  indices. These contours take account of the annual activity at Bristol Airport, rather than just the summer period used in the  $L_{Aeq,T}$  contours. This approach follows good practice and is in line with current Government guidance that recommends use of supplementary noise indices to assist in describing noise effects, rather than relying solely on the standard  $L_{Aeq,T}$  noise contours which are used to rate community disturbance.
- 6.6.11 The contour areas, dwelling counts and population counts will be determined for each scenario considered. In addition, the schools, hospitals and other key public buildings encompassed by the  $L_{Aeq,T}$  summer average mode contours will be identified. The impact of these contours will also be assessed in terms of those people likely to be highly annoyed by such noise, based on current and emerging guidance on this topic. Consideration will also be given to the effects of noise on other community buildings and outdoor amenity spaces. Noise effects on Heritage buildings/features and tranquillity will also be assessed. The effects of noise on protected ecological sites and the local ecology will also be considered in relevant chapters of the Environmental Statement.
- 6.6.12 Night-time noise will be assessed having regard to the usual noise dose indices, including  $L_{Aeq,8h}$  and  $L_{night}$ , and indices relating to individual aircraft events, such as the Number Above indices (N60 and N70), SEL and  $L_{Amax}$  values.

- 6.6.13 Noise and vibration effects from the Proposed Development will be assessed having regard to current Government guidance on noise<sup>61,62,63</sup>. Consideration will also be given to guidance on noise matters emerging from Europe.
- 6.6.14 The impact of the key contours will also be assessed in terms of proposed land use policy, in addition to identifying those permitted developments within the contour bands that are planned for construction.
- 6.6.15 Consideration will be given to key receptors around Bristol Airport to illustrate how, over a typical day, the air noise level received will vary by the hour. A variation may occur, if for example there will tend to be more aircraft movements in the peak hours than at other hours of the day.

### Ground noise

- 6.6.16 The ground noise assessment will involve the preparation of ground noise contours using CADNA noise modelling software (or equivalent). The results of any recent ground noise studies, together with the library of ground noise measurement data, will be used to model ground noise.
- 6.6.17 From the ground noise assessment, average mode summer daytime and night-time noise contours will be generated in terms of  $L_{Aeq,16h}$  and  $L_{Aeq,8h}$  indices respectively, for the same years as used for the air noise assessment. For key receptors, the variation in ground noise expected over a typical day will be identified in terms of the  $L_{Aeq,1h}$  index, for the baseline year and also in 2026 with and without development.
- 6.6.18 The impact of ground noise on local dwellings, schools, hospitals and other key public buildings for each assessment year will be undertaken, having regard to World Health Authority criteria<sup>69</sup> and other recognised guidance related to ground noise assessment.

### Road traffic

- 6.6.19 An assessment of road traffic noise will be undertaken using the standard UK methodology set out in the Department of Transport publication CRTN<sup>67</sup>. Guidance will be taken from the Design Manual for Roads and Bridges<sup>70</sup> and impacts assessed in line with the NPPF, the NPSE and other relevant guidance.
- 6.6.20 Consideration will be given to key receptors around Bristol Airport and the absolute road traffic noise levels now and in the future (2026), with and without the development, will be assessed along with the changes in noise expected between the assessed cases.
- 6.6.21 For the A38 trunk road works, CADNA noise modelling will be used to produce noise maps showing the noise effects in 2026 with and without implementation of the proposed works, with a comparison of what occurs now.

### Construction noise and vibration assessment

- 6.6.22 An assessment will be undertaken of construction noise and vibration using the standard UK methodology set out in Parts 1 and 2 of BS 5228:2009+A1:201468, taking account of any

<sup>69</sup> World Health Organisation, 1999. Guidelines for Community Noise. Available online <http://whqlibdoc.who.int/hq/1999/a68672.pdf?ua=1> [Accessed 24/04/2018]

<sup>70</sup> Highways England, 2018. Design Manual for Roads and Bridges. Available online <http://www.standardsforhighways.co.uk/ha/standards/dmr/index.htm> [Accessed 24/04/2018]

Construction Management Plan that will be prepared to ensure works are undertaken in a manner which minimises noise impacts as far as practicable.

6.6.23

The assessment will include detailed calculations of the noise emissions expected from the different phases of construction activities in order to establish the need for and development of appropriate mitigation measures. The effects of construction noise will be assessed for those areas in proximity to construction works based both on worse case (closest) activities and a more typical case activity, where appropriate to do so. Consideration will be given to the prevailing ambient noise levels, as well as standard noise and vibration criteria set out in British Standard BS 5228: Parts 1 and 2:2009+A1:2014 and that specified by the local authority in local planning guidance documentation.

## 7. Air quality, dust and odour

### 7.1 Introduction

7.1.1 This chapter describes the scope of the assessment for air quality, dust and odour. The chapter should be read in conjunction with the description of the Proposed Development presented in **Chapter 2**.

7.1.2 This chapter describes:

- Relevant legislation, policy and guidance;
- The main sources of data used;
- Engagement with consultees and stakeholders;
- An overview of the baseline conditions; and
- The scope of the assessment, the assessment methodology and the potential effects of the Proposed Development.

### 7.2 Relevant legislation, policy and guidance

#### Legislation

7.2.1 The following legislation is relevant to air quality and the assessment that will be presented within the Environmental Statement (ES):

- Directive 2008/50/EC<sup>71</sup> on ambient air quality and cleaner air for Europe: sets limit values (for the protection of human health) and critical levels<sup>72</sup> (for the protection of vegetation and ecosystems) for selected pollutants that are to be achieved by specific dates, and details procedures EU Member States should take in assessing ambient air quality. Regulated pollutants include sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), lead (Pb), benzene (C<sub>6</sub>H<sub>6</sub>) and carbon monoxide (CO);
- Directive 92/43/EEC<sup>73</sup> on the conservation of natural habitats and of wild fauna and flora and Directive 79/409/EEC<sup>74</sup> on the conservation of wild birds (superseded by Directive 2009/147/EC<sup>75</sup>): provides for designation of sites which are important for habitats or species as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs);
- The Convention on Wetlands, called the Ramsar Convention<sup>76</sup>: an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation

<sup>71</sup> Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, 2008. Available online: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0050> [Checked 22/03/2018].

<sup>72</sup> A legally binding limit on pollutant concentrations in ambient air for the protection of vegetation and ecosystems.

<sup>73</sup> Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, 1992. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31992L0043> [Checked 22/03/2018].

<sup>74</sup> Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds, 1979. Available online <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:31979L0409> [Checked 22/03/2018].

<sup>75</sup> Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, 2009. Available online: <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32009L0147> [Checked 22/03/2018].

<sup>76</sup> UNESCO, 1971. Convention on wetlands of international importance especially as waterfowl habitat. Available online: <https://www.ramsar.org/> [Checked 22/03/2018].



and wise use of wetlands and their resources;

- Wildlife and Countryside Act 1981<sup>77</sup>, as amended: provides the regulatory framework for the designation of Sites of Special Scientific Interest (SSSIs) in England;
- The Environment Act 1995<sup>78</sup>: provides the framework for the management of air quality in the UK; and
- The Air Quality Standards Regulations 2010<sup>79</sup>: transpose Directive 2008/50/EC, including the limit values, into UK legislation. The limit values in the Air Quality Standards Regulations are generally referred to as Air Quality Standards (AQS).

## Policy

7.2.2 There are a number of policies at the national and local level that are relevant for the Proposed Development, notably:

- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland<sup>80</sup>: provides a framework for improving air quality at a national and local level. It imposes a number of obligations on local authorities to manage air quality but does not directly impose obligations on developers;
- National Planning Policy Framework (NPPF): At Paragraph 124, the NPPF states: "*Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas.*"  
A draft revised NPPF was issued for consultation in March 2018<sup>81</sup>. At Paragraph 179, the Draft NPPF adds: "*Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement.*";
- North Somerset Council's (NSC) Core Strategy<sup>82</sup> is the main planning document which guides development choices and decisions in North Somerset. Policy CS3: Environmental impacts and flood risk assessment states: "*Development that, on its own or cumulatively, would result in air, water or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other control regimes, or by measures included in the proposals, by the imposition of planning conditions or through a planning obligation.*"; and
- Somerset County Council's County Plan 2016–2020<sup>83</sup> provides a high-level overview of county-wide policy.

<sup>77</sup> Wildlife and Countryside Act 1981. Available online: <http://www.legislation.gov.uk/ukpga/1981/69> [Checked 22/03/2018].

<sup>78</sup> Environment Act 1995. Available online: <http://www.legislation.gov.uk/ukpga/1995/25/contents> [Checked 22/03/2018].

<sup>79</sup> The Air Quality Standards Regulations 2010. Statutory Instrument 2010 No. 1001. Available online <http://www.legislation.gov.uk/uksi/2010/1001/contents/made> [Checked 22/03/2018].

<sup>80</sup> Department for Environment, Food & Rural Affairs, 2007. The air quality strategy for England, Scotland, Wales and Northern Ireland: Volume 1. Available online: <https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1> [Checked 22/03/2018].

<sup>81</sup> Ministry of Housing, Communities & Local Government, 2018. National Planning Policy Framework: Draft text for consultation. Available online <https://www.gov.uk/government/consultations/draft-revised-national-planning-policy-framework> [Checked 22/03/2018]

<sup>82</sup> North Somerset Council, 2017. Core Strategy. Available online: <http://www.n-somerset.gov.uk/wp-content/uploads/2015/11/Core-Strategy-adopted-version.pdf> [Checked 22/03/2018].

<sup>83</sup> Somerset County Council (2016) The County Plan 2016–2020. Available online: <http://www.somersetcountyplan.org.uk/> [Checked 24/05/2018]

## Guidance

7.2.3 The assessment will also be guided by a number of technical guidance documents:

- The World Health Organization's (WHO) Air Quality Guidelines for Europe<sup>84</sup>;
- The Environment Agency (EA) guidance note "Air emissions risk assessment for your environmental permit" <sup>85</sup>;
- DEFRA's Local Air Quality Management Technical Guidance (TG16)<sup>86</sup>;
- The UK Air Pollution Information System (APIS) website<sup>87</sup>;
- The Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) guidance Land-use Planning and Development Control: Planning for Air Quality, v1.2<sup>88</sup>;
- The IAQM's guidance note Use of a Criterion for the Determination of an Insignificant Effect of Air Quality Impacts on Sensitive Habitats<sup>89</sup>;
- The IAQM's guidance note Guidance on the Assessment of Dust from Demolition and Construction<sup>90</sup>; and
- The IAQM's guidance note Guidance on the Assessment of Odour for Planning<sup>91</sup>.

## 7.3 Main sources of data

7.3.1 The EIA scoping exercise presented in this Scoping Report, with respect to air quality, has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the sources of data detailed here.

7.3.2 Concentrations of nitrogen dioxide (NO<sub>2</sub>) and fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>, collectively referred to as PM) are routinely monitored around Bristol Airport. Due to the length of time data has been collected across a number of monitoring sites at various on site and off-site locations, it is considered that this data is sufficient to provide a robust baseline. Baseline air quality monitoring data will be obtained from Bristol Airport Limited (BAL), and from local authority Annual Status Reports that are produced each year in accordance with DEFRA requirements for LAQM. Background concentration information will be supplemented by data from DEFRA's background concentration maps<sup>92</sup>.

7.3.3 Information on odour complaints will be collected from BAL and NSC.

7.3.4 Information on critical loads and background deposition rates will be obtained from APIS.

<sup>84</sup> World Health Organization, 2000. Air Quality Guidelines for Europe, Second Edition. Available online: [http://www.euro.who.int/\\_data/assets/pdf\\_file/0005/74732/E71922.pdf](http://www.euro.who.int/_data/assets/pdf_file/0005/74732/E71922.pdf) [Checked 22/03/2018].

<sup>85</sup> Environment Agency, 2016. Air emissions risk assessment for your environmental permit. Available online: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit> [Checked 22/03/2018].

<sup>86</sup> DEFRA, 2016. Local Air Quality Management Technical Guidance (TG16).

<sup>87</sup> APIS (no date) Critical Loads and Critical Levels - a guide to the data provided in APIS. Available online: [http://www.apis.ac.uk/overview/issues/overview\\_Cloadslevels.htm](http://www.apis.ac.uk/overview/issues/overview_Cloadslevels.htm) [Checked 22/03/2018].

<sup>88</sup> EPUK and IAQM, 2017. Land-use Planning and Development Control: Planning for Air Quality, v1.2.

<sup>89</sup> IAQM, 2016. Use of a criterion for the determination of an insignificant effect of air quality impacts on sensitive habitats.

<sup>90</sup> IAQM, 2014. Guidance on the assessment of dust from demolition and construction.

<sup>91</sup> IAQM, 2014. Guidance on the assessment of odour for planning.

<sup>92</sup> Defra, 2017. Background Mapping data for local authorities. Available online: <https://uk-air.defra.gov.uk/data/laqm-background-home> [Checked 22/03/2018].

## 7.4 Engagement with consultees

- 7.4.1 It is intended that the majority of engagement on the topic of air quality will be through the consultation undertaken as part of the planning application process.
- 7.4.2 However, where issues arise during other consultation processes, these will be addressed as appropriate.

## 7.5 Overview of baseline conditions

### Zones of influence

#### Spatial extent

- 7.5.1 Total airborne pollutant concentrations approach background levels on a distance scale of a few kilometres or less from key airport sources. This sets the spatial scale of the area over which airport-related effects on local air quality will be assessed. Elevated aircraft 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.
- 7.5.2 Airport-related road traffic will extend over a larger area, potentially covering hundreds of kilometres from the airport, although the greatest amount of airport traffic, and therefore impacts, will be on roads that directly connect with Bristol Airport. It is impractical to assess the road network in its entirety due to the dispersion of airport-related traffic. However, consideration of the principal routes used by airport-related traffic suggests that for air quality purposes, it will be sufficient to consider traffic on the A38 and selected minor roads (principally Downside Road) within a few kilometres of Bristol Airport. These roads have relevant receptors close to them, so these are expected to be the most sensitive to airport-related traffic. The road network to be modelled will be kept under review as the traffic and transport modelling (**Chapter 5**) develops.
- 7.5.3 As well as grid points within the core assessment area, concentrations will be assessed at a selection of specific receptor points. The purpose of the specific receptor points is to allow a more detailed assessment at particular locations where air quality assessment levels apply, for example residential properties.
- 7.5.4 The selection of ecological sites to be assessed will be made in line with EA guidance<sup>85</sup>. This guidance is designed for the assessment of installations subject to the EA permitting regime, but is commonly used for other types of development. The EA guidance states that SPAs, SACs and Ramsar sites within 10km of the site should be assessed, as should SSSIs and local nature sites within 2km of the site. These are listed at **Section 7.5.15** and outlined further in **Chapter 9: Biodiversity** and shown on **Figure 9.1** and **Figure 9.2**.

#### Assessment years

- 7.5.5 Air quality impacts will be assessed for the following assessment years:
- A recent historic year (e.g. 2017), for comparison and evaluation of the model predictions against monitoring data; and
  - The year in which Bristol Airport is expected to achieve a throughput of 12 million passengers per annum (mppa), forecast to be 2026.

- 7.5.6 The 12 mppa year will be assessed for both the 'Proposed Development' case (i.e. with Bristol Airport growing to 12 mppa) and the 'existing site layout' case (i.e. passengers are limited to 10 mppa). This will allow the impact of the development to be evaluated.

### Pollutants to be assessed

- 7.5.7 The air quality assessment will focus on the local air pollutants which are subject to concern about actual or potential exceedances of AQALs, including AQOs, EU limit values, targets, critical levels or critical loads at locations in the UK (not necessarily in the vicinity of Bristol Airport). These are NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> in relation to concentrations in air, and nutrient nitrogen and acidity in relation to deposition. PM<sub>10</sub> and PM<sub>2.5</sub> are collectively referred to as PM in this document.
- 7.5.8 Emissions of dust and odour, which can affect amenity, will also be considered.
- 7.5.9 Nitrogen oxides (NO and NO<sub>2</sub>) are emitted as a result of combustion processes (from aircraft, equipment, heating plant and vehicles). Chemical reactions in the atmosphere convert NO to NO<sub>2</sub> (mostly through reaction with ozone) and vice versa (through photolysis during daylight hours). The sum of NO and NO<sub>2</sub> is referred to as NO<sub>x</sub>. It is usual practice to treat NO<sub>x</sub> and NO<sub>2</sub> as distinct pollutants, with the modelling process keeping track of the relationship between them. For example, some regulations and air quality assessment levels relate to NO<sub>2</sub> while others relate to NO<sub>x</sub>.
- 7.5.10 All other pollutants are scoped out of the assessment. Full justification for scoping out other pollutants is given in **Section 7.6**.

## Current baseline

### Setting of Bristol Airport

- 7.5.11 Bristol Airport is located within the administrative area of NSC. The unitary authority of Bath and North East Somerset (BNES) lies approximately 300m from the Bristol Airport ownership boundary. Significant fractions of airport-related traffic pass through the City of Bristol and Sedgemoor district, using the A38 which passes just east of Bristol Airport.
- 7.5.12 The area around Bristol Airport is predominantly rural. Sources of pollution that influence air quality include the ambient background (pollutants transported from elsewhere, including the wider UK and northern Europe), road traffic (both airport-related and non-airport) and domestic, commercial and industrial heating, as well as Bristol Airport itself.
- 7.5.13 The settlements of Lulsgate Bottom and Downside lie immediately to the north of the airport, with houses close to airport facilities, especially car parks. The larger village of Felton lies a short distance away to the east. Land to the south and west is rural with isolated properties.
- 7.5.14 Designated sites of ecological interest near Bristol Airport are:
- Avon Gorge Woodlands SAC;
  - North Somerset and Mendip Bats SAC;
  - Mendip Woodlands SAC;
  - Chew Valley Lake SPA;
  - Goblin Combe SSSI;
  - King's Wood and Urchin Wood SSSI. This coincides with part of the North Somerset and Mendip Bats SAC;

- Brockley Hall Stables SSSI; and
- Felton Common LNR.

## Ambient air quality

### Local air quality management

- 7.5.15 As part of their responsibilities under the Environment Act 1995, local authorities prepare annual reports on the air quality within their regions, and declare AQMAs in locations where there is a risk of exceeding an AQO. NSC has not declared any AQMAs. BNES has declared four AQMAs for annual mean NO<sub>2</sub> or hourly mean NO<sub>2</sub>, covering parts of Bath, Keynsham and Saltford; the nearest of these is about 15km from Bristol Airport. Bristol City Council has declared three AQMAs for annual mean NO<sub>2</sub>, hourly mean NO<sub>2</sub> or daily mean PM<sub>10</sub>, covering much of the city; at the nearest point they are about 8km from Bristol Airport.

### Air quality monitoring

- 7.5.16 In 2012, BAL installed a continuous air quality monitoring station, measuring NO<sub>x</sub>, NO<sub>2</sub> and PM<sub>10</sub>. BAL has also installed diffusion tubes at nine locations, one of which is collocated with the continuous monitor.
- 7.5.17 NSC does not undertake any continuous monitoring<sup>93</sup>.
- 7.5.18 NSC undertook passive monitoring of NO<sub>2</sub> with diffusion tubes at 26 sites during 2015<sup>93</sup>. Of these, four are close to Bristol Airport, with two next to the A38 and two along Downside Road. Of the remainder, 18 are classified as roadside or kerbside sites, so are of little value in understanding the air quality around Bristol Airport. The final four diffusion tube sites are classified as background, so provide an indication of the background concentrations within about 20km of Bristol Airport.
- 7.5.19 BNES undertook continuous monitoring at four stations in 2016<sup>94</sup>. These are all in urban Bath, so are of little value in understanding air quality around Bristol Airport. BNES undertook passive monitoring of NO<sub>2</sub> with diffusion tubes at 92 sites during 2016. Most of these are roadside, kerbside or urban background sites, so are of little value in understanding air quality around Bristol Airport. Two are urban background sites outside Bath, in Keynsham and Radstock, so are potentially useful for understanding air quality around Bristol Airport.
- 7.5.20 There is a continuous monitor at a rural location at Charlton Mackrell, approximately 35 km south of Bristol Airport. This is part of the Automatic Urban and Rural Network (AURN) and measures NO<sub>x</sub>, NO<sub>2</sub> and ozone. Although distant, it is potentially useful for understanding background air quality around Bristol Airport.
- 7.5.21 The nearest monitoring of PM<sub>2.5</sub> is at Bristol St Pauls. As an urban location this is not suitable for understanding air quality around Bristol Airport.
- 7.5.22 The locations of the monitoring stations to be used in the assessment are summarised in **Table 7.1** and **Figure 7.1** and **Figure 7.2**.

<sup>93</sup> NSC, 2016. 2016 Air Quality Annual Status Report (ASR).

<sup>94</sup> BNES, 2017. 2017 Air Quality Annual Status Report (ASR).

Table 7.1 Monitoring stations

ID and name	Type	Classification	Coordinates	Distance from Bristol Airport (km)
<b>BAL Continuous</b>	Continuous	Airport	351101, 165538	0
<b>BAL 1</b>	Diffusion tube	Airport	351042, 165317*	0
<b>BAL 2</b>	Diffusion tube	Airport	350557, 165385*	0
<b>BAL 3</b>	Diffusion tube	Airport	348843, 165001*	0
<b>BAL 4</b>	Diffusion tube	Airport	350390, 165780*	0
<b>BAL 5</b>	Diffusion tube	Airport	350622, 165550	0
<b>BAL 6</b>	Diffusion tube	Airport	350780, 165700*	0
<b>BAL 7</b>	Diffusion tube	Airport	351101, 165538	0
<b>BAL 8</b>	Diffusion tube	Airport	351138, 165463	0
<b>BAL 9</b>	Diffusion tube	Airport	351410, 165470*	0
<b>NSC 1 Long Ashton Park &amp; Ride (A370)</b>	Diffusion tube	Background	356021, 171009	8
<b>NSC 3 Pill (Railway Line)</b>	Diffusion tube	Background	352084, 176273	11
<b>NSC 5 Bristol Airport (A38)</b>	Diffusion tube	Roadside	350890, 164688	1
<b>NSC 6 Felton Primary School</b>	Diffusion tube	Roadside	351289, 165479	1
<b>NSC 7 Downside Road (Holmlea)</b>	Diffusion tube	Background	350920, 165745	1
<b>NSC 8 Downside Road (Top 8)</b>	Diffusion tube	Kerbside	351054, 165665	1
<b>NSC 20 Weston-Super-Mare, Bedford Road</b>	Diffusion tube	Background	332402, 159840	19
<b>NSC 26 Banwell, Bowling Green</b>	Diffusion tube	Background	339838, 159166	12
<b>DT33 Keynsham</b>	Diffusion tube	Urban Background	364803, 168237	15
<b>DT30 MSN Westfield Primary Sch</b>	Diffusion tube	Urban Background	367280, 153840	20
<b>UKA00537 AURN Charlton Mackrell</b>	Continuous	Rural background	352196, 128768	35

\* Approximate coordinates.

Not shown: AURN Charlton Mackrell.

- 7.5.23 Over the period 2012–2016, monitored annual mean NO<sub>2</sub> concentrations upwind of the airport and away from roads were typical of rural locations in England, at around 9–12 µg m<sup>-3</sup>. At kerbside locations on the A38, they were about 30 µg m<sup>-3</sup>, and immediately downwind of the airport they were generally in the range 10–30 µg m<sup>-3</sup> depending on exact location, with concentrations dropping rapidly with distance from the airfield. Concentrations at all these locations are well below the legal limit of 40 µg m<sup>-3</sup>. Regression analysis suggests that there is a slight decreasing trend at most of the monitoring stations, averaging a decrease of about 0.5 µg m<sup>-3</sup> per year; again, this is what would be expected based on observations at other, similar locations.
- 7.5.24 Over the same period, monitored PM<sub>10</sub> concentrations at the BAL Continuous monitor, downwind of the airport, were about 18–21 µg m<sup>-3</sup>, well below the legal limit of 40 µg m<sup>-3</sup>.

#### *Air quality background concentration modelling*

- 7.5.1 DEFRA maintains a nationwide model (the Pollution Climate Mapping (PCM) model) of existing and future background air quality concentrations at a 1km grid square resolution. The data sets include annual average concentration estimates for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>, as well as other pollutants. The PCM model is semi-empirical in nature: it uses data from the National Atmospheric Emissions Inventory (NAEI) to model the concentrations of pollutants at the centroid of each 1km grid square but then calibrates these concentrations in relation to actual monitoring data. Concentrations represent background locations, not roadside locations or those particularly influenced by point sources.
- 7.5.2 The dataset was updated in 2016. Data is available for years covering 2013 to 2030; modelled concentrations are generally decreasing over that time period.
- 7.5.3 Concentrations of NO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> from the DEFRA data are all well below the corresponding legal limits and typical of rural locations in England. The DEFRA NO<sub>2</sub> concentrations are generally comparable with the monitored locations where there is little airport or road contribution such as BAL 3 and BAL 4, but are appreciably lower than monitored results near roads or close to and downwind of airport activity.

#### *Dust deposition*

- 7.5.4 Ambient dust deposition rates are not monitored extensively in the UK. Monitoring that is undertaken is usually connected with specific activities such as mining and mineral extraction operations or specific large-scale construction programmes. Dust monitoring may also be undertaken to investigate specific complaints received by local authorities, who are then empowered to investigate dust nuisance under the Environmental Protection Act 1990.
- 7.5.5 Dust deposition rates are not currently monitored in the Bristol Airport area. Current dust levels in the areas potentially affected by the Proposed Development are expected to be well below annoyance levels. The main potential source of dust in the area is construction activity, and is controlled through agreed Construction Environmental Management Plans (CEMPs) which include measures to ensure that dust is kept below annoyance levels. No records of dust complaints at Bristol Airport have been identified.

#### *Odour*

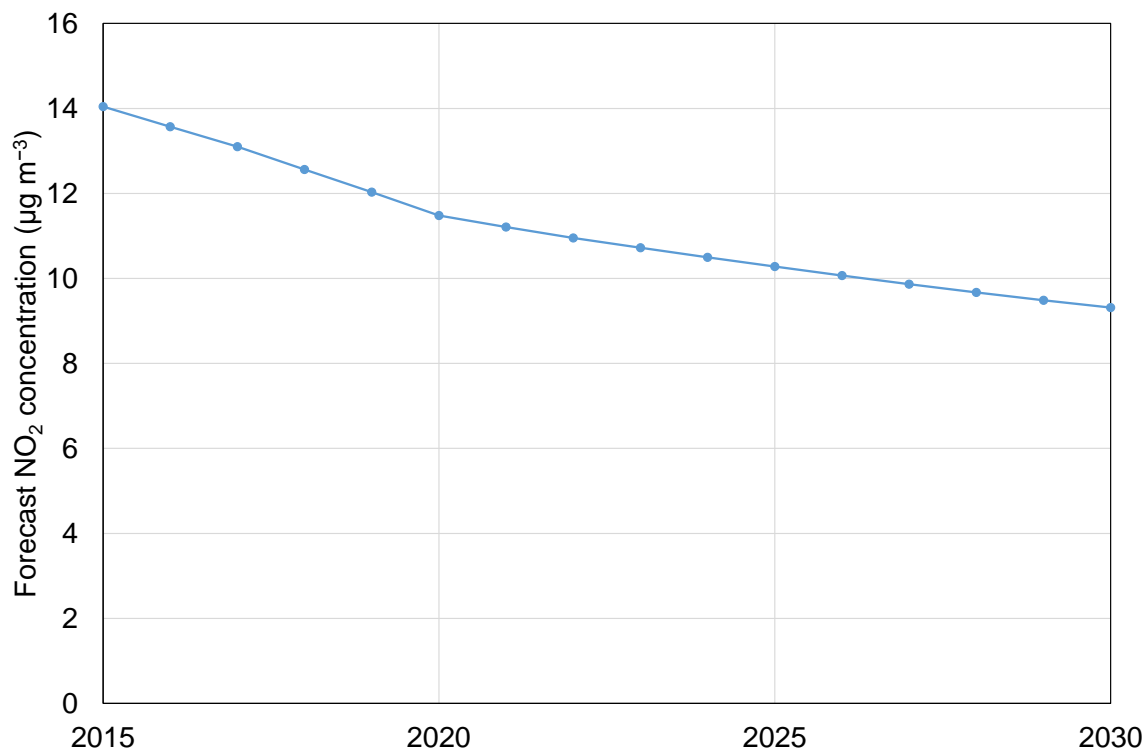
- 7.5.6 Odour is not routinely monitored in the UK. Odour measurements are usually connected with specific activities, commonly in response to complaints received by local authorities, who are then empowered to investigate odour nuisance under the Environmental Protection Act 1990. NSC have not received any odour complaints regarding Bristol Airport over the last five years.



## Factors influencing baseline conditions

- 7.5.7 In the absence of the Proposed Development, the baseline is likely to change for a number of reasons.
- 7.5.8 Air quality in the UK is generally improving as a result of controls on emissions sources. DEFRA issues projections of background (non-roadside) concentrations on a 1km square basis, out to 2030. For a grid square covering Bristol Airport, the total projected concentrations of NO<sub>2</sub> are shown in **Figure 7.3**. Concentrations are expected to fall by about 30% between 2015 and 2030.

Figure 7.3 Trend in modelled NO<sub>2</sub> concentrations



- 7.5.9 Concentrations near roads are also expected to decline, as a result of emissions controls, though this may be partly offset by an increase in traffic levels. Projections of emission factors for road vehicles are provided by DEFRA out to 2030. Projections of changes in traffic are provided by the Department for Transport; these will be taken into account in the traffic and transport assessment (**Chapter 5**) which feeds into the air quality assessment.

## Additional baseline information requirements

- 7.5.10 It is judged that there is sufficient monitoring and background modelling data available that no further information on the air quality baseline is required. It is unlikely that 2017 monitoring data will be available on the timescale required for this assessment, but if it becomes available in time it will be incorporated into the assessment.
- 7.5.11 Baseline data that have yet to be gathered, but that will be sourced for the assessment include:
- NSC's monitoring for 2016; and
  - Details of BAL continuous monitoring, including NO<sub>x</sub> concentrations.

## 7.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

- 7.6.1 Receptors that could be subject to likely significant effects have been briefly described above in the description of the zone of influence. On the basis of the consideration of the emission sources and their relative impacts, and the results of the air quality assessment for the 10 mppa planning application<sup>95</sup>, the core assessment area is proposed to be an area of 5km × 3km, centred on Bristol Airport, with the southwest corner at National Grid Reference (348000, 164000) and the northwest corner at (353000, 167000). This is the region over which gridded concentrations will be calculated and contours presented. This region is shown in **Figure 7.4**.
- 7.6.2 The resolution of the grid points within the core assessment area will be 50m. This resolution is considered suitable for capturing the maximum contribution from site emissions, given that the emissions sources are spread over an area of several square kilometres in extent. This grid does not cover the full extent of the specific receptors, but is considered sufficient to cover the locations where the impacts are expected to be greatest.
- 7.6.3 Specific receptors will be selected to represent locations where there is the greatest possibility of a significant impact either on human health or on vegetation or ecosystems. Specific receptors are chosen, in general, as the nearest relevant location in any given direction from sources of emissions, to ensure that the worst-case impacts will be picked up.
- 7.6.4 In addition, a receptor has been specified for each property in Lulsgate Bottom, as this is the area where there is the greatest risk of significant impacts; this will allow the number of properties experiencing significant impacts to be counted. Because this results in a large number of receptors being modelled, for presenting and reporting the results, full details will only be given for those where the impacts are greatest.
- 7.6.5 Receptors for assessment of human health effects will be chosen based on guidance regarding relevant exposure, judged in terms of the likely duration of exposure to pollutants and proximity to the site, as described in **Section 7.2**. They will be chosen to ensure that sufficient receptor coverage is available for the Health Impact Assessment (**Chapter 15**) to determine population health effects. Not every location of relevant exposure within the study area has been included as a specific receptor, but a selection has been made that covers the locations most likely to be affected by the Proposed Development and is representative of wider locations. The gridded receptors can be used to fill in gaps if required.
- 7.6.6 Committed developments will be reviewed to determine where new locations of exposure may be created in future (e.g. new residential developments) and specific receptors for these will be chosen on the same basis as for existing locations of exposure.
- 7.6.7 While most human receptors are likely to have both long-term (annual mean) and short-term (typically hourly mean) exposure, a number of receptors will have only short-term exposure (e.g. St. Katharine's Church).
- 7.6.8 In addition, a receptor (H118) has been selected to represent the nearest edge of the Bristol AQMA.
- 7.6.9 For the purposes of assessing air quality impacts, workplace locations have been excluded from the assessment in accordance with Schedule 1, Part 1, and Paragraph 2 of the Air Quality Standards

<sup>95</sup> Entec UK Limited (2009) Development and enhancement of Bristol International Airport. Environmental Statement, Volume 3 Air Quality.

Regulations 2010<sup>79</sup>. These Regulations are detailed in **Section 7.2** of this report and do not differentiate between whether this is a workplace location under the control of the operator, or an off-site workplace location.

7.6.10 The proposed human receptors are shown in **Figure 7.4**. The AQMA receptor is shown in **Figure 7.6**.

7.6.11 The EA guidance note "*Air emissions risk assessment for your environmental permit*"<sup>85</sup> indicates that the impact of the installation should be evaluated at protected conservation areas that meet the following criteria:

- SPAs, SACs or Ramsar sites within 10km of the installation (or within 15km of coal or oil fired power stations); and
- SSSIs or local nature sites (ancient woodlands, local wildlife sites, National Nature Reserves (NNR) and Local Nature Reserves (LNR)) within 2km of the location.

7.6.12 Following the above guidance, suitable ecological receptors will be included in the assessment. The ecological sites that will be assessed are:

- Avon Gorge Woodlands SAC;
- North Somerset and Mendip Bats SAC;
- Mendip Woodlands SAC;
- Chew Valley Lake SPA;
- Goblin Combe SSSI;
- King's Wood and Urchin Wood SSSI. This coincides with part of the North Somerset and Mendip Bats SAC;
- Brockley Hall Stables SSSI. This coincides with part of the North Somerset and Mendip Bats SAC;
- Felton Common LNR; and
- 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.

7.6.13 SSSIs which are cited for their geological interest only, with no particular features of ecological interest, are proposed to be scoped out of the assessment. This applies to the Lulsgate Quarry and Hartcliff Rocks Quarry SSSIs.

7.6.14 The proposed ecological receptors to be assessed are shown in **Figure 7.5** and **Figure 7.6**.

7.6.15 In order to allow modelled results to be compared against monitoring data, the monitoring locations near the airport (**Section 7.5**) will also be included as receptors.

### Potential significant effects requiring further assessment

7.6.16 The potential effects of the Proposed Development likely to be significant with regard to air quality, and which will be subject to further assessment (to be presented within the ES), are summarised in the following sections.

## Sources of emissions

- 7.6.17 The following aspects of the Proposed Development have potential to impact upon air quality, dust emissions and/or odour:
- Increased aircraft movements, on the ground and in the air;
  - Increased ground support equipment (GSE);
  - Increased landside road activity, including car park usage;
  - Construction activity; and
  - Changes to road layouts and consequent changes to road traffic (e.g., reduced queuing).

## Potentially significant effects on human health

- 7.6.18 It is unlikely that the Proposed Development will result in significant air quality effects (in EIA terms). Of the potential air quality impacts on human health, the greatest risk of significant effects is from annual mean nitrogen dioxide (NO<sub>2</sub>). Given that the airport will operate at a steady level of activity over time (except for daytime/night-time differences), it is much less likely that short-term (i.e. hourly mean) NO<sub>2</sub> concentrations will cause significant effects. Concentrations of other pollutants such as PM<sub>10</sub> or PM<sub>2.5</sub> are also less likely to cause significant effects. However, they have been included in the assessment to provide confidence in this conclusion.
- 7.6.19 IAQM/EPUK<sup>88</sup> suggest thresholds for screening out changes in road traffic. Outside AQMAs, these thresholds are a change in flow of heavy duty vehicles of 100 annual average daily traffic (AADT), or a change in flow of light duty vehicles of 500 AADT. Construction-related road traffic may be above these thresholds in which case it would need to be included in the assessment. This will be revisited as necessary as the traffic and transport assessment progresses but has been provisionally scoped in until further information is available.

## Potentially significant effects on ecological sites

- 7.6.20 Concentrations of NO<sub>x</sub> in air are associated with adverse effects on plant growth, and will be included in the assessment.
- 7.6.21 In addition, emissions of NO<sub>x</sub> and sulphur oxides to the air may result in deposition onto ecological sites, which may be sensitive to both nitrifying nitrogen and acid deposition. As discussed above, emissions of sulphur oxides from the Proposed Development are expected to be negligible, but the impact of NO<sub>x</sub> on nitrogen and acid deposition will be included in the assessment.

## Potentially significant effects on amenity

- 7.6.22 Emissions of dust can cause loss of amenity to nearby receptors. Emissions of dust from normal airport operations are unlikely to be significant and are scoped out, as there are no significant dust-generating activities. However, emissions of dust from construction activity (including construction or demolition of structures, earth-moving, and trackout of dust due to vehicles leaving dusty sites) are potentially significant and will be included in the assessment.
- 7.6.23 Airport operations can be a source of odour which causes loss of amenity to nearby receptors. Although no odour complaints have been received by NSC, the likely impacts of odour will be considered for inclusion in the assessment.

## Summary of effects to be assessed

- 7.6.24 The likely effects requiring assessment are summarised in **Table 7.2**.

Table 7.2 Likely effects requiring assessment

Activity	Impact	Potential effect
<b>Construction</b>		
Construction site (including laydown areas, staff facilities etc.), airfield expansion (including earthworks), campus development and changes to road infrastructure	Emission of dust	Amenity at sensitive receptors (residential properties, schools, medical facilities, ecological receptors) near to work sites and haul routes
Construction vehicle movements using the public highway	Combustion emissions from construction vehicles	Increased concentrations of air pollutants that could affect human health (NO <sub>2</sub> and PM) or ecological features at sensitive receptors near to construction traffic routes
<b>Operation</b>		
Airport operational activity (including aircraft movements, ground support equipment)	Increased combustion emissions as a result of increased aircraft movements	Increased concentrations of air pollutants that could affect human health (NO <sub>2</sub> and PM) at sensitive receptors (residential properties, schools, medical facilities), or could affect ecological sites
Airport operational activity (including aircraft movements, ground support equipment and fuel handling)	For consideration: Increased emissions of odour from aircraft fuel, aircraft operation and airfield activity	Amenity at sensitive receptors (residential properties, schools, medical facilities) near to Bristol Airport
Landside road traffic	Increased combustion emissions as a result of increased road traffic	Increased concentrations of air pollutants that could affect human health (NO <sub>2</sub> and PM) at sensitive receptors (residential properties, schools, medical facilities), or could affect ecological sites

## Potential effects not requiring further assessment

- 7.6.1 The Proposed Development entails a certain amount of construction activity, associated with extensions to the terminal buildings, new multi-storey and surface car parks, and changes to road configurations. The activity associated with construction is expected to be small compared with the ongoing operational activities, so the impacts on air quality and odour are expected to be negligible, and accordingly have been scoped out from assessment. Emissions of dust from construction, which do not have a comparable source during routine operation, remain scoped in. Emissions from construction-related traffic have been provisionally scoped in pending further information on traffic flows.
- 7.6.2 The pollutants carbon monoxide, sulphur dioxide, lead, benzene and 1,3 butadiene, which are also subject to the Air Quality Standards Regulations 2010, have been scoped out of this assessment. The justification for this is presented in the following section.

## Rationale for excluding other pollutants from this assessment

- 7.6.3 Other pollutants may also be emitted from airport and associated operations, including SO<sub>2</sub>, CO and volatile organic compounds (VOCs), but these will not be assessed. The justification for scoping out other pollutants is based on the results of previous assessments of air quality around UK airports, including the assessment prepared for Bristol Airport's 10 mppa planning application<sup>95</sup>. Strong justification for excluding other pollutants comes from the PSDH. The PSDH was set up by the Department for Transport in 2006 to investigate the environmental effects of a third runway at

Heathrow Airport. It convened a panel of experts in air quality, aircraft technology, airport operations and related fields to develop a best practice methodology for assessing the air quality impacts of a third runway at Heathrow. Among the conclusions of the project<sup>96</sup> it states:

*"What are the pollutants of concern for all Panels?;*

*Key pollutants for assessment: NO<sub>x</sub>, NO<sub>2</sub> and PM;*

*Ozone: for role in atmospheric chemistry in dispersion models;*

*Not required: benzene, 1,3-butadiene, carbon monoxide, lead, PAHs and sulphur dioxide;*

*... Given the importance of ozone in the formation of nitrogen dioxide, the Panels decided that it would be appropriate to collate monitoring data for ozone within the study area. While ozone information is important for atmospheric chemistry effects in dispersion modelling, the technical Panels did not consider a priority area to be modelling the impact of Heathrow emissions on ozone concentrations.*

*In summary, the pollutants for which subsequent assessments would be undertaken for DfT are therefore recommended to be nitrogen oxides (NO<sub>x</sub>), nitrogen dioxide (NO<sub>2</sub>), and particulate matter (PM)."*

- 7.6.4 Furthermore, according to DEFRA's background concentration maps<sup>92</sup> (which included modelled contributions from airports), background concentrations of SO<sub>2</sub>, CO, benzene and 1,3-butadiene are lower in north Somerset than in west London. Background concentration maps of polycyclic aromatic hydrocarbons (PAH) and lead are not available. Emissions from the proposed activity at Bristol Airport will, at 12 mppa, be roughly 15% of emissions from Heathrow Airport which in 2017 served 78 mppa. Like Bristol Airport, Heathrow Airport has sensitive receptors close to its boundary. It is clear, therefore, that the PSDH arguments for screening out pollutants apply even more strongly to Bristol Airport.
- 7.6.5 Concentrations are sufficiently low across the country that DEFRA has not felt the need to update the background concentration maps for SO<sub>2</sub>, CO, benzene and 1,3-butadiene since 2001. Monitoring of benzene is carried out by BNES as part of the national non-automatic hydrocarbon network located at the London Road continuous site. At this urban roadside site, concentrations of benzene are well within legal limits, being below 1.7 µg m<sup>-3</sup> since 2008 (the legal limit is 5 µg m<sup>-3</sup>)<sup>94</sup>.
- 7.6.6 Moreover, DEFRA's guidance on local air quality management<sup>97</sup> includes advice on incorporating the effects of airports on local air quality management. This guidance states that only NO<sub>x</sub>/NO<sub>2</sub> from airports need be assessed, saying:
- "7.16 Aircraft are potentially significant sources of NO<sub>x</sub> emissions, especially during take-off, and therefore the main risk is related to potential exceedances of the NO<sub>2</sub> air quality objectives."*
- 7.6.7 In summary, a clear expert consensus shows that NO<sub>x</sub>/NO<sub>2</sub>, and to a lesser extent PM, are the only local air quality pollutants where there is any risk of significant effects from airport operations. Therefore, they will not be assessed further.

### Summary of effects not requiring assessment

- 7.6.8 The potential effects not requiring further assessment are summarised in **Table 7.3**.

<sup>96</sup> Department for Transport, 2006. Project for the Sustainable Development of Heathrow - Report of the Air Quality Technical Panels. Available at: <http://www.shepway.gov.uk/webapp/lydd-airport/CORE%20DOCS/CD12/CD12.5.pdf> [Checked 16 April 2018].

<sup>97</sup> Defra, 2016. Local Air Quality Management Technical Guidance (TG16). April 2016.

Table 7.3 Potential effects not requiring assessment

Activity	Impact	Potential effect
<b>Construction</b>		
Construction site (including laydown areas, staff facilities etc.), airfield expansion (including earthworks), campus development and changes to road infrastructure	Combustion emissions from construction vehicles and plant	Increased concentrations of air pollutants that could affect human health (NO <sub>2</sub> and PM) at sensitive receptors (residential properties, schools, medical facilities), or could affect ecological sites
Construction site (including laydown areas, staff facilities etc.), airfield expansion (including earthworks), campus development and changes to road infrastructure	Emission of odours	Amenity at sensitive receptors (residential properties, schools, medical facilities) near to work sites
<b>Operation</b>		
Airport operational activity, including landside road traffic	Emission of other pollutants	Increased concentrations of air pollutants that could affect human health (SO <sub>2</sub> , CO, benzene, 1,3-butadiene, etc.) at sensitive receptors (residential properties, schools, medical facilities), or could affect ecological sites

## Proposed assessment methodology

- 7.6.9 The methodology outlined in this section is based on best practice and published guidance, and will be followed when completing the impact assessment presented in the ES.

### Construction dust

- 7.6.10 The IAQM has developed guidance for assessing the impacts of construction on dust and determining their significance<sup>98</sup>. This guidance will be used to assess impacts from construction dust.
- 7.6.11 The IAQM guidance provides a method to assess the significance of construction effects by considering the annoyance due to dust soiling as well as harm to ecological receptors and the risk of health effects due to any significant increases to PM<sub>10</sub> or PM<sub>2.5</sub>.
- 7.6.12 The IAQM approach begins with a counterfactual assessment of the risk dust impacts in the absence of any dust control measures. This is then used to determine what control measures are recommended. In practice, these control measures, or equally effective measures, are normally implemented in the construction project through a CEMP as part of standard good practice, and as such can be considered as embedded mitigation. The IAQM method is therefore somewhat inconsistent with the normal EIA approach, in which effects with embedded mitigation are assessed first to determine if additional mitigation is required.
- 7.6.13 Individual construction working sites will be classified according to the risk of effects (based upon the scale and nature of the works, plus the proximity of sensitive receptors) in the absence of dust control measures. Appropriate site-specific embedded mitigation measures will then be identified.
- 7.6.14 The significance of the dust effects is assigned after applying the site-specific embedded mitigation. The overall significance of the effects arising from the entire construction phase of the

<sup>98</sup> IAQM, 2014. Guidance on the assessment of dust from demolition and construction.



Proposed Development is based upon professional judgement, taking into account the significance of the effects of each of the four activity types and any residual effect after the embedded mitigation is applied.

### Construction vehicle and plant emissions

- 7.6.15 The impact of emissions from the additional vehicles on public roads during the construction phase will be considered (if not scoped out, which will depend on the results of the traffic and transport assessment) using the same methodology as described below for the operational assessment. Construction-related road traffic will be modelled as part of the overall traffic assessment.

### Operation

- 7.6.16 The air quality assessment will predict concentrations of NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. The air quality assessment will lead directly to forecasts of annual mean concentrations of the identified pollutants. Shorter-period concentrations, which feature in some AQALs, will be derived from annual mean values, using relationships that have been recommended in technical guidance for local authority LAQM Review and Assessment<sup>97</sup>. This is necessary because the very large number of sources associated with an airport cannot practically be included in a single Atmospheric Dispersion Modelling System (ADMS)<sup>99</sup> model run.

### Aircraft emissions

- 7.6.17 Emissions from the following sources will be calculated:
- Aircraft on the ground, including landing roll, taxi-in, taxi-out, hold, take-off-roll, auxiliary power unit (APU) usage, brake wear, tyre wear and (subject to data availability) testing ground runs;
  - Aircraft in the air up to 3,000 feet (914m), including approach, initial climb and climb-out; and
  - Ground support equipment.
- 7.6.18 Emissions will be calculated using a bottom-up approach, based on multiplying activity levels by appropriate emission factors. Data on activity levels will be provided by BAL, supplemented by data from comparable airports. Emission factors will be taken from standard published sources.
- 7.6.19 Emissions will be assigned to spatial elements based on layout drawings provided by BAL and standard aviation operational practice (e.g. for taxiing routes). The spatially-defined emissions will then be entered into the dispersion modelling tool ADMS, which calculates concentrations of pollutants at receptors. Deposition rates at ecological receptors are calculated from concentrations in air using standard deposition velocities.
- 7.6.20 Throughout the modelling process, care will be taken not to risk underpredicting impacts. Where data is not available, conservative assumptions will be made if necessary.

### Comparison with PSDH methodology

- 7.6.21 As mentioned in **Section 7.5**, the PSDH methodology is considered to be best practice for airport air quality assessments. The methodology to be used will be generally consistent with the PSDH, but a number of differences are appropriate, and these are summarised here.

<sup>99</sup> A computer tool for modelling dispersion of substances through air. It also has various specialist versions such as ADMS-Roads and ADMS-Airport.

- 7.6.22 The PSDH recommended a procedure for taking into account changes in ambient temperature, pressure and humidity on aircraft engine emissions, which it found changed overall aircraft NO<sub>x</sub> emissions amounted to about 2 or 3%<sup>100</sup>. The PSDH also recommended an elaborate methodology for take-off roll, accounting for non-uniform acceleration, effects of the forward speed on the engine thrust, etc. It found that these made a difference of between 2 and 7% on average to emissions from the take-off roll phase. Unfortunately, the engine-specific data that underlie these methodologies were not published and remains proprietary. In view of the small difference that these effects make to emissions, they will be omitted from the Bristol Airport assessment.
- 7.6.23 The PSDH carried out a model intercomparison study to compare the use of various dispersion modelling tools for airport air quality modelling. As a result, the PSDH endorsed the use of ADMS-Airport, a version of the long-established dispersion modelling tool ADMS, adapted to account for the momentum and buoyancy fluxes from jet engines. However, the use of the regular version of ADMS with suitable initial dispersion characteristics was also found to be acceptable and has been used in other airport assessments since PSDH, including the Stansted Generation 1 and Generation 2 planning applications.
- 7.6.24 The PSDH recommendations leave a great deal open to depend on data available, for example regarding aircraft times in mode, take-off thrusts etc. Because air quality around Heathrow Airport has been subject to intensive research and evaluation for many years, good data is generally available there. It is likely that more limited data will be available for Bristol Airport, so more assumptions (which will be conservative) will be required.

### Road traffic emissions

- 7.6.1 The contribution from road traffic on roads around Bristol Airport will be assessed using data generated as part of the traffic and transport assessment (**Chapter 5**). Contributions from airport-related and non-airport traffic will be included on road links where the airport traffic meets the criteria given by EPUK/IAQM<sup>88</sup>. Emissions will be calculated by ADMS-Roads, using the latest emission factors from DEFRA's Emissions Factors Toolkit<sup>101</sup>. ADMS-Roads will also be used to perform the dispersion modelling and calculate concentrations at receptors.

### Impact significance

- 7.6.2 The significance of effects on NO<sub>2</sub> and PM concentrations in air at human receptors will be assessed in accordance with guidance developed by the IAQM and EPUK<sup>88</sup>. The IAQM/EPUK significance criteria take account of both the incremental change in air quality at relevant receptors and the absolute concentration in relation to AQALs, and defines descriptors for the level of impact.
- 7.6.3 The overall significance of the effect will then be determined using professional judgement. One of the relevant factors to consider is the potential for cumulative effects, e.g. in cases where several 'slight' impacts on receptors individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area. Conversely, a 'moderate' or 'substantial' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health.
- 7.6.4 For ecological receptors, the criteria recommended in EA guidance<sup>85</sup> and IAQM commentary<sup>89</sup> 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.

<sup>100</sup> Department for Transport. Project for the Sustainable Development of Heathrow. Report of the Technical Panels, Chapter 3 - Emission sources.

<sup>101</sup> Defra (2017) Emissions Factors Toolkit. Available online <https://iaqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html> [Checked 22/03/2018].

### *Odour emissions and potential annoyance*

- 7.6.5 There is no established methodology for assessing odour emissions from airports. There is little published information regarding the odour characteristics of VOC emissions from aircraft engines, so it is difficult to evaluate potential odour annoyance. Odour perception and its potential to cause annoyance is also subjective and is strongly dependent on the nature of the odour and the sensitivity or tolerance of those exposed.
- 7.6.6 Two main approaches have been followed in other airport assessments:
- A semi-quantitative, risk-based approach using IAQM odour guidance<sup>102</sup>; and
  - Using a dispersion model to determine concentrations of hydrocarbons from aircraft, and applying odour factors used in an assessment of Copenhagen Airport<sup>103</sup>.
- 7.6.7 Both of these methods have very high uncertainties. The Copenhagen method, being based on dispersion modelling that gives detailed answers, has the disadvantage that the uncertainties are masked by a veneer of precision, and is therefore vulnerable to over-interpretation.
- 7.6.8 A further approach is based on an analysis of complaints data. Complaints generally provide the best way to evaluate annoyance from odour, but have the disadvantage that they cannot easily be used to predict annoyance from future changes.

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<sup>102</sup> IAQM, 2014. Guidance on the assessment of odour for planning.

<sup>103</sup> Morten Winther, Uffe Kousgaard and Arne Oxbøl, 2006. Calculation of odour emissions from aircraft engines at Copenhagen Airport. Science of the Total Environment 366 218–232.

## 8. Landscape and Visual

### 8.1 Introduction

- 8.1.1 The Landscape and Visual Impact Assessment (LVIA) consists of two related assessments that evaluate effects of the construction and operation of the proposed development on the landscape. These assessments concentrate upon effects on the landscape character and designations, and the views and visual amenity of people who live, undertake recreational activities, work and/or travel through the area around Bristol Airport.

### 8.2 Relevant legislation, policy and guidance

#### Legislation

- 8.2.1 The following legislation is relevant to the LVIA that will be presented within the Environmental Statement (ES):
- Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (SI No 571); and
  - The European Landscape Convention 2000, which became binding in the UK in 2007, seeks to protect (conserve and maintain) the significant or characteristic features of the landscape.

#### Policy

- 8.2.2 **Table 10.2** lists the planning policy guidance and policies that are relevant to the LVIA, and sets out the implications of the guidance and policies for its scope.

Table 8.1 Relevant policies and their implications for the LVIA

Policy reference	Implications
<b>National Planning Policy Framework (NPPF)<sup>104</sup></b>	
Conserving and enhancing the natural environment	The planning system should contribute to and enhance the natural and local environment, protecting and enhancing the valued landscapes. (Paragraph 109). The planning system should give great weight to conserving landscape and scenic beauty in Areas of Outstanding Natural Beauty (Paragraph 115). The closest boundary section of the Mendip Hills Area of Outstanding Natural Beauty is located 2.9km from the boundary of Bristol Airport.
<b>North Somerset Council (NSC) Core Strategy January 2017<sup>105</sup></b>	
CS5: Landscape	For landscape character Policy CS5 requires that <i>"The character, distinctiveness, diversity and quality of North Somerset's landscape ... will be protected and enhanced by the careful, sensitive management and design of development. Close regard will be paid to the character of National Character Areas in North Somerset and particularly that of the 11 landscape types and 31 landscape character areas identified in the North Somerset</i>

<sup>104</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. [Online] Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Accessed 12 03 2018].

<sup>105</sup> 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> [Accessed 16 04 18]

Policy reference	Implications
CS23: Bristol Airport	<p><i>Landscape Character Assessment.</i>" Reference to relevant North Somerset landscape character areas should be included in the landscape assessment.</p> <p>For landscape designations Policy CS5 requires that <i>"The Mendip Hills Area of Outstanding Natural Beauty (AONB) will be protected by ensuring that development proposals conserve and enhance its natural beauty and respect its character, taking into account the economic and social well-being of the area."</i> Effects upon the Mendip Hills AONB will be considered in the landscape assessment.</p> <p>This policy requires that <i>"proposals for development at Bristol Airport ... demonstrate the satisfactory resolution of environmental issues, including the impact of growth of surrounding communities ..."</i>. Effects upon the visual amenity of nearby communities will be considered in the visual assessment.</p>
<b>North Somerset Development Management Policies Sites and Policies Plan Part 1. Adopted July 2016<sup>106</sup></b>	
DM9 Trees and Woodland	<p>There is some potential for the Proposed Development to affect a small number of trees within the development site and for tree planting to form part of a landscaping strategy to support the Proposed Development. Policy DM9 requires that development proposals affecting trees show that <i>"the retention, protection and enhancement of the tree canopy cover has been considered throughout the design"</i> and evaluate the impacts that the proposed development may have on existing trees. Such an evaluation can be interpreted as requiring any loss of existing tree cover and any proposed additions to tree cover to be considered within the landscape (landscape character areas) and visual assessments (specific visual receptors' views and visual amenity).</p>
DM10 Landscape	<p>Strong links with CS5: Landscape, with the need to demonstrate that the Proposed Development would not have <i>"an unacceptable adverse impact on the designated landscape character of the district as defined in the Landscape Character Assessment Supplementary Planning Document (2005)."</i> Policy DM10 also emphasises the need for the landscape assessment to consider how the Proposed Development responds to local character; reflects <i>"the identity of the local surroundings"</i>; respects <i>"the tranquillity of an area"</i>; respects the character of the historic landscape including features such as <i>"stone walls, hedgerows and field patterns"</i>; and to consider how the lighting for the proposed development impacts upon any dark skies.</p> <p>The justification for Policy DM10 requires that <i>"photomontages or other similar visuals"</i> should be provided to show how the proposed development has taken regard of the local landscape.</p>
DM11 Mendip Hills Area of Outstanding Natural Beauty (AONB)	<p>Strong links with CS5: Landscape, with an overarching aim <i>"to ensure that development would not harm the natural beauty of the AONB ..."</i>. The landscape assessment must assess if the proposed development would have <i>"an adverse impact upon the landscape, setting and scenic beauty of the Mendip Hills AONB, including views in and out of the AONB ..."</i>. In undertaking the assessment of landscape effects upon the Mendip Hills AONB <i>"particular attention"</i> will need to be given to <i>"the siting, scale, size, character, design, materials and landscaping of the proposed development and views to and from the AONB"</i>. The landscape assessment baseline will identify if <i>"dark skies are an important feature"</i> of the parts of the AONB closest to Bristol Airport.</p>
DM12 Development within the Green Belt	<p>Some of the Proposed Development is sited within the Green Belt. The LVIA will not assess how this Proposed Development impacts upon the functions of the Green Belt in this location. However, the landscape and visual assessment can contribute to the understanding of how the relevant components of the Proposed Development impact upon the <i>"visual character of the site and surroundings"</i> as well as effects on <i>"the open and rural character of the area in general, prominence, visual and physical impact (including the impact of lighting) ..."</i></p>
DM50 Bristol Airport	<p>Policy DM50 states that <i>"development within the Green Belt insert at Lulsgate will be permitted provided that ... it is suitably sited, design and landscaped so as not to harm the surrounding landscape."</i> The landscape assessment will assess how the components of the Proposed Development located within the Green Belt insert impact upon the surrounding landscape as represented by the defined landscape character areas.</p>
<b>North Somerset Supplementary Planning Documents</b>	

<sup>106</sup> North Somerset Council, 2016. Development Management Policies, Sites and Policies Plan Part 1. [online] Available at: <http://www.n-somerset.gov.uk/wp-content/uploads/2015/11/Sites-and-Policies-Plan-Part-1-Development-Management-Policies-July-2016.pdf> [Accessed 16 04 18]

Policy reference	Implications
North Somerset Landscape Character Assessment Supplementary Planning Document. Adopted December 2005 <sup>107</sup>	Defines Landscape Character Types (LCTs) and the more detailed and location specific landscape character areas (LCAs) that will be used within the landscape assessment component of the LVIA.
<b>Mendip Hills Area of Outstanding Natural Beauty (AONB) Management Plan 2014-19<sup>108</sup></b>	
Introduction to the Management Plan	As set out in paragraph 1.2.8 <i>"what happens in the countryside adjacent to the boundary or within the view of the AONB is also of significance."</i> The landscape assessment will consider effects upon the AONB and the visual assessment will include any AONB visual receptors that are within the Zone of Theoretical Visibility (ZTV) for the Proposed Development.
Statement of Significance – The AONB's special qualities	The AONB Management Plan identifies and summarises 12 special qualities. The landscape assessment will consider the potential for the Proposed Development to impact upon these special qualities. The AONB Management Plan states that <i>"particular combinations of these special qualities form 11 distinctive landscape areas identified in the Mendip Hills AONB Landscape Character Assessment."</i> Those LCAs with potential to sustain effects as a result of the Proposed Development will be included in the landscape assessment.

## Guidance

- 8.2.3 The LVIA will be undertaken in accordance with the third edition of the Guidelines for Landscape and Visual Impact Assessment (GLVIA3)<sup>109</sup> produced by the Landscape Institute and the Institute of Environmental Management and Assessment. GLVIA3 is widely regarded by landscape and planning professions as the 'industry standard' together with best practice and professional experience. The LVIA will take account of the following advice notes and technical notes published by the Landscape Institute.
- Photography and photomontage in landscape and visual impact assessment – Advice Note 01/11<sup>110</sup>;
  - Tranquillity – An overview. Technical Information Note 01/2017 (revised);<sup>111</sup> and
  - Visual representation of development proposals. Technical Guidance Note 02/17<sup>112</sup>.

## 8.3 Main sources of data

- 8.3.1 The EIA scoping exercise presented in this Scoping Report, with respect to LVIA, has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the following sources of data:
- Ordnance Survey (OS) 1:25,000 scale mapping:

<sup>107</sup> Land Use Consultants (on behalf of North Somerset Council), 2005. North Somerset Landscape Character Assessment, Supplementary Planning Document. [online] Available at: <http://www.n-somerset.gov.uk/wp-content/uploads/2015/11/landscape-character-assessment-supplementary-planning-document.pdf> [Accessed 16 04 18]

<sup>108</sup> Landscapes for life, 2013. Mendip Hills area of Outstanding Natural Beauty (AONB) Management Plan 2014-19. [online] Available at: <http://www.mendiphillsaonb.org.uk/wp-content/uploads/2012/12/Mendip-Hills-AONB-Management-Plan-Nov-2013.pdf> [accessed 16 04 18]

<sup>109</sup> The Landscape Institute and the Institute of Environmental Management and Assessment, 2013. *Guidelines for Landscape and Visual Impact Assessment*. 3<sup>rd</sup> edition. London. Routledge.

<sup>110</sup> The Landscape Institute, 2011. *Photography and photomontage in landscape and visual impact assessment – Advice Note 01/11*. London. Landscape Institute.

<sup>111</sup> The Landscape Institute, 2017. *Tranquillity – An overview. Technical Information Note 01/2017 (Revised)*. London. Landscape Institute.

<sup>112</sup> The Landscape Institute, 2017. *Visual representation of development proposals. Technical Guidance Note 02/2017 (31 March 2017)*. London. Landscape Institute.

- ▶ Explorer 154 – Bristol West and Portishead;
- ▶ Explorer 155 – Bristol and Bath;
- ▶ Explorer 141 – Cheddar Gorge and Mendips Hill West; and
- ▶ Explorer 142 – Shepton Mallet and Mendip Hills East.
- National Character Area profile: 118. Bristol, Avon Valleys and Ridges.<sup>113</sup>
- North Somerset Landscape Character Assessment Supplementary Planning Document.<sup>114</sup>
- Bath and North East Somerset Landscape Character Assessment Supplementary Planning Guidance.<sup>115</sup>
- Mendip Hills AONB Management Plan 2014-19.<sup>116</sup>
- Multi-Agency Geographic Information for the Countryside Website.<sup>117</sup>
- Tranquillity mapping produced by Campaign for the Preservation of Rural England (CPRE).<sup>118</sup>
- Light pollution and dark skies mapping for North Somerset produced by LUC for CPRE.<sup>119</sup>
- Aerial photography (Google Earth Pro).
- Visits to Bristol Airport undertaken on 6 June 2017, 6 April 2018 and 25 April 2018. The latter two visits to Bristol Airport were undertaken before the tree cover was fully in leaf i.e. under winter conditions.
- Review of the LVIA undertaken in 2009 for development and enhancement proposals at Bristol Airport.<sup>120</sup>

## 8.4 Engagement with consultees

- 8.4.1 NSC, Bath and North East Somerset and the Mendip Hills AONB Partnership will be consulted with regard to landscape receptors for inclusion in the landscape assessment. Key considerations are landscape character areas for inclusion, and which of the AONB's special qualities need to be considered. Consultation on the visual assessment will concentrate upon the selection of viewpoints from which appropriate visualisations will be produced. In consulting on viewpoints, specific reference will be made to the landscape and visual receptors and viewpoints that were included, following consultation, in the LVIA that was completed for the 2009 development to 10mppa<sup>120</sup>.

<sup>113</sup> Natural England, 2014. *National Character Area profile: 118. Bristol, Avon Valleys and Ridges*. Available online [www.naturalengland.org.uk](http://www.naturalengland.org.uk) [Checked 13/03/18].

<sup>114</sup> Land Use Consultants on behalf of North Somerset Council, 2005, *North East Somerset Landscape Character Assessment Supplementary Planning Document*. Adopted December 2005.

<sup>115</sup> Bath and North East Somerset Planning Services. (2003). *Rural Landscapes of Bath and North East Somerset: A Landscape Character Assessment Supplementary Planning Guidance*. Adopted April 2003.

<sup>116</sup> Mendip Hills Area of Outstanding Natural Beauty Partnership. (November 2013). *Mendip Hills AONB Management Plan 2014-19*.

<sup>117</sup> Department for Environment, Food and Rural Affairs, 2018. *MAGIC*. Available online [www.magic.gov.uk](http://www.magic.gov.uk) [Checked 08/03/18]

<sup>118</sup> Campaign to Protect Rural England, 2018. *Tranquil Places*. Available online [www.cpre.org.uk/resources/countryside/tranquil-places](http://www.cpre.org.uk/resources/countryside/tranquil-places) [Checked 12/03/18].

<sup>119</sup> Campaign to Protect Rural England, 2018. *England's Light Pollution and Dark Skies - map*. Available online [www.cpre.org.uk/nightblight/maps](http://www.cpre.org.uk/nightblight/maps) [Checked 12/03/18].

<sup>120</sup> Entec UK Ltd for Bristol International Airport Ltd. (2009). *Volume 8: Landscape and Visual Assessment. Environmental Statement for the Development and Enhancement of Bristol International Airport*.



## 8.5 Overview of baseline conditions

### Zones of influence

#### Study area

- 8.5.1 The LVIA for the Proposed Development will be based upon a study area of 5km from the Bristol Airport boundaries, save as described at **Section 8.5.2**. This study area has been defined to ensure that the LVIA concentrates upon receptors that are most likely to be significantly affected by the Proposed Development at Bristol Airport. It is derived from a review of the 2009 LVIA<sup>120</sup> and the assessors' recent experience of undertaking an LVIA for another airport development. The selection of the study area has been undertaken in accordance with best as set out in Sections 5.2 and 6.2 in GLVIA3<sup>109</sup>.
- 8.5.2 Based upon a review of the Mendip Hills AONB Management Plan<sup>116</sup> allied with a review of the 2009 LVIA<sup>120</sup>, the LVIA study area will be extended to a 10km offset to the south-east, south and south-west. This extension is required to encompass the closest parts of the Mendip Hills AONB which as a nationally designated landscape has particularly high sensitivity to development. The proposed LVIA study area is shown in **Figure 8.1**.

#### Zone of Theoretical Visibility (ZTV)

- 8.5.3 A preliminary ZTV has been generated to inform the scoping study and the initial viewpoint selection. This preliminary ZTV is shown in **Figure 8.1** and has been based upon a 5m Digital Terrain Model (DTM) and initial height parameter plans for the tallest and most extensive components of the Proposed Development. These are:
- The west terminal extension– 13.5m height;
  - The east terminal extension – 12.5m height;
  - Proposed new canopy 12.5m height;
  - The southern terminal extension – 9.5m height;
  - The additional multi storey carpark – 16.0m height;
  - The eastern pier – 10.2m height; and
  - The Silver Zone Seasonal car park extension also known as 'Cogloop' Phase 2 carpark – 2m height assumed height of tallest vehicles).
- 8.5.4 This ZTV is shown overlaid on a ZTV for the tallest and/or most extended components of the existing development, including development that has been approved. These elements comprise: existing terminal building; western walkway; eastern walkway; control tower; hotel; transport interchange; multi-storey carpark; fire station; hangars in the south-east; strategic sequential radar (SSR) monopole tower, existing carparking areas (northside and southside including the Silver Zone Seasonal car park 'Cogloop' 1) and tailfins of aircraft at aircraft stands.
- 8.5.5 The ZTVs illustrate the topographic constraints on the visual influence of the existing and Proposed Development components at Bristol Airport but do not take account of built elements outside Bristol Airport or vegetation cover, both of which can reduce the area and extent of actual visibility. The preliminary ZTV for the tallest and most extensive components of the Proposed Development therefore forms an appropriate starting point for undertaking the LVIA.

## Current baseline

### Landscape baseline – landscape elements within Bristol Airport

- 8.5.6 Bristol Airport occupies approximately 192ha of land. The runway runs east to west and is in the centre of the airport. Aircraft stands, taxiways and apron surrounds the runway area. The fuel farm is located in the centre of the northern edge of the apron. Built development is concentrated on the northern side of the runway and includes the airport terminal, hotel, control tower, car parking and the current administrative building with facilities linked by the North Side Road. On the southern side of the runway are located aircraft ancillary areas including the southern apron, Bristol Flying Centre, Bristol and Wessex Flying Club, helicopter areas and associated hangars, the Silver Zone and 'Cogloop' carpark. The tallest built elements are the air traffic control tower which is 28.9m high.
- 8.5.7 Bristol Airport is located on the Broadfield Down Plateau with the runway and its southern part at an elevation of between 196m and 183m Above Ordnance Datum (AOD) with the most elevated area being sited on the south-western boundary. Its northern part has more topographical variation being at elevations between 185m and 165m AOD with the lower elevations at the boundary.
- 8.5.8 Operational requirements dictate that in the proximity of the runway vegetation cover is restricted to grassland. There are lengths of recent and well-established hedgerows in the southern part, most of which are trimmed low, although some are overgrown. Tree and shrub cover is limited, except for belts along some sections of the boundary. These are concentrated around the south-eastern carpark area and extensive belts alongside Downside Road on the northern boundary. The latter provide an important screening function for residents in Lulsgate Bottom. Away from the boundaries, tree cover is mainly restricted to small groups of trees and rows of trees alongside sections of North Side Road. Boundary tree and shrub cover along the sections of the A38 close to the principal entrance to Bristol Airport provide good levels of screening from the A38.

### Landscape baseline – landscape context

- 8.5.9 Bristol Airport is sited on one of the most elevated plateau ridge locations in the surrounding area characterised by rolling ridge and valley topography with a general east to west grain. There are only a small number of locations with a similar or greater elevation. These include Felton Common (191m AOD) to the east; Oatfield Hill (206m AOD) to the north; and Dundry Down (233m AOD) further to the east. The area to the south descends unevenly to the River Yeo Valley at elevations below 20m AOD around Wrington before rising steeply with the north slopes of the Mendip Hills with a maximum elevation in the study area of 325m AOD at Beacon Batch. The ridgelines and plateaux also descend rapidly to the west and north-west so that these edges of the study area are also at low elevations. Overall the study area is topographically complex.
- 8.5.10 The settlement pattern is characterised by dispersed and isolated small villages, hamlets and farmsteads. Their distribution is often concentrated at the base of the ridgelines or plateaux. Many of these settlements are not spatially well defined with a dispersed morphology allowing them to merge into one another. Settlements avoid locations at the bottom of the River Yeo Valley and are only infrequently located on the steepest sections of the plateau and ridgeline slopes. Within the study area the largest settlement is the small town of Nailsea, although only its south-eastern half is within the study area. Other settlements include Wrington, Redhill, Felton and Winford as well as the eastern fringes of Yatton and Congresbury.
- 8.5.11 The study area is characterised by a relatively dense road network. A high proportion of these roads are minor roads linking the dispersed settlements often following indirect routes. The visits to Bristol Airport and use of Google Earth Pro has demonstrated that these minor roads are often

bounded by tall boundary hedgerows. The principal routes are the A386; A368 and A38. The latter is routed alongside the eastern side of Bristol Airport where it has been realigned to facilitate an earlier eastward extension of the runway.

- 8.5.12 In the immediate vicinity of Bristol Airport, i.e. within 1.5km, there are a limited number of Public Rights of Way (PRoWs) to the south and west, with a higher density located on the northern side. The latter link the dispersed settlements of Lulsgate Bottom and Downside with the substantial number of outlying farmsteads and hamlets. A similar situation prevails to the east beyond the A38 focusing upon Felton Common which is an Open Access Area. Further away from Bristol Airport the density of the PRoW network is generally moderate with a lower density in the section of the bottom of the Yeo Valley east of Wrington to Blagdon Lake. Conversely there is a higher density of PRoWs on the northern slopes of the Mendip Hills including within the large Open Access Area around Beacon Batch in the Mendip Hills AONB. The PRoW network includes a small number of long distance trails and sections of four Sustrans national and regional cycle networks. These are shown on **Figure 8.2** along with the Open Access Areas.
- 8.5.13 The land-use pattern in the study area is predominantly rural away from the larger settlements listed in **Section 8.5.10** and Bristol Airport itself. In broad terms in the lower lying parts of the study area the principal cropping type is arable, whilst on the slopes of the plateaux and ridgelines pastoral cropping predominates. The latter land-use is often undertaken in fields with retained, albeit sometimes gappy, hedgerow boundaries and a moderate number of hedgerow trees. The highest density of tree and woodland cover is to the west of Bristol Airport extending to the A368 where there are extensive coniferous and mixed woodland plantations. Large coniferous plantations are also located in two areas on the northern slopes of the Mendip Hills: around Rowberrow to the west and south of Ubley to the east.
- 8.5.14 Across the remainder of the study area tree and woodland cover is generally restricted to a combination of small woodlands, field corner copses, grown out lengths of hedgerow trees and remnant hedgerow trees with some parkland style planting and local variations such as trees in Tall Pines Golf Club to the north-west of Bristol Airport. The density of tree cover varies but is highest in the area south of Bristol Airport between Wrington and Redhill. It is also moderately high in the elevated area to the north of Bristol Airport around Oatfield Hill. The different tree cover types can coalesce to filter, frame and screen views and give the visual impression of a well-treed landscape character in several parts of the study area.

#### Landscape baseline - landscape designations

- 8.5.15 There are no local landscape designations in the LVIA study area. The Mendip Hills AONB is a national landscape designation with an area of 198km<sup>2</sup> that at its closest point is located 2.9km to the south of the boundary of Bristol Airport. The primary purpose of AONB designation is to conserve and enhance the area's natural beauty.
- 8.5.16 The AONB's Statement of Significance contained in its current Management Plan<sup>116</sup> sets out the AONB's 12 special qualities. These special qualities include views into and out of the AONB. Section 1.2.8 of the Management Plan<sup>116</sup> emphasises that whilst *"the Plan's focus is upon the designated area[...] what happens in the countryside adjacent to the boundary or within view of the AONB is also of significance."*
- 8.5.17 The current Management Plan<sup>116</sup> draws upon the Mendip Hills Landscape Character Assessment which was undertaken in 1998. This study defined 11 character areas, nine of which are entirely or partly located in the north-eastern part of the Mendip Hill AONB that falls within the study area that has been defined for the Proposed Development.

## Landscape baseline – landscape character

- 8.5.18 At the national scale of Natural England's 159 National Character Areas (NCAs), Bristol Airport and a large majority of the study area are within NCA 118: Bristol, Avon Valleys and Ridges<sup>113</sup>. This is a large NCA that extends from the foot of the northern slopes of the Mendip Hills across the city of Bristol and up the M5 corridor. The southern edge of the study area is within NCA 141: Mendip Hills. The presence of Bristol Airport is noted in the introductory summary of NCA 118 and is listed as one of the developments that is a key characteristic of the NCA. On page 8 Bristol Airport is described as dominating the *"hilltop along from Dundry"*, whilst on page 13 the NCA description notes that *"the planned expansion of Bristol Airport may significantly impact on the tranquillity and traffic of this NCA ..."*. Although on page 66 in the section on ecosystem service analysis, the description of the current state of tranquillity in the NCA notes that disturbance is high alongside the A38 and that Bristol Airport *"significantly impacts upon tranquillity south of Bristol ..."*<sup>113</sup>
- 8.5.19 At a local scale the landscape character of the study area has been defined in the three landscape character assessments that have been undertaken for North Somerset Council<sup>114</sup>, Bath and North East Somerset Council<sup>115</sup> and the Mendip Hills AONB Partnership<sup>116</sup>. The distribution of the LCAs defined in these landscape character assessments is shown in **Figure 8.3**. Bristol Airport and the majority of the study area are within the area covered by the NCA landscape character assessment.
- 8.5.20 Bristol Airport is sited within the Settled Limestone Plateau LCT and within the G1: Broadfield Down Settled Limestone Plateau LCA. This LCA's key characteristics that are of relevance to the Proposed Development are:
- Flat to gently undulating elevated broad plateau;
  - Open and exposed landscape with distant views to lowland and wooded ridges;
  - Mixed and coniferous woodland belts and clumps, the most substantial of which are to the north of the LCA i.e. north of Bristol Airport;
  - Large rectilinear fields enclosed by low hedgerows;
  - Bristol Airport and the associated terminal building and infrastructure dominate the central section of the LCA;
  - Settlement is limited to isolated farmsteads, nucleated villages and, along the A38, development of a more urban character;
  - Low levels of accessibility away from the A38 with a more urban feel in parts of the LCA close to Bristol Airport; and
  - Rural character and night skies are impacted by increased lighting levels at Bristol Airport.
- 8.5.21 The Broadfield Down Settled Limestone Plateau LCA's description on page 109 starts by stating that Bristol Airport has a *"profound influence"*<sup>114</sup> on the character of the LCA. It notes the contrast between strong sense of exposure created by the runway and taxiways and the concentration of buildings and activity on the northern side. Bristol Airport is described as having an urbanising effect upon Lulsgate Bottom. Away from Bristol Airport the LCA is described as being pastoral with the edges of the LCA becoming more rural and remote with increased tree cover. The influence of the A38 is also noted with regard to noise, movement, road side development and signage clutter.
- 8.5.22 The Broadfield Down Settled Limestone Plateau LCA is assessed as possessing moderate strength of character with the presence of Bristol Airport noted as a disruptive influence. The landscape character assessment concludes that whilst the LCA exhibits a number of the characteristics of the Settled Limestone Plateau LCT, the LCA lacks unity or a distinct pattern of features. On page 110 the landscape character assessment judges that the Broadfield Down Settled Limestone LCA has a

declining condition “due to the poor management of its field boundaries and the effects of the pressure on the area from airport infrastructure.”<sup>114</sup> Amongst the landscape guidelines that are advocated for the LCA is to use design guidance and appropriate land management to minimise the visual impacts generated by the airport and associated development and infrastructure.

8.5.23

A review of **Figure 8.3** showing the distribution of LCAs and **Figure 8.1** showing the comparative ZTVs indicates that the LCAs with the most potential to be influenced by indirect impacts generated by the present and Proposed Development at Bristol Airport are the closest LCAs; LCAs located to the east due to their comparative elevation; and those on the northern slopes of the Mendip Hills in the southern part of the study area. These LCAs are:

- North Somerset LCAs
  - ▶ E6: Cleeve Ridge LCA;
  - ▶ H1: Dundry Hill LCA; and
  - ▶ J3: Chew Valley Rolling Farmland LCA.
- Bath and North East Somerset LCAs
  - ▶ 1: Thrubwell Farm Plateau LCA
- Mendip Hill AONB character areas
  - ▶ The Northern Slopes Character Area;
  - ▶ Blagdon-Compton Martin Character Area; and
  - ▶ The Plateau Character Area.

8.5.24

The descriptions for the host NCA 118: Bristol, Avon Valleys and Ridges<sup>113</sup> and the host LCA G1: Broadfield Down Settled Limestone Plateau LCA<sup>114</sup> comment on the impacts of Bristol Airport on tranquillity as set out above. In addition, the CPRE Tranquillity Maps for Somerset and Avon<sup>118,119</sup> and the CPRE North Somerset Map for Light Pollution and Dark Skies<sup>119</sup> will be considered. The former indicates that levels of tranquillity tend to increase from north to south across the study area. Bristol Airport and the immediate surrounding area are shown as having moderate levels of tranquillity which does not vary appreciably from the level of tranquillity found across the study area. The least tranquil part of study area is found around Nailsea, whilst the most tranquil part of the study area is located around Black Down in the Mendip Hills AONB.

8.5.25

The more recent Map for Light Pollution and Dark Skies states that North Somerset is the 131<sup>st</sup> darkest district out of the 326 districts in England<sup>119</sup>. Bristol Airport is the only area in North Somerset within the highest of the nine categories for light pollution. However light pollution levels diminish rapidly away from the boundary of Bristol Airport, particularly to the south and west. The southern part of the study area contains large areas categorised in the second and third lowest of the nine categories.

### Visual baseline – existing visibility

8.5.26

The visual baseline has been refined from the range of visual receptors that were incorporated in the 2009 LVIA taking into account the ZTVs shown in **Figure 8.1**, a review of aerial photography and Bristol Airport site visits undertaken in June 2017 and April 2018. Many of the factors that influence the present visibility of the built development and infrastructure at Bristol Airport have been discussed in the landscape baseline. Although Bristol Airport has an elevated plateau location, the so-called ‘tabletop effect’ of the topography and, in some parts of the study area, the coalescence of vegetative and built screening elements, combine to restrict its visibility in daytime

views in winter and summer conditions i.e. regardless of the deciduous vegetation being in leaf. The effect of topography is shown in the ZTVs for existing and Proposed Development in **Figure 8.1**.

- 8.5.27 The ZTV for the existing development at Bristol Airport is relatively compact and fragmented being restricted to the plateau upon which it is located and partly extending down the southern side of the plateau around Row of Ashes Lane. The ZTV for the existing development extends eastwards through Felton as a narrow link to a larger fragment sited on the southern and western slopes of Dundry Hill. The largest part of the ZTV for the existing development is located on the middle and upper northern slopes of the Mendip Hills extending as far south as the elevated area around Beacon Batch and the edge of the Mendip Plateau around Hazel Warren Farm and Gibbets Brow. The ZTV does not extend further south into the heart of the Mendip Hills. A review of the 23 viewpoints, that were included in the 2009 LVIA<sup>120</sup> after extensive consultation, shows that within the ZTV there are many locations where the presence of vegetation cover has the consequence that the theoretical views of built development at Bristol Airport are not available to visual receptors due to screening. The April 2018 visits to Bristol Airport, conducted when the majority of the deciduous vegetation was not in leaf, allied with the review of the summer and winter viewpoint photography contained in the 2009 LVIA<sup>120</sup>, confirms that this situation applies in winter conditions as well as in summer conditions.

#### Visual baseline – distribution of visual receptors

- 8.5.28 The distribution of settlements within the study area in which a high proportion of residential visual receptors are located is summarised in **Section 8.5.10**. Outside of these settlements a smaller proportion of residential visual receptors are located in the scattered hamlets, farmsteads and isolated residential properties distributed across much of the study area away from valley bottoms and the most elevated and exposed areas. Review of aerial photography and the early April and June visits to Bristol Airport show that many of these hamlets, farmsteads and isolated residential properties benefit from vegetation cover in their curtilages and/or nearby which restrict and filter the availability of views to their residents.
- 8.5.29 Recreational visual receptors are also widely distributed across the study area with likely concentrations in the southern part in the Mendip Hills AONB which contains extensive Open Access Areas and sections of two long distance trails: the Limestone Link and the West Mendip Way. The second important Open Access Area is Felton Common to the east of Bristol Airport. Visits to Bristol Airport have shown that it is well-used and that its low level of tree cover ensures that open views are readily available within the Common. As shown on **Figure 8.1**, there is a limited network of long distance trails and Sustrans cycle routes within the remainder of the study area.
- 8.5.30 A review of OS Explorer maps indicates that the distribution of PRoWs has a generally moderate density across the study area with variations close to Bristol Airport as noted in the 2009 LVIA. Key amenity assets for visitors and local residents in addition to the Tall Pines Golf Club to the north-west of Bristol Airport will be identified. Three registered parks and gardens are present in the study area of which two: Tyntesfield and Barley Wood are open to the public i.e. are accessible to recreational visual receptors.

#### Factors influencing baseline conditions

- 8.5.31 Many of the factors influencing baseline landscape and visual conditions have been noted in the baseline summary description in **Sections 8.5.5 – 8.5.29**. Other factors that are likely to influence baseline conditions are:



- Diurnal variations – the effects of lighting at Bristol Airport, within settlements and along roads upon some landscape characteristics and tranquillity is restricted to night time and potentially periods of adverse weather such as fog or heavy rain.
- Seasonal variations – visibility from some viewpoints and the views available to some visual receptors will vary according to whether any nearby and intervening deciduous vegetation is in leaf i.e. between summer months (generally April to mid-October) and winter months (generally late October – late March). Unless otherwise stated the landscape and visual assessments assume a worst case scenario of leaf loss for deciduous vegetation.
- Effects of weather upon visibility – the availability and composition of longer distance views within the study area e.g. from the north slopes of the Mendip Hills is influenced by weather and atmospheric conditions such as rain, fog and haze in humid conditions. The visual assessment assumes weather conditions that allow for optimal visibility.
- Potential for additional future visual receptors – the number of residential visual receptors has the potential to increase as the consequence of additional residential development. Comparison of the distribution of residential development in 2009 with that in 2018 shows that changes are likely to be minimal and restricted to small scale development in the small number of larger settlements. North Somerset Council Core Strategy<sup>105</sup> Policy CS14: Distribution of new housing, states that housing development will be concentrated in Weston-super-Mare, Clevedon, Nailsea and Portishead. There will be small-scale development in service villages but *“Elsewhere development will be more strictly controlled although appropriate development will be acceptable within settlement boundaries of infill villages.”*
- Long term changes in landscape character – landscape character as defined in LCAs in the baseline will gradually change with regard the factors such as the number, distribution and condition of key landscape elements. This is evidenced and influenced by the landscape guidelines for each LCA contained in the North Somerset landscape character assessment<sup>114</sup> and the summary of landscape change for each LCA in the Bath and North East Somerset landscape character assessment<sup>115</sup>. A relevant example is the identification of the declining condition of hedgerow field boundaries in the host LCA: G1: Broadfield Down Settled Limestone Plateau LCA.

## Additional baseline information requirements

8.5.32 The following additional baseline information requirements have been identified for the LVIA:

- Detailed descriptions of key characteristics, condition and management guidelines or strategies for the Mendip Hills AONB LCAs in the study area as shown on **Figure 8.3** and referenced in the current Mendip Hills AONB Management Plan<sup>116</sup>.
- A more detailed understanding of the main contributory factors to levels of tranquillity in the study area as defined by the CPRE studies<sup>118,119</sup>. This will concentrate upon a qualitative review of night time lighting levels including the contribution of baseline lighting at Bristol Airport to glare, skyglow and light spillage for residents in nearby communities as well as in the AONB. Information to be obtained from night time visits to Bristol Airport including night time photography from night time viewpoints whose location will be determined following consultation with NSC, Bath and North East Somerset Council and the Mendip Hills AONB.
- Development of a more detailed understanding of formal and informal recreational and visitor facilities within the study area within the preliminary ZTVs shown on **Figure 8.1**.



## 8.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

- 8.6.1 The identification of landscape and visual receptors that could be subject to likely significant landscape or visual effects has been guided by review of the ZTVs for the present and Proposed Development at Bristol Airport as shown in **Figures 8.2 & 8.3** supported by a review of the 2009 LVIA. This review included the distribution of landscape and visual receptors for whom significant effects were assessed and a review of the rationale for the assessment of magnitudes of change for all receptors.
- 8.6.2 The ZTV determines the selection of visual receptors for inclusion in the visual assessment as these visual receptors can only sustain effects as the result of a visual effects pathway i.e. visual receptors have to potentially be able to see one or more of the components of the proposed development to sustain visual impacts.
- 8.6.3 Effects upon landscape receptors are not entirely dependent on the presence of a visual effects pathway i.e. the landscape receptor being located within the ZTV. Landscape effects can also be generated by changes to other perceptual characteristics impacting upon landscape qualities such as tranquillity. Hence the scope of the landscape assessment has been determined by reviewing the defined key characteristics of the LCAs in the study area and a consideration of the potential for these characteristics to be impacted by the Proposed Development.

### Potential landscape significant effects requiring further assessment

- 8.6.4 The potential effects of the Proposed Development that are likely to be significant with regards to landscape, and which will be subject to further assessment (to be presented within the ES), are summarised in the following sections.
- 8.6.5 Landscape effects - landscape designations:
- Mendip Hills AONB. The landscape assessment will assess potential effects upon the defined special qualities of the AONB. This is due to the closest part of the AONB being located less than 3km from the southern boundary of Bristol Airport with 40.4% (80km<sup>2</sup>) of the AONB being located within the study area. The availability and composition of outward views are one of the AONB's special qualities. Tranquillity and the presence of dark skies are another special quality of the AONB which have the potential to be affected by the Proposed Development.
- 8.6.6 Landscape effects – landscape character areas. The following North Somerset LCAs shown on **Figure 8.3** will require further assessment:
- E1: Mendip Ridges and Combes LCA. This LCA is included in the landscape assessment due to its location against the northern boundary of the Mendip Hills AONB and consequently contributes to the AONB's setting. Some of the LCA is covered by the preliminary ZTV potentially providing a visual effects pathway plus moderate to high levels of tranquillity. This LCA was included in the 2009 LVIA.
  - E6: Cleeve Ridge LCA. This LCA is included in the landscape assessment due to its proximity to the north, south and especially the west of Bristol Airport. Hence there is increased potential for impacts upon the LCA's perceptual characteristics. The LCA's proximity and relative elevation result in several fragments of the preliminary ZTV being located within it providing a potential effects pathway. This LCA was included in the 2009 LVIA.

- G1: Broadfield Down Settled Limestone Plateau LCA. This LCA is the host LCA and will therefore sustain some direct impacts upon existing landscape elements and the introduction of new landscape elements with potential effects upon defined key characteristics. A high proportion of the LCA is within the preliminary ZTV.
- H1: Dundry Settled Hill LCA. This LCA is at the same or a higher elevation as Bristol Airport and wide views are one of its key characteristics. Its elevation ensures that a high proportion of the LCA is within the preliminary ZTV. This LCA was included in the 2009 LVIA.
- J3: Chew Rolling Valley Farmland LCA. Although only a couple of small areas of the preliminary ZTV extend into this relatively low lying LCA, its north-western part is located under 1km from the eastern boundary of Bristol Airport. Therefore, there is potential for perceptual impacts upon the LCA's *"peaceful rural ambiance"* and *"remote and rural nature"*<sup>114</sup>. This LCA was included in the 2009 LVIA.

8.6.7 Landscape effects – landscape character areas. The following Bath and North East Somerset LCAs shown on **Figure 8.3** will require further assessment:

- 1: Thrubwell Farm Plateau LCA – several small fragments of the preliminary ZTV extend into this LCA. It is a compact LCA completely located within 2km of the south-eastern boundary of Bristol Airport that possesses outward views. This LCA was included in the 2009 LVIA.
- 2: Chew Valley LCA - several small fragments of the preliminary ZTV extend into this LCA. The LCA is adjacent to the Mendip Hills AONB and will form part of its setting. One of the LCA's key characteristics is the presence of extensive outward views.
- 4: Mendip Slopes LCA – a small proportion of this LCA is located in the preliminary ZTV. This LCA is adjacent to the Mendip Hills AONB and will form part of its setting. One of the LCA's key characteristics is the availability of extensive views across Chew Valley.

8.6.8 Landscape effects – landscape character areas. The following Mendip Hills AONB character areas shown on **Figure 8.3** will require further assessment:

- The Northern Slopes Character Area – this has extensive coverage of the preliminary ZTV and relatively compact character area;
- The Blagdon-Compton Martin Character Area – this has extensive coverage of the preliminary ZTV and relatively compact character area; and
- The Plateau Character Area – this has some coverage by the preliminary ZTV.

### Potential landscape effects not requiring further assessment

8.6.9 Landscape effects – landscape character areas. The following North Somerset LCAs shown on **Figure 8.3** will not require further assessment and are scoped out of the assessment:

- A1: Kingston Seymour and Puxton Moore LCA – only a small proportion of the LCA is located within the study area and has no relationship to Bristol Airport.
- A3: Kenn and Tickenham Moors LCA – as above.
- B1: Land Yeo and Kenn River Floodplain LCA – low lying LCA outside preliminary ZTV with no relationship to Bristol Airport and proximity to Nailsea means it has low levels of tranquillity as shown on CPRE Tranquillity mapping<sup>118</sup>.
- E5: Tickenham Ridge LCA - only a small proportion of the LCA is located within the study area, and it is well outside the preliminary ZTV and has no relationship to Bristol Airport.

- G2: Failand Settled Limestone Plateau LCA – Minute fragment of LCA located in edge of study area.
- J2: River Yeo Rolling Valley Farmland LCA – Although this large LCA covers a considerable part of the south-western study area, its low elevation ensures that it is mostly outside the preliminary ZTV. Relatively low levels of tranquillity due to presence of large settlements such as Congresbury, Langford and Wrington plus a long section of the A38 reduce the LCA's susceptibility and hence low landscape sensitivity to potential impacts from the Proposed Development. Two other LCAs separate it from Bristol Airport and one LCA separates it from the Mendip Hills AONB.
- J4: Colliters Brook Rolling Farmland LCA – outside of the preliminary ZTV with a minimum separation distance of over 2km from the north-eastern corner of Bristol Airport. Low susceptibility and hence low landscape sensitivity due to proximity to south-western edge of Bristol and presence of sections of A38 and A362.
- J5: Land Yeo and Kenn River Rolling Valley Farmland LCA – although it is a relatively extensive LCA in the north-west of the study area, it is low lying at the base of the Cleve Ridge and consequently is outside the preliminary ZTV and has no relationship with Bristol Airport. Proximity to Nailsea and presence of the A362 reduce tranquillity and are indicative of low landscape sensitivity.
- K1: Nailsea Farmed Coal Measures LCA – low elevation ensures it is outside the preliminary ZTV and proximity to Nailsea results in low tranquillity and is indicative of low landscape sensitivity.

8.6.10

Landscape effects – landscape character areas. The following Bath and North East Somerset LCAs shown on **Figure 8.3** will not require further assessment and are scoped out of the assessment:

- 3. Upper Chew and Yeo Valleys LCA – low elevation ensures that this LCA is mostly outside preliminary ZTV, no linkages with Bristol Airport identified and review of key characteristics does not identify any that would be particularly susceptible to the Proposed Development.
- 5. Dundry Plateau LCA – only a small proportion of this LCA falls within the study area and this is mostly outside the preliminary ZTV.
- 6. Hinton Blewitt and Newton St. Loe Plateau Lands LCA – only a small proportion of this LCA falls within the study area and this is outside the preliminary ZTV.

8.6.11

Landscape effects – landscape character areas. The following Mendip Hills AONB character areas shown on **Figure 8.3** will require not further assessment and are scoped out of the assessment:

- The Chew Lowlands Character Area – low elevation ensures that this Character Area is mostly outside the preliminary ZTV.
- The Harptree – Chewton Edge Character Area – only the north-western corner of this Character Area is located within the study area.
- The Lox Yeo Valley and Winscombe Vale Character Area – low elevation and south-facing aspect result in this Character Area being almost completely outside the preliminary ZTV. The presence of Winscombe and the A38 reduce local levels of tranquillity.
- The South Western Slopes Character Area – only a small proportion of the north-eastern part of this Character Area is within the study area and its aspect ensures that it is outside the preliminary ZTV.

- Crook Peak to Callow Hill Character Area - only a small proportion of the northern part of this Character Area is within the study area and its aspect ensures that only fragments of the preliminary ZTV extend into this northern part.
- Banwell Head to Towerhead Character Area - only a small proportion of the eastern part of this Character Area is within the study area and hence only a small proportion is located within the preliminary ZTV.

### Potential significant visual effects requiring further assessment

- 8.6.12 The potential effects of the Proposed Development likely to be significant with regards to views available to visual receptors and their visual amenity, and which will be subject to further assessment (to be presented within the ES), are summarised in the following sections. The selection of visual receptors has been guided by the preliminary ZTV, a review of the visual receptors included in the 2009 LVIA<sup>120</sup> and the distribution of significant visual effects:
- 8.6.13 Residential and recreational visual receptors in communities within, or in proximity to, the preliminary ZTV:
- Lulsgate Bottom;
  - Hyatt Wood Road/Oatfield;
  - Downside;
  - Potters Hill;
  - Felton;
  - Felton Hill;
  - Redhill; and
  - Blagdon.
- 8.6.14 Residential visual receptors in individual or small groups of residential properties outside communities within, or in proximity to, the preliminary ZTV:
- Edson's Farm;
  - Oatfield Farm;
  - Downside House Farm;
  - Properties on Long Lane;
  - Properties around Hunter's Hall;
  - Properties around Butcombe Court;
  - Properties around Hailstones Farm and the A38;
  - Properties around Winters Lane; and
  - Properties along Cook's Bridle Path.
- 8.6.15 Recreational visual receptors using long distance trails within the study area that have a section(s) that are within the preliminary ZTV:
- Monarch's Way;

- Limestone Link;
- West Mendip Way; and
- Community Forest Path (at Dundry Hill).

8.6.16 Recreational visual receptors using Sustrans National Cycle Routes within the study area that have a section(s) that are within the preliminary ZTV:

- Regional Route 10;
- National Route 334; and
- National Route 3.

8.6.17 The long distance trails and Sustrans National Cycle Routes are shown in **Figure 8.2**.

8.6.18 Recreational visual receptors using Open Access Areas shown in **Figure 8.2**:

- Felton Common;
- Black Down (Mendip Hills AONB);
- Burrington Ham (Mendip Hills AONB); and
- Dolebury Warren (Mendip Hills AONB).

8.6.19 Recreational visual receptors using PRowWs within 1.5km of Bristol Airport boundary. This offset was used in the 2009 LVIA with the individual PRowWs combined to form 11 PRowW networks. A similar network grouping will be considered in the visual assessment.

8.6.20 Recreational visual receptors using outdoor recreational facilities outside of communities within 1.5km of Bristol Airport boundary:

- Tall Pines Golf Club.

8.6.21 Vehicular visual receptors (drivers and their passengers) using the local road network:

- A38 southbound;
- A38 northbound; and
- Downside Road.

8.6.22 The visual assessment will be supported by baseline daytime photography from viewpoints presented in accordance with Landscape Institute guidance<sup>110</sup>. Consultee discussions are invited as to whether night time photography will be required from any of these viewpoints and whether the LVIA needs to include visualisations from any of these viewpoints. Visualisation should accord with Landscape Institute guidance on the visual representation of developments<sup>112</sup>.

8.6.23 The provisional viewpoint selection is based on a review of the viewpoints used in the 2009 LVIA and the visit to Bristol Airport undertaken in June 2017. The selection is set out in **Table 8.2** and illustrated in **Figure 8.4**.

Table 8.2 Provisional Viewpoint Selection for Visual Assessment

Viewpoint reference	Location	Reason for selection	GLVIA3 <sup>109</sup> viewpoint typology
1	Field gate south side of Downside Road near Lime Kiln Cottage, Downside	Representative of close distance views available to residential visual receptors in Downside and vehicular receptors travelling on Downside Road	Representative
2	PRoW to immediate east of Oatfield	Representative of close distance views available to residential receptors in Oatfield and recreational visual receptors using this PRoW network	Representative
3	PRoW between Oatfield Farm and Yewtree Farm	Close distance, panoramic view from one of the most elevated, publicly accessible locations close to Bristol Airport	Specific
4	PRoW at western edge of Stanshall's Close, Felton	Representative of the close distance views available to some residential receptors on western side of Felton and recreational visual receptors using this PRoW network	Representative
5	South-western part of Felton Common Open Access Area	Representation of the most open close distance views available to recreational visual receptors visiting a popular recreational destination	Representative
6	Winters Lane south of Goblin Combe Farm	Illustrative of the way that plateau topography affects the availability of close distance southern views of components at Bristol Airport including the 'Cogloop' carpark	Illustrative
7	Picnic area on southern side of Blagdon in Mendip Hills AONB	Representative of relatively elevated, middle distance views available to residential and recreational visual receptors in one of the closest parts of the AONB	Representative
8	Summit of Beacon Batch in Mendip Hills AONB	Most elevated location in a portion of the AONB in the study area. Located in Open Access Area	Specific
9	Crossroads close to Wrangle in Mendip Hills AONB	Representative of long distance views available to recreational visual receptors in this part of the AONB	Representative
10	PRoW on Burlidge Common in Mendip Hills AONB	Illustrative of occasional, long distance views available to recreational visual receptors in this part of the AONB	Illustrative

### Potential visual effects not requiring further assessment and are scoped out of the assessment

- 8.6.24 Visual effects cannot be sustained by visual receptors with no potential views of any component of the Proposed Development i.e. those visual receptors located outside the preliminary ZTV. As noted in the previous sections, a precautionary approach has been applied to the selection of visual receptors for inclusion in the visual assessment. As a result communities that are close to the preliminary ZTV have been included as have long distance trails and Sustrans cycle routes where only a short section of their route is within the preliminary ZTV.
- 8.6.25 Communities, long distance trails, Sustrans cycle routes and Open Access Areas entirely outside the preliminary ZTV do not require any further assessment in the absence of a potential visual effects pathway. Likewise, recreational visual receptors including the three registered parks and gardens

that are open to the public which are located within the study area are excluded due to the parks and gardens being well outside the preliminary ZTV.

- 8.6.26 Residential visual receptors in limited numbers of residential properties outside the larger settlements or communities are located within the preliminary ZTV other than those listed in **Section 8.6.13** will not be included in the visual assessment. Their exclusion is because of their separation distance from the Proposed Development. A review of the 2009 LVIA and experience gained undertaking visual assessments for other airport and similar scale developments shows that significant visual effects will be highly unlikely to be sustained by residential visual receptors in properties located more than 1.5km from any of the components of the Proposed Development.
- 8.6.27 The same principles apply to the limited number of PRoWs that are routed through the parts of the ZTV located more than 1.5km from the boundary of Bristol Airport. Recreational visual receptors using these PRoWs will be excluded from the visual assessment.

## Proposed assessment methodology

### Overview

- 8.6.28 The methodology outlined in this section is based on the third edition of GLVIA3<sup>109</sup> which will be followed when completing the impact assessment presented in the ES. GLVIA3 states that the assessment of significance of landscape and visual effects is "*an evidence based process combined with professional judgement.*" All assessments and judgements must be transparent and capable of being understood by others.

### Temporal scope

- 8.6.29 The landscape and visual assessments will be undertaken for the first winter following the commencement of operations of all the principal components of the Proposed Development. Winter will allow the assessments to take account of any increase in visibility due to seasonal leaf loss. The assessment for landscape and visual receptors where the magnitude of change sustained could potentially be changed by the maturation of any proposed mitigation planting e.g. potentially around the perimeter of the extension to the 'Cogloop' carpark, will also include an assessment of effects at winter 15 years after the commencement of operation of the Proposed Development. This timescale allows such mitigation planting to become established and fully effective in landscape and visual terms.

### Landscape assessment

- 8.6.30 The sensitivity of a landscape receptor e.g. an LCA, to a proposed development is determined by the susceptibility of that landscape receptor to the changes identified as the result of the proposed development and the landscape receptor's value. The methodology describes landscape sensitivity as very high, high, medium, low or very low.
- 8.6.31 Landscape value is determined by taking into consideration a range of attributes including: the presence or absence of landscape designations; landscape and scenic qualities; rarity and representativeness; conservation interests; recreational value; perceptual qualities; and historic and cultural value. It is also concerned with landscape quality and the physical state of a landscape receptor. This could include consideration of the landscape receptor's intactness and the condition of individual landscape elements. The absence of landscape planning designations does not automatically mean that an area or landscape receptor is of low landscape value. These attributes are determined by review of extant landscape character assessments, management guidelines and other similar documentation supplemented by observations made during visits to Bristol Airport.



- 8.6.32 Landscape susceptibility concerns the ability of a landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline situation. The landscape assessment will include analysis for each landscape receptor of the factors that have been assessed in the determination of its landscape value and the assessment of its susceptibility to the Proposed Development at Bristol Airport. These will be set out in a proforma completed for each landscape receptor that will show how the assessment of the landscape value and landscape susceptibility have been combined to determine that landscape receptor's sensitivity.
- 8.6.33 The magnitude of landscape change resulting from the operation of the Proposed Development at Bristol Airport will be assessed as high, medium, low or negligible. In accordance with GLVIA3 the magnitude of landscape change will consider: the size and/or scale of the change that would result from each identified landscape effect acting upon a landscape receptor; the geographical extent over each identified landscape effect would be experienced; and the duration and reversibility of each identified landscape effect.

### Visual assessment

- 8.6.34 The sensitivity of visual receptors will consider the susceptibility of the visual receptor to the visual change identified and the value that is likely to be attributed by the visual receptor to their baseline view. These are described as high, medium or low. The main influencing factors are:
- the occupation or activity of the visual receptor at a particular location;
  - the extent to which their attention or interest is focused upon the available views;
  - the importance and/or popularity of the view;
  - the typical numbers of receptors to whom that view is available;
  - in a link with landscape considerations, the context of a viewpoint in terms of landscape value and quality within a view; and
  - any indication of a view being valued such as the presence of interpretation boards, parking and seating facilities, it being referenced in a guidebook or marked on a published map.
- 8.6.35 The nature of visual effects or their magnitude of change resulting from the operation of the Proposed Development at Bristol Airport will be assessed as high, medium, low or negligible. The magnitude of visual change will be described by reference to the scale of visual change; the contrast with the baseline view; separation distance; the duration over which a view is available; the angle of view; levels of screening; and whether new visual elements are seen on a skyline or against a background.

### Evaluating and explaining the significance of landscape and visual effects

- 8.6.36 The level of landscape and visual effects will be determined with reference to landscape or visual sensitivity and the magnitude of landscape or visual change likely to be experienced. For each receptor the evaluation process will be informed by use of a matrix.
- 8.6.37 Likely significant landscape and visual effects arising from the operation of the Proposed Development at Bristol Airport would be effects that are assessed as being likely or certain to result in effects that would be 'major'. Effects assessed as being 'moderate' would have the potential to be significant and whether they are assessed as significant or not significant will be justified in the detailed assessment for the relevant landscape or visual receptor. In line with the emphasis placed in GLVIA3 upon application of professional judgement, the adoption of an overly mechanistic approach through reliance upon a matrix will be avoided. This will be achieved by the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for

each landscape and visual receptor over and above the outline assessment provided by use of the matrix. Wherever possible cross references will be made to figures to support and explain the rationale.

## 9. Biodiversity

### 9.1 Introduction

- 9.1.1 This chapter identifies the potential likely significant effects of the Proposed Development on biodiversity that will be considered within (scoped in) the Environmental Impact Assessment (EIA) and outlines the proposed scope and methodology of the assessment in relation to these effects. It also identifies those effects scoped out of further consideration within the EIA.
- 9.1.2 Please refer to **Chapter 2** of this scoping document for a full description of the Proposed Development.
- 9.1.3 This scoping assessment considers the likely significant effects of the Proposed Development (both construction and operation) on protected habitats and species (legally protected and notable). Potential impacts on biodiversity both within and outside of the bounds of Bristol Airport land will be examined and will include: habitat loss (temporary and permanent), habitat change and degradation, and displacement / disturbance of fauna.
- 9.1.4 Potential impacts may be associated with: the construction of infrastructure, buildings, taxiways, etc., operation of aircraft on the ground and on landing / take-off and road traffic (during operational and construction phases).
- 9.1.5 This scoping chapter has been written with the joint purpose of scoping the approach to the EIA assessment and also the Habitat Regulations Assessment (HRA).

### 9.2 Relevant legislation, policy and guidance

#### Legislation

- 9.2.1 The legislation relevant to biodiversity and the assessment that will be presented within the Environmental Statement (ES) includes:
- Conservation of Habitats and Species Regulations 2017<sup>121</sup> - 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 (1981) (as amended)<sup>122</sup>: 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<sup>123</sup>: Protection from killing, injury or disturbance; protection of setts from damage or destruction;

<sup>121</sup> UK Government, 2017. Conservation of Habitats and Species Regulations 2017. Available online: <https://www.legislation.gov.uk/uksi/2017/1012/contents/made> [Checked 01/06/18]

<sup>122</sup> UK Government, 1981 (as amended). The Wildlife and Countryside Act 1981. <https://www.legislation.gov.uk/ukpga/1981/69> [Checked 20/03/2018]

<sup>123</sup> UK Government, 1992. The Protection of Badgers Act 1992. Available online: <https://www.legislation.gov.uk/ukpga/1992/51/contents> [Checked 21/03/2018]

- The Natural Environment and Rural Communities Act (NERC) (2006)<sup>124</sup>: Section 41 lists flora, fauna and habitats of principal importance. Section 40 - public bodies and local planning authorities, to have regard to the conservation of biodiversity in England, when carrying out their normal functions; and
- The Hedgerow Regulations (1997)<sup>125</sup>: Protects important countryside hedgerows from removal.

## Policy

9.2.2 There are a number of policies and guidance at the national and local level that will be relevant to the Bristol Airport Limited (BAL) ES. These are listed in **Table 9.1**.

**Table 9.1 Relevant policies and their implications for biodiversity**

Policy reference	Implications
<b>The National Planning Policy Framework (NPPF)<sup>126</sup></b>	
Paragraph 109	Requires that planning decisions should minimise the impacts on biodiversity and provide net gains for biodiversity wherever possible. Opportunities to incorporate biodiversity in and around developments should be sought.
Paragraph 113	Paragraph indicates the planning system should provide protection for designated nature conservation sites commensurate with their status and give appropriate weight to their importance and the contribution that they make to wider ecological networks.
Paragraph 117	States the planning system should promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations linked to national and local targets. Furthermore, the NPPF emphasises the requirement for ecological networks to be created throughout the wider landscape. Development proposals can contribute to this broader aim through sympathetic site design and landscaping.
Paragraph 118	Identifies that when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity, and, where significant harm resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.
<b>National Planning Practice Guidance<sup>127</sup></b>	
Natural Environment	Sets out guidance regarding the protection and conservation of the natural environment.
<b>North Somerset Council Core Strategy January 2017<sup>128</sup></b>	
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; 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;

<sup>124</sup> UK Government, 2005. The Natural Environment and Rural Communities Act (2006). Available online: <https://www.legislation.gov.uk/ukpga/2006/16/contents> [Checked 21/03/2018]

<sup>125</sup> UK Government, 1997. The Hedgerow Regulations 1997. Statutory Instrument 1997 No. 1160. Available online: <http://www.legislation.gov.uk/uksi/1997/1160/contents/made> [Checked 21/03/2018]

<sup>126</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. [Online] Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Checked 12/03/2018].

<sup>127</sup> Ministry of Housing, Communities and Local Government (2016). National Planning Policy Guidance. [Online] Available at: <https://www.gov.uk/government/collections/planning-practice-guidance> [Checked 19/03/18]

<sup>128</sup> 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 16/04/18]

Policy reference	Implications
	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.”
<b>North Somerset Council Development Management Policies: Sites and Policies Plan Part 1 July 2016<sup>129</sup></b>	
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.
<b>North Somerset Council Supplementary Planning Documents</b>	
Mendip Bats Special Area of conservation (SAC) Guidance on Development January 2018 <sup>130</sup>	Bristol Airport lies within 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/compensation therefore apply where there is potential for these species to be adversely impacted by development.
Biodiversity and Trees SPD 2005 <sup>131</sup>	The plans seek to ensure that development does not cause a net loss in the biodiversity resource of North Somerset.
<b>Emerging West of England Joint Spatial Plan<sup>132</sup></b>	
Policy 5 - Place Shaping Principles	Requires protection and enhancement of the natural environment.

## Guidance

- 9.2.1 The UK Government publishes standing advice for local planning authorities concerning protected sites and species<sup>133</sup>. This covers survey requirements and guidance on appropriate mitigation.
- 9.2.2 The British Standards Institution have published a British Standard relating to biodiversity<sup>134</sup> providing guidance for planning applications as well as recommendations on professional ethics, decision making, etc.

## 9.3 Main sources of data used

- 9.3.1 The EIA scoping exercise has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the sources of data outlined here. Historical data on ecological

<sup>129</sup> 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]

<sup>130</sup> 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]

<sup>131</sup> North Somerset Council. December 2005. Biodiversity and Trees. Supplementary planning document for developments within North Somerset. (Online) Available at: <http://www.n-somerset.gov.uk/wp-content/uploads/2015/11/biodiversity-and-trees-supplementary-planning-document.pdf> [Checked 23/05/18]

<sup>132</sup> 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 17 05 18]

<sup>133</sup> UK Government, 2015. UK Government: Planning and Development: Protected Sites and Species. Available online: <https://www.gov.uk/topic/planning-development/protected-sites-species> [Checked 21/03/2018]

<sup>134</sup> British Standards Institution, 2013. BS 42020:2013. Biodiversity. Code of Practice for Planning and Development. BSI Standards Ltd

survey work for Bristol Airport is available, which have been used to inform the scoping assessment, including:

- MAGIC<sup>135</sup> and Natural England<sup>136</sup> - designations, habitat and site records / details (5km from BAL boundary);
- Bristol Regional Environmental Records Centre (BRERC) (October 2017) - Non-statutory designated sites, Habitats of Principal Importance and records of notable and protected species (standard 2km from BAL boundary; 5km bat for bats); and
- Ecological Volume of the Environmental Statement submitted to NSC under application 09/P/1020/OT2 - Ecological baseline.

9.3.2 Since 2008, ecological surveys and investigations have been undertaken to support the ongoing delivery of planning applications and the operation of Bristol Airport. The ecological baseline will reflect the updated information.

9.3.3 In spring 2018 updates to Extended Phase 1 Habitat surveys, bat roost inspections and habitat assessments of ponds were undertaken.

## 9.4 Engagement with consultees

9.4.1 Key consultees have been identified and consultation will be undertaken during the formulation of the assessment. Consultees are:

- Natural England (NE);
- North Somerset Council;
- Avon Wildlife Trust (AWT);
- Environment Agency (EA);
- Avon Bat Group (ABG)
- Royal Society for the Protection of Birds (RSPB); and
- Local Authority Ecologist(s).

9.4.2 To date, NE and NSC have been engaged in respect of biodiversity interest.

9.4.1 Formal agreement with NE and NSC will be sought iteratively on the scope of all baseline surveys and the assessment methodology. For the HRA this will be achieved through the production of an Evidence Plan (in discussion with NE and NSC), supported by evidence gathered from desk studies and field surveys (if necessary).

<sup>135</sup> Natural England, 2018. Multi Agency Geographic Information for the Countryside (MAGIC). Available online <http://www.magic.gov.uk/MagicMap.aspx> [Checked 18/04/2018].

<sup>136</sup> Natural England, 2018. Designated Sites View. Available online <https://designatedsites.naturalengland.org.uk/SiteSearch.aspx> [Checked 18/04/2018].

## 9.5 Overview of baseline conditions

### Zones of influence (ZOI)

- 9.5.1 The ecological ZOI is the area affected by land-take and direct land-cover changes associated with the Proposed Development. This zone is the same for all affected ecological features. Environmental changes can extend beyond this area (e.g. changes in aircraft noise associated with increased aircraft movement), therefore the ZOI may vary between ecological features, dependent upon their sensitivity and nature of the change.
- 9.5.2 In view of these complexities, the definition of the ZOI that extends 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 (e.g. air quality and noise). Environmental changes within their assessments will be combined aligned with ecological information about feature sensitivity to define the extent of each ecological zone of influence.

### Current baseline

#### Bristol Airport site ecological context

- 9.5.3 Bristol Airport 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 the airport these valleys run east to west and support a high concentration of designated sites of nature conservation value. A large woodland complex is located west of the airport 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 in the wider area.

#### Designated Sites of Nature Conservation Interest

- 9.5.4 Designated sites of nature conservation interest located within 5km of Bristol Airport (as measured from the Bristol Airport Limited (BAL) land ownership boundary) are shown on **Figure 9.1** and described within **Table 9.2**.
- 9.5.5 Nine SSSIs are located within 5km of Bristol Airport. Two of these sites, Kings Wood and Urchin Wood SSSI and Brockley Hall Stables SSSI are a component of the North Somerset and Mendip Bats SAC (referred to here as the SAC) due to the populations of greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*) that they support.
- 9.5.6 Bristol Airport is located within the ZOI of the North Somerset and Mendip Bats SAC as defined by the NSC SPD<sup>130</sup>. Although Bristol Airport is located 2km away from the SAC, the landscapes around the SAC provide important foraging habitat needed to maintain the favourable conservation status of bat species identified as features of interest of the SAC. The NSC SPD therefore maps key landscape zones around the SAC that are likely to be important to support the SAC populations. Bristol Airport falls within Bat Consultation Zone B and suitable habitat within the airport land is likely to support horseshoe bat populations associated with the SAC.
- 9.5.7 In addition, three Local Nature Reserves (LNR) are located within 5km of Bristol Airport.



Table 9.2 Statutory designated sites of nature conservation importance

Site name	Reason for designation	Approx. distance and direction from Bristol Airport
Felton Common LNR	The site comprises an open expanse of common land, the last significant remaining area of the once extensive Broadfield Down. The site supports a mosaic of habitats, ranging from acidic and calcareous grassland to scrub, including limestone heath, which supports a variety of plants, invertebrates and birds.	0km east
Lulsgate Quarry SSSI	Designated for geological features	440m east
Goblin Combe SSSI	The Combe supports semi-natural ancient woodland and areas of unimproved calcareous grassland and limestone heath. These woodland and grassland types now have a limited distribution in Great Britain. Nationally scarce botanical species present on site.	940m west
Hartcliff Rocks Quarry SSSI	Designated for geological features	1.7km east
North Somerset and Mendip Bats SAC	Presence of lesser and greater horseshoe bat species	2km west
King's Wood and Urchin Wood SSSI	One of the largest areas of ancient woodland remaining in Avon, characteristic of ash/field maple/dog's mercury woodland type. The presence of boundary banks and large pollarded small-leaved lime <i>Tilia cordata</i> on the periphery of the wood suggests that some of the boundaries have remained unchanged for centuries. Nationally rare plants, mammal species (greater horseshoe and dormouse), beetles and ants present on site.	2km west
Brockley Hall Stables SSSI	The roof void is used as a summer breeding roost by a substantial colony of greater horseshoe bats.	3.4km north west
Blagdon Lake SSSI	A large freshwater reservoir with peripheral areas of reedbed, carr, woodland and natural grassland. Diverse invertebrate flora, fish, waterfowl and botanical species present.	3.6km south
Plaster's Green Meadows SSSI	Unimproved and traditionally managed species-rich neutral grassland meadows, bounded by hedges. Nationally botanical species present on site.	3.9km south east
Barns Batch Spinney SSSI	Designated for geological features.	4.4km east
Bucklands Pool/Backwell Lake LNR	Manmade lake constructed in the mid 1970s, has become an important site for wildfowl and dragonflies. It is a foraging area for bats.	4.5km north west
Cadbury Hill LNR	An Iron Age hillfort, designated as a Scheduled Ancient Monument. The plateau comprises unimproved calcicole grassland on Carboniferous Limestone, which is home to various species of butterflies and invertebrates. Bats and owls forage across the site at dusk. Six hectares of woodland surround the hillfort, dominated by ash and field maple, with some elements of ancient woodland and veteran oak pollards on the upper slopes. The site also includes mesotrophic grassland on the lower slopes, including an orchid slope.	4.3km west
<b>Bourne SSSI</b>	Designated for geological features.	4.7km south

9.5.8 There are 24 non-statutory designated nature conservation sites within 2km of Bristol Airport, which are Sites of Nature Conservation Interest (SNCIs) or Wildlife Sites (WS). Further information on these sites is provided in **Table 9.3** and their locations shown on **Figure 9.2**.

Table 9.3 Non-statutorily designated sites within 2km of Bristol Airport

Site name	Reason for designation	Approx. distance and direction from Bristol Airport
<b>Felton Hill and Common (also a LNR)</b>	Semi-improved and unimproved acidic grassland, with unimproved calcareous grassland and scrub.	0km
<b>Brockley Combe, Cleeve Hill and Goblin Combe</b>	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.	400m west
<b>High Wood, Lulsgate</b>	Ancient semi-natural broadleaved woodland, part of which may be Priority Habitat Lowland Mixed Deciduous Woodland.	420m south
<b>Garley's Wood</b>	Ancient semi-natural broadleaved woodland with smaller areas of semi-improved neutral and improved grassland. Diverse ancient woodland ground flora.	580m north east
<b>Oatfield Wood</b>	Ancient semi-natural broadleaved woodland and semi-improved neutral grasslands. Diverse ancient woodland ground flora.	600m north
<b>Woodland south of Broadfield farm</b>	Semi-natural broad-leaved woodland, possible areas of Priority Habitat Lowland Mixed Deciduous Woodland, coniferous plantation, diverse limestone grassland. Includes part of Goblin Combe Regionally Important Geological Site (RIGS).	720m south
<b>Heall's Scars</b>	Semi-natural broadleaved woodland much of which qualifies as Priority Habitat Upland Mixed Ashwoods with semi-improved neutral grassland. Diverse ancient woodland ground flora.	780m north
<b>Oatfield Pool</b>	Semi-natural broadleaved woodland (carr) and swamp, with standing water and scrub.	950m north
<b>May's Grove Coppice and adjacent field</b>	Semi-natural broad-leaved woodland with diverse ground flora that may qualify as Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.	1km south
<b>Hyatt's Wood</b>	Ancient semi-natural broadleaved woodland, which may include some areas of Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.	1.1 km north
<b>Lye Wood</b>	Semi-natural broad-leaved woodland with diverse ground flora that may qualify as Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.	1.2 km south
<b>Scars Wood and adjacent field</b>	Ancient semi-natural broad-leaved woodland, on Ancient Woodland Inventory (AWI) and qualifying as Priority Habitat Lowland Mixed Deciduous Woodland, with unimproved, semi-improved neutral and limestone grassland.	1.5km south
<b>Prestow Wood and Shippehay's Wood</b>	Ancient semi-natural broad-leaved woodland, the majority of which is on the AWI, and may include areas of Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.	1.5km southwest

Site name	Reason for designation	Approx. distance and direction from Bristol Airport
<b>Ball Wood and Corporation Woods</b>	Ancient semi-natural broad-leaved woodland, with mixed woodland plantation. Contains Priority Habitat Upland Mixed Ashwoods. Diverse ancient woodland ground. Wide variety of invertebrates on site and lesser & greater horseshoe, Daubenton's, brown long-eared bat, and common dormouse associated with site.	1.6km west
<b>Littler Plantation</b>	Semi-natural mixed woodland which may qualify as Priority Habitat Lowland Mixed Deciduous Woodland. Diverse ancient woodland ground flora.	1.7km southwest
<b>Little Horts Wood and Horts Wood</b>	Semi-natural broad-leaved woodland with diverse ground flora that may qualify as Priority Habitat Lowland Mixed Deciduous Woodland.	1.7km south
<b>Tucker's Grove and Whitley Coppice</b>	Ancient semi-natural broad-leaved woodland, most of it on the AWI (some as Plantation on Ancient Woodland Sites (PAWS)) and including areas of Priority Habitat Lowland Mixed Deciduous Woodland. Ancient woodland ground flora.	1.7km southwest
<b>Steven's Farm Fields</b>	Neutral grassland. Species include salad burnet, black knapweed, common bird's-foot trefoil, devil's-bit scabious, betony, lesser quaking-grass.	1.7km northeast
<b>Barrow Rock Lane Fields</b>	Semi-improved neutral grassland. Species include salad burnet, cowslip and primrose.	1.7km northeast
<b>Goblin Combe Wildlife Reserve</b>	A combination of grassland and damp woodland containing a combe. Rare plants, a diverse array of butterflies and dormice are present.	1.7km west
<b>Batches Wood</b>	Ancient semi-natural and semi-natural broad-leaved woodland. Diverse ancient woodland ground flora.	1.8km northeast
<b>Bourton Combe</b>	Ancient semi-natural broadleaved woodland with mixed deciduous plantation and scrub. Diverse ancient woodland ground flora. Dark green fritillary.	1.9km north
<b>Cheston Combe and Backwell Hill</b>	Semi-natural broadleaved woodland with semi-improved neutral grassland.	2km northwest
<b>Cleeve Heronry Wildlife Reserve</b>	A small oak and ash dominated woodland, home to a large heronry.	2.3km northwest (centroid)

## Habitats

- 9.5.9 A total of 16 habitat types were recorded and updated during the spring 2018 Extended Phase I Habitat survey. **Figure 9.3** shows the current Phase I Habitat map and outlines the habitats recorded. Update surveys are to be undertaken during the optimal survey period and the map will be updated.
- 9.5.10 More detail on some of the semi-natural habitats has been provided in **paragraphs 9.5.11 to 9.5.24**. Bare ground shown on **Figure 9.3** is predominantly formed of gravel parking bays with tarmac roads throughout.

## Grassland

- 9.5.11 Grassland in the south of the BAL land holding comprises intensively cattle-grazed improved grassland, with a short sward. The sward is dominated by perennial ryegrass *Lolium perenne*. Forb

species such as white clover *Trifolium repens* and creeping buttercup *Ranunculus repens* are occasional in the community. Common nettle *Urtica dioica* is frequent in areas with intensive cattle presence.

- 9.5.12 The majority of the airside grassland comprises species-poor semi-improved grassland. The grassland community is dominated by grasses, including false oat-grass *Arrhenatherum elatius* and cock's-foot *Dactylis glomerata*. A small number of common forb species were recorded, but none more than occasional or of note e.g. dandelion *Taraxacum agg.* and common mouse-ear *Cerastium fontanum*.
- 9.5.13 Some of the large airfield grassland compartments support similar species but with frequent upright brome *Bromopsis erecta* and occasional greater knapweed *Centaurea scabiosa*, bulbous buttercup *Ranunculus bulbosus*, and wild carrot *Daucus carota*. These areas are species-poor semi-improved calcareous grassland. The boundaries between species-poor semi-improved neutral and calcareous grassland on **Figure 9.3** has not been marked due to regular vegetation management being a limiting factor of the survey. Transitions between neutral and calcareous vegetation types are likely within the airfield grassland.
- 9.5.14 Small areas of airside grassland support a more species-rich calcareous grassland which are dominated by upright brome (semi-improved grassland). Species indicative of less improved calcareous conditions in these areas include downy oat-grass *Avenula pubescens*, common spotted orchid *Dactylorhiza fuchsii* and cowslip *Primula veris*.
- 9.5.15 A small area of relatively species-rich limestone grassland has also colonised the A38 road cutting to the east of the operational area of Bristol Airport.

### Woodland, hedgerow and scrub

- 9.5.16 Young secondary broad-leaved woodland is located in the north east of Bristol Airport adjacent to Downside Road and the A38.
- 9.5.17 Many intensively managed, largely defunct hedgerows are located within or adjacent to Bristol Airport. They are subject to varying degrees of disturbance and lighting. Less intensively managed hedgerows that are more species rich are present, typically on the outer perimeter of the BAL landholding. Additional hedgerows are located within land situated to the north of Downside Road.
- 9.5.18 Belts of young broad-leaved plantation woodland within the BAL land holding have been planted as part of landscaping schemes, including the dense plantation along the northern boundary, linear belts along North Side Road and on earth bunds associated with the Silver Zone and seasonal long stay parking in the southwest of the airport.
- 9.5.19 Scattered and small patches of continuous scrub within the BAL land holding are usually associated with tree belts. Several stands of scrub are present in the large field south of the airport runway referred to as 'Cogloop 2' (extension to the Silver Zone car park) and comprise dense bramble with frequent to occasional blackthorn (*Prunus spinosa*) and hawthorn *Crataegus monogyna*.

### Ponds

- 9.5.20 One pond is present in the far south of the BAL landholding, known as Pond 6. Pond 6 comprises an artificial waterbody previously used for cattle drinking, surrounded by natural stone walls on three sides, with a sloping access way from the field to the north. It is surrounded by scrub, which casts dense shade on the majority of the open water.
- 9.5.21 A number of other water bodies are located within 500m of the airport and the development boundary. Great crested newt have been recorded as being present in a number of these, although the closest known location is some 320m to the west of the Bristol Airport boundary.

## Adjacent habitats

- 9.5.22 Agricultural land associated with the former Cornerpool Farm lies adjacent to the southern boundary of the Proposed Development and is partially within the BAL landholding. It includes a complex of small fields bounded by hedges and a small broadleaved copse that is approximately 0.5ha in extent. The copse consists of mature cherry (*Prunus avium*) ash, (*Fraxinus excelsior*) and the occasional oak (*Quercus robur*), with an understorey of occasional hawthorn. The woodland has been subject to ongoing enhancement as part of the planning conditions associated with the 10 mppa planning permission (09/P/1020/OT2). The woodland is small but supports mature trees and patches of ground flora indicative of ancient woodland.
- 9.5.23 The adjacent fields comprise improved grassland dominated by perennial rye-grass. In a single field a feature known as “gruffy land” was noted (small rock-strewn mining depressions on which patches of scrub have become established).
- 9.5.24 Immediately to the east of Bristol Airport is the open landscape of Felton Common LNR. Land immediately to the north includes a small linear settlement associated with Downside Road before rising and supporting grassland and woodland. Land immediately to the west is livestock grazed grassland with a large area of mature woodland.

## Badgers

- 9.5.25 Original badger surveys within the BAL land holding were completed in support of planning application 09/P/1020/OT2. Surveys have been ongoing for over a decade. Locations of badger setts comprises ecologically sensitive information and are therefore not shown on **Figure 9.3**.
- 9.5.26 An active artificial badger sett is located within the current southwestern landscape bund/boundary associated with the Silver Zone car parking area. A number of small active setts are associated with the wider hedge boundaries adjacent to, but outside of this part of the Silver Zone.
- 9.5.27 A second active main badger sett is within a landscape bund located to the south east of the Silver Zone car park. A limited number of smaller setts are also found in this location. An outlier sett is located within Cornerpool Wood.
- 9.5.28 Badger bait marking surveys have been conducted south of the airport security fence line. This exercise has confirmed the likely presence of two badger social groups in this location.
- 9.5.29 A third active main badger sett is located to the north west of the Motor Transport area on the northern boundary.

## Amphibians

- 9.5.30 Amphibian surveys undertaken in 2015 did not record any great crested newts associated with Pond 6. However, great crested newts were recorded in two ponds: Pond 1 and Pond 2 in Abspit Woods (385m west of Bristol Airport boundary). The population is considered to be ‘small’<sup>137</sup> for both ponds. This result is consistent with historic great crested newt surveys associated with Bristol Airport.
- 9.5.31 Other ponds are present within 500m to the south, west and north of Bristol Airport and further away in the wider landscape. Where these have been surveyed, no great crested newts have been recorded.

<sup>137</sup> English Nature (2001). The Great Crested Newt Mitigation Guidelines

- 9.5.32 Repeat habitat suitability assessment of all identified ponds within 1km of the BAL landholding was undertaken in spring 2018. It was confirmed that a number of ponds had been filled in and/or provided no potential to support great crested newts.

### Reptiles

- 9.5.33 Suitable habitat for reptiles within Bristol Airport is mostly limited to discrete areas of edge habitats alongside hedgerows, scrub and tree belts. Connectivity with other suitable habitat is present via the network of hedgerows and tree lines within the survey area.
- 9.5.34 Historical reptile surveys, including more recently in 2015, 2016 and 2017, have targeted habitats assessed as providing potential for reptiles. No evidence of reptiles was recorded from any survey undertaken at Bristol Airport. It is therefore considered that reptile species are absent from Bristol Airport.

### Dormouse

- 9.5.35 Dormouse nest tubes, feeding sign, nest searches and nuts searches have been undertaken within hedgerows and trees associated within and along the boundary of Bristol Airport, most recently in 2015 and 2016.
- 9.5.36 No evidence of dormouse has been recorded to date at Bristol Airport. However, some of the historic survey data is now considered out of date. In addition, some areas of woodland and mature hedgerow habitat, which has not been subject to previous survey but may provide good quality potential dormouse habitat, can be found adjacent to Downside Road. Therefore, the likely absence of dormouse within the Bristol Airport land holding cannot be confirmed at this stage.

### Bats

#### Roost inspection surveys

- 9.5.37 All buildings and trees within Bristol Airport having potential to support roosting bats are included in **Table 9.4**. No evidence of roosting bats has been recorded in association with any of these structures.

**Table 9.4** Buildings, structures or trees associated with the Proposed Development site at Bristol Airport with potential to support roosting bats

Ref (Fig 9.3)	Building / structure / tree	Description	Potential Roost Features	Bat Conservation Trust (BCT) Classification
B6	B143 Fuel Farm	Single storey office building with brick cavity walls, wooden barge boards and box soffits.	Raised wooden barge board, gaps at each corner of the enclosed wooden soffit box	Low
T4	Hedgerow tree on the southern boundary of Bristol Airport associated with 'Cogloop 2'	Large mature oak tree	Some small torn limbs and gaps at collars, one small knot hole present.	Medium

- 9.5.38 Ecological mitigation measures were required to deliver the construction phases of the previous development application (planning permission 09/P/1020/OT2) and subsequent operational

projects. This included artificial bat roost features including bat boxes, two wooden bat towers (AR1 and AR4), two wooden night feeding roosts (AR2 and AR3), a converted former latrine building (AR5) and a converted former air raid shelter (AR6).

- 9.5.39 These mitigation features have been monitored from 2015 to 2018. Lesser horseshoe bats have been recorded throughout this period using AR5 (former air raid shelter) for hibernation purposes and night roosting in AR6 (former latrine) in July 2017. Small numbers of *Pipistrelle* sp. droppings were recorded in 2017 within AR1.

#### *Bat surveys south of the airfield*

- 9.5.40 Bat activity surveys were completed in land south of the Airport boundary in summer 2005. A range of common species of bat were recorded. Greater horseshoe bats were detected south of Bristol Airport. Bats typically were recorded foraging adjacent to hedgerows or the area of woodland.
- 9.5.41 A maternity colony of noctule bat was confirmed within a cherry tree in Cornerpool Wood during 2005. Noctule bats were recorded foraging throughout the survey area to the south of the current southern airport boundary fence.
- 9.5.42 Bat transect and static detector surveys were undertaken most recently in 2017 to monitor the landscape bunds south of Silver Zone. Transect and static detector surveys were conducted in 2016 in the seasonal carpark area ('Cogloop') located in the southwest of Bristol Airport (planning application reference 16/P/1486/F).
- 9.5.43 Activity within Bristol Airport is dominated by common pipistrelle, followed by serotine *Eptesicus serotinus* and *Myotis* species. Other common species were recorded.
- 9.5.44 Occasional greater horseshoe passes were recorded along darker/shaded vegetation features associated with the external boundary of Silver Zone. Static detectors recorded regular low-level activity by greater horseshoe during all months of deployment. The 2015 static detector surveys recorded greater horseshoe as the first and last passes of the night in July, suggesting a roost for low numbers of bats could be located in close proximity.
- 9.5.45 Occasional lesser horseshoe passes were recorded, indicating regular low-level use of similar habitat features.
- 9.5.46 Overall, the boundary habitats to the east and south of 'Cogloop', Cornerpool field and Cornerpool Wood were identified as habitats that support consistent levels of bat activity.

#### *Bat surveys north of the terminal*

- 9.5.47 Historic records of bat activity at Bristol Airport north of the terminal building were completed in 2006 and 2009. Individual calls from small numbers of common species of bats were recorded within parts of the airport car park, notably along the darker Downside Road corridor.
- 9.5.48 The majority of the area north of the terminal building is unsuitable for bats due to disturbance from lighting, including the trees. The edge of the woodland block across the A38 is also lit by street lighting.
- 9.5.49 Opportunities for commuting and foraging bats are considered to be limited to the northern and north western boundary plantation woodland and hedgerows. The woodland in the north eastern corner of the Proposed Development adjacent to Downside Road and associated hedgerows are likely to provide darker areas with good potential foraging and commuting habitat for bats, including light-sensitive species.



## Other mammals

- 9.5.50 Other mammals are known to be present including brown hare (*Lepus europaeus*) (including within the airfield grassland and Silver Zone boundaries), deer species, rabbit (*Oryctolagus cuniculus*), voles (*Microtus sp.*), common shrew (*Sorex araneus*), European mole (*Talpa europaea*) and mice. European hedgehog (*Erinaceus europaeus*) are known to be present in the wider area, but have not been recorded at Bristol Airport, although suitable habitat exists.

## Breeding Birds

- 9.5.51 Formal breeding bird surveys were last completed in 2009. These are being updated in 2018.
- 9.5.52 At least twenty-five species of breeding birds have been recorded during previous surveys, including three red listed species of concern<sup>138</sup> in small numbers and two amber listed species. These were skylark *Alauda arvensis*, linnet *Carduelis cannabina*, song thrush *Turdus philomelos*, dunnoek *Prunella modularis*, and mistle thrush *Turdus viscivorus*. The Airside Safety Unit (ASU) has records of up to 25 breeding pairs of skylark.
- 9.5.53 Most species recorded were common woodland and farmland birds utilising the habitats south of the existing southern boundary of Bristol Airport. The improved grassland fields supported few breeding birds. Important areas for breeding birds were Cornerpool Wood, scrub in the adjacent field to the east and the hedgerows present throughout the survey area. These habitats are actively managed for nature conservation by BAL.
- 9.5.54 Swallows have consistently bred within the airfield.
- 9.5.55 The ASU has reported common species having bred in scrub and hedgerows surrounding the airfield. During typical winters up to 40 golden plover are regularly seen foraging on the airfield. These are actively discouraged from settling as they constitute part of the 'priority group' of birds which pose a high collision risk with aircraft.

## Factors influencing baseline conditions

- 9.5.56 In the 'do-nothing' scenario, no significant changes or trends are predicted to occur to the habitats and species populations associated with Bristol Airport. Management of habitats within the airport would continue as currently (in accordance with the Civil Aviation Authorities (CAA) CAP 772 Wildlife Hazard Management at Aerodromes<sup>139</sup> and maintaining an effective Bird Control Management Plan (BCMP)).

## Additional baseline information requirements

- 9.5.57 Surveys listed in this section will be undertaken to inform the baseline for the ecological chapter of the ES and HRA.

<sup>138</sup> The population status of birds regularly found in the UK, Channel Islands and the Isle of Man is reviewed every five years to provide an up-to-date assessment of conservation priorities. A total of 247 species have been assessed and placed onto one of three lists – red, amber or green. Forty species are red-listed, 121 are amber-listed and 86 are green-listed.

Seven quantitative criteria are used to assess the population status of each species and to place it on the red, amber or green list. These were global conservation status, recent decline, historical decline, European conservation status, rare breeders, localised species and international importance. (information from BTO website [www.bto.org.uk](http://www.bto.org.uk))

<sup>139</sup> Civil Aviation Authority, 2017. CAP 772: Wildlife hazard management at aerodromes. Civil Aviation Authority, Gatwick Airport. Available online: [http://publicapps.caa.co.uk/docs/33/CAP772\\_Issue2.pdf](http://publicapps.caa.co.uk/docs/33/CAP772_Issue2.pdf) [Checked 25/03/2018]

### Botanical survey

- 9.5.58 Further detailed botanical surveys will be undertaken across the BAL land holding during the optimal survey period as part of the EIA.
- 9.5.59 The extended Phase I survey will include the management and use of each habitat in accordance with NSC SPD<sup>130</sup>. Habitat Suitability Indices to be calculated will use Integrated Habitat System (IHS) for horseshoe bats in accordance with the NSC SPD<sup>130</sup>.
- 9.5.60 Repeat Phase 2 detailed botanical survey of grasslands where development is proposed will be undertaken using the National Vegetation Classification (NVC) survey technique.
- 9.5.61 Botanical condition assessment of key habitats within Kings Wood and Urchin Wood SSSI may be required to assess any current negative impacts of nutrient deposition. NE will be consulted on the need for and scope of the assessment.

### Bat survey

#### Potential roost surveys

- 9.5.62 Relevant structures will undergo emergence and re-entry surveys in accordance with the BCT Guidelines<sup>140</sup>, including:
- The fuel farm (low potential to support roosting bats); and
  - All trees within and in close proximity to the Proposed Development will be subject to ground-based assessment for their potential to support roosting bats. Medium to high potential trees will undergo climbing inspections.

#### Manual activity transect surveys

- 9.5.63 Manual transect surveys will be carried out on ten separate evenings. At least one survey will be undertaken in each month from April to October 2018. Transects will cover all habitats likely to be affected by the Proposed Development.
- 9.5.64 The location and effort for each transect will be planned in accordance with **Table 9.5**.
- 9.5.65 Surveys will be conducted under suitable weather conditions for bat activity (>10°C but <15°C in late summer, low air movement). Survey temperature and weather will be reported alongside the results. Surveys will start at sunset for at least three hours.
- 9.5.66 Transect surveys will be undertaken with the most sensitive equipment available. Details of recordings, detector details and maps of bat activity will be included within the report.
- 9.5.67 Surveys will be carried out by a sufficient number of suitably qualified and experienced persons.

<sup>140</sup> Bat Conservation Trust (2016) (3<sup>rd</sup> Edition). Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines.

Table 9.5 Zones to determine location of manual bat activity transects

Transect	Location	Notes
Zone A	Area to the north east of the current operational airport. Field boundaries including downside meadow, Downside Road woodland and associated boundary habitats	This area has not been subject to previous survey and, as such, the bat activity and species present is unknown. This is a priority area for survey. Transects will be designed to cover all areas and habitats evenly to allow analysis of relative species activity levels and to reduce surveyor bias towards areas of high suitability/activity and to ensure a level of survey effort is applied to the wider survey area with the range of the automated detectors.
Zone B	The area around the northern operational part of Bristol Airport. A particular focus on the northern boundary woodland, the entrance roundabout and the Cook's Farm boundary habitats.	This area has been surveyed previously and habitats are considered broadly of very low quality for foraging and commuting purposes with the exception of the areas previously identified.
Zone C	Central 'airside' area	Transect to cover perimeter and grassland habitats as far as safety and security protocols permit. The airside grassland has not been surveyed previously as the impact levels and consistency of management have not changed significantly in a number of years. This grassland still has some suitability for greater horseshoe bats and the value of this area requires further detailed investigation. The constraints on access may require a higher concentration of automated detector deployment.
Zone D	Area associated with 'Cogloop 2', the southern boundary and habitats immediately adjacent.	Greater and lesser horseshoe bat activity has been recorded in this zone previously both along field boundaries and within the grazed pasture. This is a priority area for further survey as the loss of this area is likely to require off site alternative habitat provision as prescribed by the North Somerset SPD <sup>130</sup> .

### Static detector surveys

- 9.5.68 The specification for static detector surveys will be in accordance with guidance set out in the NSC SPD<sup>130</sup> as follows:
- To detect commuting routes and foraging areas rather than roosts;
  - The intensive survey effort and broadband surveying technique have been adopted to ensure that greater and lesser horseshoe bat will be detected (if present);
  - Surveys will be undertaken with the most sensitive equipment available;
  - Surveys will pay particular attention to linear landscape features;
  - Automatic bat detector systems will be deployed at all appropriate locations (i.e. on a likely flyway) and in sufficient numbers for adequate survey. The period of deployment will be at least 50 days from April to October and will include at least one working week in each of the months of April, May, August, September and October (50 nights out of 214 ≈25%);
  - Numbers of automated detectors will vary depending upon linear landscape elements and habitat structure, type and quality accounting for horseshoe bat behaviour; and
  - The automated detectors' recordings will be analysed to determine the value of the BAL land holding for bats (including horseshoe bats).
- 9.5.69 The number and location of static bat detectors will be determined in accordance with **Table 9.6**. The following factors will determine number and location of static detectors:
- Hedges - height and width, presence of trees;
  - Grassland – comparison between grazed / ungrazed; and
  - Woodland – minimum three detectors: woodland edge, canopy and interior woodland with one at eye-level.

Table 9.6 Zones to determine number and location of static detectors

Zone	Locations	Notes
A	Area to the north east of the current operational airport. Field boundaries including downside meadow, Downside Road woodland and associated boundary habitats	The woodland will require additional static density to sample the woodland edge, interior at ground level and the canopy.
B	The area around the northern operational part of Bristol Airport. A particular focus on the northern boundary woodland, the entrance roundabout and the Cook's Farm boundary habitats.	Additional units deployed across Bristol Airport to ensure coverage of low suitability habitats to evidence this assessment.
C	Central 'airside' area	Deployment will focus on boundary habitats particularly along the western/southwestern boundary and the hedgerow along the northern boundary of the aircraft stands. An even deployment of detectors across the airside grassland will be required. An assessment as to the detection range of greater horseshoe bats in this context and the sensitivity of the units will be required to inform the final deployment spacing to ensure full coverage.
D	Area associated with 'Cogloop 2', the southern boundary and habitats immediately adjacent.	Deployment will be directed along all field boundaries, and within the grazed pasture.

### Lighting surveys

- 9.5.70 Surveys of existing light levels on the Proposed Development at Bristol Airport will follow NSC SPD<sup>130</sup> guidance. Full moon and dark of the moon periods will be covered for comparison of horseshoe bat activity on the Proposed Development at Bristol Airport. Light levels will be measured at 1m above ground level.
- 9.5.71 A lux contour plan of light levels down to 0.5 Lux, modelled at 1m above ground level, will be prepared.

### Other surveys

- 9.5.72 The following additional surveys are proposed to be undertaken:
- Updated badger survey targeted to the Proposed Development at Bristol Airport;
  - Breeding bird survey of woodland at the junction of Downside Road with the A38 including associated habitat, and 'Cogloop 2';
  - Amphibian survey of ponds within 500m of the Proposed Development. (Initial presence/absence survey; population class size assessment if presence is confirmed<sup>137</sup>);
  - Dormouse survey. Cover woodland and mature hedgerows around the junction of Downside Road with the A38; and suitable habitat surrounding 'Cogloop 2'. Surveys (including survey effort) will be undertaken in accordance with the Dormouse Conservation Handbook<sup>141</sup>; and
  - Incidental records of other mammals during all other surveys.

<sup>141</sup> English Nature, 2006. (2<sup>nd</sup> Edition). The Dormouse Conservation Handbook.

## 9.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

- 9.6.1 Development can affect flora and fauna directly (e.g. the land-take required) and indirectly, by affecting land beyond the boundaries of Bristol Airport (e.g. through noise generation). This will be considered when identifying receptors (habitats and species).
- 9.6.2 Identification of Important Ecological Features is a key first step in predicting the level and severity of ecological impacts arising from the development proposals. Ecological features and their 'importance' are assessed using professional judgement and the following scale:
- International and European;
  - National;
  - Regional;
  - Metropolitan, County, vice-county or other local authority wide-area; and
  - Local (where various approaches can be used for defining local importance, such as assessment within a district or borough context or within a zone of influence).
- 9.6.3 The legislative and policy framework relating to biodiversity in England and North Somerset has identified a large number of habitats, sites and species that provide the key focus for biodiversity conservation. These features are listed in **Table 9.7**.

Table 9.7 Key sites, habitats and features for biodiversity conservation in the UK

International designated sites	Statutory sites designated or classified under international conventions or European legislation.
World Heritage Sites Biosphere Reserves Wetlands of International Importance (Ramsar sites) Special Areas of Conservation Special Protection Areas (Including candidate SACs and proposed SPAs, and Ramsar sites)	
Nationally designated sites	Statutory sites designated under national legislation
Sites of Special Scientific Interest National Nature Reserves Local Nature Reserves (UK)	
Locally designated sites	
Sites of Importance for Nature Conservation (SNCIs) County Wildlife Sites	
Country Biodiversity Lists	
Habitats and Species of Principal Importance for Biodiversity (Section 41 NERC species)	
Biodiversity Action Plan Lists	

International designated sites	Statutory sites designated or classified under international conventions or European legislation.
<b>UK BAP Priority Habitats and Species</b> <b>Local BAP Priority Habitats and Species</b>	
<b>Species</b>	
<b>Species of Conservation Concern, Red Data Book (RDB) Species</b> <b>Birds of Conservation Concern</b> <b>Nationally Rare and Nationally Scarce Species</b> <b>Legally-protected Species</b>	

## Impact characterisation

- 9.6.4 Characterisation of impacts takes into account the baseline conditions and likely change as a result of the construction and operation of the Proposed Development. The following parameters, defined by the Chartered Institute of Ecology and Environmental Management when undertaking Ecological Impact Assessment (and EIA) will be used in the assessment:
- Magnitude - the 'size' or 'amount' of an impact, determined on a quantitative basis where possible;
  - Extent – the area over which an impact is expected to occur;
  - Duration - The time for which the impact is expected to last prior to recovery or replacement of the resource or feature;
  - Reversibility – An irreversible (permanent) impact is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible (temporary) impact is one from which spontaneous recovery is possible or for which effective mitigation is both possible and an enforceable commitment has been made; and
  - Timing and frequency – some impacts will only occur if an activity takes place at a certain time of day/year (i.e. when a species is active).

## Potential significant effects requiring further assessment

- 9.6.5 Potential effects of the Proposed Development likely to be significant with regards to biodiversity, and which will be subject to further assessment (to be presented within the ES), are summarised in **Table 9.8**.

**Table 9.8** Important ecological features and potential ecological effects scoped in to the EIA

Ecological Feature	'Important'?	Relevant criteria used to judge importance? (see Table 9.7)	Potential Significant effects to be assessed
<b>North Somerset and Mendip Bats SAC, including local constituent SSSIs (Brockley Hall Stables and King's Wood and Urchin Wood SSSI)</b>	Yes - international	Habitats Regulations	The Proposed Development will involve direct loss of improved cattle-grazed pasture due to 'Cogloop 2' car park; and secondary woodland and mature hedgerows in the north eastern corner of the Proposed Development. These may comprise foraging habitat utilised by greater and lesser horseshoe bats associated with the SAC populations.

Ecological Feature	'Important'?	Relevant criteria used to judge importance? (see Table 9.7)	Potential Significant effects to be assessed
			<p>Increased lighting levels associated with new car parking and highways improvements may result in indirect impacts on foraging and commuting habitats. Horseshoe bats are known to be particularly light-sensitive and increased lighting of foraging and commuting habitat may make them unsuitable for these species, thus reducing the available foraging habitat for the bat populations associated with the SAC.</p> <p>Disturbance to roosting bats from an increase in air traffic movements.</p> <p>Potential for collision of horseshoe bats with aircraft/ ground transport.</p>
<b>Goblin Combe SSSI</b>	Yes - national	Wildlife and Countryside Act	Change to vegetation composition due to an increase in nitrogen deposition (arising from increased air traffic movements; and increased vehicular traffic during construction and operation).
<b>King's Wood and Urchin Wood SSSI</b>	Yes - national	Wildlife and Countryside Act	Change to vegetation composition due to an increase in nitrogen deposition (arising from increased air traffic movements; and increased vehicular traffic during construction and operation).
<b>Various non-statutory designated sites (Details to be confirmed once air quality modelling outputs completed and in consultation with NSC and NE)</b>	Yes - county	Policy CS4, NSC Core Strategy	Change to vegetation composition due to an increase in nitrogen deposition (arising from increased air traffic movements; and increased vehicular traffic during construction and operation).
<b>Hedgerows</b>	Yes - local	Hedgerow Regulations  NERC Act Section 41 Habitats of Principal Importance	Direct loss and/ or fragmentation of habitat
<b>Broad-leaved woodland</b>	Yes - local	NERC Act Section 41 Habitats of Principal Importance	Direct loss and/ or fragmentation of habitat
<b>Semi-improved calcareous grassland</b>	Yes - local	NERC Act Section 41 Habitats of Principal Importance	Direct loss and/ or fragmentation of habitat
<b>Bats – general NB populations of greater and lesser horseshoe covered under the North Somerset and Mendip Bats SAC</b>	Yes - county	Habitats Regulations  NERC Act Section 41 Species of Principal Importance	<p>Direct loss of bat roosts (if present in trees/ structures to be removed)</p> <p>Increased lighting levels associated with new car parking and highways improvements may result in indirect impacts on foraging and commuting habitats (disturbance, ultimately resulting in loss of habitat)</p>



Ecological Feature	'Important'?	Relevant criteria used to judge importance? (see Table 9.7)	Potential Significant effects to be assessed
			Potential for collision of bats with aircraft/ ground transport
<b>Great crested newt (if present)</b>	Yes - county	Habitats Regulations NERC Act Section 41 Species of Principal Importance	Overall impacts to local great crested newt population caused by:  Permanent land take causing death/injury/ disturbance/loss of terrestrial resting places.
<b>Dormouse (if present)</b>	Yes - county	Habitats Regulations NERC Act Section 41 Species of Principal Importance	Overall impacts to local dormouse population caused by loss of hedgerow/ woodland, resulting in: <ul style="list-style-type: none"><li>• Killing/ injury of dormouse individuals.</li><li>• Damage or disturbance to resting places, and/or loss/disturbance of foraging habitat.</li></ul> Increased lighting levels associated with new car parking and highways improvements, resulting in disturbance of dormouse
<b>Badger</b>	Yes - local	Protection of Badgers Act	Overall impacts to local badger population caused by landtake resulting in: • Loss of setts. • Killing/ injury of individuals. • Disturbance to badgers. • Loss of some foraging habitat, and/or access to some foraging habitat. • Potential for isolation of a main sett.
<b>Breeding birds</b>	Yes - local	Wildlife and Countryside Act	Permanent landtake resulting in loss of breeding habitat.  Damage or disturbance to nesting birds, nests, or their young by construction activities.  Increase in risk of mortality through bird strike.

## Potential effects not requiring further assessment

9.6.6 The following potential effects are unlikely to be significant and do not require further assessment.

- Lulsgate Quarry and Hartcliff Rocks Quarry SSSIs - Geological interest only, sufficiently distant, no potential source-receptor pathway is present that could result in any change to the geological SSSI interest;
- Air quality effects on certain other designated sites - depending on the outcomes of proposed air quality modelling and consultation. The assessments are detailed within **Chapter 7: Air quality**;
- Reptiles - likely absence from the Bristol Airport land holding (based on negative results from surveys carried out from 2007 through to 2017) and general unsuitability of habitats);
- Loss of other common and easily recreatable habitats, e.g. tall ruderal vegetation, scattered scrub and short perennial/ ephemeral vegetation - Only small areas of these habitat lost;

- Invertebrates – habitats associated with Bristol Airport’s current and proposed operational areas have a limited ability to support notable species assemblages; and
- Important ecological features associated with aquatic habitats (other than amphibians), and potential effects arising from construction or operational phase contamination have been scoped out from further assessment due to the adoption of tried and tested pollution prevention and control measures already in place at Bristol Airport (at all times). Surface water and groundwater assessments are detailed within **Chapter 10** and **Chapter 11** respectively.

### Proposed assessment methodology

- 9.6.7 Assessment of the effects of the Proposed Development on biodiversity will be undertaken with reference to CIEEM’s Guidelines for Ecological Impact Assessment in the United Kingdom<sup>142</sup>.
- 9.6.8 A significant effect on biodiversity is an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting such a project. Determining whether effects are ecologically significant or not is a function of two different considerations:
- The determination of important ecological features (these being habitats, species and ecosystems); and
  - Impact characterisation (the nature of the predicted change to the environment).
- 9.6.9 The assessment will focus upon impacts with potential to cause significant effects to ‘important’ ecological features, rather than all potential associated ecological effects. Features can continue to be ‘scoped out’ (with justification provided) of the assessment if no effect is likely or the effect is not considered ‘important’. Uncertain effects on features have been ‘scoped in’ for more detailed assessment, with further effects potentially added through the EIA process as appropriate.

### Impact characterisation

- 9.6.10 Characterisation of impacts takes into account the baseline conditions and likely change as a result of the construction and operation of the Proposed Development. The following parameters are considered in this assessment:
- Magnitude - the 'size' or 'amount' of an impact, determined on a quantitative basis where possible;
  - Extent – the area over which an impact is expected to occur;
  - Duration - The time for which the impact is expected to last prior to recovery or replacement of the resource or feature;
  - Reversibility – An irreversible (permanent) impact is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible (temporary) impact is one from which spontaneous recovery is possible or for which effective mitigation is both possible and an enforceable commitment has been made; and

142 CIEEM, 2016. Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, freshwater and marine. Available online: [http://www.cieem.net/data/files/Publications/EcIA\\_Guidelines\\_Terrestrial\\_Freshwater\\_and\\_Coastal\\_Jan\\_2016.pdf](http://www.cieem.net/data/files/Publications/EcIA_Guidelines_Terrestrial_Freshwater_and_Coastal_Jan_2016.pdf) [Checked 21/03/2028]

- Timing and frequency – some impacts will only occur if an activity takes place at a certain time of day/year (i.e. when a species is active).

### Approach to mitigation

- 9.6.11 Consideration and application of avoidance, mitigation and compensation to development proposals must be considered from the earliest possible stage; and will be an iterative process. Appropriate measures should be realistically achievable where a high likelihood of success is expected, based on good practice guidance and evidence. Measures will be proposed in consultation with NSC, Natural England and other stakeholders. Commitments would be secured through appropriate planning conditions and/or legal agreements.
- 9.6.12 A sequential process will be adopted:
- Avoidance. Avoidance of potentially adverse impacts is best achieved through consideration of potential impacts of a project from the earliest stages of scheme design and throughout its development;
  - Mitigation involves reduction or minimisation of adverse impacts. Measures incorporated into the scheme design are often described as 'embedded mitigation' or 'mitigation by design'. This can include the re-design of the layout of the scheme, or adjusting the location of certain activities; and
  - Where a predicted adverse impact cannot be acceptably mitigated, there may be opportunity for implementation of compensatory environmental measures. Compensation comprises measures taken to make up for loss of, or permanent damage to, ecological features, despite application of mitigation.
- 9.6.13 Where appropriate, biodiversity enhancements will be identified for incorporation into the planning application in accordance with planning policy.

### Identifying significance of residual ecological effects

- 9.6.14 A 'significant residual effect' (both positive and negative) within the EIA will be an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' after taking into account embedded ecological mitigation. Significant effects require assessment (including to appropriate geographical scale) to inform the decision maker of the environmental consequences of permitting a project.
- 9.6.15 In determining whether a residual ecological effect is 'significant' or not, the following will be considered:
- Designated sites – whether construction and / or operation is likely to undermine conservation objectives, affect the conservation status or condition?
  - Ecosystems – whether the project is likely to cause changes in structure and function?
  - Habitats – the effect on conservation status (including cumulative effects).
  - Species – the effect on conservation status (including cumulative effects).
- 9.6.16 The consequence for decision making in relation to the policy and legal framework will be presented.

## Cumulative Impact Assessment

- 9.6.17 Cumulative effects within the same zone of influence will be taken into account in the following way (using criteria set out by the CIEEM):
- Additive/incremental effects from multiple activities/projects that may give rise to a significant effect (additive or synergistic) due to their proximity in time and space; and
  - Associated/connected effects arising because of an enabling effect from one development on another development e.g. phased development occurring as part of separate planning applications.
- 9.6.18 Developments to include in the cumulative assessment will be assessed on national guidance and in agreement with NSC.

## 10. Surface Water and Flood Risk

### 10.1 Introduction

- 10.1.1 This chapter sets out the proposed approach to assessing the potential effects on the surface water environment and flood risk that would result from the Proposed Development.
- 10.1.2 For the purposes of the Environmental Statement (ES) the 'surface water environment' chapter will cover: surface water quantity, surface water quality and flood risk & drainage. Reference is also made to foul water, effluent treatment and water supply.
- 10.1.3 The key legislation, policy and guidance is set out with respect to the surface water environment and key consultees identified. The surface water environment is then described, based on a review of previous technical reports and the preliminary desk study. An initial view of potential (pre-mitigation) effects is then presented, and the proposed assessment methodology for the forthcoming ES is finally described.

### 10.2 Relevant legislation, policy and guidance

#### Legislation

- 10.2.1 The legislation relevant to the surface water environment and the assessment that will be presented within the ES includes:
- The European Union (EU) Water Framework Directive (WFD): focuses on delivering an integrated approach to the protection and sustainable use of the water environment on a river basin scale;
  - Environmental Permitting (England and Wales) Regulations 2010 (Statutory Instrument (SI) 2010 No. 676), as amended: of relevance to surface water and drainage design at the airport due to infiltration to ground. The regulations include requirements for the prevention of hazardous substances entering groundwater and the control of non-hazardous pollutants to avoid pollution of groundwater;
  - Water Resources Act 1991: states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The Act was revised by the Water Act (2003), which sets out regulatory controls for water abstraction, discharge to water bodies, water impoundment and protection of water resources;
  - The Land Drainage Act 1991 and 1994: places responsibility for maintaining flows in watercourses on landowners and gives Local Authorities powers to serve a notice on landowners to ensure works are carried out to maintain flow of watercourses; and
  - In December 2009, the Flood Risk Regulations were published, which transpose the EU Floods Directive into UK law. The Flood and Water Management Act, 2010: sets out the Government's proposals to improve flood risk management (building on the 2009 regulations), and also covers approaches to water quality and to ensure water supplies are more secure.

#### Policy

- 10.2.2 There are a number of policies and guidance at the national and local level that will be relevant to the Bristol Airport Limited (BAL) ES. These are listed in **Table 10.1**.

Table 10.1 Relevant policies and their implications for surface water and flood risk

Policy reference	Implications
<b>National Planning Policy Framework (NPPF)<sup>143</sup></b>	
Paragraph 143	Considers the need for local planning authorities to mitigate and adapt to climate change, taking full account of flood risk and water supply and demand considerations.
Paragraph 103	Requires development proposals to prevent unacceptable adverse impacts on the flow and quantity of surface and groundwater and migration of contamination from the site is specific to the consideration of flood risk in determining planning applications and requires that development proposals ensure that flood risk is not increased elsewhere. This includes requiring development proposals in areas at risk of flooding to be accompanied by a flood risk assessment. These requirements will help form a framework for assessing the potential impacts.
<b>The National Planning Practice Guidance<sup>144</sup></b>	
	sets out guidance regarding the need for and scope of assessments on the impact of developments on surface water quantity/quality and flood risk.
<b>North Somerset Council (NSC) Core Strategy January 2017<sup>145</sup></b>	
CS1 - addressing climate change and carbon reduction	indicates the need for developments to demonstrate water resource efficiency to reduce demand via efficient appliances/processes and the use of rainwater recycling.
CS2 - Delivering sustainable design and construction	requires the application of best practice to incorporate Sustainable Drainage Systems to manage runoff from new development. These should be integrated in designs and easily maintained.
CS3 - Environmental impacts and flood risk assessment	requires potential adverse effects to be mitigated by control measures and mitigations - these may require planning conditions/obligations. A range of guidance is given on flood risk, however this focuses on potential development in Flood Zones 2 and 3.
CS9 - Green infrastructure	supports the development of green corridors, which may include Sustainable Drainage Systems infrastructure. These policies will also help form a framework for assessing the potential impacts.
<b>North Somerset Strategic Flood Risk Assessment (SFRA)<sup>146</sup></b>	
	Provides a baseline understanding of flood risk across North Somerset, before focussing on the level of current and future flood risk to potential future residential development areas across North Somerset. Winford to the east is highlighted as a settlement at risk from fluvial flooding. The document provides limited information relevant to Bristol Airport. SFRA Figure 3.2 highlights several historic surface water flood events along the A38 at Lulsgate Bottom, and along Downside Road.
<b>The 2011 North Somerset Preliminary Flood Risk Assessment<sup>147</sup> (PFRA)</b>	
	Provides a baseline and 'with future climate change' understanding of flood risk from 'local' sources of flood risk (i.e. Ordinary Watercourses, surface water, groundwater) for which North Somerset Council is responsible for managing (as the Lead Local Flood Authority (LLFA)). The study assesses flood risk from these sources to all types of development across North Somerset. Winford is highlighted as a settlement at risk from surface water flooding. The document provides limited information relevant to the Bristol Airport site itself.

<sup>143</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. [Online]

Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Accessed 12 03 2018].

<sup>144</sup> Ministry of Housing, Communities and Local Government (2017). National Planning Policy Guidance. Available online:

<https://www.gov.uk/government/collections/planning-practice-guidance> [Accessed 19-03-18]

<sup>145</sup> 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> [Accessed 16 04 18]

<sup>146</sup> North Somerset Council (2008) Strategic Flood Risk Assessment. Available online: <https://www.n-somerset.gov.uk/my-services/planning-building-control/planningpolicy/supplementary-planning-advice/guidance/strategic-flood-risk-assessment/> (checked 19-03-18)

<sup>147</sup> North Somerset Council (2011) Preliminary Flood Risk Assessment. Available online: <https://www.n-somerset.gov.uk/wp-content/uploads/2017/04/North-Somerset-preliminary-flood-risk-assessment-report-2011.pdf> (checked 19-03-18)

Policy reference	Implications
The 2015 North Somerset Local Flood Risk Management Strategy <sup>148</sup> (LFRMS)	Builds on the PFRA to identify actions for key flooding hotspots where North Somerset Council as LLFA has responsibility. The study assesses flood risk management action required to alleviate flooding in the 15 settlements judged to be most at risk of flooding. Claverham, situated immediately west of Brockley Coombe is one of these, where flood risk is associated with surface water runoff from the hills east of Claverham, and groundwater emergence. The document does not cover the Bristol Airport site itself.

## Guidance

10.2.3 The assessment will also be guided by a number of technical guidance documents:

- CIRIA (2001) C532: Control of water pollution from construction sites;
- CIRIA (2006) C635: Designing for exceedance in urban drainage - good practice;
- CIRIA (2012) C692: Environmental good practice on site;
- CIRIA (2015) C753: The SuDS Manual;
- DEFRA (2015) Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems<sup>149</sup>;
- West of England Partnership (2015) West of England Sustainable Drainage Developer Guide<sup>150</sup>; and
- (WRc) (2012) Sewers for Adoption - A Design & Construction Guide for Developers: 7<sup>th</sup> Edition.

## 10.3 Main sources of data

10.3.1 The EIA scoping exercise presented in this Scoping Report, with respect to surface water, has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the sources of data set out in **Table 10.2**.

Table 10.2 Sources of Information

Topic	Aspect	Source of Information
Topography and Land-use	Ground elevation and gradient	Ordnance Survey 1:50,000, Landranger Sheet 182 Weston-super-Mare Ordnance Survey 1:50,000, Landranger Sheet 172 Bristol & Bath Ordnance Survey 1:25,000, Explorer Sheet 154 Bristol West & Portishead On-line maps and aerial photography, at: <a href="https://www.bing.com/maps">https://www.bing.com/maps</a>
	Land-use	
Hydrology	River network	Ordnance Survey 1:50,000, Landranger Sheet 182 Weston-super-Mare Ordnance Survey 1:50,000, Landranger Sheet 172 Bristol & Bath Ordnance Survey 1:25,000, Explorer Sheet 154 Bristol West & Portishead On-line maps and aerial photography, at: <a href="https://www.bing.com/maps">https://www.bing.com/maps</a> Department of Environment, Food and Rural Affairs MAGIC database, at:

<sup>148</sup> North Somerset Council (2011) Local Flood Risk Management Strategy. Available online: <https://www.n-somerset.gov.uk/wp-content/uploads/2015/11/local-flood-risk-management-strategy.pdf> (checked 19-03-18)

<sup>149</sup> Defra (2015) Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems. Available online: <https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards> (checked 19-03-18)

<sup>150</sup> West of England Partnership (2015) West of England Sustainable Drainage Developer Guide. Available online: <https://www.bristol.gov.uk/documents/20182/34524/West+of+England+sustainable+drainage+developer+guide+section+1/864fe0d2-45bf-4240-95e2-a9d1962a0df9> (checked 19-03-18)



Topic	Aspect	Source of Information
	Surface water quality (Water Framework Directive (WFD) information)	<a href="http://magic.defra.gov.uk/">http://magic.defra.gov.uk/</a> Environment Agency River Basin Management Plan (2016 cycle 2) information, via the <a href="http://environment.data.gov.uk/catchment-planning/">Environment Agency Catchment Data Explorer</a> , at: <a href="http://environment.data.gov.uk/catchment-planning/">http://environment.data.gov.uk/catchment-planning/</a>
	Surface water abstractions and discharges	Information has been obtained from the Envirocheck report. Licensed abstraction/discharge data request will also be sent to the Environment Agency and Private water supply data will be requested from North Somerset Council.
	Flood risk	Environment Agency Flood Map for Planning map, at: <a href="https://flood-map-for-planning.service.gov.uk/">https://flood-map-for-planning.service.gov.uk/</a> Environment Agency Flood Risk from Surface Water map, at: <a href="https://flood-warning-information.service.gov.uk/long-term-flood-risk/">https://flood-warning-information.service.gov.uk/long-term-flood-risk/</a>
	Conservation sites	Department of Environment, Food and Rural Affairs MAGIC database, at: <a href="http://magic.defra.gov.uk/">http://magic.defra.gov.uk/</a>
Geology	Solid and drift geology	British Geological Survey 1:50,000 Series Geology maps, Sheet 264, Bristol, Solid and Drift Edition (2004) British Geological Survey Geology of Britain Viewer, at: <a href="http://mapapps.bgs.ac.uk/geologyofbritain/home.html">http://mapapps.bgs.ac.uk/geologyofbritain/home.html</a>
Hydrogeology	Aquifer type	EA Groundwater Source Protection Zone and BGS Aquifer designation maps, at: <a href="http://maps.environment-agency.gov.uk/wiyby">http://maps.environment-agency.gov.uk/wiyby</a>

Websites accessed by Wood in the week of 19<sup>th</sup> March 2018.

## 10.4 Engagement with consultees

- 10.4.1 Consultation will be undertaken with the stakeholders identified below to inform the assessment and the identification of mitigation measures as appropriate. Consultation will be undertaken with the following stakeholders throughout the EIA process:
- NSC as Lead Local Flood Authority (LLFA) and highways authority to understand their requirements for the management of drainage and potential flood risk effects. The A38 at Lulsgate Bottom/West Lane 0.2km northeast of the airport has suffered historical flooding;
  - Environment Agency (EA) - requirements for flood risk management (given the strategic scale of the Proposed Development), and to request water quantity and quality monitoring data for nearby watercourses; and
  - Wessex Water (WW) – in order to obtain details on the capacity of the local foul water network, and associated Sewage Treatment Works. The system discharges treated effluent to the River Chew, consultation is required to confirm the ability of these systems to operate within Wessex Water's existing agreed environmental permits is not compromised by the Proposed Development.
- 10.4.2 The resulting requirements and data will inform the ES, along with a walkover survey which will be undertaken to establish the existing points of connection (if any) between the Bristol Airport site and the wider surface water environment.
- 10.4.3 The water supply company (Water2Business, Bristol Water/Wessex Water's joint company for business water supplies) will be contacted as part of the design process to ensure that capacity exists for the development's needs.

## 10.5 Overview of baseline conditions

### Zones of influence

- 10.5.1 The hydrological 'zone of influence' has been defined as the WFD water body units in which the Bristol Airport site is situated (**Figure 10.1**). This is on the basis that there are direct pathways from the Bristol Airport site into these catchments. The water body units provide a thorough definition of the potential zone of influence linking sources within the development area, via flow pathways to potential receptors situated downstream and off-site.
- 10.5.2 As the Bristol Airport site is situated on a plateau, and straddles the watershed there are three relevant catchments:
- Winford Brook (source to confluence with the River Chew) - Water body (WB) ID: GB109053021900;
  - Kenn (source to Kenn Moor SSSI) - WB ID: GB109052021670; and
  - Kenn Moor SSSI - WB ID: GB109052021682.

### Current baseline

#### Topography and Land-use

- 10.5.3 Referring to the Ordnance Survey (OS) map coverage of the area, the Bristol Airport site covers a total area of 196 ha. Bristol Airport is located to the immediate south of Lulsgate Bottom and 10.6km southwest of Bristol City Centre. The site is situated on a plateau with land falling away to the north, south and west (**Figure 10.2**). The highest point, located on the southwest of the site, is 196mAOD while the lowest point is at the northern site boundary and is approximately 150mAOD.
- 10.5.4 The Bristol Airport site currently comprises large impermeable areas associated with the airport runway, taxiways and apron, and also the site buildings and large car parking areas. The rest of the Bristol Airport site, including the land between and around the runway and taxiways is currently set to grass.
- 10.5.5 With regards to the area to which surface water runoff could drain, the airport is set within an agricultural landscape, primarily pasture. Areas of woodland/forestry operations exist to the west, a golf course to the north. Residential development is present around the site. Key settlements include Downside and Lulsgate Bottom/Felton to the north and north-east of the airport, to the west and south individual residential developments are set interspersed within agricultural land.
- 10.5.6 A corridor of land along the A38 to the north-east of the airport is included within the Bristol Airport site. This is associated with proposed improvements to the A38 between the airport's northern access roundabout, Downside Road and West Lane.

#### Geology - solid and drift geology

- 10.5.7 Geology is discussed in more detail in the Groundwater chapter (**Chapter 11**). It is not repeated here.

## Hydrology

- 10.5.8 Rainfall records for the nearest river flow gauging station (Congresbury Yeo at Iwood - 52017<sup>151</sup>) indicate typical average yearly rainfall of around 982mm (1960 to 1990).
- 10.5.9 The Site straddles three drainage catchments, as shown on **Figure 10.1** and **10.2**.
- 10.5.10 The southern half of the Bristol Airport Site, defined by the drainage divide which runs west-east along the current runway, drains to the south and west into the 'Kenn Moor Site of Special Scientific Interest (SSSI)' WFD water body catchment (23km<sup>2</sup>). This catchment encompasses Goblin Coombe and at its downstream end flows into the Kenn Moor SSSI, an area managed by the North Somerset Internal Drainage Board, and then into the Blind Yeo that flows into the Bristol Channel at Clevedon.
- 10.5.11 The northern half of site, excluding the north-eastern edge, drains to the north and west into the 'River Kenn – Source to Kenn Moor SSSI' WFD water body catchment (35km<sup>2</sup>). This catchment covers flows to the north, covering the settlement of Nailsea and flows into the River Kenn EA Main River. This flows into the Kenn SSSI and ultimately into the Bristol Channel.
- 10.5.12 Finally, the north-eastern edge of the site drains to the east into the 'Winford Brook - Source to Confluence with River Chew' WFD water body catchment (20km<sup>2</sup>). This catchment covers the settlement of Felton and drains to the east, to the Winford Brook EA Main River. This joins the River Chew in Chew Magna, which flows into the River Avon, which ultimately flows into the Bristol Channel.
- 10.5.13 During instances of intense rainfall, where the quantity of rainfall temporarily exceeds the infiltration capacity of the ground, runoff may flow off site into one of these catchments. As the Bristol Airport site is located on a plateau, there are no substantial areas of surface water originating off site that run on to the Bristol Airport site.
- 10.5.14 No surface water bodies are present on-site.

## Surface water quality

- 10.5.15 A summary of the three WFD river water bodies within 1km of the centre of the Bristol Airport site as identified in the Severn River Basin Management Plan<sup>152</sup> (RBMP) is provided in **Table 10.3**.

**Table 10.3 Summary of Local WFD River Water Bodies and their Associated Status Definitions (EA (Cycle 2), 2015)**

WFD Water Body	River Kenn – Source to Kenn Moor SSSI	Kenn Moor SSSI	Winford Brook – source to confluence River Chew
Water Body Identifier	GB109052021670	GB109052021682	GB109053021900
Heavily Modified Water Body (HMWB)	N	Y	N
Overall current (2015 Cycle 2) status	Good	Moderate	Poor*
Objectives	Good by 2015	Good by 2021	Good by 2027

<sup>151</sup> Taken from <http://nrfa.ceh.ac.uk/data/station/info/52017> accessed on 19 March 2017

<sup>152</sup> Defra (2016) Severn river basin district - River Basin Management Plan Available online: <https://www.gov.uk/government/publications/severn-river-basin-district-river-basin-management-plan> (checked 19-03-18)

- 10.5.16 The Moderate score for the Kenn Moor SSSI in **Table 10.3** relates to two WFD elements only: Fish and Supporting elements (Surface Water) Mitigation measures assessment. A score of Poor is associated with fish, due to fish stocking, however the data is considered unreliable. The mitigation measures relate to the artificial nature of the river and drainage channels in this catchment (a Heavily Modified Water Body). For these reasons the Proposed Development will have no effect on the WFD scores for these elements.
- 10.5.17 The Poor score for the Winford Brook in **Table 10.3** relates to one WFD element only: Fish. The 'Reasons for Not Achieving Good' data for this waterbody indicates that this relates to Bristol Water's impounding dam at Chew Magna Reservoir, which will block fish passage. Achieving good is considered to be disproportionately expensive. For this reason, the Proposed Development will have no effect on the WFD score for this element.
- 10.5.18 For all three waterbodies, all other statuses are at Good or High for assessed elements. The only exceptions being the 'Does Not Support Good' scores for Hydrological Regime element for the Kenn Moor SSSI (on account of it being a Heavily Modified Water Body) and for the Winford Brook (on account of the effect of the impounding dam). Again, the Proposed Development will have no effect on the WFD score for this element.
- 10.5.19 The Bristol Airport site is not situated within a surface Nitrate Vulnerable Zone (NVZ). The nearest NVZ is a Eutrophic Water NVZ located approximately 1.5km to the southeast of the site, however, there are no surface water flow paths from the Bristol Airport site to this NVZ.
- 10.5.20 A Drinking Water Safeguard Zone (Surface Water) covers the far east of the Site and extends to the east covering the catchment of the Winford Brook that drains to Chew Magna Reservoir. These zones are primarily intended to manage the risk of pollution from land-uses within the zone to raw water supply (and thus reduce the level of treatment required to supply suitable wholesome drinking water). The portion of the Bristol Airport site within the zone comprises less than 2% of the overall zone, and is located at the most upstream end of the area. No watercourses are present here, limiting the potential to rapidly convey contaminants. Bristol Airport's drainage system collects runoff onsite passing this through interceptors to capture contaminants before discharge to ground. The drainage system is designed to capture and manage runoff on-site up to the 1%AEP with climate change event. The airport's environmental management system details strict policies for airport operations to ensure that Bristol Airport meets the requirements of the associated Discharge Consents.
- 10.5.21 For the purposes of the ES, a request will be submitted to the EA for details of water quality data held for watercourses within the Zone of Influence.

### Surface water abstractions and discharges

- 10.5.22 Bristol Airport's foul drainage is routed to Chew Stoke Sewage Treatment Works, with treated effluent being discharged to the River Chew. The treated effluent discharge is situated just downstream of Chew Valley Lake.
- 10.5.23 The Landmark Information Group Envirocheck<sup>153</sup> report indicates that there are no surface water or potable (private water supply, PWS) abstractions within 2km of the Bristol Airport site boundary.
- 10.5.24 There are however, 18 discharge consents within 2km of the Bristol Airport site boundary (see Appendix A). These are predominantly site drainage and trade effluent-site drainage for buildings on the Bristol Airport site itself. There are also two domestic properties (including farm houses) and Wessex Water's Lulsgate-Downside Sewage Treatment Works that are permitted to discharge

<sup>153</sup> Landmark Information Group (2017) Envirocheck report: Bristol Airport

sewage discharges – final/treated effluent. All of the 18 discharges are into the land via soakaways or infiltration systems and all discharge into groundwater.

- 10.5.25 The Winford Brook drains to Chew Magna reservoir, owned by Bristol Water. The reservoir is stocked for fishing. Water from here can be used as compensation flow on the downstream River Chew, or pumped from here to their main Chew Valley Reservoir.
- 10.5.26 For the purposes of the ES, a request will be submitted to the EA for details of water quantity (flow) monitoring, licensed surface water abstractions and discharge consents within the Zone of Influence to confirm this, and to NSC for details of surface water PWSs.

### Flood risk

- 10.5.27 The EA Flood Map for Planning confirms that the whole of the Bristol Airport site is within Flood Zone 1 (the lowest flood risk area - less than 0.1% Annual Exceedance Probability (AEP)). As such, the Bristol Airport site can be considered to be at low risk of fluvial flooding. However, it should be noted that the flood modelling underpinning the map typically only maps fluvial flood risk for watercourses with catchments greater than 3km<sup>2</sup>. In these areas, surface water flood mapping (10.5.24) provides a guide to areas at risk from flooding.
- 10.5.28 The nearest areas of Flood Zone 2 and 3 (medium and high risk) are located in the settlements of Winford to the east and Wrington to the southwest. Both of these areas of flooding are located at elevations significantly below the Bristol Airport site and therefore are not considered to pose a risk to the Site. The existing drainage systems ensure that runoff from Bristol Airport's buildings, runway, roads and associated impermeable areas is managed within the site up to the 1% AEP with climate change event as required by current guidance. This ensures that off-site flood risk is not increased.
- 10.5.29 The EA Flood Risk from Surface Water map shows that the majority of the Bristol Airport site is at 'very low' (less than 0.1% AEP) risk of surface water (rain and runoff) flooding. There are however, significant areas of surface water ponding associated with low points between the runway and taxiways. On the south side of terminal buildings areas of surface water flooding are shown extending across the concrete aprons where runoff draining northwards is shown to pond against these buildings. These areas of ponding contain areas at low, medium, and high risk of surface water flooding (0.1% AEP to 1% AEP, 1% AEP to 3.33% AEP, and greater than 3.33% AEP respectively). There are also three notable surface water flowpaths that originate on-site. These follow the routes of the dry valleys of the upper Winford Brook, Goblin Coombe (draining to the River Kenn catchment) and Brockley Coombe (draining to the Kenn Moor SSSI catchment). These flowpaths extend away from the site to downslope settlements indicated as being at risk from surface water flooding (Felton and Winford in the east, Brockley and Cleeve in the west). These flow paths are classified as low, medium and high surface water flood risk areas along the valley bottoms.
- 10.5.30 The NSC Strategic Flood Risk Assessment Level 1 (2008)<sup>146</sup> indicates there has been historic surface water flooding to the A38 at Lulsgate Bottom immediately to the north-east of Bristol Airport.
- 10.5.31 The Landmark Information Group Envirocheck report<sup>153</sup> indicates that the British Geological Survey's (BGS) groundwater susceptibility mapping shows the Site overlies geology classed as being in the lowest category of risk from potential groundwater flooding. Notable areas of risk nearby are confined to the deeper coombes and valley bottoms.

## Conservation sites

- 10.5.32 The DEFRA MAGIC<sup>154</sup> website indicates that there is only one SSSI with a hydrological basis to its designation within the Zone of Influence that has a surface water flow path connecting it to the site. This is the Tickenham, Nailsea and Kenn Moors SSSI. The SSSI is split into 32 units, divided by a drainage network (known locally as rhynes). It is a human influenced environment, maintained by the management of land drainage by landowners and the North Somerset Internal Drainage Board. It is scientifically important due to the variety of aquatic plant life and rare dragonfly species that are present.

## Factors influencing baseline conditions

### Predicted Trends

- 10.5.33 The effects of climate change are expected to alter the baseline over time. As a result of climate change, it is predicted that there will be an increase in peak rainfall intensities and resulting flood flows over time. The latest guidance on climate change allowances to be applied in England was last updated in April 2016 and provides guidance on the potential enhanced rainfall intensity and seasonality with wetter winters and drier summers.
- 10.5.34 In addition, the location and rate of surface and groundwater abstractions in the area could vary over time, leading to changes in groundwater levels (influencing river flows and flood risk), aquifer status and SPZ designations.

## Additional baseline information requirements

- 10.5.35 Additional supporting information to define the baseline will be obtained via data requests submitted to the EA and NSC for records of relevant surface water abstractions and discharges.
- 10.5.36 An optional walkover is planned to which the EA will be invited to observe key hydrological features.

# 10.6 The scope of the assessment, methodology and characteristics of the potential effects

## Identification of receptors that could be subject to likely significant effects

- 10.6.1 On the basis of the baseline appraisal, the following classes of receptors have been identified:
- Aquatic environment receptors;
  - Water resources receptors; and
  - Flood risk (primarily surface water) receptors - people, property and infrastructure.
- 10.6.2 On the basis of the baseline presented, the specific surface water environment receptors to be considered in the forthcoming EIA include:
- Aquatic Environment and Water Resources receptors:
    - ▶ The River Kenn and tributaries;

<sup>154</sup> Multi-Agency Geographic Information for the Countryside

- ▶ The Kenn Moor SSSI; and
- ▶ The Winford Brook and associated springs, Chew Magna Reservoir (and potentially Chew Valley Lake).
- Flood Risk receptors:
  - ▶ Existing development at Bristol Airport;
  - ▶ The adjacent road network; and
  - ▶ Based on mapped surface water flood risk pathways in the three catchments: existing development at Lulsgate Bottom, Felton, and Winford; Downside, Coomehead Farm, and Brockley; and Hailstone Cottages and Cleeve respectively.

10.6.3 Other receptors are considered too distant and/or not in potential hydraulic continuity (i.e. no 'pathway') with the Bristol Airport site, including the following:

- Barrow Gurney Reservoirs.

10.6.4 With further baseline information pending, there may be a number of other receptors identified in the ES that require assessment, potentially including:

- Surface water or potable abstractions; and
- Local residential properties, in terms of surface water flood risk.

### Potential significant effects requiring further assessment

10.6.5 The potential effects of the Proposed Development that are likely to be significant with regards to the surface water environment, and those which will be subject to further assessment are set out in this section. The assessment presented within the ES will be informed by supporting studies including a Flood Risk Assessment (FRA) and Drainage Strategy (DS). The appraisal will be undertaken with reference to this project's key inter-related EIA disciplines, including groundwater, biodiversity and transport.

### During Construction

10.6.6 The components of the Proposed Development are outlined in **Chapter 2**. Details regarding the construction and operation of these facilities will develop during the EIA process, but 'Significant' construction effects could potentially occur associated with the building construction excavation/foundation work, and the construction of the associated sustainable drainage system for these elements of the Proposed Development. In particular, surface water flowpaths could be captured/diverted, and excavations, and the construction of new infiltration features introduces new pathways from the surface water environment to groundwater. During these works, contaminants and pollutants could be released or mobilised.

### During Operation

10.6.7 During operation potential effects would relate to: contaminants entering the surface water environment due to unintentional or accidental release of contaminants/pollutants. Ineffective management of runoff could lead to increases in flood risk on and adjacent to the Bristol Airport site. Additionally, effects may occur if the Proposed Development reduces the quantity of water available within each catchment (via capture or diversion between catchments).



## Potential effects not requiring further assessment

- 10.6.8 In terms of WFD waterbody status, the potential assessment of effects to water quality would only consider effects related to key determinands of relevance to the development's construction and operation (i.e. hydrocarbons, de-icer compounds). It is not proposed to assess nutrients and pesticides associated with agriculture, Priority Substances or Specific Pollutants.
- 10.6.9 No other identified potential effects have been scoped out at this stage.

## Proposed assessment methodology

- 10.6.10 The methodology outlined in this section has been developed during previous EIAs and will be followed when completing the impact assessment presented in the ES.

## Determination of Significance

- 10.6.11 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations require detailed assessment only of resources that are *"likely to be significantly affected by the development"*.
- 10.6.12 The EIA Regulations themselves do not define significance and it is therefore necessary to state how this will be established for the EIA. The significance of an effect resulting from a development (during construction or operation) is most commonly assessed with reference to the sensitivity (or value) of a given surface water receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development, and will be adopted for the Bristol Airport surface water EIA. The residual effects of the Proposed Development on the surface water environment will be evaluated assuming that identified mitigations are fully implemented.
- 10.6.13 In terms of the surface water environment the EIA will be largely based on professional judgement, based on experience and the use of best practice guidance (**paragraph 10.2.3**), such as that published by CIRIA, Defra and the West of England Authority. The key determinands of sensitivity and magnitude will relate to the Aquatic Environment, Water Resources and Flood Risk.
- 10.6.14 **Table 10.4** details the basis for assessing receptor sensitivity.

Table 10.4 Establishing the sensitivity of receptors

Sensitivity	Criteria	Receptor type	Examples
Very High	Feature with a high quality and rarity at an international scale, with little potential for substitution	Aquatic environment	Conditions supporting sites with international conservation designations (Special areas of Conservation (SACs), Special Protection areas (SPAs), Ramsar sites), where the designation is based specifically on aquatic features.
		Water resources	Regionally important public water supplies.
		Flood risk	Land use types defined as 'Essential Infrastructure' (i.e. critical national infrastructure) in the National Planning Policy Framework (NPPF) flood risk vulnerability classification.
High	Feature with a high yield and/or quality and rarity at a national scale, with a	Aquatic environment	Conditions supporting sites with national conservation designations (i.e. SSSI, National Nature Reserves (NNR)) where the designation is based specifically on aquatic features.

Sensitivity	Criteria	Receptor type	Examples
	limited potential for substitution		Receptor water body: all relevant WFD supporting elements* at least good status/potential.
		Water resources	Local public water supplies.
		Flood risk	Land use types defined as 'Highly Vulnerable' in the NPPF flood risk vulnerability classification.
Medium	Feature with a medium yield and/or quality at a regional scale or good quality at a local scale, with some potential for substitution	Aquatic environment	Sites with local conservation designations where the designation is based specifically on aquatic features.
			Receptor water body: all relevant WFD elements* at least moderate status/potential.
		Water resources	Un-licensed potable surface water abstractions, e.g. private domestic water supplies.
		Flood risk	Land use types defined as 'More Vulnerable' in the NPPF flood risk vulnerability classification.
Low	Feature with a low yield and/or quality at a local scale, with some potential for substitution	Aquatic environment	Receptor water body: relevant WFD elements* at less than moderate status/potential.
			Small watercourses not classified as a WFD river water body.
		Water resources	Licensed abstractions which are not public water supply, e.g. industrial process water, spray irrigation.
		Flood risk	Land use types defined as 'Less Vulnerable' in the NPPF flood risk vulnerability classification.
Very Low	Feature with minimal yield and/or very low quality at a local scale, with a high potential for substitution	Aquatic environment	Receptor water body: relevant WFD elements* at poor status/potential.
			Minor water features such as ditches, not classified as a WFD river water body.
		Water resources	Un-licensed non-potable abstractions, e.g. livestock supplies.
		Flood risk	Land use types defined as 'Water-compatible development' in the NPPF flood risk vulnerability classification and undeveloped land.
<p>*For the purposes of this assessment, 'relevant WFD elements' are taken to mean:</p> <ul style="list-style-type: none"> <li>all biological quality elements e.g. fish, invertebrates etc.;</li> <li>all physico-chemical quality elements e.g. dissolved oxygen, phosphate etc.; and</li> <li>hydromorphological supporting elements.</li> </ul> <p>The definition of 'relevant WFD elements' (given the lack of potential for the Proposed Development to influence these substances) excludes:</p> <ul style="list-style-type: none"> <li>Priority Hazardous Substances;</li> <li>Priority Substances; and Specific Pollutants.</li> </ul>			

10.6.15 **Table 10.5** details the basis for assessing magnitude of change.

Table 10.5 Establishing the magnitude of change

Magnitude	Criteria	Receptor type	Examples of negative change
<b>Very High</b>	Results in major change to feature, of sufficient magnitude to affect its use/integrity	Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant conservation objectives (COs) or downgrading of WFD status (including downgrading of individual WFD supporting elements).
		Water resources	Complete loss of resource or severely reduced resource availability and/or quality, permanently compromising the ability of water users to exercise licensed rights.
		Flood risk	Change in flood risk resulting in potential loss of life or major damage to property and infrastructure.
<b>High</b>	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances	Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or downgrading of WFD status (including downgrading of individual WFD supporting elements or ability to achieve future WFD objectives).
		Water resources	Moderate reduction in resource availability and/or quality, which may compromise the ability of water users to exercise licensed rights on a temporary basis or for limited periods.
		Flood risk	Change in flood risk resulting in potential for moderate damage to property and infrastructure.
<b>Medium</b>	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances	Aquatic environment	Measureable deterioration in river flow regime, morphology or water quality, but remaining generally within COs, and with no change to WFD status (of overall status or supporting element status).
		Water resources	Minor reduction in resource availability and/or quality, but unlikely to affect the ability of water users to exercise licensed rights.
		Flood risk	Change in flood risk resulting in potential for minor damage to property and infrastructure.
<b>Low</b>	Results in little change to feature, with insufficient magnitude to affect its use/integrity	Aquatic environment	Limited measureable deterioration in river flow regime, morphology or water quality and limited probability of consequences in terms of COs or WFD designations.
		Water resources	Limited measurable change in resource availability or quality and limited probability of changes to the ability of water users to exercise licensed rights.
		Flood risk	Increased frequency of flood flows, but which does not pose an increased risk to people, property and infrastructure.
<b>Very Low</b>	Results in no change to feature, with insufficient magnitude to affect its use/integrity	Aquatic environment	No measureable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs or WFD designations.
		Water resources	No measurable change in resource availability or quality and no change in ability of water users to exercise licensed rights.
		Flood risk	No increase in frequency of flood flows, and no increase in risk to people, property and infrastructure.

10.6.16

**Table 10.6** provides an indication of how the level of effect will be categorised from the interaction of a receptor's sensitivity to change and the magnitude of change. A level of effect of Substantial/Moderate or greater is generally of most importance to the decision-maker, and so these effects are considered 'Significant'. Where a level of effect is Minor or below, these are generally considered to be 'Not Significant'.

Table 10.6 Establishing the Level of Effect

Magnitude of Change						
Importance or Sensitivity of Receptor		Very high	High	Medium	Low	Very low
	Very high	Major (Significant)	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)
	High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)
Key		Significant in EIA terms.				
		Not Significant in EIA terms				

# 11. Groundwater

## 11.1 Introduction

- 11.1.1 This chapter sets out the proposed approach to assessing the potential effects on the groundwater environment that would result from the Proposed Development.
- 11.1.2 For the purposes of the ES the 'groundwater' chapter will cover: groundwater quantity and groundwater quality including discharges of site drainage to ground.
- 11.1.3 The key legislation, policy and guidance is set out with respect to the groundwater environment and key consultees identified. The groundwater environment is then described, based on a review of previous technical reports and preliminary desk study. An initial view of potential (pre-mitigation) effects is then presented and the proposed assessment methodology for the forthcoming ES is finally described.

## 11.2 Relevant legislation, policy and guidance

### Legislation

- 11.2.1 The following legislation is relevant to groundwater and the assessment that will be presented within the Environmental Statement (ES):
- The EU Water Framework Directive (2000/60/EC) (WFD), as enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003; focuses on delivering an integrated approach to the protection and sustainable use of the water environment on a river basin scale;
  - Environmental Permitting (England and Wales) Regulations 2010 (SI 2010 No. 676), as amended: includes requirements for the prevention of hazardous substances entering groundwater and the control of non-hazardous pollutants to avoid pollution of groundwater. Discharges to groundwater are controlled by these regulations;
  - Water Resources Act 1991: states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The Act was revised by the Water Act (2003), which sets out regulatory controls for water abstraction, discharge to water bodies, water impoundment and protection of water resources;
  - The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 sets out standards for surface water quality;
  - Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (SI No 571) (the EIA Regulations);
  - Priority Substances Directive (2008/105/EC), as enacted into domestic law by the 2010 Regulations listed above;
  - Environment Act 1995; and
  - Environmental Protection Act 1990.

## Policy

11.2.2 **Table 10.2** lists the planning policies and guidance at the national and local level that will be relevant for the groundwater assessment undertaken.

**Table 11.1** Relevant policies and their implications for groundwater

Policy reference	Implications
<b>National Planning Policy Framework (NPPF)<sup>155</sup></b>	
Paragraph 143	Considers the need for local planning authorities to mitigate and adapt to climate change, taking full account of flood risk and water supply and demand considerations.
Paragraph 103	Requires development proposals to prevent unacceptable adverse impacts on the flow and quantity of surface and groundwater and migration of contamination from the site
	Is specific to the consideration of flood risk in determining planning applications and requires that development proposals ensure that flood risk is not increased elsewhere. This includes requiring development proposals in areas at risk of flooding to be accompanied by a flood risk assessment. These requirements will help form a framework for assessing the potential impacts.
<b>North Somerset Council (NSC) Core Strategy January 2017<sup>156</sup></b>	
CS2: Delivering sustainable design and construction	Requires the application of best practice to incorporate sustainable drainage systems to manage runoff from new development. These should be integrated in designs and easily maintained.
CS3: Environmental impacts and flood risk assessment	states that development that, on its own or cumulatively, would result in air, water or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other control regimes, or by measures included in the proposals, by the imposition of planning conditions or through a planning obligation. Development that, in the opinion of the council after consultation with the Environment Agency (EA), poses an unacceptable risk of pollution of or damage to the water environment either directly or via the surface water sewerage system, or which does not dispose of surface water run-off in an acceptable manner, will only be permitted if these concerns can be overcome.

## Guidance

11.2.3 The assessment will also be guided by a number of technical guidance documents:

- EA<sup>157</sup>. Approach to Groundwater Protection and its predecessor, Groundwater Protection: Principles and Practice (GP3), outline the key water regulator's framework for the management and protection of groundwater;
- CIRIA C532<sup>158</sup>: Control of water pollution from construction sites;
- CIRIA C736<sup>159</sup> Containment systems for the prevention of pollution;
- Health and Safety Executive<sup>160</sup> (HSE) HSG176 Storage of Flammable liquids in tanks;

<sup>155</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. [Online] Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Accessed 12 03 2018].

<sup>156</sup> 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> [Accessed 16 04 18]

<sup>157</sup> Environment Agency, 2017. The Environment Agency's approach to groundwater protection. Version 1.1.

<sup>158</sup> CIRIA, 2001. Control of water pollution from construction sites. Guidance for consultants and contractors (C532)

<sup>159</sup> CIRIA, 2014. Containment systems for the prevention of pollution (C736): Secondary, tertiary and other measures for industrial and commercial premises

<sup>160</sup> Health and Safety Executive, 2015. HSG176 Storage of Flammable liquids in tanks

- Energy Institute<sup>161</sup> (EI) 1540 Design, construction, commissioning, maintenance and testing of aviation fuelling facilities;
- Environment Agency<sup>162</sup>. Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: Guidance on pollution prevention; and
- CIRIA<sup>163</sup> C692: Environmental good practice on site.

## 11.3 Main sources of data

11.3.1 The EIA scoping exercise presented in this Scoping Report for groundwater, has been undertaken for the Proposed Development (**Chapter 2**) and used the sources of data set out in **Table 11.2**.

Table 11.2 Sources of Information

Topic	Aspect	Source of Information
Topography and Land-use	Ground elevation and gradient	Ordnance Survey 1:50,000, Landranger Sheet 182 Weston-super-Mare Ordnance Survey 1:50,000, Landranger Sheet 172 Bristol & Bath Ordnance Survey 1:25,000, Explorer Sheet 154 Bristol West & Portishead On-line maps and aerial photography, at: <a href="https://www.bing.com/maps">https://www.bing.com/maps</a>
Hydrology	River network	Ordnance Survey 1:50,000, Landranger Sheet 182 Weston-super-Mare Ordnance Survey 1:50,000, Landranger Sheet 172 Bristol & Bath Ordnance Survey 1:25,000, Explorer Sheet 154 Bristol West & Portishead On-line maps and aerial photography, at: <a href="https://www.bing.com/maps">https://www.bing.com/maps</a> Department of Environment, Food and Rural Affairs MAGIC database, at: <a href="http://magic.defra.gov.uk/">http://magic.defra.gov.uk/</a>
	Groundwater quality (Water Framework Directive (WFD) information)	Environment Agency River Basin Management Plan (2016 cycle 2) information, via the <a href="http://environment.data.gov.uk/catchment-planning/">Environment Agency Catchment Data Explorer</a> , at: <a href="http://environment.data.gov.uk/catchment-planning/">http://environment.data.gov.uk/catchment-planning/</a>
	Groundwater abstractions and discharges	Information has been obtained from the GroundSure EnviroInsight report. Licensed abstraction/discharge data request will also be sent to the Environment Agency and Private water supply data will be requested from NSC.
Geology	Solid and drift geology	British Geological Survey 1:50,000 Series Geology maps <sup>164</sup> British Geological Survey Geology of Britain Viewer, at: <a href="http://mapapps.bgs.ac.uk/geologyofbritain/home.html">http://mapapps.bgs.ac.uk/geologyofbritain/home.html</a>
Hydrogeology	Aquifer type	EA Groundwater Source Protection Zone and BGS Aquifer designation maps, at: <a href="http://maps.environment-agency.gov.uk/wiyby">http://maps.environment-agency.gov.uk/wiyby</a> (note this is due to be withdrawn in April)
	Groundwater flow direction / groundwater level	BAL groundwater monitoring data Hydrogeology of Bristol International Airport: Desk Study <sup>165</sup>
	Water Abstractions and Discharges	GroundSure EnviroInsight report

<sup>161</sup> Energy Institute, 2014. EI 1540 Design, construction, commissioning, maintenance and testing of aviation fuelling facilities

<sup>162</sup> Environment Agency, 2001. Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: Guidance on pollution prevention

<sup>163</sup> CIRIA, 2010. C692: Environmental good practice on site (Third Edition)

<sup>164</sup> British Geological Survey, 2004. Sheet 264, Bristol, Solid and Drift Edition

<sup>165</sup> AEA Technology, 2000, Hydrogeology of Bristol International Airport: Desk Study. AEAT/ENV/R/0447



## 11.4 Engagement with consultees

- 11.4.1 Consultation will be undertaken with the following stakeholders throughout the EIA process:
- Bristol Water as the key user of groundwater (the site lies in the source protection zone for their Chelvey Source); and
  - EA as the regulator responsible for managing both groundwater resources and groundwater quality.
- 11.4.2 Any data or requirements identified during consultation will inform the assessment in the ES.

## 11.5 Overview of baseline conditions

### Zones of influence

- 11.5.1 The hydrogeological 'zone of influence' has been defined as the Principal Aquifer beneath the site which lies in the Bristol Airport groundwater body. It includes the area beneath the site and extends to groundwater abstraction at Chelvey. The groundwater body provides a thorough definition of the potential zone of influence linking sources within the development area, via flow pathways to potential receptors situated downstream and off-site.

### Current baseline

- 11.5.2 The topography, land use and hydrology baseline is the same as for surface water and flood risk and is outlined in **Chapter 10: Surface water and flood risk**. It is not repeated here.

### Geology - solid and drift geology

- 11.5.3 The BGS geological map identifies the Bristol Airport site as largely underlain by the Black Rock Limestone Subgroup, with the exception of an area to the south of the Bristol Airport site, associated with the Silver Zone Parking and Bristol and Wessex Aeroplane Club, and also to the very northwest, covering the north of Tall Pines Golf Club, where the bedrock geology is the Brockley Down Limestone. There is also a small area in the southwest of the Bristol Airport site where the Westbury Formation and Cotham Member (undifferentiated) are found.
- 11.5.4 The Black Rock Limestone is of Carboniferous Age. It is a thin to thick-bedded packstone with subordinate thin beds of shaley argillaceous packstone and mudstone. The Westbury Formation and Cotham Member consists of interbedded mudstones and limestones.
- 11.5.5 The Carboniferous Limestones forms an outlier to the main outcrop of the Mendips and is in the form of a dome-shaped periclinal structure (sloping down in all directions from a central dome) from which the rocks dip away in a radial manner.
- 11.5.6 No superficial deposits are recorded as being present beneath any of the Proposed Development site.
- 11.5.7 Borehole logs from investigations at the Bristol Airport site generally show a thin layer of Made Ground overlying silty drift deposits, which extend to a depth of approximately 2 to 5m below ground level (bgl). The silty drift is locally deeper, up to 8 to 9m bgl in several of the boreholes, indicating the presence of infilled solution or mining features. At depth boreholes have encountered a sequence of limestone, with layers of mudstone, which became more frequent towards the base of the sequence. Cavities and zones of poor recovery were noted at around 40m bgl in several boreholes.

- 11.5.8 BAL has recorded a number of contemporary subsidence features that have (typically) formed within the northside car park. These are considered to be associated with sinkholes or mining features in the underlying limestone.

## Hydrogeology

- 11.5.9 The Black Rock Limestone Subgroup is a Principal Aquifer. Principal Aquifers are rocks that have high intergranular and/or fracture permeability – meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
- 11.5.10 The Brockley Down Limestone is a Secondary A Aquifer. These are predominantly lower permeability rocks (compared to Principal Aquifers) which may store or yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons or weathering.
- 11.5.11 The Westbury Formation and Cotham member (undifferentiated) is a Secondary B Aquifer.
- 11.5.12 The Bristol Airport site is in an area of High groundwater vulnerability, and is considered to be an area where pollutants are easily transmitted to groundwater. These areas are characterised by high leaching soils and the absence of low permeability superficial deposits.
- 11.5.13 The Bristol Airport site is in Zone 2 of a groundwater Source Protection Zone (SPZ) (with the exception of the eastern edge which lies beyond the zone boundary). This SPZ is for Bristol Water's Chelvey source, which is approximately 3.4km to the north east of the Bristol Airport site.
- 11.5.14 A second SPZ lies to the west of the Bristol Airport site. This has been defined for the surface water catchment to Bristol Water's Winford Brook source. The definition of the surface water catchment reflects the potential for karst features to provide rapid fast pathways for pollution migration to the source.
- 11.5.15 The major regional discharge for the Broadfield Down area is the large springs at Chelvey, which issue through fault-disturbed Mercia Mudstone and related conglomerate. The Chelvey Well intercepts a proportion of the water feeding the springs and can supply 27Ml/day. The discharge at Chelvey Well is estimated to account for approximately 40% of the recharge to the Carboniferous Limestone aquifer<sup>166</sup>. Although there are no important water supply wells within 2km of Bristol Airport, the presence of major springs like the Chelvey source on the north western fringe of the plateau are testament to the importance of this aquifer as a source of potable water.
- 11.5.16 The EA has defined SPZs (inner, outer and total catchment) for all groundwater sources such as springs, wells and boreholes used for public drinking water supply and for groundwater sources supplying some private water supplies and food processing factories. These zones identify areas at risk of contamination from surface activities that might cause pollution. An area of the aquifer under Bristol Airport has been defined as SPZ2 because it lies within the catchment to Chelvey spring. SPZ2, or the Outer Protection Zone, is the area where pollution may take up to 400 days to travel to the spring. Other springs in the area may also receive recharge from Bristol Airport. These include Cold Bath Spring on the north flank of Broadfield Down, and a number of springs to the east at the head of the Winford Brook in Winford.
- 11.5.17 SPZs and groundwater abstractions associated with Bristol Airport, are shown on **Figure 11.1**. Groundwater flow within the SPZ is anticipated to be towards Chelvey.
- 11.5.18 Groundwater lies at an elevation of approximately 145mAOD, compared to ground levels of 163 to 185mAOD.

<sup>166</sup> AEA Technology, 2000, Hydrogeology of Bristol International Airport: Desk Study. AEAT/ENV/R/0447

## Groundwater quality

- 11.5.19 The Bristol Airport site lies over the Bristol Airport Carboniferous Limestone groundwater body. The status of the water body is summarised in **Table 11.3**. The overall Poor status is driven by the quantitative status which is poor due to abstraction affecting natural flows. This is likely to be due to Bristol Water's abstractions for public water supply. The airport does not have any abstractions and none are planned for the development.

Table 11.3 Summary of WFD Groundwater Body Status Definitions (EA (Cycle 2), 2015)

WFD Water Body	Bristol Airport- Carboniferous Limestone
Water Body Identifier	GB40901G804900
Overall current (2015 Cycle 2) status	Poor
Quantitative Saline Intrusion	Good
Chemical Drinking Water Protected Area	Good
Trend Assessment	No trend
Quantitative Status element	Poor
Quantitative GWDTEs test	Good
Quantitative Water Balance	Good
Objectives	Poor

- 11.5.20 The Site is not covered by a surface Nitrate Vulnerable Zone (NVZ). The nearest NVZ is a Eutrophic Water NVZ located approximately 1.35km to the southeast of the Bristol Airport site, however, this is not hydrologically linked to the Bristol Airport site.
- 11.5.21 A Drinking Water Safeguard Zone (Surface water) covers the far east of the Site and extends to the east covering the catchment of the Winford Brook.
- 11.5.22 Water quality in the aquifer beneath the airport is regularly monitored by Bristol Airport and information from this monitoring programme will be used to inform the ES.

## Groundwater abstractions and discharges

- 11.5.23 There are no surface water or potable (private water supply, PWS) abstractions within 2km of the Site boundary.
- 11.5.24 There are however, 18 discharge consents within 2km of the Bristol Airport site boundary. These are predominantly site drainage and trade effluent-site drainage for buildings at Bristol Airport. There are also two domestic properties (including farm houses) and a Wessex Water Sewage Treatment Works that are permitted to discharge sewage discharges – Final/treated effluent. All 18 discharges are into land via soakaways or infiltration systems.
- 11.5.25 The Winford Brook drains to Chew Magna reservoir, owned by Bristol Water. The reservoir is stocked for fishing. Water from here can be used as compensation flow to the downstream River Chew, or pumped to Chew Valley Reservoir.

- 11.5.26 For the purposes of the assessment, a request will be submitted to the EA to confirm details of licensed groundwater abstractions and discharge consents within the Zone of Influence to confirm this understanding, and to NSC to confirm details of private water supplies.

## Factors influencing baseline conditions

### Predicted Trends

- 11.5.27 The latest guidance on climate change allowances to be applied in England was last updated in April 2016 and provides guidance on the potential enhanced rainfall intensity and seasonality with wetter winters and drier summers. Changes in patterns of rainfall could influence the quantity of recharge to the aquifer.
- 11.5.28 The location and rate of surface and groundwater abstractions in the area could vary over time, leading to changes in groundwater levels (influencing river flows and flood risk), aquifer status and SPZ designations.

### Additional baseline information requirements

- 11.5.29 Additional supporting information to define the baseline will be obtained via data requests submitted to the EA, Bristol Water and NSC for records of relevant groundwater abstractions and discharges.
- 11.5.30 Bristol Airport's groundwater monitoring data will be used to assess baseline groundwater quality.

## 11.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

- 11.6.1 On the basis of the baseline appraisal, the following classes of receptors have been identified:
- Groundwater within the Principal Aquifer beneath and downgradient of the site;
  - Groundwater abstractions; and
  - Surface water fed by groundwater baseflow.
- 11.6.2 On the basis of the baseline presented above, the specific groundwater environment receptors to be considered in the assessment presented in the ES will include:
- Groundwater in the Principal Aquifer;
  - Public Water Supplies at:
    - ▶ Chelvey; and
    - ▶ Cold Bath Springs.
- 11.6.3 Other receptors are considered too distant and/or not in potential hydraulic continuity (i.e. no 'pathway') with the Proposed Development site, including:
- Public Water supply from Chew Magna reservoir.
- 11.6.4 With further baseline information pending, there may be a number of other receptors identified that require assessment, potentially including:

- Private water supply wells; and
- Newly licenced water supply wells.

### Potential significant effects requiring further assessment

- 11.6.5 The potential effects of the Proposed Development that are likely to be significant with regards to the groundwater environment, and which will be subject to further assessment (to be presented within the ES), are summarised in the following sections.

#### During Construction

- 11.6.6 The Proposed Development is outlined in **Chapter 2**. Construction effects could potentially occur associated with the construction excavation/foundation work, and the construction of the associated sustainable drainage system for these elements of the Proposed Development. In particular, surface water flowpaths could be captured/diverted, and excavations, and the construction of new infiltration features could introduce new pathways from the surface water environment to groundwater.

#### During Operation

- 11.6.7 During operation potential effects could relate to: contamination of the groundwater environment due to unintentional or accidental release of contaminants/pollutants principally in the form of fuel or de-icer causing non-compliance with WFD targets and failure of water quality standards at Bristol Water sources. Additionally, the development has the potential to reduce recharge to groundwater, which could reduce the quantity of water available for groundwater abstraction and to support baseflows to surface water. As the site is already an operational airport, these are incremental effects due to the incremental increase in the number of aircraft movement and the increase in area of hardstanding. Existing controls, such as permits and licences will remain in place and be varied to take into account the new development. The ES will consider the sensitivity of the receptors to the incremental increase in size.

### Potential effects not requiring further assessment

- 11.6.8 No potential effects have been scoped out at this stage.

### Proposed assessment methodology

- 11.6.9 The methodology outlined in this section has been developed during previous EIAs and will be followed when completing the impact assessment presented in the ES.

#### Determination of Significance

- 11.6.10 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are *"likely to be significantly affected by the development"*.
- 11.6.11 The EIA Regulations do not define significance and it will be necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate

the risk presented by the development. This approach will be adopted for the Bristol Airport groundwater impact assessment and presented in the ES. The residual effects of the Proposed Development on the groundwater environment will be evaluated assuming that identified mitigation measures are fully implemented.

11.6.12 In terms of groundwater, the assessment will be largely based on professional judgement. The key determinants of sensitivity and magnitude will relate to the groundwater resources and groundwater quality.

11.6.13 **Table 11.4** details the basis for assessing receptor sensitivity.

Table 11.4 Establishing the sensitivity of receptors

Sensitivity	Criteria	Receptor Type	Examples
Very High	Feature with a high quality and rarity at an international scale, with little potential for substitution	Groundwater quality	Conditions supporting sites with international conservation designations (SACs, SPAs, Ramsar sites), where the designation is based specifically on aquatic features.
		Groundwater resources	Regionally important public water supplies.
High	Feature with a high yield and/or quality and rarity at a national scale, with a limited potential for substitution	Groundwater quality	Conditions supporting sites with national conservation designations (i.e. SSSI, NNR) where the designation is based specifically on aquatic features.
		Groundwater resources	Receptor water body: all relevant WFD supporting elements* at least good status/potential.  Local public water supplies.
Medium	Feature with a medium yield and/or quality at a regional scale or good quality at a local scale, with some potential for substitution	Groundwater quality	Sites with local conservation designations where the designation is based specifically on aquatic features.
		Groundwater resources	Receptor water body: all relevant WFD elements* at least moderate status/potential.  Licensed abstractions which are not public water supply, e.g. industrial process water, spray irrigation.  Un-licensed potable surface water abstractions, e.g. private domestic water supplies.
Low	Feature with a low yield and/or quality at a local scale, with some potential for substitution	Groundwater quality	Receptor water body: relevant WFD elements* at less than moderate status/potential.  Small watercourses not classified as a WFD river water body.
		Groundwater resources	Licensed abstractions which are not public water supply, e.g. industrial process water, spray irrigation.  Land use types defined as 'Less Vulnerable' in the NPPF flood risk vulnerability classification.

Sensitivity	Criteria	Receptor Type	Examples
Very Low	Feature with minimal yield and/or very low quality at a local scale, with a high potential for substitution	Groundwater quality	Receptor water body: relevant WFD elements* at less than moderate status/potential.
		Groundwater resources	Minor watercourses not classified as a WFD river water body.
			Unlicensed non-potable abstractions, e.g. livestock supplies.
*For the purposes of this assessment, ‘relevant WFD elements’ are taken to mean: all chemical elements; and quantitative status			

11.6.14 **Table 11.5** details the basis for assessing magnitude of change.

**Table 11.5** Establishing the magnitude of change

Magnitude	Criteria	Receptor type	Examples of negative change
<b>Very High</b>	Results in major change to feature, of sufficient magnitude to affect its use/integrity	Groundwater quality	Deterioration in groundwater flow quantity or downgrading of WFD quantitative or chemical status (including downgrading of individual WFD supporting elements).
		Groundwater resources	Complete loss of resource or severely reduced resource availability and/or quality, permanently compromising the ability of water users to exercise licensed rights.
<b>High</b>	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances	Groundwater quality	Deterioration in groundwater quantity or water quality, leading to periodic, short-term and reversible breaches of conservation objectives (COs), or downgrading of WFD status (including downgrading of individual WFD supporting elements or ability to achieve future WFD objectives).
		Groundwater resources	Moderate reduction in resource availability and/or quality, which may compromise the ability of water users to exercise licensed rights on a temporary basis or for limited periods.
<b>Medium</b>	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances	Groundwater quality	Measurable deterioration in groundwater quantity or water quality, but remaining generally within COs, and with no change to WFD status (of overall status or supporting element status).
		Groundwater resources	Minor reduction in groundwater quantity and/or quality, but unlikely to affect the ability of water users to exercise licensed rights.
<b>Low</b>	Results in little change to feature, with insufficient magnitude to affect its use/integrity	Groundwater quality	Limited measurable deterioration in river flow regime, morphology or water quality and limited probability of consequences in terms of COs or WFD designations.



Magnitude	Criteria	Receptor type	Examples of negative change
		Groundwater resources	Limited measurable change in resource availability or quality and limited probability of changes to the ability of water users to exercise licensed rights.  Increased frequency of flood flows, but which does not pose an increased risk to people, property and infrastructure.
<b>Very Low</b>	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity	Groundwater quality	No measurable deterioration in groundwater quantity or water quality and no consequences in terms of COs or WFD designations.  No measurable change in groundwater quantity or quality and no change in ability of water users to exercise licensed rights.
		Groundwater resources	

11.6.15 **Table 11.6** provides an indication of how the level of effect will be categorised from the interaction of a receptor's sensitivity to change and the magnitude of change. A level of effect of Substantial/Moderate or greater is generally of most importance to the decision-maker, and so these effects are considered 'Significant'. Where a level of effect is Moderate or below, these are generally considered to be 'Not Significant'.

Table 11.6 Establishing the Level of Effect

Magnitude of Change						
Importance or Sensitivity of Receptor		Very high	High	Medium	Low	Very low
	Very high	Major (Significant)	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)
	High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)
<b>Key</b>		Significant in EIA terms.				
		Not Significant in EIA terms				

## 12. Land Quality

### 12.1 Introduction

- 12.1.1 This Chapter provides an initial assessment of the likely significant effects in relation to land quality and soils of the Proposed Development during the construction and operation phases. The chapter should be read in conjunction with the Proposed Development description in **Chapter 2**.
- 12.1.2 The 2018 Phase 1 Land Quality Assessment<sup>167</sup> (LQA) (presented in **Appendix B**) that is summarised within this Chapter should be regarded as an initial phase of assessment in relation to potential contaminated land and further phases of site investigation based on the findings of the LQA may be required following and at a suitable point within the scheme's development.
- 12.1.3 The scope of the LQA in respect of groundwater and surface water is limited to water quality (i.e. potential impact to controlled waters associated with the Proposed Development areas). Effects on water quantity (such as groundwater base flow to rivers or groundwater levels) are covered in **Chapter 10: Surface water and flood risk**; and **Chapter 11: Groundwater**.
- 12.1.4 Potential contamination resulting from a major accident or disaster is covered in **Chapter 16: Major accidents and disasters**.
- 12.1.5 Potential effects on ecological receptors are included in **Chapter 9: Biodiversity**.
- 12.1.6 The scope of agricultural land quality covered in this chapter relates to the quality of farmland, soils and geodiversity.

### 12.2 Relevant legislation, policy and guidance

#### International Legislation

- 12.2.1 International legislation relevant to land quality and the assessment that will be presented within the Environmental Statement (ES) includes:
- Environmental Liability Directive<sup>168</sup>: Focuses on the "polluter pays" principle and requires EU member states to impose obligations and liabilities on operators whose activities cause or threaten environmental damage. Environmental damage specifically includes land contamination where there is a significant risk of adverse effects to human health;
  - The Water Framework Directive<sup>169</sup>: focuses on delivering an integrated approach to the protection and sustainable use of the water environment on a river basin scale. The main features relevant to land quality and its potential impact to surface water and groundwater quality are:
    - ▶ Member states should take all necessary measures to ensure that groundwater quality does not deteriorate and to prevent the input of pollutants to groundwater;

<sup>167</sup> Preliminary Phase 1 Land Quality Assessment, Bristol Airport Limited, Report Reference 40506RR005i1, Wood E&IS Ltd, April 2018.

<sup>168</sup> European Commission, 2004. Environmental Liability Directive. Available online <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02004L0035-20130718> [Checked 20/03/18]

<sup>169</sup> European Commission, 2000. The EU Water Framework Directive – integrated river basin management for Europe. Available online <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060> [checked 30/03/18]

- ▶ Discharges of hazardous substances must cease or be phased out within 20 years of their identification as a priority hazardous substance; and
- ▶ All inland and coastal waters within defined river basin districts must reach at least good status by 2015. The directive defines how this should be achieved through the establishment of environmental objectives and ecological targets for surface waters.
- Groundwater Directive<sup>170</sup>: aims to protect groundwater against pollution caused by dangerous substances and prevent the discharge of 'Hazardous' substances to groundwater. The Directive is primarily implemented in England and Wales by the Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675)<sup>171</sup>; and
- Directive on the Protection of Groundwater against Pollution and Deterioration (2006/118/EC)<sup>172</sup>: to ensure good groundwater quality, in line with the requirements of the WFD. The Directive sets out specific measures for preventing and controlling groundwater against pollution and deterioration.

## National Legislation

12.2.2 National legislation relevant to land quality and the assessment that will be presented within the ES includes:

- Part 2A of the Environmental Protection Act (EPA), 1990<sup>173</sup>: sets out the contaminated land regime and came into force in England on 1 April 2000 and was subsequently revised in 2006 and 2012. Part 2A of the EPA provides a statutory definition of 'Contaminated Land' and sets out the nature of liabilities that can be incurred as a result of contaminated land and groundwater. Contaminated land is defined as:
 

*"Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land that:*

  - *Significant harm is being caused, or there is significant possibility of such harm being caused; or*
  - *Significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused"*.
- The Statutory Guidance states that Part 2A of the EPA, 1990 takes a risk based approach to defining contaminated land. The guidance follows established principles of risk assessment, including the concept of a 'contaminant linkage' (i.e. a linkage between a 'contaminant' and a 'receptor' by means of a 'pathway') where:
  - ▶ A contaminant is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or cause significant pollution of controlled waters;

<sup>170</sup> European Commission, 2000. The Groundwater Directive. Available Online <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02006L0118-20140711> [checked 30/03/18]

<sup>171</sup> Environmental protection, England and Wales, 2010. Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675). available Online [https://www.legislation.gov.uk/uksi/2010/675/pdfs/uksi\\_20100675\\_en.pdf](https://www.legislation.gov.uk/uksi/2010/675/pdfs/uksi_20100675_en.pdf) [checked 30/03/18]

<sup>172</sup> European Commission, 2006/ Directive on the Protection of Groundwater against Pollution and Deterioration (2006/118/EC). Available online <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:372:0019:0031:EN:PDF> [checked 30/03/18]

<sup>173</sup> Defra, 2012, Environmental Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance. Available Online [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/223705/pb13735cont-land-guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/223705/pb13735cont-land-guidance.pdf) [checked 30/03/18]

- ▶ A receptor is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property or controlled waters; and
- ▶ A pathway is a route by which a receptor is or might be affected by a contaminant.
- Water Resources Act 1991 And Environmental Permitting Regulations (in relation to controlled waters)<sup>174</sup>: for sites where contamination of controlled waters is a potential issue, in addition to the provisions of Part 2A consideration must also be given to the Water Resources Act (WRA) 1991. Parts of the Act have been replaced by the Environmental Permitting (England and Wales) Regulations 2010, SI 2010 No.675 (referred to here as EPR), although some of the core definitions (e.g. controlled waters) still refer to the WRA; and
- Environmental Damage (Prevention and Remediation) Regulations 2009<sup>175</sup> implement the provisions of the Environmental Liability Directive in England. The Regulations follow the provisions of the Directive closely and accordingly impose obligations and liability on operators for environmental damage caused or threatened by their activities, specifically including damage to land by contamination by substances, preparations, organisms or micro-organisms that results in a significant risk of adverse effects on human health. The Regulations only apply to damage that takes place after the Regulations come into force on 1 March 2009.

12.2.3

There are several items of legislation and/or guidance that aim to deal with the prevention of land and groundwater contamination and others which aim to address and remediate contamination once it has occurred. As with European legislation, several of these regulations are indirectly relevant to the management and prevention of land contamination. Examples of indirectly relevant regulations are listed here for reference but are not discussed in detail within this Chapter:

- Water Resources Act 1991 (SI 57) (as partly amended by the Water Act 2003) and associated Anti-pollution Works Regulations 1999 (SI 1999/1006);
- Control of Pollution (Oil Storage) (England) Regulations 2001 (SI 2001/2954); and
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI 2003/3242) amended in 2015 (2015/1623).

## National Planning Policy

12.2.4

There are a number of policies and guidance at the national and local level that will be relevant to the Bristol Airport Limited (BAL) ES. These are listed in **Table 12.1**.

**Table 12.1** Relevant policies and their implications for land quality

Policy reference	Implications
National Planning Policy Framework (NPPF) 2012 <sup>176</sup>	

<sup>174</sup> UK Government, 1991. Water Resources Act 1991. Available online

[https://www.legislation.gov.uk/ukpga/1991/57/pdfs/ukpga\\_19910057\\_en.pdf](https://www.legislation.gov.uk/ukpga/1991/57/pdfs/ukpga_19910057_en.pdf) [checked 30/03/18]

<sup>175</sup> The Environmental Damage (Prevention and Remediation) Regulations 2009. (SI 2009/153). available Online

<http://www.legislation.gov.uk/uksi/2009/153/contents/made> [checked 30/03/18]

<sup>176</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. [Online]

Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Accessed 12 03 2018].

Policy reference	Implications
Paragraph 109	The natural environment should be conserved and enhanced by remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land.
Paragraph 110	The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.
Paragraph 111	In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the least environmental or amenity value.
Paragraph 121	Planning policies and decisions should encourage the effective use of land by re-using land that has previously been developed (brownfield land), provided that it is not of high environmental value.
	Therefore, planning policies and decisions should also ensure that: <ul style="list-style-type: none"> <li>• A site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or effects on the natural environment arising from that remediation;</li> <li>• After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and</li> <li>• Adequate site investigation information, prepared by a competent person, is presented.</li> </ul>
<b>Biodiversity and Geological Conservation Circular 2005177</b>	
	Outlines obligations under the planning system with respect to the conservation of biodiversity and geology.
<b>North Somerset Council (NSC) Core Strategy January 2017178</b>	
Policy CS3 - Environmental Impacts and Flood Risk Assessment	States that development that, on its own or cumulatively, would result in air, water or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other control regimes, or by measures included in the proposals, by the imposition of planning conditions or through a planning obligation.

## Guidance

### Environment Agency Contaminated Land Report 11 (CLR 11), Model Procedures for the Management of Land Contamination<sup>179</sup>

- 12.2.5 CLR 11 provides the technical framework for applying a risk management process when dealing with land affected by contamination. The technical approach presented in the Model Procedures is designed to be applicable to a range of non-regulatory and regulatory contexts. These include:
- Development or redevelopment of land under the planning regime;
  - Regulatory intervention under Part 2A of the EPA, 1990;
  - Voluntary investigation and remediation; and
  - Managing the potential liabilities of those responsible for individual sites or a portfolio of sites.

<sup>177</sup> Office of the Deputy Prime Minister, 2005. Government circular, Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system. Available Online [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/7692/147570.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf) [checked 30/03/18]

<sup>178</sup> 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> [Accessed 16 04 18]

<sup>179</sup> Environment Agency, 2004. Model Procedures for the Management of Land Contamination. Available online <http://webarchive.nationalarchives.gov.uk/20140328160926/http://cdn.environment-agency.gov.uk/scho0804bibr-e-e.pdf> [checked 30/03/18]

## UK Best Practice Guidance

- 12.2.6 In addition to the above legislation and policies, there is a large amount of UK best practice guidance documentation which is relevant to geology and land contamination. Some of the key pieces of guidance are listed below (the list is indicative only, i.e. it is not exhaustive):
- BS10175:2011+ A1:2013 Investigation of Potentially Contaminated Sites – Code of Practice<sup>180</sup>;
  - Guidance on the Safe Development of Housing on land affected by contamination (National House-Building Council (NHBC)<sup>181</sup>, Environment Agency and Chartered Institute of Environmental Health (CIEH)) 2008;
  - Guiding Principles for Land Contamination<sup>182</sup> (Environment Agency 2010);
  - Department of Environment Industry Profiles<sup>183</sup>; and
  - Safeguarding our Soils; a Soil Strategy for England<sup>184</sup>, 2011, DEFRA.
- 12.2.7 There is also a range of best practice guidance mainly relating to prevention of pollution and good environmental management which is relevant to construction and operational phases of the proposed facility. This includes:
- Construction Industry Research and Information Association (CIRIA) Report 132: A guide for safe working practices on contaminated sites<sup>185</sup>;
  - CIRIA Report C532: Control of Water Pollution from Construction Sites<sup>186</sup>;
  - CIRIA Report C502: Environmental Good Practice on Site<sup>187</sup>; and
  - Health and Safety Executive (HSE) 1991 Protection of workers and the general public during the development of contaminated land<sup>188</sup>.

## 12.3 Main sources of data

- 12.3.1 The EIA scoping exercise presented in this Scoping Report, with respect to land quality, has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the following sources of data:

<sup>180</sup> BSI Standards Publication, 2013. Investigation of potentially contaminated sites – Code of practice. Available online <http://bailey.persona-pi.com/Public-Inquiries/M4-Newport/C%20-%20Core%20Documents/12.%20Geology%20and%20Soils/12.2.13%20-%20BS10175%20Code%20of%20Practice%20for%20Investigation%20of%20Potentially%20Contaminated%20Sites%20%28inc.%202013%20Amendment%29.pdf> [checked 30/03/18]

<sup>181</sup> Environment Agency and Chartered Institute of Environmental Health, 2008. Guidance on the Safe Development of Housing on land affected by contamination. Available online

<http://www.nhbc.co.uk/NHBCpublications/LiteratureLibrary/Technical/filedownload,33595,en.pdf> [checked 30/03/18]

<sup>182</sup> Environment Agency, 2010. GPLC1 Guiding principles for land contamination. Available online <https://www.clare.co.uk/useful-government-legislation-and-guidance-by-country/192-guiding-principles-for-land-contamination-gplc> [checked 30/03/18]

<sup>183</sup> Department of Environment, 1995. DoE Industry Profiles. Available online <https://www.clare.co.uk/useful-government-legislation-and-guidance-by-country/198-doe-industry-profiles> [checked 30/03/18]

<sup>184</sup> Defra, 2009. Safeguarding our Soils, A strategy for England. Available online [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69261/pb13297-soil-strategy-090910.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69261/pb13297-soil-strategy-090910.pdf) [checked 30/03/18]

<sup>185</sup> CIRIA, 1996. CIRIA Report 132 - A Guide for Safe Working on Contaminated Sites

<sup>186</sup> CIRIA, 2001. CIRIA Report C532: Control of Water Pollution from Construction Sites

<sup>187</sup> CIRIA, 2010. CIRIA Report C502: Environmental Good Practice on Site

<sup>188</sup> HSE, 1991. Protection of workers and the general public during the development of contaminated land.

- British Geological Survey (BGS) Geology of Britain Viewer<sup>189</sup>: borehole logs and BGS maps;
- Environment Agency website: "What's in your backyard?"<sup>190</sup>;
- Magic website<sup>191</sup>;
- Envirocheck report<sup>192</sup> (reference 128842570\_1\_1), including historical / recent Ordnance Survey plans and environmental datasheets;
- 2018 Preliminary Phase 1 LQA<sup>167</sup> to confirm the current land use, potential geotechnical constraints associated with this use, evidence of contamination / potential sources of contamination, an indication of potential receptors (on and off-site) and an assessment of potential risks to receptors; and
- Previous Phase 1 Contaminated Land Desk Study<sup>193</sup> dated July 2011, including a preliminary unexploded ordnance (UXO) assessment that remains relevant for the majority of the Proposed Development site. Areas excluded from this survey, relevant to the Proposed Development are the areas proposed for the extension to the Silver Zone car park and the A38 highway improvements.

12.3.2 No specific baseline surveys have been carried out which inform scoping of land quality within the Proposed Development. There have been sampling programmes completed at Bristol Airport which may inform the conceptual site model for the Proposed Development. A full review of previous work will be completed as part of the planning process and intrusive investigation undertaken where there are data gaps.

## 12.4 Engagement with consultees

12.4.1 Initial consultation and request for further information from the Environment Agency (EA) and North Somerset Council (NSC) (**Section 12.5.32**) has begun. The EA and NSC will have the opportunity to comment on the scoping report in their role as a statutory consultee throughout consultation.

## 12.5 Overview of baseline conditions

### Zones of influence

- 12.5.1 The study area for the LQA comprises all of the land required for the Proposed Development and a surrounding buffer area extending 250m outwards from the Proposed Development. The Proposed Development is outlined within the Preliminary Phase 1 LQA<sup>167</sup> and associated drawings (**Appendix B**).
- 12.5.2 The rationale for the study area is informed by professional judgement when considering:

<sup>189</sup> British Geological Survey, Geology of Britain Viewer <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> [last accessed 20 March 2018].

<sup>190</sup> Environment Agency, What's in Your Backyard <http://apps.environment-agency.gov.uk/wiyby/default.aspx> [last accessed 20 March 2018]. N.B. from April 2018 this service is no longer available from the Environment Agency.

<sup>191</sup> Magic.gov.uk website, <http://www.magic.gov.uk/MagicMap.aspx> [last accessed 20 March 2018].

<sup>192</sup> Envirocheck Report, Ref. 128842570\_1\_1, 16 June 2017.

<sup>193</sup> Post Planning Application Conditions: Phase 1 Contaminated Land Desk Study, Report Reference 28770 RR002i4, Entec UK Limited, July 2011.



- The spatial extent (taking into account contaminant degradation, dilution and dispersion in the environment) at which significant land quality effects are likely to have the potential to be realised through potentially active contaminant linkages;
- The spatial extent from which off-site sources of contamination are likely to have the potential to present significant effects on receptors within the Proposed Development; and
- The spatial extent from which geohazards such as compressible and collapsible ground and ground gases are likely to have the potential to present significant effects on receptors within the Proposed Development.

## Current baseline

### Geology and Hydrogeology

- 12.5.3 The majority of the Proposed Development site is underlain by Made Ground associated with the existing infrastructure, which in turn is underlain by superficial deposits of clay of up to 8m to 9.0 m in thickness (typically 2 to 5m in thickness), overlying bedrock of the Carboniferous Black Rock Limestone subgroup. Exceptions to this comprise an area to the south of the Bristol Airport site, associated with the Silver Zone Parking and Bristol and Wessex Aeroplane Club, and also to the very northwest, covering the north of Tall Pines Golf Club, where the bedrock geology is the Brockley Down Limestone. There is also a small area in the south west of Bristol Airport where the Westbury Formation and Cotham Member (undifferentiated) are found.
- 12.5.4 Bristol Airport is underlain by a Principal Aquifer (the Black Rock Limestone) with relatively thin and intermittent drift cover (unproductive superficial strata). The Brockley Down Limestone at the northwest is a Secondary A Aquifer.
- 12.5.5 The majority of the Bristol Airport site lies within a Zone 2 outer Source Protection Zone (SPZ) associated with the designated outer catchment of the Chelvey Well SPZ. This SPZ is for Bristol Water's Chelvey source, which is approximately 3.4km to the north east of Bristol Airport.
- 12.5.6 There is evidence that historical limestone quarrying has taken place at the Bristol Airport site within and in the immediate vicinity of the Proposed Development.
- 12.5.7 Lead and calamine (zinc oxide) workings are evident within the vicinity of the Proposed Development at the north and the south of the Site.
- 12.5.8 A number of collapse features and voids are present across the Bristol Airport site associated with the natural geology that underlies this area.
- 12.5.9 Further details of the geology and hydrogeology within the area of the Proposed Development are outlined in the **Chapter 11: Groundwater**.

### Hydrology

- 12.5.10 There are no surface water features reported within the vicinity of the Proposed Development. There are no surface watercourses present and none are recorded above the 150m Above Ordnance Datum (AOD) contour of Broadfield Down. Below this level, a number of springs are recorded, which are likely to be fed by discharge from the limestone aquifer underlying Bristol Airport.
- 12.5.11 A second SPZ lies to the west of Bristol Airport and this has been defined for the surface water catchment to Bristol Water's Winford Brook source.

- 12.5.12 Further details regarding the hydrology of the area of the Proposed Development are outlined in the **Chapter 10: Surface water and flood risk**.

### Sensitive Land Use

- 12.5.13 The Envirocheck Report<sup>192</sup> has been used to review the presence of sensitive land uses. A Local Nature Reserve is present at Felton Common, located adjacent to the east of the north eastern extent of the Proposed Development. No other sensitive land uses are identified.
- 12.5.14 Further details regarding sensitive ecological land uses within of the area of the Proposed Development are outlined in the **Chapter 9: Biodiversity**.

### Current / Historic Land Use

- 12.5.15 It is understood that Bristol Airport was first developed as an airfield in 1941 for use during WWII, known as RAF Lulsgate Bottom. After WWII, in 1946, the airfield was abandoned by the RAF. During the next ten years the airfield was used by Bristol Gliding Club and motor race meetings were held at the airfield.
- 12.5.16 In 1955 work began on airport terminal facilities. The new aerodrome known as Bristol (Lulsgate) Airport opened in 1957. Extensions were made to the terminal building in 1965 and work to lengthen the main runway to the west was completed in 1963.
- 12.5.17 It is understood that the central apron was developed in three phases between 1984 and 1992.
- 12.5.18 In 2000 a new terminal building opened, the new control tower was completed and the Category III all-weather landing system (which required diversion of the A38 main road) was installed.
- 12.5.19 It is understood that raising of ground levels occurred during both the runway extension and the construction of the current Terminal building.

### Agricultural Land Quality

- 12.5.20 An Agricultural Land Classification (ALC) assessment has not been undertaken for the Proposed Development site. The nearest assessment classifies land approximately 550 m to the north as Grade 3a land (good quality agricultural land). Where there is a proposed change from agricultural land use, such as the extension to the Silver Zone car park, an ALC assessment should be completed to ascertain the agricultural land quality and inform the Proposed Development scheme. Bristol Airport itself is not classified as agricultural land.

### Soils

- 12.5.21 Soilscape summary data available on the Magic.gov website<sup>191</sup> indicates that soils on and directly surrounding the Site are classed as loamy freely draining slightly acid soils with natural high fertility.

### Waste disposal / Landfilling

- 12.5.22 The Envirocheck Report<sup>192</sup> identifies one Licensed Waste Management Facility within 500 m of the Proposed Development, located at Lulsgate Quarry, approximately 100 m to the northwest of the Proposed Development at the northwest of the Bristol Airport site. The licence is reported to be for inert landfill and is licensed to Churngold Recycling Limited.
- An area of "unknown filled ground" is identified by the Envirocheck Report<sup>192</sup>, located between the runway and the existing terminal building. The approximate location corresponds with the historical former Lulsgate Farm Quarry.

- 12.5.23 Other former quarries, lead workings and an old limekiln are noted within the Bristol Airport site which may have been subject to infilling with contaminated, putrescible or biodegradable materials.
- 12.5.24 A large area of level raising is noted at the west of the Bristol Airport site associated with former expansion of the runway. The level-raising materials that were used are not identified in the information that has been made available.

### Unexploded Ordnance (UXO)

- 12.5.25 A UXO assessment was completed by Zetica Limited in 2011<sup>194</sup>. The assessment concluded that UXO risk at this Site is Low. The assessment did not include the proposed extension to the Silver Zone car park and the A38 improvements.

### Radioactive Contamination

- 12.5.26 Former RAF bases may have a legacy of radioactive contamination arising from ad hoc disposal of radium luminised cockpit instruments etc. dating from the mid-20th century, which were incinerated at a 'burning ground'. The previous contaminated land desk study report<sup>193</sup> indicates that wartime site layout plans identify a "*refuse destructor*" within the current sewage treatment plant, located to the north of Downside Road (outside the current Bristol Airport site boundary). It is considered likely that any luminised cockpit instruments that were burnt would have been within this area and the likelihood of any radioactive contamination being present within the Proposed Development Site is considered to be Low.

### Radon

- 12.5.27 The Envirocheck Report<sup>192</sup> indicates that the National Geoscience Information Service of the British Geological Survey report that the area in which the Proposed Development is located is in a "higher probability radon area" (10 to 30% of homes are estimated to be at or above the Action Level) and full radon protective measures are necessary in the construction of new dwellings or extensions.

### Land Quality Preliminary Risk Assessment

- 12.5.28 In line with the approach set out in CLR11<sup>195</sup>, the data from the Preliminary Phase 1 LQA<sup>167</sup> has been used to undertake a Preliminary Risk Assessment in order to develop a Conceptual Site Model (CSM).
- 12.5.29 The CSM identifies the potential contaminant linkages between contaminants (sources) and receptors present in a given scenario (known as Source-Pathway-Receptor (SPR) Linkages).

### Potential sources of contamination

- 12.5.30 Plans showing the locations of the potential contamination sources at the Bristol Airport site, including the Proposed Development, are included in the Preliminary Phase 1 LQA<sup>167</sup>, based on the following historical and current potential contaminant sources and poor ground conditions:
- Made Ground from landfills, level-raising and infilling of features (such as historical quarries);
  - Former sewage works;
  - Potentially contaminative WWII site uses;

<sup>194</sup> Sitesafe UXO Desk Study, Bristol Airport, Lulsgate, North Somerset, Report Ref, P2787-11-R-1-1, Zetica Ltd. April 2011.

<sup>195</sup> Environment Agency (2004): *Model Procedures for the Management of Land Contamination*, Contaminated Land Report 11 (CLR11)

- Electricity substations;
- Bulk oil and fuel storage;
- Hydrocarbon contaminated shallow groundwater;
- Aircraft operation and maintenance facilities;
- Historical quarrying;
- Historical lead workings;
- Geological hazards including collapse features and voids (including “swallets” marked on geological map) and geological fault lines (at the northern and southern extent of the Bristol Airport site); and
- Other potentially contaminative land uses (such as farm buildings, possible domestic fuel tanks etc.).

### Factors influencing baseline conditions

- 12.5.31 The baseline conditions outlined in this Scoping Report are based solely on a review of the Preliminary Phase 1 LQA<sup>167</sup> data available at the time of writing. The data available to date will be supplemented by the additional baseline information identified below.

### Additional baseline information requirements

- 12.5.32 Further baseline information will be obtained from an environmental information request from the EA and NSC to determine if they hold any further environmental information not readily available through the Envirocheck reports and public websites (e.g. BGS<sup>189</sup>, Magic.gov.uk<sup>191</sup>).
- 12.5.33 The baseline data from the Preliminary Phase 1 LQA<sup>167</sup> will be further developed by additional Ground Investigation data as part of the ES, including:
- Additional environmental information, for information that has not been made available to date (including site specific ground investigation and remediation information, if available, and supplementary UXO assessments within Proposed Development areas that fall outside of the existing UXO survey area);
  - Targeted site-specific data comprising information on geological ground conditions (from both an environmental and geotechnical perspective) and the hydrogeological, hydrological and ground gas regime; and
  - Laboratory chemical analysis of soil, water and gas samples to determine the presence and magnitude of existing contamination in soil, groundwater, surface water and soil vapour, which will be completed in accordance with current guidance and standard practice including:
    - ▶ British Standard BS10175:2011+A1:2013 Investigation of Potentially Contaminated Sites;
    - ▶ British Standard BS5930:2015 Code of Practice for Ground Investigations;
    - ▶ British Standard BS EN 1997-2:2007 Eurocode 7. Geotechnical design. Ground investigation and testing;

- ▶ Environment Agency Model Procedures for the Management of Land Contamination (CLR 11); and
- ▶ Institution of Civil Engineers, ICE, UK Specification for Ground Investigation, 2<sup>nd</sup> edition (2012).

12.5.34 As the design and consultation processes progress and the land required for the Proposed Development is refined, the need for (and extent of) additional baseline data will also be reviewed and updated.

12.5.35 The level of data collected to support the ES will be dependent on the availability of site access to undertake the Ground Investigation surveys, where required, for the assessment. Where required, Ground Investigation surveys will continue beyond the ES in order to support further evaluation and implementation of detailed design parameters and, where necessary, remediation options.

## 12.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

12.6.1 In order for land contamination risk to be realised, a 'contaminant linkage' must exist<sup>195</sup>. A contaminant linkage requires the presence of:

- Source of contamination;
- Receptor capable of being harmed; and
- Pathway capable of exposing a receptor to the contaminant.

12.6.2 From the desk study data available to date, the receptors relating to human health which could be affected by the potential contamination sources include:

- Current and future site users (members of the public and commercial site users);
- Neighbouring site users (residential and amenity/public open space);
- Land and property (including land used for agriculture (crops and livestock), existing structures, utilities and infrastructure);
- Groundwater in the underlying bedrock (in relation to human health); and
- Construction workers (during the construction phase).

12.6.3 Risks to ecological receptors (as defined in Part 2A) are considered in **Chapter 9: Biodiversity**.

12.6.4 Controlled water receptors include:

- Groundwater in bedrock (Principal and Secondary A Aquifers and Zone 2 SPZ); and
- Surface waters (i.e. streams, rivers, lakes and ponds).

12.6.5 These are also discussed in **Chapter 10: Surface water and flood risk**; and **Chapter 11: Groundwater**.

12.6.6 A review of baseline information indicates that there are potential sources of contamination within the Proposed Development site, particularly the Made Ground associated with former

development, the Site's historical use as an airport and a RAF base, infilling / level-raising activities on-site, and bulk fuel storage. Potential contaminants include:

- **Historical Land Uses.** There are a number of historical land uses with the Proposed Development Site that may add a constraint to development associated with ground and groundwater contamination and geotechnical implications. Such historical land uses include former widespread small-scale mine workings and quarrying, WWII airfield and subsequent airfield use, fire-fighting training, farm land and buildings. Contaminants associated with historical land uses may include, but are not limited to, asbestos containing materials, fuels, oils, volatile contaminants, polyaromatic hydrocarbons, heavy metal contamination, pesticides, herbicides, de-icers, fire-fighting foams, surfactants, UXO and putrescible wastes. In addition, historical land uses may have caused poor geotechnical ground conditions in areas such as former mine workings, quarrying and areas of Made Ground, such as ad-hoc disposal of materials.
- **Current Land Use.** It is assumed that current site uses will be operated in accordance with contemporary legislation, guidance and best practice. However, there is the potential for constraints to arise from poor practice whereby impact to land quality may occur. There is the potential for contaminants to exist, and may include but are not limited to, fuels, oils, polyaromatic hydrocarbons, asbestos containing materials, heavy metals, volatile contaminants, pesticides, herbicides, de-icers, fire-fighting foams and surfactants.
- **Geology.** The ground (limestone bedrock) is vulnerable to dissolution and may pose a constraint through collapsing ground and sinkholes. Several sinkholes are recorded on database records. Two geological fault lines are present at the northern and southern extent which may require geotechnical foundation design considerations. Radon levels are indicated to be naturally elevated within the area of the Bristol Airport site.

12.6.7 A review of currently available baseline information has identified Receptors that are potentially subject to effects as a result of the Proposed Development and the associated potential Exposure Pathways. These are summarised in **Table 12.2**.

**Table 12.2 Identified Receptors\* and Exposure Pathways**

Receptors*	Potential Exposure Pathways
<b>Current and future site users (members of the public, construction workers and commercial site users)</b>	Dermal contact, ingestion and inhalation of dusts, vapours, fibres and accumulated gases, including radon, explosion.
<b>Neighbouring site users (residential/Public Open Space)</b>	Dermal contact, ingestion and inhalation of dusts, vapours, fibres and accumulated gases, explosion.
<b>Controlled Waters: Principal Aquifer and Source Protection Zone</b>	Leaching from soils, migration in groundwater.
<b>Property: buildings and buried services (current and future)</b>	Direct contact, vapour migration and accumulation of gases, explosion

\* Receptors presented in **Table 12.2** do not include those assessed elsewhere in this Scoping Report (e.g. Ecology – discussed in **Chapter 9: Biodiversity**)

## Potential significant effects requiring further assessment

12.6.8 The potential effects of the Proposed Development likely to be significant with regards to land quality, and which will be subject to further assessment (to be presented within the ES) are identified below. The initial CSM from the Preliminary Phase 1 LQA<sup>167</sup> have been used to identify the likely significant land quality effects to be assessed, as summarised in **Table 12.3**.

Table 12.3 Potential Significant Land Quality Effects

Activity	Effect	Receptor
<b>Construction</b>		
Construction activities located on, or adjacent areas of land filling / level raising and other potentially contaminative land uses such as current and historical fuel storage/distribution facilities, old lead workings, WWII land uses and former sewage works.	Mobilisation of contamination <i>via</i> numerous pathways (including groundwater migration, surface water migration, leaching from soils) resulting in contamination of controlled waters.	Principal aquifer and surface water receptors.
	Mobilisation of contamination <i>via</i> numerous pathways (including groundwater migration, surface water migration, leaching from soil, migration of vapours and windblown dusts, explosion) resulting in health impacts	Residents, adjacent commercial workers and airport users, adjacent public open space / amenity users.
	Build-up of gases in confined spaces in existing or newly constructed infrastructure on and beyond the land required for the Proposed Development, leading to potentially explosive atmospheres, property damage and human health risk.	Residents, adjacent commercial workers and airport users.
	Exposure to contamination <i>via</i> direct contact, inhalation and/or ingestion of soils and dusts, explosion resulting in health impacts.	Construction workers.
	Damage to newly constructed infrastructure from aggressive ground conditions (such as sulphate attack on concrete), explosion.	Permanent infrastructure for the Proposed Development.
Construction activities located on, or adjacent to collapse features and voids.	Damage to newly constructed infrastructure associated with unstable ground conditions and risks to human health during construction.	Construction workers and permanent infrastructure / property associated with the Proposed Development.
Construction vehicle and equipment maintenance and storage of fuels/oils for construction vehicles and equipment	Accidental spillages and leaks resulting in ground and groundwater contamination	Soils, Principal Aquifer / SPZ, surface water receptors, construction workers.
Construction activities on previous agricultural land permanently taken for the Proposed Development	Permanent loss of agricultural land, permanent loss of topsoil and changes to soil structure due to inappropriate storage and/or handling of soils.	Soils.
<b>Operation</b>		
Presence of significant quantities of Made Ground and/or disturbed materials, UXO beneath permanent infrastructure.	Damage to infrastructure from aggressive ground conditions unstable ground conditions, settlement and explosion.	Permanent infrastructure and property associated with the Proposed Development.



Activity	Effect	Receptor
	Build-up of landfill gases in confined spaces in existing or newly constructed infrastructure on and beyond the development boundary, leading to potentially explosive atmospheres, property damage and human health risk.	Residents, commercial workers and airport users, property.
Presence of collapse features, voids and historical quarrying and lead workings.	Damage to infrastructure associated with unstable ground conditions and settlement, and risks to human health.	Permanent infrastructure and property associated with the Proposed Development. Future airport users.
Vehicle and equipment maintenance and use of a wide variety of chemicals including fuels/oils, de-icers and substances used in firefighting foams.	Accidental spillages and leaks resulting in ground and groundwater contamination.	Soils, Principal Aquifer / SPZ, surface water receptors, Proposed Development users and adjacent site users.
Presence of naturally occurring radon gas.	Accumulation within unprotected buildings and structures.	Workers and airport users.

- 12.6.9 It is noted that the assessment of significant effects for land quality is closely linked to other topics including **Chapter 7: Air quality and odour**, **Chapter 10: Surface water and flood risk**, and **Chapter 11: Groundwater**. Contamination resulting from a major accident or disaster is covered in **Chapter 16: Major accidents and disasters**. Inter-related effects will be considered in the cumulative effects assessment presented within the ES.

### Potential effects not requiring further assessment

- 12.6.10 Based on the information that is currently available it is considered that potential radioactive contamination does not require further assessment and is scoped out. This will be reviewed should any new information become available, including actual ground conditions encountered during Ground Investigation and subsequent development.
- 12.6.11 At this stage of the process, no other effects have been identified that can be scoped out of further assessment based on the data and design information that has currently been made available. However, it is anticipated that it will be possible to scope out many of the potential effects at an early stage of the assessment process presented in the ES as more information becomes available.

### Proposed assessment methodology

- 12.6.12 The LQA approach and associated methodologies outlined in this section have been developed to combine the requirements of the UK legislative framework for the assessment and management of potentially contaminated land with the assessment of potentially significant land quality effects within the EIA process.
- 12.6.13 This approach incorporates current standard practice including statutory and non-statutory guidance and codes of good practice, in particular the phased and iterative approach set out in CLR11<sup>195</sup> comprising a Preliminary Risk Assessment (as part of the Preliminary Phase 1 LQA<sup>167</sup>) followed by Quantitative Risk Assessment (QRA) following collection of Ground Investigation data.
- 12.6.14 The evaluation of significance for land quality effects will be undertaken using the following methodology:
- The initial CSM's will be refined based on the desk study and ground investigation data to provide final CSM scenarios representing the baseline for the construction phase;

- For each of the CSM scenarios, the QRA process will be used to evaluate the level of risk from measured concentrations of contaminants of concern in soil, groundwater, surface water and vapour to the identified receptor; and
- Significant land quality effects will be identified based on the presence of contaminants in soil, groundwater, surface water and vapour which exceed the applicable QRA screening values, alongside professional judgement considering the changes in the CSM between baseline and construction phase and the context of the contaminant exceedance (for example a spatially isolated or marginal exceedance).

- 12.6.15 The selection of appropriate screening criteria to be used in the QRA will be issued to the EA (as the UK regulator responsible for controlled waters) and NSC's contaminated land officers (as the UK regulator responsible for human health) for comment. Consultation is discussed in **Section 12.4**.
- 12.6.16 Potential human health and controlled water receptors will change during and post-construction, for example through the introduction of new roadways, carparking and commercial properties. The CSM's and the assessment of land quality presented in the ES will take into account these changes in receptors.
- 12.6.17 Baseline ALC surveys to determine the agricultural land quality will be undertaken on agricultural land that coincides with the Proposed Development and will be undertaken according to Natural England 2018 guidance<sup>196</sup>. The extent of the baseline ALC surveys will be dependent on whether the land was formerly used for agriculture and whether it will be disrupted, disturbed, lost or taken out of agricultural production due to the Proposed Development scheme. ALC surveys will not be required within other areas (such as non-agricultural land, woodland and amenity land).

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<sup>196</sup> Natural England, Guide to assessing development proposals on agricultural land, January 2018.

## 13. Historic Environment

### 13.1 Introduction

13.1.1 This chapter sets out the proposed approach to assessing the potential effects on the historic environment ('heritage') that would result from the Proposed Development.

13.1.2 The historic environment is defined as:

*"... all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora."*<sup>197</sup>

13.1.3 Heritage features within the Bristol Airport site and in close proximity to it are considered. Previous assessment and archaeological work has revealed important archaeological artefacts and features dating from the prehistoric and post-medieval periods, providing evidence of funerary practices, occupation and industrial activity. Bristol Airport opened in 1957 on an airfield which had been in operation during World War II as RAF Lulsgate Bottom. Built heritage remains from this period are present on the Bristol Airport site and there is potential for further buried remains from this and earlier periods in areas little disturbed by recent development.

### 13.2 Relevant legislation, policy and guidance

#### Legislation and policy

13.2.1 The importance of cultural heritage and archaeology is recognised in legislation, with heritage assets that are deemed to be of particular importance given legal protection. Key aspects of legislation and planning policies relevant to the historic environment and the assessment that will be presented within the ES are set out in **Table 13.1**.

Table 13.1 Legislation, National and Local Planning Policies relevant to Historic Environment

Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
<b>Legislation:</b>  <b>Ancient Monuments and Archaeological Areas Act (1979)<sup>198</sup> (subsequently amended by the National Heritage Acts 1983<sup>199</sup> and 2002<sup>200</sup>)</b>	Changes to the fabric of scheduled monuments require consent from the Secretary of State, as advised by Historic England (HiE).

<sup>197</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. [Online] Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Accessed 12 03 2018].

<sup>198</sup> Ancient Monuments and Archaeological Areas Act 1979, Chapter 46, Part I. [Online] Available at: [www.legislation.gov.uk/ukpga/1979/46](http://www.legislation.gov.uk/ukpga/1979/46) [Accessed 12 03 2018].

<sup>199</sup> National Heritage Act, 1983. Chapter 47, 32-38. [Online] Available at: [www.legislation.gov.uk/ukpga/1983/47/contents](http://www.legislation.gov.uk/ukpga/1983/47/contents) [Accessed 12 03 2018].

<sup>200</sup> National Heritage Act, 2002. Chapter 14, 1-8. [Online] Available at: [www.legislation.gov.uk/id/ukpga/2002/14](http://www.legislation.gov.uk/id/ukpga/2002/14) [Accessed 12 03 2018].

Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
<b>Planning (Listed Buildings and Conservation Areas) Act (1990)<sup>201</sup></b>	Covers the registration of Listed Buildings (buildings that are seen to be of special architectural or historic interest) and designation of Conservation Areas (areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance).
<b>National Planning Policies and Regulations:</b>	
<b>NPPF 2012<sup>197</sup></b>	The NPPF 2012 Section 12 relates to the historic environment and is consistent with the draft policies of the Draft Airports NPS. A positive strategy should be implemented for the conservation and enjoyment of the historic environment, including heritage assets (both designated and non-designated) most at risk through neglect, decay or other threats. Heritage assets should be conserved in a manner appropriate to their significance. Local authorities will require applicants to describe the significance of heritage assets, including the contribution made by their setting affected by the application.
<b>Paragraph 129</b>	The particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) should be identified and assessed, taking account of the available evidence and any necessary expertise. This is in order to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.
<b>Paragraph 132</b>	When considering the impact of a proposal on a designated heritage asset, great weight should be given to the asset's conservation. The more significant the asset the greater the weight should be. Significance can be harmed or lost through alteration to the asset or development in its setting.
<b>Paragraph 134</b>	Where development will lead to less than substantial harm to the significance of the designated asset, the harm should be weighed against the public benefit of the proposal.
<b>Paragraph 135</b>	The effect of a proposal on the significance of a non-designated heritage asset should be taken into account in determining the application.
<b>Paragraph 139</b>	Non-designated archaeological heritage assets of demonstrably equivalent significance to scheduled monuments should be managed as designated heritage assets.
<b>Paragraph 141</b>	Information about the significance of the historic environment gathered as part of plan-making or development management should be made publicly accessible. Developers are required to record and

<sup>201</sup> Planning (Listed Buildings and Conservation Areas) Act, 1990. Chapter 9, Part 1, Chapter I. [Online] Available at: [www.legislation.gov.uk/ukpga/1990/9/part/1/chapter/1](http://www.legislation.gov.uk/ukpga/1990/9/part/1/chapter/1) [Accessed 12 03 2018].

Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
	<p>advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. Copies of evidence should be deposited with the relevant Historic Environment Record and any archives with a local museum or other public depository. The ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.</p>
<p><b>National Planning Policy Framework (NPPF): Draft for Consultation (March 2018)<sup>202</sup></b></p> <p><b>Paragraph 185</b></p>	<p>The draft NPPF Section 16 relates to the historic environment and is consistent with the draft policies of the Draft Airports National Policy Statement (NPS).</p> <p>In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum, the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary.</p> <p>Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.</p>
<p><b>Paragraph 186</b></p>	<p>The particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) should be identified and assessed, taking account of the available evidence and any necessary expertise. This is in order to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.</p>
<p><b>Paragraph 189</b></p>	<p>When considering the impact of a proposal on a designated heritage asset, great weight should be given to the asset's conservation irrespective of the degree of potential harm to its significance. The more significant the asset the greater the weight should be.</p>
<p><b>Paragraph 192</b></p>	<p>Where development will lead to less than substantial harm to the significance of the designated asset, the harm should be weighed against the public benefit of the proposal.</p>
<p><b>Paragraph 193</b></p>	<p>The effect of a proposal on the significance of a non-designated heritage asset should be taken into account</p>

<sup>202</sup> Ministry of Housing, Communities and Local Government, 2018. National Planning Policy Framework. Draft text for consultation. [Online] Available at:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685289/Draft\\_revised\\_National\\_Planning\\_Policy\\_Framework.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/685289/Draft_revised_National_Planning_Policy_Framework.pdf) [Accessed 12 03 2018].

Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
	<p>in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required. Giving regard to the scale of any harm or loss and the significance of the heritage asset.</p>
<p><b>Paragraph 190</b></p>	<p>Any harm or loss to a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:</p> <ul style="list-style-type: none"> <li>a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional; and</li> <li>b) scheduled monuments, protected wreck sites, registered battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional**.</li> </ul> <p>** Non-designated heritage assets of archaeological interest, that are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.</p>
<p><b>Paragraph 195</b></p>	<p>Local planning authorities should require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible.</p> <p>However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.</p>
<p><b>Hedgerow Regulations 1997<sup>203</sup></b></p>	<p>Sets out criteria for identifying important hedgerows and for a process of gaining consent for their removal, including heritage-based considerations. Removal of an important hedgerow is deemed as permitted where a planning permission or Development Consent Order (DCO) which would require removal of a hedgerow has been granted, as detailed in <i>The Infrastructure Planning (Interested Parties and Miscellaneous Prescribed Provisions) Regulations 2015<sup>204</sup></i>.</p>
<p><b>Draft Airports NPS<sup>205</sup></b></p>	<p>The government issued the Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England in February 2017 (revised October 2017). Whilst this document focuses on the southeast and specifically the potential for an expanded Heathrow Airport, it provides policy guidance as to how the impacts of airport development upon the historic environment should be considered.</p>

<sup>203</sup> The Hedgerow Regulations, 1997. Section 4-5. [Online] Available at: [www.legislation.gov.uk/ukxi/1997/1160/contents/made](http://www.legislation.gov.uk/ukxi/1997/1160/contents/made) [Accessed 12 03 2018].

<sup>204</sup> The Infrastructure Planning (Interested Parties and Miscellaneous Prescribed Provisions) Regulations, 2015.

<sup>205</sup> Revised Draft Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England, October 2017, Paragraph 5.186. [Online] Available at: [www.gov.uk/government/publications/revised-draft-airports-national-policy-statement](http://www.gov.uk/government/publications/revised-draft-airports-national-policy-statement) [Accessed 12 03 2018].

Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
	<p>The Draft NPS is consistent with the NPPF, but emphasises the specific impacts that come from airport development. Paragraph 5.184 of the Draft NPS makes reference to noise impacts and how these affect the understanding and appreciation of heritage assets affected by airport schemes.</p>
<b>Local Policies:</b>	
<p><b>Bristol Development Framework Core Strategy<sup>206</sup></b>  <b>(Adopted June 2011)</b>  <b>Policy BCS 22</b></p>	<p>Development proposals will safeguard or enhance heritage assets and the character and setting of areas of acknowledged importance including Scheduled ancient monuments, Historic buildings both nationally and locally listed, Historic parks and gardens both nationally and locally listed, Conservation areas and Archaeological remains.</p>
<p><b>West of England Joint Spatial Plan (November 2017; pending examination)<sup>207</sup></b>  <b>Policy 5, Principle 4</b></p>	<p>Ensure the protection and enhancement of the natural, built and historic environment. Ensure areas of high landscape and visual sensitivity are respected, and the historical environment is conserved and enhanced.</p>
<p><b>North Somerset Council (NSC) Core Strategy January 2017<sup>208</sup></b>  <b>Policy CS5</b></p>	<p>Sets out a policy framework for the protection and enhancement of the historic environment, to be reinforced by detailed development management policies in the Sites and Policies Development Plan Document and in accordance with NPPF. Has regard for the significance of heritage assets such as conservation areas, listed buildings, buildings of local significance, scheduled monuments, other archaeological sites, registered and other historic parks and gardens, with particular regard given to aspects of the historic environment which contribute to the distinctive character of North Somerset.</p> <p>Buildings need not be listed to be of importance to the historic environment. NSC is proposing to introduce a scheme by which buildings of local or regional importance are identified, using specific criteria. It is envisaged that this status would be a material consideration in assessing planning applications affecting such buildings. Archaeological remains are important for their historical and educational interest and may also be important features in the landscape.</p>
<p><b>North Somerset Development Management Policies Sites and Policies Plan Part 1. Adopted July 2016<sup>209</sup></b></p>	<p>Recognises that heritage assets are a finite and irreplaceable resource and an essential part of North Somerset's cultural and local distinctiveness, creating a unique sense of place. The plan sets out a strategic</p>

<sup>206</sup> Bristol City Council, 2011. Bristol Development Framework Core Strategy, Adopted June 2011. [Online] Available at: [https://www.bristol.gov.uk/documents/20182/34540/Core+Strategy+WEB+PDF+\(low+res+with+links\)\\_0.pdf](https://www.bristol.gov.uk/documents/20182/34540/Core+Strategy+WEB+PDF+(low+res+with+links)_0.pdf) [Accessed 06 04 2018]

<sup>207</sup> Bath & North East Somerset Council, Bristol City Council, North Somerset Council, South Gloucestershire Council, 2017. West of England Joint Spatial Plan. Publication Document. [Online] Available at: [http://www.bristol.ac.uk/media-library/sites/estates/documents/West\\_of\\_England\\_Joint\\_Spatial\\_Plan\\_Publication\\_Document\\_2017%20\(5\).pdf](http://www.bristol.ac.uk/media-library/sites/estates/documents/West_of_England_Joint_Spatial_Plan_Publication_Document_2017%20(5).pdf) [Accessed 10 04 2018]

<sup>208</sup> 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> [Accessed 16 04 18]

<sup>209</sup> North Somerset Council, 2016. Development Management Policies, Sites and Policies Plan Part 1. [online] Available at: <http://www.n-somerset.gov.uk/wp-content/uploads/2015/11/Sites-and-Policies-Plan-Part-1-Development-Management-Policies-July-2016.pdf> [Accessed 16 04 18]



Legislation or Policy reference	Legislation Summary or Policy Information relevant to Historic Environment
<b>DM4</b>	<p>framework to guide the protection and enhancement of North Somerset heritage assets whether or not formally designated, to include conservation areas, historic buildings, historic parks and gardens, archaeology.</p> <p>Listed Buildings: To safeguard the special architectural and historic interest of North Somerset listed buildings as well as their settings.</p>
<b>DM6</b>	<p>Archaeology: To safeguard as yet unidentified heritage assets. Archaeological interests will be fully taken into account when determining planning applications. Where an initial assessment indicates that the development site includes or has the potential to include heritage assets with archaeological interests, the council will seek an archaeological assessment and field evaluation. An initial field evaluation as opposed to a desk-based assessment will only be required where necessary.</p> <p>It is nearly always preferable that archaeological remains are preserved 'in situ'. Modification of proposals may be required to take account of the archaeological remains, for example by using foundations which avoid disturbing the remains or by the careful siting of landscaped or open areas.</p> <p>In cases where the council decides that it is not necessary to preserve remains 'in situ', developers will be required to make appropriate and satisfactory provision for the excavation and recording of the remains before development commences. Planning conditions will be attached to the grant of planning permission requiring an approved programme of archaeological work to be undertaken before development commences, which may include the submission of geotechnical information. Alternatively, legal agreements may be sought with developers, before permission is granted, to excavate and record the remains and to publish the results.</p> <p>Where archaeological assets are considered to be at risk, the council will seek to secure their protection to prevent continued deterioration.</p>
<b>DM7</b>	<p>Non-designated heritage assets: To safeguard non-designated heritage assets. When considering proposals involving non-designated heritage assets NSC will take into account their local significance and whether they warrant protection where possible from removal or inappropriate change including harm to their setting.</p>

## Guidance

- 13.2.2 Guidance on the implementation of the NPPF is provided by the Planning Practice Guidance (PPG), published by the Department for Communities and Local Government (DCLG) and available

online<sup>210</sup>. HiE have produced guidance on how to assess the impacts upon the setting of heritage assets and implementation of heritage policies from the NPPF. The Chartered Institute for Archaeologists (CIfA) has produced standards and guidance documents for the production of desk-based assessments and providing consultancy advice in the historic environment. Applicable guidance and summary descriptions are given in **Table 13.2**.

Table 13.2 HiE and CIfA Guidance

Source	Summary description
<b>HiE GPA2</b> <b>Managing significance in decision-taking in the historic environment (2015)</b> <sup>211</sup>	Guidance from Historic England on how to implement the historic environment policies included in the NPPF.
<b>HiE GPA3</b> <b>The Setting of Heritage Assets (2017)</b> <sup>212</sup>	Guidance from Historic England demonstrating how to assess the impacts upon the setting of a heritage asset.
<b>CIfA</b> <b>Standard and guidance for historic environment desk-based assessment (December 2014)</b> <sup>213</sup>	Assessment will determine, as far as is reasonable, from existing records, the nature, significance potential and importance of the historic environment within a defined area. The assessment will also assess the impact of the development on identified assets, both designated and undesignated.
<b>CIfA</b> <b>Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment (December 2014)</b> <sup>214</sup>	Advice provided should be clear, impartial, informed, robust and compliant with policy and guidance. It should be proportionate, researched and provide a reasoned argument assessing the known and potential significance of heritage assets impacted by the proposal.
<b>Temple and Cotswold Archaeology for English Heritage (2014)</b> <sup>215</sup>	Aviation Noise Metric - Research on the Potential Noise Impacts on the Historic Environment by Proposals for Airport Expansion in England.
<b>English Heritage 2008</b> <sup>216</sup>	Conservation Principles
<b>Historic England 2017</b> <sup>217</sup>	Conservation Principles 2017 (consultation draft)

<sup>210</sup> Ministry of Housing, Communities and Local Government, 2016. Planning practice guidance. The National Planning Policy Framework and relevant planning practice guidance. [Online] Available at: <https://www.gov.uk/government/collections/planning-practice-guidance> [accessed 16 04 2018].

<sup>211</sup> Historic England, 2015. GPA2: Managing Significance in Decision-Taking in the Historic Environment. [Online] Available at: <https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/> [Accessed 12 03 2018].

<sup>212</sup> Historic England, 2017. Conservation Principles: Consultation Draft. [Online] Available at: <https://content.historicengland.org.uk/content/docs/guidance/conservation-principles-consultation-draft.pdf> [Accessed 12 03 2018].

<sup>213</sup> CIfA, 2015. Standard and Guidance for Historic Environment Desk Based Assessment. [Online] Available at: [http://www.archaeologists.net/sites/default/files/CIfAS&GDBA\\_2.pdf](http://www.archaeologists.net/sites/default/files/CIfAS&GDBA_2.pdf) [Accessed 12 03 2018].

<sup>214</sup> CIfA, 2014. Standard and Guidance for Commissioning Work or Providing Consultancy Advice on Archaeology and the Historic Environment. [Online] Available at: [www.archaeologists.net/sites/default/files/CIfAS&GCommissioning\\_1.pdf](http://www.archaeologists.net/sites/default/files/CIfAS&GCommissioning_1.pdf) [Accessed 12 03 2018].

<sup>215</sup> Temple Group Ltd. and Cotswold Archaeology, 2014. Aviation Noise Metric - Research on the Potential Noise Impacts on the Historic Environment by Proposals for Airport Expansion in England. [Online] Available at: <http://content.historicengland.org.uk/images-books/publications/aviation-noise-metric/eh-aviation-noise-final-report.pdf/> [Accessed 12 03 2018].

<sup>216</sup> English Heritage, 2008. Conservation Principles, Policies and Guidance. [Online] Available at: <https://content.historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/conservationprinciplespoliciesguidanceapr08web.pdf/> [Accessed 12 03 2018].

<sup>217</sup> Historic England, 2017. GPA 3: The Setting of Heritage Assets. [Online] Available at: <https://content.historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/heag180-gpa3-setting-heritage-assets.pdf/> [Accessed 12 03 2018].

## 13.3 Main sources of data

- 13.3.1 The EIA scoping exercise presented in this Scoping Report, with respect to the historic environment, has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the following sources of data:
- North Somerset Council Historic Environment Records;
  - HiE National Heritage List for England spatial datasets;
  - HiE National Record of the Historic Environment (NRHE); and
  - Magic.gov.uk.
- 13.3.2 Reference has also been made to a preliminary Zone of Theoretical Visibility (ZTV) shown in **Figure 8.1**, which is based on initial height parameter plans for the tallest and most extensive components of the Proposed Development.

## 13.4 Engagement with consultees

- 13.4.1 HiE and NSC heritage and conservation officers will be consulted during the preparation of the assessment to be presented within the Environmental Statement (ES).

## 13.5 Overview of baseline conditions

### Zones of influence

- 13.5.1 For the purposes of this scoping exercise and for the assessment to be undertaken of the Proposed Development, all heritage assets within a study area extending to approximately 500m radius from the perimeter of the current airport boundary are considered. This allows for minor changes in landownership or masterplanning design to ensure that a suitable buffer around all elements of the Proposed Development are considered. Designated assets which fall within the preliminary ZTV have also been considered in this scoping exercise.

### Current baseline

#### Designated heritage assets

##### World Heritage Sites

- 13.5.2 There are no World Heritage Sites within the Bristol Airport site or study area. The nearest World Heritage Site (WHS) is City of Bath. This WHS is c. 20km east of Bristol Airport.

##### Scheduled Monuments

- 13.5.3 There are no Scheduled Monuments (SM) within the Bristol Airport site. Seven SMs are within 500m of the Bristol Airport site, while a further six are within the preliminary ZTV. These assets are summarised in **Table 13.3** and shown on **Figure 13.1**.

Table 13.3 Scheduled Monuments within the study area or ZTV

List Entry	Name	Location relative to site boundary
<b>Within Study Area</b>		
<b>1008291</b>	Long barrow 350m southwest of Cornerpool Farm	c. 260m to south
<b>1008300</b>	Oval barrow on Felton Hill 100m east of The Round House	c. 75m to east
<b>1008361</b>	Two confluent bowl barrows on Felton Hill	c. 430m to east
<b>1011126</b>	Bowl barrow 420m ENE of Quarry Farm: part of the Redhill round barrow cemetery	c. 400m to south
<b>1011127</b>	Two bowl barrows 400m north-east of Quarry Farm: part of the Redhill round barrow cemetery	c. 350m to south
<b>1011128</b>	Bowl barrow 300m NNE of Quarry Farm: part of the Redhill round barrow cemetery	c. 350m to south
<b>1011129*</b>	Bowl barrow 230m NNE of Quarry Farm: part of the Redhill round barrow cemetery	c. 400m to south
<b>Within ZTV</b>		
<b>1004526</b>	Large univallate hillfort with outworks 800m west of White Cross	c. 9km to southeast
<b>1006991</b>	Richmont Castle	c. 9.9km to southeast
<b>1008184</b>	Dolebury Camp: a large univallate hillfort and associated and later earthworks on Dolebury Warren	c. 6.6km to southwest
<b>1008295</b>	Cadbury Camp, a small multivallate hillfort on Cadbury Hill	c. 7.3km to northwest
<b>1011621</b>	Slight univallate hillfort and associated earthworks on Burrington Ham	c. 6km to south
<b>1020995</b>	World War II bombing decoy complex, anti-aircraft obstructions and Beacon Batch round barrow cemetery on Black Down	c. 7km to south

\* does not lie within the preliminary ZTV.

13.5.4 These SMs date predominantly to the prehistoric period and contribute to known Neolithic to Iron Age funerary and settlement activity in the region.

### Listed Buildings

13.5.5 HiE data shows a single listed building within 500m of the Bristol Airport site. Grade II Windmill House (List entry 1158202) is located adjacent to the eastern boundary of the Bristol Airport site. This asset is shown on **Figure 13.1**. Fourteen Grade II listed buildings and one Grade I listed

building (Nailsea Court; list entry 1129104) are within the preliminary ZTV and within 5km of the Bristol Airport site. These assets are listed in **Table 13.4**.

Table 13.4 Listed buildings within the study area or ZTV

List Entry	Name	Grade
<b>Within Study Area</b>		
<b>1158202</b>	Windmill House	II
<b>Within ZTV</b>		
<b>1129104</b>	Nailsea Court	I
<b>1129077</b>	Pair of gatepiers, circa 15 metres north of Castle Farmhouse	II
<b>1129103</b>	South Common Farmhouse	II
<b>1129194</b>	Row of Ashes Farmhouse	II
<b>1129218</b>	New farmhouse	II
<b>1129219</b>	Hollyhedge Farmhouse	II
<b>1129228</b>	K6 telephone kiosk Felton village centre	II
<b>1157857</b>	Gatepiers to Row of Ashes Farmhouse	II
<b>1245212</b>	The Meadows including front garden area wall, railings, piers and gate	II
<b>1245213</b>	Coach house and stables adjoining north east of number 1 The Meadows	II
<b>1311604</b>	Barn to north of Felton House	II
<b>1312663</b>	Wall, railings and gate about 10 metres south of South Common Farmhouse	II
<b>1320919</b>	Felton House	II
<b>1320997</b>	Castle Farmhouse	II
<b>1320998</b>	Hill House Farmhouse	II

### Conservation Areas

- 13.5.6 There are no conservation areas within 500m of the Bristol Airport site. The conservation area of Felton lies c. 900m east-north-east of the Bristol Airport site.

### Registered Parks and Gardens

- 13.5.7 There are no Registered Parks and Gardens (RPG) within 500m of the Bristol Airport site. The nearest RPG is grade II\* registered Barley Wood which is c. 1.9km to the south-south-west of the Bristol Airport site.

### Registered Battlefields

- 13.5.8 There are no Registered Battlefields (RB) within 500m of the Bristol Airport site. The nearest RB is Battle of Lansdown (Hill) 1643 c. 20.5km to the north-east of the Bristol Airport site.

### Non-designated heritage assets

- 13.5.9 Non-designated heritage assets consist of assets listed in the North Somerset Historic Environment Records (NSHER), and any locally listed assets and non-designated built heritage assets considered to be of local historical importance.
- 13.5.10 The NSHER was obtained on 28 June 2017. There are 211 records within the Bristol Airport site and a further 124 records within 500m. These assets are shown on **Figure 13.2**.

### Prehistoric

- 13.5.11 The Bristol Airport site lies within an area known for prehistoric activity. This is best represented by the presence of numerous scheduled barrows and hillforts in the local area (**Table 13.3**). Further barrows have also been identified within 500m of the Bristol Airport site, including several within a barrow cemetery west of Butcombe Court (MNS620).
- 13.5.12 Within the Bristol Airport site, three features have been tentatively interpreted as barrows at North Hill within the western area (MNS294; MNS296; MNS356) and an undated mound in the southern area of the Bristol Airport site (MNS618). These may be associated with funerary practices within the wider area. Two bronze age axes have been recovered from the Bristol Airport site (MNS1326; MNS355) indicating presence during this period. Earlier prehistoric activity is represented by a flint scatter south of Down House (MNS591) and flint working site to the east of Cornerpool Farm (MNS619). A possible Mesolithic occupation site is also recorded to the west of Carlisle House (MNS633).

### Roman to Post medieval

- 13.5.13 Much of the remaining pre-20<sup>th</sup> Century evidence identified both within the Bristol Airport site and the study area is related to industrial activity. Numerous limekilns and quarries are recorded on the NSHER. The area to the south of the airport and southeast of Cornerpool Cottage is known to have been an area of former lead extraction. The scar of uneven hummocky ground in the landscape, locally referred to as 'Gruffy Ground'<sup>218</sup>, produced during this activity is visible on aerial

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<sup>218</sup> British Geological Survey, NERC, 2017. Foundations of the Mendips website [Online] Available at <https://www.bgs.ac.uk/mendips/home.htm> [Accessed 10 04 2018]

photography. While the activity is known from as early as the Bronze Age in Charterhouse in the Mendips<sup>219</sup>, the recorded activity in this area most likely dates to the post medieval period.

## 20<sup>th</sup> Century

- 13.5.14 Aviation use of the Bristol Airport site influenced the Bristol Airport site and surrounding area in the 20<sup>th</sup> Century. An area of farmland was bought in 1929 and officially opened as an airport in May 1930. It was requisitioned by the Air Ministry at the outbreak of World War Two (WWII)<sup>220</sup>. Known as Lulsgate Airfield, it was in use during WWII and abandoned in 1946. Little of the infrastructure of the original airfield survives; however, the NSHER identifies several built heritage assets of historical interest within and to the south of the airfield, including aircraft double-fighter pens (MNS3953; MNS3954; MNS3955; MNS3956; MNS3957; MNS3958) which contain reinforced store rooms and/or air raid shelters. Also, the brick built remains of a firing range (MNS4059) and cannon test butt (MNS4058), aircraft hangars (MNS3951; MNS3952) and several latrines, recreational huts, and barrack huts. These were removed during recent enhancement of the airport. The NSHER also records the location of numerous former buildings associated with this period of use, including offices, stores and the Battle HQ (MNS4029).

## Factors influencing baseline conditions

- 13.5.15 In the absence of the Proposed Development, no changes to the future baseline are anticipated during the period that the development would be constructed and operating. It is anticipated that below-ground archaeological heritage assets would remain in situ without significant further disturbance.

## Additional baseline information requirements

- 13.5.16 The baseline assessment is based on information currently available in the public domain. No site visits, survey or intrusive investigations have been undertaken to inform this report. While the desk-based research has identified areas of specific archaeological potential or historic significance, previously unrecorded archaeological remains may be present within the Bristol Airport site.
- 13.5.17 In order to provide a full assessment of the historic environment baseline, a site walkover to include a survey of the condition and presence of built heritage assets will be undertaken. A full desk-based assessment will assess the significance and potential for direct effects on buried heritage assets. This will include an updated NSHER search to include the most recent data. These assessments will inform the potential requirement for further survey or intrusive evaluation.
- 13.5.18 Baseline data for the assessment will be obtained from the following sources:
- A site walkover;
  - A site survey of built heritage assets;
  - NSC Historic Environment Records;
  - NSC Historic Landscape Characterisation data;
  - HiE National Record of the Historic Environment;

<sup>219</sup> McFarlane, D.A et al., 2013. A speleothem record of early British and Roman mining at Charterhouse, Mendip, England. *Archaeometry*, 56 (3); p. 431-443 [online] DOI: <https://doi.org/10.1111/arc.12025>

<sup>220</sup> Bristol Airport, 2018. History of Bristol Airport. [Online] Available at: <https://www.bristolairport.co.uk/about-us/who-we-are/our-history> [Accessed 15 03 2018].



- Reports of previous site investigation works;
- Landscape and visual impact assessment reports and data;
- Somerset Heritage Centre;
- Royal Air Force (RAF) Museum, Duxford;
- HiE National Monument Record (NMR);
- Aerial photographs at the NMR;
- Defence of Britain Project Database; and
- Other libraries and online resources as necessary.

13.5.19 Visits to assets identified in **Section 13.6** will be undertaken where appropriate to inform setting assessments, including an assessment of visual, noise and lighting effects, to determine potential indirect effects on the setting of designated heritage assets.

## 13.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

Table 13.5 Receptors and likelihood of significant effects

Potential receptor	Predicated changes and potential effects
<b>Non-designated buried heritage assets</b>	The current baseline suggests potential for buried remains dating to the prehistoric, post-medieval industrial activity and WWII use of the Bristol Airport site. Disturbance or removal of assets associated with construction of the Proposed Development could give rise to loss of archaeological interest.
<b>Non-designated built heritage assets</b>	Disturbance or removal of surviving features related to the WWII airfield during construction of the Proposed Development could give rise to loss of archaeological interest. The operational period has the potential to give rise to a change in setting.
<b>Designated Heritage Assets</b>	Change to setting arising from visibility, lighting or noise during both construction and operation could harm the contribution made to the significance of designated heritage assets by that setting.

### Potential significant effects requiring further assessment

13.6.2 The potential effects of the Proposed Development likely to be significant with regards to the historic environment and which will be subject to assessment (to be presented within the ES), are summarised here.

#### Loss of non-designated buried heritage assets of prehistoric date:

13.6.3 A full desk-based assessment, based on all available evidence, will consider the potential for further unrecorded remains to be present on the Bristol Airport site. A walkover survey will consider the

topography and any prehistoric earthworks evident in the landscape. It will determine if and when investigative fieldwork may be required. It is anticipated that geophysical survey and/or trial trenching may be required in previously undisturbed areas. While there is potential for remains of national or regional significance to be present, there is no current evidence for remains of sufficient significance to warrant preservation in situ.

#### Loss of non-designated buried heritage assets of post medieval date:

- 13.6.4 A full desk-based assessment, based on all available evidence, will consider the potential for further unrecorded remains to be present on the Bristol Airport site. A walkover survey will consider the topography and any post medieval earthworks evident in the landscape. This will be supported by analysis of past land use from cartographic sources. It will determine if and when investigative fieldwork may be required. It is anticipated that geophysical survey and/or trial trenching may be required in previously undisturbed areas. Such remains, if present, are likely to be of local or regional significance and it is anticipated that preservation by record would provide appropriate and proportionate mitigation.

#### Loss of non-designated buried heritage assets of WWII date:

- 13.6.5 A full desk-based assessment, based on all available evidence, will consider the potential for further unrecorded remains to be present on the Bristol Airport site. A walkover survey will consider the topography and any WWII earthworks evident in the landscape. This will be supported by analysis of past land use from cartographic sources and aerial photographs. It will determine if and when investigative fieldwork may be required. It is anticipated that geophysical survey and/or trial trenching may be required in previously undisturbed areas. Such remains, if present, have the potential to contribute to knowledge of this period of use, and it is anticipated that preservation by record would be appropriate mitigation.

#### Loss of non-designated built heritage assets of WWII date:

- 13.6.6 A full desk-based assessment, based on all available evidence, will consider the significance of WWII built heritage assets present on the Bristol Airport site. This will be supported by analysis of past land use from cartographic sources and aerial photographs. A field survey will determine the presence and condition of extant assets. These will inform the potential for sustainable reuse or level of building recording which may be required.

#### Effects on the settings of heritage assets:

- 13.6.7 Effects on the settings of the following assets will assessed:
- LB1158202 Grade II listed Windmill House;
  - SM1008291 Long barrow 350m southwest of Cornerpool Farm;
  - SM1008300 Oval barrow on Felton Hill 100m east of The Round House;
  - SM1008361 Two confluent bowl barrows on Felton Hill;
  - SM1011126 Bowl barrow 420m ENE of Quarry Farm: part of the Redhill round barrow cemetery;
  - SM1011127 Two bowl barrows 400m north-east of Quarry Farm: part of the Redhill round barrow cemetery;
  - SM1011128 Bowl barrow 300m NNE of Quarry Farm: part of the Redhill round barrow cemetery; and

- SM1011129 Bowl barrow 230m NNE of Quarry Farm: part of the Redhill round barrow cemetery.

### Assessment and evaluation methodology

- 13.6.8 The assessment will be completed in accordance with Historic England guidance<sup>217</sup>.
- 13.6.9 The evaluation of significant effect on a heritage asset is combination of the heritage significance of the asset and the magnitude of the effect that may give rise to harm, qualified by professional judgement. An assessment of effects on an asset involves an understanding of the heritage significance of the asset and in the case of an indirect effect, the contribution of the setting to the significance of the asset.
- 13.6.10 The heritage significance of the asset is determined by reference to the heritage interests set out in the NPPF<sup>197</sup> Annex 2. These are:
- Archaeological interest: the potential of a place to yield evidence about the past;
  - Historic interest: how the past can be connected to the present through a place through association with or illustration of the past; and
  - Architectural/artistic interest: how sensory and intellectual stimulation is drawn from a place either through design or fortuitous development over time.
- 13.6.11 For the purposes of assessing the significance of effects, heritage significance is assigned to one of four classes, with reference to the heritage interests described above and relying on professional judgement as informed by policy and guidance. The hierarchy given in **Table 13.6** reflects the NPPF distinction between designated and non-designated heritage assets.

Table 13.6 Definition of heritage significance

Heritage Significance	Summary rationale	Example asset class
<b>High</b>	Asset has significance for an outstanding level of archaeological, architectural, historic and/or artistic interest.	Designated Heritage Assets.  Nationally and internationally significant non-designated archaeological sites.
<b>Medium</b>	Asset has significance for a high level of archaeological, architectural, historic and/or artistic interest.	Locally listed buildings and other local/county-based designations.  Regionally significant non-designated archaeological sites.
<b>Low</b>	Asset has significance for elements of archaeological architectural, historic or artistic interest.	Locally-significant archaeological site.
<b>Negligible</b>	Due to its nature of form/condition/survival, cannot be considered as an asset in its own right.	Non-extant HER record.

- 13.6.12 Magnitude of change is a measure of the extent to which an asset which would be disturbed or lost, and the effect of this loss on the significance of the asset. In respect of buried archaeological remains with no visible above ground remains, this would normally result in the loss of archaeological interest, but elements of architectural and historic interest can also be affected. The effects of change in the setting of a heritage asset may depend on individual aspects of that

setting, and assessments must be, by their nature, specific to the individual assets being considered.

13.6.13 Effects on receptors are assigned to one of four classes of magnitude, defined in **Table 13.7**.

Table 13.7 Methodology criteria for magnitude of change

Magnitude of change	Summary rationale
<b>High</b>	Loss of significance of an order of magnitude that would result from total or substantial demolition/disturbance of a heritage asset or from the disassociation of an asset from its setting.
<b>Medium</b>	Loss of significance arising from partial disturbance or inappropriate alteration of asset which will adversely affect its importance. Change to the key characteristics of an asset's setting, which gives rise to harm to the significance of the asset but which still allows its archaeological, architectural or historic interest to be appreciated.
<b>Low</b>	Minor loss to or alteration of an asset which leaves its current significance largely intact. Minor and short-term changes to setting which do not affect the key characteristics and in which the historical context remains substantially intact.
<b>Negligible</b>	Minor alteration of an asset which does not affect its significance in any discernible way. Minor and short term or reversible change to setting which does not affect the significance of the asset.

13.6.14 Effects are considered to be significant or not significant in EIA terms according to the matrix in **Table 13.8**.

Table 13.8 Significance assessment matrix

Receptor heritage significance	Magnitude of Change			
	High	Medium	Low	Negligible
<b>High</b>	Significant	Significant	Not Significant	Not Significant
<b>Medium</b>	Significant	Not Significant	Not Significant	Not Significant
<b>Low</b>	Not Significant	Not Significant	Not Significant	Not Significant
<b>Negligible</b>	Not Significant	Not Significant	Not Significant	Not Significant

## Potential effects not requiring further assessment

Change to setting of designated heritage assets (excluding assets listed in **Section 13.6.7**):

13.6.15 Increase in size and scale of buildings and noise and lighting levels are not currently expected to be sufficient to cause potentially significant change on the setting of designated heritage assets other than those identified in **Section 13.6.7** in the context of the existing airport. The scheduled monuments listed in **Table 13.3** do not represent significant visitor attractions and their settings do not rely on tranquillity. While the WWII features at Black Down relate to the same period as the WWII use of the airfield, distance precludes significant association. No listed buildings or conservation areas are in close enough proximity to the Proposed Development to experience

significant change in setting compared to the current baseline. These effects will not be considered further but will be re-appraised subject to changes in the design.

### Proposed assessment methodology

- 13.6.16 This scoping assessment was prepared in accordance with the methodology detailed in guidance from HiE and CIfA (**Section 13.2**) regarding assessment of the historic environment. The same methodology will be followed when completing the impact assessment presented in the ES.

## 14. Socio-economics

### 14.1 Introduction

- 14.1.1 This chapter examines the likely significant socio-economic effects of the Proposed Development, outlining the issues that will need to be considered in greater detail within the Environmental Statement (ES).

### 14.2 Relevant legislation, policy and guidance

#### Legislation

- 14.2.1 The following legislation is relevant to the assessment that will be presented within the ES:
- The Town and Country Planning (Environmental Impact Assessment (EIA)) Regulations 2017<sup>221</sup> (EIA Regulations) require “an assessment of the direct and indirect significant effects of the development on [...] population [...]”. This is typically interpreted as requiring an assessment of socio-economic effects (i.e. how the interaction of social and economic factors arising from the development affect people<sup>222</sup>).

#### Policy

- 14.2.2 An extensive assessment of national, regional and local planning (and aviation) policy is contained in **Chapter 3**.
- 14.2.3 A full review of the relevant local regional and national policies relating to social and economic development associated with the development of Bristol Airport will be included within the ES chapter. Relevant policies to the assessment are listed in **Table 14.1**.

Table 14.1 Relevant policies and their implications for socio-economics

Policy reference	Implications
<b>National Planning Policy Framework (NPPF)<sup>223</sup></b>	
Paragraph 7	Provides high level guidelines for planning for sustainable development, specifically in relation to socio-economics, identifies the importance of “ensuring that sufficient land of the right type is available in the right places at the right time to support growth and innovation.”
Paragraph 14	Presumption in favour of sustainable development including: “local planning authorities should positively seek opportunities to meet the development needs of their area.”
Paragraph 17	“... proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs. Every effort should be made objectively to identify and then meet the housing, business and

<sup>221</sup> Ministry of Housing, Communities & Local Government, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Available online <http://www.legislation.gov.uk/ukxi/2017/571/contents/made> [Checked 23/03/2018]

<sup>222</sup> Oxford Dictionaries, 2018. *Definition of socio-economic in English*. Available online <https://en.oxforddictionaries.com/definition/socio-economic> [Checked 28/03/2018]

<sup>223</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. [Online] Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Accessed 12 03 2018].

Policy reference	Implications
	<i>other development needs of an area, and respond positively to wider opportunities for growth."</i>
Paragraph 18	<i>"the Government is committed to securing economic growth in order to create jobs and prosperity, building on the country's inherent strengths..."</i>
Paragraph 19	<i>"The government is committed to ensuring that the planning system does everything it can to support sustainable economic growth. Planning should operate to encourage and not act as an impediment to sustainable growth. Therefore, significant weight should be placed on the need to support economic growth through the planning system."</i>
Paragraph 20	<i>"To help achieve economic growth, local planning authorities should plan proactively to meet the development needs of business and support an economy fit for the 21st century."</i>
Paragraph 33	<i>"When planning for ports, airports and airfields that are not subject to a separate national policy statement, plans should take account of their growth and role in serving business, leisure, training and emergency service needs. Plans should take account of this Framework as well as the principles set out in the relevant national policy statements and the Government Framework for UK Aviation."</i>
<b>West of England Local Enterprise Partnership, Strategic Economic Plan (2015-2030)<sup>224</sup></b>	
Page 10-11	This sets out the sub-regional aspirations for economic development.  The vision is that by 2030 the West of England will have one of Europe's fastest growing and most prosperous sub regions... A buoyant economy competing internationally and easier local, national and international travel, thanks to transport solutions that link communities to employment opportunities and local services, control and reduce congestion and improve strategic connections by road, rail and through Bristol Airport and Bristol Port.
Page 22-23	The plan aims to "successfully capture the impact major developments at the airport (and port) can have at meeting the investment and jobs targets.
Page 40-41	The plan notes the importance of the M4 in connecting four enterprise zones, the port and airport.
Page 76-77	Bristol airport is noted as a "lever of growth".
<b>North Somerset Council (NSC) Core Strategy January 2017<sup>225</sup></b>	
CS20 – Delivering a prosperous economy	The Core Strategy seeks to "provide at least 10,000 additional employment opportunities 2006-2026".
CS23 – Bristol Airport	"Proposals for the development of Bristol Airport will be required to demonstrate the satisfactory resolution of environmental issues, including the impact of growth on surrounding communities and surface access infrastructure".
<b>North Somerset Economic Plan 2017-2036</b>	
	The plan outlines the continuing mission for NSC and its partners to "champion North Somerset and provide the strategic leadership necessary for transformational economic change". Most notably, the plan has five core strategic objectives which will be delivered via four investment themes.  These themes highlight the important role of the airport to the economy of North Somerset. For example, Theme 1: Facilities and Infrastructure' highlights the need to work with partners to maximise the role of the airport and port as strategic employment locations'.
<b>West of England Joint Spatial Plan – Publication Document November 2017<sup>226</sup></b>	
	The purpose of the plan is to provide a framework to assist the delivery of new homes, land for employment purposes and supporting infrastructure that will be required over the next 20 years.

<sup>224</sup> West of England Local Enterprise Partnership. West of England Strategic Economic Plan 2015-2030. Available online <http://westofenglandlep.co.uk/about-us/strategicplan>. [Checked 19/03/2018].

<sup>225</sup> 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> [Accessed 16 04 18]

<sup>226</sup> Joint Planning West of England, West of England Joint Spatial Plan. Available online <https://www.jointplanningwofe.org.uk/consult/ti/JSPPublication/consultationHome> [Accessed 24.05.18]



## Guidance

- 14.2.4 There is no directly relevant guidance for the assessment of the effects of a development on population in EIA. This requirement is typically addressed in socio-economic assessments, where case law, before the recent update of the EIA Regulations, has established that effects include the direct economic consequence of the effects on the environment. Based on the revised wording of the EIA Regulations, this is now interpreted as including indirect effects as well<sup>227</sup>.
- 14.2.5 The approach to assessing socio-economic effects follow available best practice and wider guidance on such analysis. This includes the Green Book<sup>228</sup> and the Additionality Guide<sup>229</sup>.
- 14.2.6 The Green Book, published by HM Treasury provides a broad framework for how policies, programmes and projects in the UK should be appraised and evaluated in order to inform decision making. It set out guidelines for how the economic and social effects of policy should be conducted. It contains advice on the scoping of costs and benefits to be included in assessment, time period for assessment and the use of discount rates, which also apply where the societal effects of private assessment are being investigated. It contains various supplementary guidance on assessment of environmental effects, of health, crime and air quality, for example.
- 14.2.7 The Additionality Guide provides more specific guidance on how to assess impact of a policy intervention (or a private sector investment) on the local, regional and national economic growth). Additionality is the '*extent to which something happens as a result of an intervention that would have not occurred in the absence of intervention*' and involves making various adjustments to take account of economic displacement, leakage and of multiplier effects. These are discussed further below.
- 14.2.8 Other guidance includes; the importance of socio-economic assessment in improving EIA practice by the Institute of Environmental Management and Assessment (IEMA)<sup>230</sup>.

## 14.3 Main sources of data used

- 14.3.1 The EIA scoping exercise presented within this chapter has been undertaken with reference to the description of the Proposed Development (**Chapter 2**), and the following sources of data:
- NOMIS (Official labour market statistics)<sup>231</sup>;
  - Office for National Statistics<sup>232</sup>;
  - Bristol Economic Briefing<sup>233</sup>; and

<sup>227</sup> CJEU decision in Case C-420/11 Leth v. Republik Österreich. Available online <http://curia.europa.eu/juris/liste.jsf?num=C-420/11&language=EN>

<sup>228</sup> HM Treasury, 2018. *Central Government Guidance on Appraisal and Evaluation*. Available online <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government> [Checked 28/03/2018]

<sup>229</sup> English Partnerships, 2014. *Additionally Guide, English Partnerships, a Standard Approach to Assessing the Additional Impact of Projects*, Fourth Edition.

<sup>230</sup> IEMA, 2013. EIA Quality Mark Article: The importance of Socio-Economic Assessment in Improving EIA Practice. Available online [https://www.iema.net/assets/uploads/EIA%20Articles/bidwells\\_article\\_the\\_importance\\_of\\_socio-economic\\_assessment\\_in\\_improving\\_eia\\_practice.pdf](https://www.iema.net/assets/uploads/EIA%20Articles/bidwells_article_the_importance_of_socio-economic_assessment_in_improving_eia_practice.pdf) [Checked 28/03/2018]

<sup>231</sup> Office for National Statistics, 2018. NOMIS: official labour market statistics. Available online <https://www.nomisweb.co.uk/> [Checked 28/03/2018]

<sup>232</sup> Office for National Statistics, 2018. Available online <https://www.ons.gov.uk/> [Checked 28/03/2018]

<sup>233</sup> Bristol Economic Briefing, 2017. Available online <https://www.bristol.gov.uk/documents/20182/33191/Bristol+Economic+Briefing+December+2017/c3d43021-4deb-ffed-8877-3754490b855b> [Checked 28/03/2018]

- Part 1 (Strategic) Economic Impact Assessment of Bristol Airport<sup>234</sup>.

14.3.2 This will be supplemented with data in an accompanying economic impact assessment. This will utilise data collected by Bristol Airport; Civil Aviation Authority (CAA) Passenger Survey Data (and other CAA statistics) and data from the international Passenger Survey (via Visit Britain).

## 14.4 Engagement with consultees

14.4.1 It is intended that the majority of engagement will be through the formal consultation process. However, where issues arise during other consultation processes, these will be addressed as appropriate.

## 14.5 Overview of baseline conditions

### Geographical extent of effects

- 14.5.1 The economic effects of Bristol Airport will be felt across a wide area likely to extend across the South West region as well as South Wales. There are various channels of effects, both direct and indirect. The geographical extent and distribution of effects will depend on a range of factors including the place of residence of employees, the location of Bristol Airport's business supply chain and the passenger catchment for Bristol Airport. These will be assessed in detail in the accompanying Economic Impact Assessment.
- 14.5.2 The socio-economic chapter will draw on the key conclusions from this and will give particular consideration to the groups of *people* who may be affected by the economic impacts of Bristol Airport's expansion as well as how these people are likely to be affected. Those affected include local residents, local and regional employers/employees as well as visitors using Bristol Airport. Each are considered below.

### Local residents

- 14.5.3 Bristol Airport is located in the parish of Wrington in North Somerset District. The 2011 "lower level super output area" (LLSOA - the smallest geographical scale at which data is available) is E01014854: North Somerset 013D. This is an area of some 2,650 hectares around Bristol Airport, with a resident population of a little under 1,400 people as of 2011 (**Figure 14.1**). A wider range of - more accurate - data are available for larger areas "wards". Bristol Airport falls within the parish of Wrington and borders Backwell. Adjacent to these to the west, is Yatton ward which covers the area between the M5 and the coast and Congresbury ward covering the village of the same name. To the east is Windford ward. Together these areas comprise an area of some 13,000 hectares around Bristol Airport with a total resident population of 24,500 people (**Figure 14.2**).
- 14.5.4 These residents may be positively affected in terms of additional job opportunities, but may also be adversely affected from increased traffic and noise. The ES will consider effects on noise in a detailed separate chapter. The noise assessment does not currently specify geographical areas, but states that "the zone of receptors that could experience significant effects will be identified with regards to a boundary around Bristol Airport determined using the 54 dB LAeq,16h noise contour

<sup>234</sup>York Aviation, 2017. Bristol Airport Limited: Part 1 (Strategic) Economic Impact Assessment of Bristol Airport. Final Report. Available online <https://static1.squarespace.com/static/59b6667ab7411c6d0214b1f3/t/5a0c56888165f525baf57025/1510758029075/Part+1+Bristol+Economic+Impact+Final.pdf> [Checked 28/03/2018]

band for daytime and the 48 dB LAeq,8h for night-time, based on an average summer day of future traffic”.

- 14.5.5 Not all of these 24,500 residents may be affected and the assessment of noise contours as well as traffic nodes may extend beyond this area – including South Bristol for example. However, the area immediately surrounding Bristol Airport– i.e. those people who live closest to it - provides a reasonable boundary for the assessment of effects on local residents. This will be further considered with reference to the detailed noise and the traffic assessments which form part of the ES. This area can be expanded if necessary.

#### Local employees (Labour catchment area)

- 14.5.6 The 2017 Economic Impact Assessment<sup>234</sup> examines the distribution of on-site employees based on the Bristol Airport Workforce Travel Plan. This indicates that of the 3,400 direct jobs at Bristol Airport, 39% lived in North Somerset; 22% in Bristol (around half of these in South Bristol); 10% in Bath and NE Somerset; 10% in South Gloucestershire with a further 10% in the remainder of Somerset. Collectively just over 90% of the on-site employees lived in this area which was referred in the report as the “Bristol City Region”. This area is referred to as the labour catchment area (the area from which Bristol Airport is likely to draw the majority of any new employees) and the geographical area in which employment effects will be assessed. If the accompanying Economic Impact Assessment suggests a markedly different labour catchment area this will be adjusted accordingly, although this appears unlikely.

#### Effects on the local and regional economy

- 14.5.7 Bristol Airport has an economic impact (jobs, expenditure or income) in several ways. Broadly these can be grouped into the following categories; direct effects, and indirect and induced multiplier effects. Wider catalytic effects are also often assessed. These will affect people differently and at different spatial scales.
- Direct impacts relate to the economic activities and employment created and sustained by the operations of Bristol Airport. These may be physically located within Bristol Airport’s boundary (pilots, air traffic control and terminal staff); or outside but directly related to its operations (catering, logistics integrators, transportation, and many airline and passenger services). The spending of passengers on flights and in the terminal would be in this category.
  - Indirect and induced impacts relate to the multiplier or knock-on effects of the direct operations. They arise in two ways. First, supply linkages (indirect multipliers) arise from the business to business supply chain of Bristol Airport. It includes the spending, income and employment supported by every purchase made by Bristol Airport; by airlines, retail/commercial occupants or those providing services to Bristol Airport. Second, an income multiplier (induced multiplier) which arises from the consumer expenditure of those who derive incomes from Bristol Airport or from its supply chain. It includes the income/employment created by purchases of cabin crew, for example, and takes place over a wider geographical area such as their place of residence.
  - Catalytic effects arise from multiple channels and relate to increased productivity and increased economic activity resulting from connectivity. By definition these take place over a larger geographical area still.
  - The 2017 economic impact assessment<sup>234</sup> evaluated these direct, indirect, induced and catalytic effects across North Somerset, the Bristol City Region as well as the South West and South

Wales. As such, direct, indirect and induced and catalytic effects will be assessed across the same area drawing on the conclusion of the Economic Impact Assessment.

## Current baseline

### Bristol Airport

- 14.5.8 Bristol Airport handled some 8.2 million passengers in 2017 making it the 9<sup>th</sup> largest UK airport by passenger numbers. Historic data shows that passenger numbers have been steadily increasing over the last decade or more and this trend is expected to continue<sup>235</sup>.
- 14.5.9 There were just over 5,000 aircraft movements in January 2017 which compares to around 7,000 in May of the same year some 7,500 in June and August and approximately 5,500 in March 2018 (latest data)<sup>236</sup>.
- 14.5.10 Around 3,400 jobs (some 2,800 Full Time Equivalent (FTE))<sup>237</sup> jobs are sustained by Bristol Airport itself. Around a third of these are employees of airlines.
- 14.5.11 Across the wider South West and South Wales, the total direct, indirect/induced and catalytic employment effects arising from Bristol Airport is estimated at up to 15,000 FTE jobs and £1.3 billion of Gross Value Added (GVA)<sup>238</sup>. This makes Bristol Airport a major contributor to the regional economy as well as a major employer.

### Economy, Tourism and Connectivity

- 14.5.12 Based on national accounts, the total size of the South West region economy (in GVA terms) is £126 billion (2015), just under 8% of total UK GVA. GVA per head (i.e. the productivity of the workforce) stood at £23,021 (2% growth from 2014, compared to 3% in the North East, the fastest growing region that year). However, this was still around 90% of the UK average. GVA per head in London, in contrast, stood at 172% of the UK average.
- 14.5.13 Data is not available for South Wales specifically, but the comparable data for Wales indicates total Welsh GVA was £55.8 billion, accounting for just over 3% of the UK economy. GVA per head stood at £18,002. Whilst it grew strongly since 2014, this was still around 30% lower than the UK average<sup>238</sup>.
- 14.5.14 Evidence supports a relationship between international connectivity, Foreign Direct Investment (FDI) and business location. The European Cities Monitor (2010) found that 51% of companies surveyed indicated that international transport links were an important factor in deciding where to

<sup>235</sup> Civil Aviation Authority, 2017. *Size of Reporting Airports March 2016 – February 2017: Comparison with previous year*. Available online [https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard\\_Content/Data\\_and\\_analysis/Datasets/Airport\\_stats/Airport\\_data\\_2017\\_01/Table\\_01\\_Size\\_of\\_UK\\_Airports.pdf](https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport_data_2017_01/Table_01_Size_of_UK_Airports.pdf) [Checked 28/03/2018]

<sup>236</sup> Civil Aviation Authority, 2017. *Airport data: Size of UK Airports*. Available online [https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard\\_Content/Data\\_and\\_analysis/Datasets/Airport\\_stats/Airport\\_data\\_2018\\_03/TTable\\_03\\_Aircraft\\_Movements\(1\).pdf](https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport_data_2018_03/Table_03_Aircraft_Movements(1).pdf) [Checked 04/06/2018]

<sup>237</sup> Equivalent employees working full-time. In other words, one FTE is equivalent to one employee working full-time; 0.5 of an FTE works part time. The hours worked are typically 37.5 per week.

<sup>238</sup> GVA data for the South West and Wales taken from the Office for National Statistics Regional gross value added (income approach), UK: 1997 to 2015 Current basic prices, on workplace basis: <https://www.ons.gov.uk/economy/grossvalueaddedgva/bulletins/regionalgrossvalueaddedincomeapproach/deceember2016> See also: StatsWales, 2018. *Gross Value Added by area and industry*. Available online <https://statswales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/Regional-Accounts/Gross-Value-Added-GDP/latestgva-by-area-industry> [Checked 28/03/2018]

invest, alongside access to markets, availability of staff and quality of telecommunications infrastructure<sup>239</sup>.

- 14.5.15 A similar relationship exists between airport connectivity and the ease, cost, flexibility and hence propensity of firms to trade internationally. Whilst Bristol airport does not carry freight, the provision of international services (rather than the international trade in goods) are reflected in the business passenger numbers traveling through Bristol Airport<sup>240</sup> and support the economic benefits noted in the catalytic effects section above.
- 14.5.16 Aviation is important to tourism. In total, there were 37.6 million visits by overseas residents to the UK in 2016, which was 4% more than in 2015. In 2010 some 72% of international UK visitors arrived by air and account for 83% of inbound visitor spending. On average, these passengers spend more than those arriving by rail or ferry (Based on ONS, 2010. International Passenger Survey<sup>241</sup>).

### Demographic and labour market characteristics

- 14.5.17 Socio-economic data are compared in **Table 14.2** for all Local Authority Districts (LADs) in the labour catchment area. First, the total resident population is shown. Next local data has been compared to the South West average to illustrate broad characteristics. This includes whether the resident population has been increasing or decreasing in recent years; the size of the working age population and economic activity rates (an indication both of demographic characteristics and the extent to which increased employment opportunities might be met by local labour); and the percentage of workless households and those with no qualification (both an indication of the types of jobs that could be met by local labour and the presence of skill gaps and skills shortages<sup>242</sup>).
- 14.5.18 The total resident population of the LADs below is just under 1.3 million people, as of 2011. The local population described above who reside in the wards nearest to the airport represent about 2% of this; those living in the super output area closest to the airport comprise around 0.1%<sup>243</sup>.

Table 14.2 District socio-economic characteristics (all compared to South West average)

	Resident population		Is population growing, stable or in decline?	Working age population (16-64)	Economic activity rates	% of workless households	% with no qualifications
	2011 <sup>244</sup>	2016 <sup>245</sup>					
North Somerset	211,700	211,700	Stable	Below average	Above average	Below average	Below average

<sup>239</sup> Airport Operators Association (AOA), 2013. *An Integrated Policy Framework for UK Aviation: Connecting the Economy for Jobs and Growth* (page 9). Available online <http://www.aoa.org.uk/wp-content/uploads/2013/11/aoa-an-integrated-framework-for-uk-aviation-report.pdf> [Checked 28/03/2018]

<sup>240</sup> Civil Aviation Authority, Airport data 2017. Available online at:

[https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard\\_Content/Data\\_and\\_analysis/Datasets/Airport\\_stats/Airport\\_data\\_2017\\_annual/Table\\_13\\_2\\_Freight.pdf](https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport_data_2017_annual/Table_13_2_Freight.pdf) [checked 30/04/18]

<sup>241</sup> See: <https://www.ons.gov.uk/peoplepopulationandcommunity/leisureandtourism/articles/traveltrends/2016> and

<https://www.ons.gov.uk/peoplepopulationandcommunity/leisureandtourism/articles/ukperspectives2016howwetravel/2016-05-26>

<sup>242</sup> Skill gap is the difference between skills required by an organisation and the skills possessed by its workforce (I.e. training needs). Skills shortages are skills not available in the labour force to meet demand (i.e. "we can't find enough accountants to fill our vacancies").

<sup>243</sup> NOMIS, 2018. Claimant count by sex and age Available online <https://www.nomisweb.co.uk/reports/lmp/la/1946157346/report.aspx> [Checked 28/03/2018]

<sup>244</sup> NOMIS, 2018: 2011 Census data on NOMIS. Available online at <https://www.nomisweb.co.uk/census/2011> [Checked 25/05/18]

<sup>245</sup> NOMIS, 2018: Resident Population (total population) 2016. Available online at <https://www.nomisweb.co.uk/reports/lmp/la/1946157348/report.aspx#tabrespop> [Checked 25/05/18].

	Resident population		Is population growing, stable or in decline?	Working age population (16-64)	Economic activity rates	% of workless households	% with no qualifications
	2011 <sup>244</sup>	2016 <sup>245</sup>					
<b>Bristol</b>	454,200	456,000	Growing	Above average	Above average	Below average	Above average
<b>Bath and North East Somerset</b>	187,800	186,900	Declining marginally	Above average	Below average	Below average	Below average
<b>South Gloucestershire</b>	277,600	276,700	Growing	Above average	Above average	Below average	Below average
<b>Sedgemoor</b>	121,400	121,300	Stable	Below average	Below average	N/A	Above average
<b>West Somerset</b>	34,500	34,500	Declining	Below average	Above average	N/A	N/A

14.5.19 In 2016 a total of 740,000 employees worked in the labour catchment area of Bristol Airport. Of these, some 260,000 worked in Bristol; just under 150,000 in South Gloucestershire and 83,000 in North Somerset. On average, some 66% of employees worked full time, 34% worked part time. On that basis, the airport directly employs just under 5% of all employees in North Somerset District<sup>243</sup>.

14.5.20 The unemployment rate (i.e. the proportion of those of working age who are unemployed and claiming job seeker allowance (JSA)) in January 2018 the unemployment rate was 1.8% on average across the labour catchment area. This varied between 2.7% in Sedgemoor and 0.9% in South Gloucestershire. In absolute numbers this equates to a total of some 15,700 unemployed person in the labour catchment area of Bristol Airport. The unemployment rate increased in all areas from January 2008 before beginning to fall from 2013 reflecting the recession. However recently unemployment rates are beginning to rise again, with 4.2% (January 2018) nationally classified as being unemployed (**Figure 14.1**<sup>243</sup>).

14.5.21 Notified job vacancy data are collected by Jobcentre Plus and can give an indication of local labour demand as well as be compared with the labour supply. The latest data is somewhat dated (November 2012) where there were some 12,000 notified vacancies across the labour catchment area (with some 1,300 in North Somerset)<sup>246</sup>. This can be compared against unemployment at the same time (January 2013) of some 27,000 unemployed people (just under 3,500 in North Somerset)<sup>246</sup>. This suggests a labour market at that time with competition for available jobs; for each notified vacancy there were more than two people unemployed and seeking work. In North Somerset demand for employment opportunities was slightly greater, with three job seekers for each notified vacancy. The information overleaf would indicate that the labour market may well have tightened since then, given claimant unemployment had been falling – but since late 2017 is now increasing again.

### Local facilities and services

14.5.22 Bristol Airport is located in a largely rural area to the south of the City of Bristol with several small hamlets/villages within a 10km radius. These includes Lulsgate Bottom, Felton, Redhill and

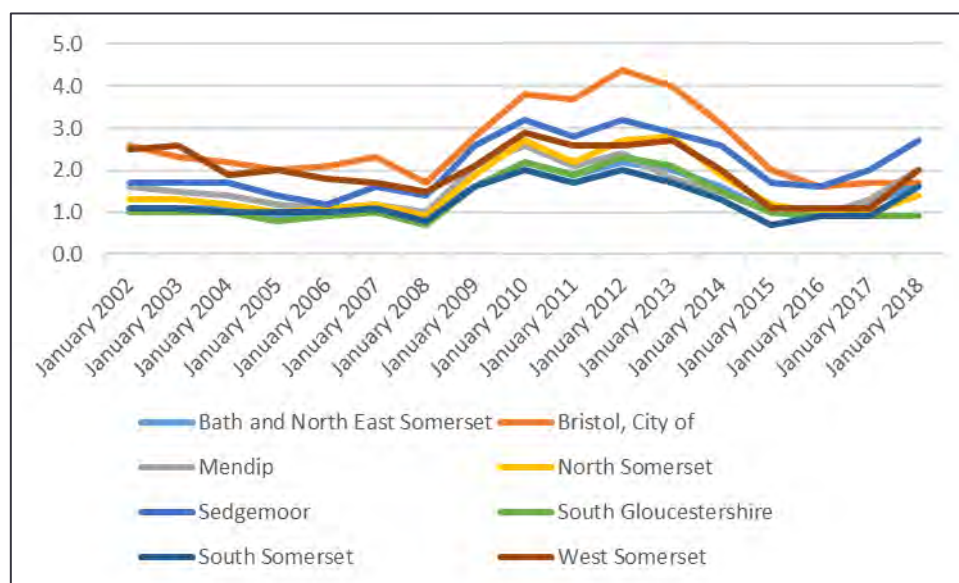
<sup>246</sup> NOMIS, 2018. Business Register and Employment Survey: open access. Available online: <https://www.nomisweb.co.uk/> [Checked 08/06/18]



Downside in the immediate vicinity of Bristol Airport (less than 1km from the perimeter). Alongside houses these include the Felton and Redhill village halls, local pubs, a post office, the Tall Pines golf club, accommodation and parking facilities (several farms in the vicinity also appear to accommodate parking). A quarry lies around 1km north of Bristol Airport site.

- 14.5.23 Further afield lie the larger villages of Wrington, Winford, Congresbury, Barrow Gurney and Yatton, each with a wider range of local services. Blagdon Lake is c. 5km to the south and the wider area is likely to be attractive for walkers, cyclists and other users.

Figure 14.1 Claimant unemployment rate – labour catchment area



Source: NOMIS, 2018<sup>247</sup>

- 14.5.24 The nearest primary schools are in Backwell, Wrington, Winford (all Church of England Primary/Junior Schools); the nearest secondary school is in Backwell<sup>248</sup> - all within 5km of Bristol Airport. The nearest medical facilities are in Nailsea (Tower House Medical Centre); a doctor's surgery in Backwell the Clevedon Hospital and the South Bristol NHS Community Hospital (up to c. 15km from Bristol Airport)<sup>249</sup>.

## Factors influencing baseline conditions

- 14.5.25 Demographic and economic characteristics are dynamic. The introduction of the Joint Strategic Plan, which 'sets out a prospectus for sustainable growth' refers to Bristol Airport as a strategic employment location and consequently will support employment growth at the Bristol Airport site. Future growth at Bristol Airport is expected, regardless as to whether the Proposed Development is consented or not. Therefore, it is considered that there are no major factors which are expected to materially affect the baseline conditions noted above. The latest available data will be used in the assessment presented within the ES.

<sup>247</sup> NOMIS (2018) Claimants as a proportion of residents aged 16-64. Available online <https://www.nomisweb.co.uk/reports/lmp/por/2092957698/report.aspx> [Checked 28/03/2018]

<sup>248</sup> National Statistics, 2018. *Schools and colleges in and near BS48 3DY*. Available online <https://www.compare-school-performance.service.gov.uk/?radius=3&schoollevel=IsSecondary&searchtype=search-by-location&keywords=BS48+3DY&LocationCoordinates=&selectionState=0%2C0%2C0%2C0&orderby=&tab=map> [Checked 28/03/2018]

<sup>249</sup> Based on a Google maps web search, March 2018.

## 14.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

- 14.6.1 There are four principal groups of people who may be affected by the Proposed Development:
- **Local residents** potentially adversely affected by increased aircraft movements and/or road traffic. They will also benefit from access to airport facilities, to employment opportunities directly or indirectly as well as access to additional flights options for business and/or leisure;
  - **Local and regional employers (businesses)** potentially affected by increased direct and indirect business opportunities arising from Bristol Airport's expansion;
  - **Local and regional employees** potentially affected by new job opportunities arising from Bristol Airport's expansion; and
  - **Visitors** (both leisure and business - originating from or arriving to Bristol and the wider region).

### Potential significant effects requiring further assessment

- 14.6.2 Local residents will be affected by aircraft noise and/or increased road traffic movements at construction as well as operational stages. The assessment of any potential effects will draw on the conclusions of the noise and traffic and transport assessment as well as local socio-economic data, as relevant.
- 14.6.3 Creation of new employment opportunities at construction and operational stages, including from tourism. As noted earlier these will be direct, indirect and induced as well as catalytic. The receptors will be employees - arising from new job opportunities in North Somerset, in the Bristol City Region as well as across the South West and South Wales - but also employers' benefitting from business expansion.

### Potential effects not requiring further assessment

- 14.6.4 It is anticipated that a range of jobs at varying skills levels will be created as a result of the Proposed Development. Whilst a proportion of these jobs will be specialised in nature, the majority will not be. The labour catchment area (with a total of 740,000 employees) is large and as discussed in **Section 14.5.20** unemployment rates in the labour catchment area are increasing. As Bristol Airport is an existing facility and additional employment requirements can be met from the labour catchment area, population changes resulting from people moving to the area to take up employment opportunities arising from the Proposed Development are not considered significant. Whilst it is anticipated that there will be a small increase, the extent of the increase is not likely to be significant in terms of population growth over and above the baseline.
- 14.6.5 As there will be no significant increases in population associated with the Proposed Development, increased demand on local services (such as schools and hospital places) associated with significant increases in local population, will not be significant and will therefore not be considered further.
- 14.6.6 Similarly, effects on local community facilities (beyond potential effects on noise and traffic), such as sport and recreation, housing demand/supply, and cultural or religious facilities will not be significant as population growth will not be significant over and above the baseline. There will be no change in the provision of these services arising from the Proposed Development and effects of the Proposed Development on local community facilities will therefore not be considered further.



- 14.6.7 Demand for personnel to fulfil the employment opportunities generated by the Proposed Development is likely to be met from across the labour catchment area rather than from in-migration of new employees in significant numbers. As there will be no significant in-migration from outside of the labour catchment area as a result of the Proposed Development and that the majority of jobs will be fulfilled by individuals from the labour catchment area, both relocation in-migration and daily commuting in-migration effects will not be considered further.

## Proposed assessment methodology

- 14.6.8 There is no definitive guidance on significance criteria for socio-economic effects and accordingly the assessment draws on existing good practice and guidance documents noted above. Criteria in **Table 14.3** and **Table 14.4** have been formulated through professional judgement and best practice. The assessment methodology should be read in conjunction with the scope of the socio-economic assessment which is outlined above.
- 14.6.9 In the absence of accepted criteria for assessing the significance of socio-economic effects, the scale of any effects is assessed in relation to the magnitude of change against the sensitivity of the receptor. The magnitude of an effect represents its severity with key factors to be considered including the extent (number of groups and/or people, households or businesses affected) and the value of the resource. **Table 14.3** details the guideline criteria for assessing the effect magnitude. Some receptors will experience direct effects (such as through the construction of the Proposed Development), but the majority are likely to experience indirect effects.
- 14.6.10 The assessment of effects will also refer to the technical analysis contained in other chapters, including health, noise and traffic and transport, where relevant.

## Magnitude of change

- 14.6.11 The magnitude of change will be assessed based on the extent of change compared to the baseline. This will refer to the geographical scale and duration of effects. For example, the number of additional employees will be compared to the current employment base in the labour catchment area
- 14.6.12 The magnitude of change on a receptor reflects consideration and analysis relating to:
- Spatial extent (localised/isolated or widespread);
  - Duration (short-term [less than 1 year], medium term [1-10 years] and long-term [10 years+]);
  - Permanency of the effect; and
  - Likelihood of the effect occurring.
- 14.6.13 The magnitude of change criteria is provided in **Table 14.3**.

Table 14.3 Magnitude of Effect

Magnitude of Effect	Criteria
<b>Very High</b>	An effect that will significantly change baseline conditions and/or will be very likely to affect large numbers of businesses and/or people (number depending on the local context) and/or persists over many years.
<b>High</b>	An effect that can be demonstrated to change the baseline conditions and is likely to affect a moderate number of businesses and/or people (number depending on the local context) and/or of medium duration.

<b>Medium</b>	An effect that will result in a minor difference from baseline conditions and is likely or may affect a small number of businesses and/or people (number depending on the local context) and/or is of short duration.
<b>Low</b>	An effect that will result in a perceptible difference from baseline conditions and is likely to or may affect a small number of businesses and/or people (number depending on the local context) and/or is of short duration.
<b>Very Low</b>	An effect that does not result in a variation beyond the baseline conditions and/or is unlikely to measurably affect the well-being of businesses and/or people.

- 14.6.14 The assessment considers both economic and social resources. The framework set out in **Table 14.3** is suitable for assessing direct effects such as an increase in job opportunities.

### Sensitivity

- 14.6.15 The sensitivity of receptors (local employees, employers and residents) relates to the ability to withstand change. It will be assessed with reference to the type of impact and relevant population characteristics. For example, noise levels will be assessed against factors such as health and age and employment opportunities will be assessed with reference to local employment demand/supply and skill levels.
- 14.6.16 The criteria for sensitivity are the same for both direct and indirect amenity effects, as set out in **Table 14.4** and have been formulated through professional judgement.

**Table 14.4** Receptor Sensitivity

Receptor Sensitivity	Criteria
<b>Very High</b>	The receptor is of international importance and/or has little or no capacity to absorb change and/or recover or adapt to the change and/or is used by sensitive groups such as older people, children, and people of poor health.
<b>High</b>	The receptor is of national importance and/or has little capacity to absorb change and/or recover or adapt to the change and/or is used by sensitive groups such as older people, children, and people of poor health.
<b>Medium</b>	The receptor is of regional or local importance and/or has some capacity to absorb change and/or largely recover or adapt to the change and/or is used by sensitive groups such as older people, children, and people of poor health.
<b>Low</b>	The receptor is of local importance and/or has the ability to absorb change and/or completely recover or adapt to the change and/or is used by sensitive groups such as older people, children, and people of poor health.
<b>Very Low</b>	The receptor is of local importance and/or is able to absorb change and/or recover or adapt to the change and is not specifically for the use by sensitive groups such as older people, children, and people of poor health.

14.6.17 Sensitivity is a key dimension to the assessment of amenity effects. Key receptors are communities and community services resources, tourism resources and specialised manufacturing which are sensitive to noise and/or vibration effects. When a resource is considered to be sensitive to amenity effects and has a high or medium magnitude, the overall effect is considered to be significant.

### Determination of Significance

14.6.18 The assessment of likely significant environmental effects as a result of the Proposed Development has taken into account both the construction phase and operational phase. The significance level attributed to each effect has been assessed based on the magnitude of change due to the Proposed Development and the sensitivity of the affected receptor. The following terms have been used to define the significance of the effects identified (as outlined in **Table 14.5**):

- Major effect: where the Proposed Development could be expected to have a considerable effect (either positive or negative) on socio-economics;
- Moderate effect: where the Proposed Development could be expected to have a noticeable effect (either positive or negative) on socio-economics;
- Minor effect: where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) on socio-economics; and
- Negligible: where no discernible effect is expected as a result of the Proposed Development on socio-economics (i.e. the effect is insignificant).

14.6.19 **Table 14.5** sets out the approach to determining significance.

Table 14.5 Determining Significance

Magnitude of Change						
Importance or Sensitivity of Receptor		Very High	High	Medium	Low	Very low
	Very High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)
	High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Negligible (Not significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)

	<b>Very Low</b>	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)
<b>Key</b>		Significant in EIA terms				
		Not significant in EIA terms				

# 15. Human Health

## 15.1 Introduction

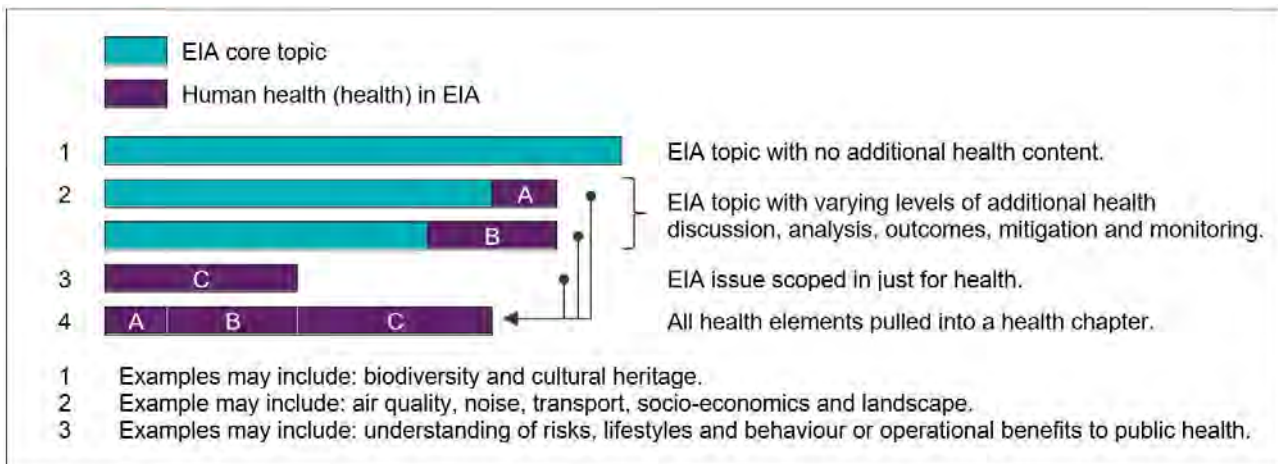
- 15.1.1 This chapter considers the potential health effects associated with the Proposed Development.
- 15.1.2 This Scoping Report defines likely significant effects for health as those that should be brought to the attention of the determining authority as they provide, or are contrary to providing, a high level of protection to population health (based on Environmental Impact Assessment (EIA) Directive 2014/52/EC250).
- 15.1.3 The way in which health is considered within EIA is a developing area of practice. Interim advice is provided in the Institute of Environmental Management and Assessment, 2017: Health in Environmental Assessment, a primer for a proportionate approach<sup>251</sup>. Public Health England has also issued a briefing note on health in EIA for local public health teams<sup>252</sup>. The approach set out below is considered to be in line with emerging best practice.
- 15.1.4 This chapter defines health as a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity. It also considers issues of wellbeing, which is defined as a state in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community. Health and wellbeing are influenced by a range of factors, termed the 'wider determinants of health'. These terms are explained further in **Section 15.6**.
- 15.1.5 The focus of the chapter is on community health and wellbeing and not on occupational health and safety. The terms 'health', 'human health', 'population health' and 'health and wellbeing' are used interchangeably.
- 15.1.6 This chapter informs and has been informed by other relevant chapters of this Scoping Report.
- 15.1.7 As illustrated by **Figure 15.1**, this chapter brings together the relevant information on health. This includes considering what the conclusions of other Scoping Report chapters mean in population health terms.

<sup>250</sup> European Parliament, Council of the European Union, 2014. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance.

<sup>251</sup> Cave B, Fothergill J, Pyper R, Gibson G, Saunders P, 2017. Health in Environmental Impact Assessment: a primer for a proportionate approach. IEMA, Faculty of Public Health and Ben Cave Associates Ltd. Lincoln, England.

<sup>252</sup> Cave B, Fothergill J, Pyper R, Gibson G, 2017. Health and Environmental Impact Assessment: a briefing for public health teams in England. Public Health England. London, England.

Figure 15.1 Illustrative coverage of health in EIA



## 15.2 Relevant legislation, policy and guidance

### Legislation

15.2.1 The legislation relevant to health and the assessment that will be presented within the Environmental Statement (ES) includes:

- The EIA Regulations 2017<sup>253</sup> give effect to the amended European Union EIA Directive<sup>250</sup>. One of the amendments clarifies that 'population and human health' factors should be on the list of environmental topics considered by EIA;
- The Health and Safety at Work Act 1974<sup>254</sup> places duties on employers to ensure, so far as is reasonably practicable: the health, safety and welfare at work of all their employees; and that persons not in their employment are not exposed to risks to their health or safety as a result of the activities undertaken. In both cases, the requirement for risks to be reduced to As Low As Reasonably Practicable is fundamental and applies to all activities within the scope of the Health and Safety at Work Act 1974;
- Part III of the Environmental Protection Act 1990<sup>255</sup> regulates control of emissions (including dust, noise and light) that may be prejudicial to health or a nuisance;
- The Environment Act 1995<sup>256</sup> sets provisions for protecting certain environmental conditions of relevance to health in the UK. Part II covers contaminated land and Part IV covers air quality;
- The Air Quality Standards Regulations 2010<sup>257</sup> transpose into English law the requirements of Directives 2008/50/EC<sup>258</sup> and 2004/107/EC<sup>259</sup> on ambient air quality; and

<sup>253</sup> Ministry of Housing, Communities & Local Government, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.SI 571. Available online <http://www.legislation.gov.uk/uksi/2017/571/contents/made> [Checked 23/03/2018].

<sup>254</sup> HM Government of Great Britain, 1974. Health and Safety at Work etc. Act.

<sup>255</sup> HM Government of Great Britain & Northern Ireland, 1990. Environmental Protection Act.

<sup>256</sup> HM Government of Great Britain & Northern Ireland, 1995. Environment Act.

<sup>257</sup> HM Government of Great Britain & Northern Ireland, 2010. The Air Quality Standards Regulations. London.

<sup>258</sup> European Parliament, 2008, European C. Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

<sup>259</sup> European Parliament, Council of the European Union, 2012. Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air, 2004.

- The Civil Aviation Act 2012<sup>260</sup> gives the Civil Aviation Authority a role in promoting better public information about the environmental effects of civil aviation in the UK, their impact on health and safety, and measures taken to mitigate adverse impacts.

## Policy

15.2.2 There are a number of policies and guidance at the international, national and local level that will be relevant to the assessment presented within the ES. These are listed in **Table 15.1**.

Table 15.1 Relevant policies and their implications for health

Policy reference	Implications
<b>The World Health Organization's (WHO's) Health 2020<sup>261</sup></b>	
	A policy framework and strategy for the 21st century. It aims to significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure sustainable people-centred health systems that are universal, equitable, sustainable and of high quality. The Health 2020 policy is based on four priority areas: investing in health through a life-course approach and empowering people; tackling the region's major health challenges of non-communicable and communicable diseases; strengthening people-centred health systems, public health capacity and emergency preparedness, surveillance and response; and creating resilient communities and supportive environments.
<b>Global Health Strategy 2014 - 2019<sup>262</sup></b>	
	Public Health England works in support of the priorities set out by WHO centrally, and in support of WHO's European health policy framework Health 2020.
<b>Helping people live well for longer<sup>263</sup></b>	
	The UK policy statement and resource pack sets out national policy actions and support for delivering local priorities to reduce levels of premature mortality, for example due to cancer, heart disease, stroke, respiratory and liver disease.
<b>National Planning Policy Framework (NPPF)<sup>264</sup></b>	
	The National Planning Policy Framework (NPPF) includes statements that frame planning policy and planning determinations with regard to health, specifically:
Paragraph 17	<i>"A set of core land-use planning principles should underpin both plan-making and decision-taking." Core principle 12 states: "take account of and support local strategies to improve health, social and cultural wellbeing for all, and deliver sufficient community and cultural facilities and services to meet local needs."</i>
Paragraph 29	<i>"Transport policies have an important role to play in facilitating sustainable development but also in contributing to wider sustainability and health objectives."</i>
Paragraph 69	<i>"The planning system can play an important role in facilitating social interaction and creating healthy, inclusive communities."</i>
Paragraph 73	<i>"Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities."</i>
Paragraph 120	<i>"To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general</i>

<sup>260</sup> HM Government of Great Britain & Northern Ireland. Civil Aviation Act.

<sup>261</sup> World Health Organization Regional Office for Europe, 2012. Health 2020: a European policy framework supporting action across government and society for health and well-being. Copenhagen, Denmark.

<sup>262</sup> Public Health England. Global Health Strategy 2014 to 2019. Published September 2014.

<sup>263</sup> Department of Health, 2014. Living Well for Longer: National Support for Local Action to Reduce Premature Avoidable Mortality. London.

<sup>264</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. [Online] Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Accessed 12 03 2018].



Paragraph 123

*amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account"*

Paragraph 171

*"Planning policies and decisions should aim to: avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development; [and] mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions; ...";*

*"Local planning authorities should work with public health leads and health organisations to understand and take account of the health status and needs of the local population (such as for sports, recreation and places of worship), including expected future changes, and any information about relevant barriers to improving health and well-being."*

#### The Aviation Policy Framework <sup>265</sup>

Sets out the government's policy to allow the aviation sector to continue to make a significant contribution to economic growth across the country. The points included here are noted in relation to health:

- The aviation sector is a major contributor to the economy (with economic prosperity being an important positive determinant of health).
- For aviation related local environmental impacts, such as air pollution, the overall objective is to ensure appropriate health protection by focusing on meeting relevant legal obligations;
- Emissions from transport, including at airports, contribute to air pollution. EU legislation sets legally binding air quality limits for the protection of human health. Around airports, sources of air pollution include aircraft engines, airport-related traffic on local roads and surface vehicles. The most important pollutants are oxides of nitrogen (NOx) and particulate matter (PM). Studies have shown that NOx emissions from aviation-related operations reduce rapidly beyond the immediate area around the runway. Road traffic remains the main problem with regard to NOx in the UK. Airports are large generators of surface transport journeys and as such share a responsibility to minimise the air quality impact of these operations;
- The Government's overall policy on aviation noise is to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise. This is consistent with the Government's Noise Policy, as set out in the Noise Policy Statement for England (NPSE) which aims to avoid significant adverse impacts on health and quality of life. The Government wants to strike a fair balance between the negative impacts of noise (on health, amenity (quality of life) and productivity) and the positive economic impacts of flights. The Government expects that the aviation industry will continue to reduce and mitigate noise as airport capacity grows. As noise levels fall with technology improvements the aviation industry should be expected to share the benefits from these improvements with local communities;
- The Government will continue to treat the 57dB LAeq 16 hour contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance. However, this does not mean that all people within this contour will experience significant adverse effects from aircraft noise. Nor does it mean that no-one outside of this contour will consider themselves annoyed by aircraft noise. The Government recommends that average noise contours should not be the only measure used when airports seek to explain how locations under flight paths are affected by aircraft noise; and
- The Government recognises that the costs on local communities are higher from aircraft noise during the night, particularly the health costs associated with sleep disturbance. Noise from aircraft at night is therefore widely regarded as the least acceptable aspect of aircraft operations. However, the Government also recognises the importance to the UK economy of certain types of flights, such as express freight services, which may only be viable if they operate at night. In recognising these higher costs upon local communities, the Government expects the aviation industry to make extra efforts to reduce and mitigate noise from night flights through use of best-in-class aircraft, best practice operating procedures, seeking ways to provide respite wherever possible and minimising the demand for night flights where alternatives are available.
- Whilst the Government's policy is to give particular weight to the management and mitigation of noise in the immediate vicinity of airports, there may be instances where prioritising noise creates unacceptable costs in terms of local air pollution. For example, displacing the runway landing threshold to give noise benefits could lead to significant additional taxiing and emissions. For this reason, the impacts of any proposals which change noise or emissions levels should be carefully assessed to allow these costs and benefits to be weighed up; and

<sup>265</sup> Secretary of State for Transport, 2013. Aviation policy framework. Available online [www.gov.uk/government/publications/aviation-policy-framework](http://www.gov.uk/government/publications/aviation-policy-framework) [Checked 21/04/18]

- Airports also have an impact on other aspects of the local environment such as water, waste management and habitat, through for example, de-icing of aircraft and runways, fuel handling and storage or the production of on-site heat or power. In England and Wales, where these activities produce waste, lead to discharges to local watercourses or groundwater, or are carried out using activities specified in the Environmental Permitting Regulations 2010, airports may require a permit from the Environment Agency or local authority. The permits contain conditions to protect the environment and human health and, where necessary, require the site operator to carry out monitoring.

#### Noise Policy Statement for England (NPSE)<sup>266</sup>

The NPSE sets out the Government's position on the underlying principles and aims of noise management decisions. The NPSE applies to all forms of noise, including environmental noise (except occupational noise). The NPSE has three aims:

- Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

#### Air Quality Strategy for England, Scotland, Wales and Northern Ireland<sup>267</sup>

The Environment Agency works with local authorities, Highways England and others to manage the government's Air Quality Strategy in England and Wales. The strategy sets air pollution standards to protect people's health and the environment. The Strategy sets out the National Air Quality Objectives (AQOs) and Government policy on achieving these objectives.

#### Beyond the horizon - the future of UK aviation: next steps towards an aviation strategy<sup>268</sup>

The Strategy notes that:

- The Government expects that demand for air services will continue to rise significantly through to 2050. Aviation plays a crucial role in the UK's wider economy and export markets. Economic benefits would be expected to make a positive contribution as a determinant of health.
- The government must ensure that growth is sustainable and is balanced with local and global environmental concerns;
- The government recognises the impact on communities living near airports and understands their concerns over local environmental issues, particularly noise. As airports grow, it is important that communities share in the economic benefits of this growth, and that adverse impacts are mitigated where possible; and
- The strategy will ensure that passengers with reduced mobility or disabilities are able to travel by air as seamlessly as possible. This includes addressing difficulties (particularly access barriers) that their health condition or disability would cause at airports or while flying.

#### Somerset County Plan 2016 - 2020<sup>269</sup>

The vision includes reducing inequalities. These are set out as:

- Social inequalities, such as within the education system where children on free school meals underachieve;
- Economic inequalities, where people in deprived areas have fewer chances to succeed and are less likely to find good quality jobs; and
- Health inequalities, where people from deprived backgrounds have poorer health, are more likely to live with long-term conditions, and have a shorter lifespan than people living in more affluent areas.

<sup>266</sup> Department for Environment, Food & Rural Affairs, 2010. Noise Policy Statement for England. London.

<sup>267</sup> Department for Environment, Food and Rural Affairs, 2011. The air quality strategy for England, Scotland, Wales and Northern Ireland: Volume 1.

<sup>268</sup> HM Government, 2018. Beyond the horizon – the future of UK aviation: next steps towards an aviation strategy

Ref: ISBN 978-1-84864-199-0. <https://www.gov.uk/government/consultations/a-new-aviation-strategy-for-the-uk-call-for-evidence>

<sup>269</sup> Somerset County Council. County Plan 2016 – 2020. Available online <http://www.somerset.gov.uk/policies-and-plans/plans/county-plan/> [Checked 18/04/18].

**North Somerset Council (NSC) Core Strategy January 2017** <sup>270</sup>

The Strategy has the following three policies under the Sustainable Community Strategy theme of 'Ensuring safe and healthy communities':

- Policy CS25 Children, young people and higher education. Predominantly relating to new residential development;
- Policy CS26 Supporting healthy living and the provision of health care facilities. The policy includes:
  - Requiring HIA on all large-scale developments in the district that assess how the development will contribute to improving the health and wellbeing of the local population;
  - Working with relevant stakeholders to reduce geographical inequalities in health within the district;
  - Encouraging development that promotes active living through creating places that are easily accessible, attractive and safe to move around by walking or cycling;
  - Recognising and safeguarding the role of allotments, small scale agriculture and farmers markets in providing access to healthy, affordable, locally produced food options; and
  - Resisting new developments which are likely to have an adverse impact on the wider community such as drug and alcohol rehabilitation facilities which do not support the needs of existing residents.
- Policy CS27 Sport, recreation and community facilities. Predominantly relating to new residential development.

## Guidance

15.2.3 Planning Practice Guidance on Environmental Impact Assessment<sup>271</sup> explains requirements of the EIA Regulations<sup>253</sup>. The guidance does not provide additional information in relation to defining, scoping or assessing 'population and human health'. Regard has therefore been given to the 2017 publication Health in Environmental Assessment, a primer for a proportionate approach<sup>251</sup>. Public Health England has also issued a briefing note on health in EIA for local public health teams<sup>252</sup>.

15.2.4 Planning Practice Guidance on health and wellbeing<sup>272</sup> that applies more broadly than just EIA notes the following:

- The link between planning and health has been long established. The built and natural environments are major determinants of health and wellbeing;
- A healthy community is a good place to grow up and grow old in. It is one which supports healthy behaviours and supports reductions in health inequalities. It should enhance the physical and mental health of the community and, where appropriate, encourage:
  - ▶ Active healthy lifestyles that are made easy through the pattern of development, good urban design, good access to local services and facilities; green open space and safe places for active play and food growing, and is accessible by walking and cycling and public transport; and
  - ▶ The creation of healthy living environments for people of all ages which supports social interaction. It meets the needs of children and young people to grow and develop, as well

<sup>270</sup> 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> [Accessed 16 04 18]

<sup>271</sup> Ministry of Housing, Communities & Local Government, Published 6 March 2014. Last updated 28 July 2017. Planning practice guidance. Environmental Impact Assessment. Requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017. <https://www.gov.uk/guidance/environmental-impact-assessment>

<sup>272</sup> Ministry of Housing, Communities & Local Government, Published 6 March 2014. Last updated 28 July 2017. Planning practice guidance. Health and wellbeing. The role of health and wellbeing in planning. <https://www.gov.uk/guidance/health-and-wellbeing>

as being adaptable to the needs of an increasingly elderly population and those with dementia and other sensory or mobility impairments.

- The range of issues that could be considered through the plan-making and decision-making processes, in respect of health and healthcare infrastructure, include how:
  - ▶ Development proposals can support strong, vibrant and healthy communities and help create healthy living environments which should, where possible, include making physical activity easy to do and create places and spaces to meet to support community engagement and social capital;
  - ▶ The healthcare infrastructure implications of any relevant proposed local development have been considered;
  - ▶ Opportunities for healthy lifestyles have been considered (e.g. planning for an environment that supports people of all ages in making healthy choices, helps to promote active travel and physical activity, and promotes access to healthier food, high quality open spaces, green infrastructure and opportunities for play, sport and recreation);
  - ▶ Potential pollution and other environmental hazards, which might lead to an adverse impact on human health, are accounted for in the consideration of new development proposals; and
  - ▶ Access to the whole community by all sections of the community, whether able-bodied or disabled, has been promoted.
- Local authority planners should consider consulting the Director of Public Health on any planning applications (including at the pre-application stage) that are likely to have a significant impact on the health and wellbeing of the local population or particular groups within it. This would allow them to work together on any necessary mitigation measures. A Health Impact Assessment (HIA) may be a useful tool to use where there are expected to be significant impacts; and
- Similarly, the views of the local Clinical Commissioning Group and NHS England should be sought regarding the impact of new development which would have a significant or cumulatively significant effect on health infrastructure and/or the demand for healthcare services.

15.2.5

The approach to assessing health in EIA has also been informed by relevant UK guidance on HIA. In England there is no overarching guidance for HIA. However, generic principles are evident in specialist guidance such as that by the Department of Health in relation to HIA of government policy<sup>273</sup>, or that by the London Healthy Urban Development Unit in relation to urban planning<sup>274</sup>. In Wales there is good quality project level guidance on HIA by the Wales Health Impact Assessment Support Unit<sup>275</sup>. Similarly, in Northern Ireland overarching project level HIA guidance is provided by the Institute of Public Health in Ireland<sup>276</sup>. HIA guidance from Scotland includes discussion of issues relevant to rural contexts<sup>277</sup>.

<sup>273</sup> Department of Health, 2010. Health Impact Assessment of Government Policy. Department of Health, England.

<sup>274</sup> NHS Healthy Urban Development Unit, 2015. Healthy Urban Planning Checklist. London.

<sup>275</sup> WHIASU, 2012. Health Impact Assessment: a practical guide. Cardiff, Wales: Wales Health Impact Assessment Support Unit.

<sup>276</sup> Metcalfe O, Higgins C, Lavin T, 2009. Health Impact Assessment guidance: Institute of Public Health in Ireland.

<sup>277</sup> Higgins M, Arnot J, Farman P, Wares J, Aboud S, Douglas MJ, 2015. Health Impact Assessment of rural development: a guide. Edinburgh: Scottish Health and Inequalities Impact Assessment Network and Scottish Public Health Network (ScotPHN).

## 15.3 Main sources of data

15.3.1 The EIA scoping exercise presented in this Scoping Report, with respect to health, has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the following sources of data:

- Other EIA Scoping Report chapters;
- Public Health England Health Profiles<sup>278</sup>;
- English indices of deprivation<sup>279</sup>;
- Somerset Intelligence<sup>280</sup>;
- NSC, Director of Public Health's annual report<sup>281</sup>; and
- Aerial photography (Google Earth Pro).

## 15.4 Engagement with consultees

15.4.1 This Scoping Report chapter forms part of the consultation process to inform engagement with health stakeholders. This scoping chapter will be the starting point for discussions on the scope and methods of the assessment stage. Consultation with health stakeholders will focus on working with the public health and the environmental protection teams at NSC.

15.4.2 A consultation on the Bristol Airport draft master plan was undertaken between November 2017 and January 2018. Those consultation responses will also inform the health assessment, as will any relevant responses made during the second consultation.

## 15.5 Overview of baseline conditions

### Zones of influence

15.5.1 The Proposed Development is an expansion of an existing operational airport. The changes experienced therefore generally relate to the scale and zone of influence of existing impacts (such as air transport movements), rather than the introduction of novel impacts.

15.5.2 The following geographic area classifications have been used:

- Site-specific (population near Bristol Airport);
- Local (North Somerset Unitary Authority);
- Regional (South West England and South East Wales);
- National; and
- International.

<sup>278</sup> Public Health England Health Profiles 2017. District and County level. Available online <http://fingertips.phe.org.uk/profile/health-profiles> [Checked 18/04/18]

<sup>279</sup> English indices of deprivation 2015. File 10: local authority district summaries. Available online <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015> [Checked 18/04/18]

<sup>280</sup> Somerset Intelligence. Available online [www.somersetintelligence.org.uk](http://www.somersetintelligence.org.uk) [Checked 18/04/18]

<sup>281</sup> North Somerset Council Director of Public Health Report 2016/17. Available online <https://www.n-somerset.gov.uk/wp-content/uploads/2018/03/director-of-public-health-annual-report-2016-17.pdf> [Checked 18/04/18]

- 15.5.3 The 'site specific' level considers localised effects with reference to routine statistics collected for Lower Layer Super Output Areas (LSOAs). The LSOAs are selected to indicate the representative characteristics of the population potentially affected. Whilst being close to the Bristol Airport site, the selected LSOAs do not define the extent of potential effects. The selected LSOAs are:
- LSOA North Somerset 013D; and
  - LSOA North Somerset 013B.
- 15.5.4 LSOA North Somerset 013D includes the Bristol Airport site as well as the closest residential areas (e.g. on Downside Road and School Lane). LSOA North Somerset 013B includes areas to the east of the Bristol Airport runway and is representative in its location and deprivation profile of residential areas that may be affected by changes in aviation take-offs and landings (e.g. residential areas near Felton).
- 15.5.5 Although the Bristol Airport site is close to areas such as LSOA North Somerset 011C and LSOA Bath and North East Somerset 021, these areas are not considered to be as representative of the affected population (their populations being predominantly further from Bristol Airport and not indicating particular sensitivity in terms of deprivation). The LSOA are selected to define a representative population in terms of sensitivity, they do not define the extent of effects.
- 15.5.6 Within the study areas the assessment defines eight population groups (described in **Section 15.6**). Defining these population groups allows a structured and consistent discussion in both the assessment and the cumulative assessment. Four of these population groups are geographically defined, the remaining four are defined in relation to reasons that a population may be sensitive, other than due to proximity.
- 15.5.7 The study areas used in other chapters of the Scoping Report are of relevance, but do not necessarily define the boundaries of potential health effects. For example, effects on mental health and wellbeing are subjective and may not be limited to the area defined in relation to achieving certain thresholds (e.g. for air quality or noise). Consequently, this chapter uses study areas to broadly define representative population groups rather than to set boundaries on the extent of potential effects.

## Current baseline

- 15.5.8 At the Scoping Report stage summary baseline information is presented at the County and District level. A more detailed baseline, including LSOA data will be presented as part of the health assessment stage in the ES.

## Somerset Joint Strategic Needs Assessment key issues<sup>282</sup>

- 15.5.9 People and neighbourhoods:
- Somerset's population is older than the national average and is becoming older;
  - There is a net flow, out of Somerset, of 18-24 year-olds; and
  - Much of Somerset is rural, which presents challenges with accessing services.
- 15.5.10 Housing:
- Housing costs are high, relative to earnings, so more affordable housing is needed;

<sup>282</sup> Somerset Health and Wellbeing Board. Joint Strategic Needs Assessment. Available online <http://www.somersetintelligence.org.uk/jsna/> [Checked 18/04/18].

- There is an increasing need for more one-bedroom and adapted accommodation;
- Demand for private rental properties is also leading to higher rents; and
- Fuel poverty is notably high in the more rural areas.

#### 15.5.11 Economy and jobs:

- The value per head of Somerset's economy is below the national average; and
- Somerset as a whole has a mixed economy of agriculture, tourism and manufacturing, including being home to many major businesses.

#### 15.5.12 Education, Skills and Learning:

- Educational achievement has improved but Somerset's GCSE pass rates remain below average; and
- Those in more deprived areas experience much lower attainment.

#### 15.5.13 Health and wellbeing:

- Life expectancy in Somerset is higher than the national average. However, people can expect to live longer in ill-health;
- Somerset is above the national average for child obesity, smoking in pregnancy and alcohol-related hospital admissions amongst under-18s;
- The ageing population is likely to increase the health burden of dementia; and
- The number of people being diagnosed with diabetes is increasing rapidly.

### Somerset County<sup>278</sup>

#### 15.5.14 Health in summary:

- The health of people in Somerset is varied compared with the England average. About 15% (14,200) of children live in low income families. Life expectancy for both men and women is higher than the England average.

#### 15.5.15 Health inequalities:

- Life expectancy is 6.3 years lower for men and 4.3 years lower for women in the most deprived areas of Somerset than in the least deprived areas.

#### 15.5.16 Local priorities:

- The public health priorities for Somerset are to build healthy communities and to prevent ill health. These priorities include: improving the health of children and young people; a focus on health behaviours in midlife; ageing well; and tackling loneliness. Somerset remains focussed on reducing health inequalities and complex needs.

### North Somerset Unitary Authority<sup>278</sup>

#### 15.5.17 Health in summary:

- The health of people in North Somerset is generally better than the England average. About 14% (5,300) of children live in low income families. Life expectancy for men is higher than the England average.



## 15.5.18 Health inequalities:

- Life expectancy is 9.1 years lower for men and 6.9 years lower for women in the most deprived areas of North Somerset than in the least deprived areas.

## 15.5.19 Local priorities:

- Priorities for North Somerset include mental health, reducing childhood obesity and reducing health inequalities.

NSC, Director of Public Health Report 2016/17<sup>281</sup>

15.5.20 The health of North Somerset is generally good compared to the national average. However, the good overall health is unevenly distributed. On average women live longer, and the gap in life expectancy between the least and most deprived areas is greatest for men. These gaps in life expectancy are partly preventable, and efforts need to be made to support individuals in adopting healthy lifestyles.

15.5.21 The importance of prevention is further highlighted in the context of an aging population and the health and social care system under unprecedented pressure. As the ratio of people above state pension age increases, the higher costs of treatment will only be able to be contained if there is an increasing focus on preventing ill health.

15.5.22 The five-year forward view is for a strong focus on major health risks such as smoking, alcohol and obesity. Alongside improving health, it is equally important to be prepared and protected against existing threats to health. This means that vaccine uptake needs to be maximised, alongside the early detection of infectious diseases and the prompt management of any outbreaks to avoid further spread.

**Factors influencing baseline conditions**

15.5.23 Population health data presents a snapshot at a particular time. It is well recognised that population health is subject to continuing influences both at the individual and community level. Influences may be environmental, such as seasonal variation in wellbeing and communicable diseases, they may also respond to socio-economic factors, such as migration and the availability of jobs.

15.5.24 Longer term trends and interventions in population health may also be observed. NHS and social care, public health initiatives and government policies aim to reduce inequalities and improve quality of life. The historic success of such interventions are increasingly challenged by national trends such as an aging population and rising levels of obesity (and its associated adverse effects on health).

**Additional baseline information requirements**

15.5.25 The baseline information will be updated as part of the assessment stage and any variation in the scope of the assessment identified through the Scoping Opinion. Information sources to develop the baseline are expected to include: published scientific literature; demographic information releases; health and wellbeing needs assessments and strategies; and any further policies developed in relation to health and wellbeing. The following sources of data will be considered:

- Somerset Health and Wellbeing Strategy<sup>283</sup>;
- NSC Joint Strategic Needs Assessment<sup>284</sup>;
- Bristol, North Somerset and South Gloucestershire Clinical Commissioning Group health priorities<sup>285</sup>;
- Public Health England Health Assets Profiles<sup>286</sup>;
- Public Health England Wider Determinants of Health Profiles<sup>287</sup>;
- Office of National Statistics and Nomis official labour market statistics<sup>288</sup>; and
- PubMed MEDLINE database of biomedical and life sciences journal literature<sup>289</sup>.

## 15.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

#### Geographic population groups

- 15.6.1 Four population groups will be selected based on the geographic zone of influence:
- The population near Bristol Airport (site-specific);
  - The population of North Somerset Unitary Authority (local);
  - The population of South West England and South East Wales (regional); and
  - The population of England and beyond the borders of England (national and international).
- 15.6.2 The scope focuses on community effects to residents, but also considers: visitors to local communities; the workforce and passengers of Bristol Airport; and the Proposed Development's construction workforce.

#### Potentially vulnerable groups

- 15.6.3 In addition, four further population groups will be defined in relation to their potential sensitivity to changes associated with the Proposed Development (beneficial or adverse):

<sup>283</sup> Somerset Health and Wellbeing Strategy 2013-18. Available online

<http://www.somersetintelligence.org.uk/files/Health%20and%20Wellbeing%20Strategy%202013-18.pdf> [Checked 18/04/18].

<sup>284</sup> North Somerset Council Joint Strategic Needs Assessment. Available online <https://www.n-somerset.gov.uk/my-council/statistics-data/jsna/joint-strategic-needs-assessment/>

<sup>285</sup> Health priorities for the local population. Bristol, North Somerset and South Gloucestershire Clinical Commissioning Group. Health priorities for the local population. Available online <https://bnssgccc.nhs.uk/about-us/what-we-do/our-priorities/health-priorities-local-population/> [Checked 18/04/18]

<sup>286</sup> Public Health England Health Assets Profiles. County level. Available online. <https://fingertips.phe.org.uk/profile/comm-assets> [Checked 18/04/18]

<sup>287</sup> Public Health England Wider Determinants of Health Profiles. District level. Available online <https://fingertips.phe.org.uk/profile/wider-determinants> [Checked 18/04/18]

<sup>288</sup> Office of National Statistics and Nomis official labour market statistics. Available online <https://www.nomisweb.co.uk/query/select/getdatasetbytheme.asp?theme=75> [Checked 18/04/18].

<sup>289</sup> PubMed MEDLINE database of biomedical and life sciences journal literature. Available Online <https://www.ncbi.nlm.nih.gov/pmc/advanced> [Checked 18/04/18].

- Children and young people;
- Older people;
- People with existing poor health (physical and mental health); and
- People living in deprivation, including those on low incomes.

15.6.4 These groups are intentionally broadly defined to facilitate a consistent discussion across health issues and as a basis to considering cumulative effects. The assessment section will discuss detail relevant to particular health issues. People falling into more than one group may be especially sensitive.

### Temporal scope

15.6.5 The temporal scope of the assessment will be defined as follows:

- 'very short term' relates to effects measured in hours, days or weeks (e.g. effects, associated with changes in exposure during particular weather conditions);
- 'short term' relates to effects measured in months (e.g. activities near particular dwellings within the construction stage);
- 'medium term' relates to effects measured in years (e.g. the construction stage); and
- 'long term' relates to effects measured in decades (e.g. the long-term effects on health from increased flights).

### Potential significant effects requiring further assessment

15.6.6 The effects of the Proposed Development that are considered likely and which have the potential to be significant with regards to health will be subject to further assessment (to be presented within the ES). These effects are summarised in the following sections.

15.6.7 The health impact assessment will cover all aspects of the Proposed Development and will not seek to assess different components individually or in isolation. The approach will identify the broad themes from:

- Construction activities; and
- Operational activities.

15.6.8 Where appropriate the assessment will identify particular components of the Proposed Development that may influence effects.

15.6.9 For air quality, noise and travel a qualitative assessment of population health effects will be undertaken, based on the quantitative modelling and analysis reported in those chapters respectively.

### Construction

15.6.10 Development theme: Construction activity and transport effects within existing Bristol Airport boundary. Potential health effects scoped in:

- Air quality: Changes in air quality (including dust, aerosols and odour) due to construction activities for community residents, airport visitors/passengers and airport staff. Health effects may be associated with cardiovascular and respiratory health conditions; and

- Noise and vibration: Changes in levels of construction related disturbance for community residents and airport hotel users. Health effects may be associated with cardiovascular and mental health conditions (e.g. stress, anxiety or depression), notably due to sleep disturbance associated with night-time noise effects.

15.6.11 Development theme: Road works, including traffic effects outside existing Bristol Airport boundary. Potential health effects scoped in:

- Air quality: Changes in road traffic related air quality (including diversions, displacement and changes to traffic flows), as well as road works related air quality (including plant, vehicles and activities that mobilise particulates) affecting community residents;
- Noise and vibration: Changes in road traffic and road works related disturbance for community residents; and
- Travel: Changes in road traffic and road works affecting road safety, travel times, accessibility and active/sustainable travel for community residents and emergency services. For road safety, health effects may be associated with the severity or incidence of road accidents. For accessibility, health effects may be associated with emergency response times or non-emergency treatment outcomes associated with delays or non-attendance. For active/sustainable travel, health effects may relate to physical health (e.g. cardiovascular health) and mental health conditions (e.g. stress, anxiety or depression) associated with obesity and levels of physical activity.

15.6.12 Development theme: Parking land requirements outside existing Bristol Airport boundary. Potential health effects scoped in:

- Community identity: Changes in current land use and the value placed on the current setting (including the attractiveness of the area) by community residents (directly or indirectly). Health effects may be associated with mental health conditions (e.g. stress, anxiety or depression) due to underlying social determinants influencing community cohesion.

## Operation

15.6.13 Development theme: Increased Air Traffic Movement (ATM) related emissions within and outside Bristol Airport boundary. Potential health effects scoped in:

- Air quality: Changes in aviation related air quality (including effects associated with any changed airspace configurations, as well as take-off and landing patterns / frequency) for community residents, airport visitors/passengers and airport staff; and
- Noise and vibration: Changes in aviation related disturbance (including due to: an increase in night-time flights; any changed airspace configurations; and changes in take-off and landing patterns / frequency) for community residents, airport hotel users and on-site accommodated airport staff.

15.6.14 Development theme: Increased airport related road traffic effects within and outside Bristol Airport boundary. Potential health effects scoped in:

- Air quality: Changes in operational road traffic related air quality affecting community residents, airport visitors/passengers and airport staff;
- Noise and vibration: Changes in operational road traffic related disturbance (including an increase associated with more night-time flights) for community residents and airport hotel users; and

- Travel: Changes in operational road traffic affecting road safety, travel times, accessibility and active/sustainable travel for community residents, emergency services, airport visitors/passengers and airport staff.

15.6.15 Development theme: Community influences from an expanded Bristol Airport. Potential health effects scoped in:

- Economic effects of increased aviation capacity: Changes in direct and indirect employment and local/regional economy opportunities for community residents and the wider population;
- Healthcare services: Changes in health service demand associated with an expanded non-permanent UK population in the area affecting the local NHS and community residents (i.e. an increased temporary population entitled to use NHS services). Excludes communicable illness transmission and health tourism – see discussion of issues scoped out;
- Travel: Changes in opportunities for increased national and international travel for community residents and the wider population; and
- Community identity: Changes in community identity, social networks and culture for community residents due the expanded airport having a greater influence on the local environmental and economic landscape, as well as the potential for changes to the permanent and non-permanent population associated with increased travel opportunities.

### Potential effects not requiring further assessment

15.6.16 The 'wider determinants of health' model introduced in **Figure 15.2** shows how in broad terms health affects everything and everything affects health. Every activity of the Proposed Development would therefore have some influence on health.

Figure 15.2 Wider determinants of health<sup>290, 291</sup>



<sup>290</sup> Dahlgren G, Whitehead M. Policies and strategies to promote social equity in health, 1991. Stockholm: Institute for Future Studies.

<sup>291</sup> Barton H, Grant M. A health map for the local human habitat. The Journal of the Royal Society for the Promotion of Health 2006; 126(6): 252-3.

- 15.6.17 When a potential effect of the Proposed Development is likely, a conclusion on significance allows the determining authority to place that health effect in context. Effects that are considered likely and which have the potential to be significant for population health should be taken into account when determining the application.
- 15.6.18 The health chapter scoping has been informed by the conclusions of other chapters of this Scoping Report. Where other chapters of this Scoping Report indicate that there would not be a plausible link between source, pathway and receptor it is unlikely that there would be a population health effect, such effects are scoped out. Similarly, if effects would require rare conditions for the link between source, pathway and receptor to occur these are also scoped out as not being probable. An exception is made for **Chapter 16: Major accidents and disasters** in the Scoping Report, which considers *"the expected significant effects arising from the vulnerability of the Proposed Development to major accidents or disasters that are relevant to that development"* (as required by Part 1 paragraph 4(4) of the EIA Regulations 2017<sup>253</sup>). The health chapter does not duplicate the issues relating to health (e.g. injury hazards) that are covered in **Chapter 16: Major accidents and disasters**.
- 15.6.19 In line with a proportionate scope, the health chapter has focused on those issues that are considered most likely to have a significant influence on population health. The scope of the health chapter will be kept under review during the assessment stage. Should other EIA chapters identify potentially significant effects on determinants of health that are currently outside the proposed scope, the scope will be extended to discuss (and if appropriate assess) such issues in the health chapter of the ES.
- 15.6.20 At this stage a number of assumptions have been made that underpin the decision to scope out some issues from the health perspective. These assumptions are stated and will be kept under review during the assessment stage. The discussion here sets out the rationale for scoping issues out of the health impact assessment.

## Construction

- 15.6.21 Development theme: Construction workforce influx to the area and their interaction with the residential community outside of work hours. Potential health effects scoped out:
- Accommodation: changes in housing availability for residents due to accommodation needs of the construction workforce. It is assumed that the great majority of the workforce will come from the regional study area (South West England and South East Wales). As such, most construction workers would be expected to be home based, with the remainder using existing rental market accommodation (such as hotels). This assumption (and its implications for other scoping decisions in this section) will be reviewed during the assessment stage; and
  - Healthcare services: changes in demand for healthcare services affecting the local NHS, residents and the construction workforce. Impact on the capacity of NHS healthcare services is expected to be limited as most construction workers are expected to be home based and would therefore access their usual General Practitioner (GP) and hospital-based services.
- 15.6.22 Development theme: Construction activity and transport effects within and outside Bristol Airport boundary. Potential health effects scoped out:
- Water environment: Changes in water quality (including surface water, groundwater and flood risk) due to construction activities for community residents, airport visitors/passengers and airport staff. The potential for health effects to these groups is considered limited and unlikely due to the standard good practice mitigation measures and regulatory requirements that would be in place. This assumption will be reviewed through a watching brief on the water environment and flood risk and ground water EIA chapters during the assessment stage; and

- Land quality: Changes in land quality (including accidental contamination and disturbance on any historic ground contamination) due to construction activities for community residents, airport visitors/passengers and airport staff. The potential for health effects to these groups is considered limited and unlikely due to the standard good practice mitigation measures and regulatory requirements that would be in place. This assumption will be reviewed through a watching brief on the land quality EIA chapter during the assessment stage.

## Operation

15.6.23 Development theme: Community influences from an expanded Bristol Airport. Potential health effects scoped out:

- Communicable illness: Changes in health service demand associated with increased national and international travel, potentially increasing the spread of communicable illnesses. Bristol Airport has indicated that it is likely that the destination range of the expanded airport would be similar to that currently provided. This already includes a range of international destinations, as well as connections with major international travel hubs in the UK and in Europe. As with other UK airports, Bristol Airport operates appropriate health surveillance systems. Communicable illness surveillance would be scaled with expansion as necessary, to ensure an appropriate level of public health protection is maintained; and
- Health tourism: Changes in health service demand associated with increased international health tourism. Including travel to the UK specifically for healthcare use and use of healthcare whilst visiting the UK for other reasons. It is assumed that the great majority of overseas travellers who may use NHS services would have appropriate health insurance to reimburse the costs of their care. Whilst it is recognised that the NHS faces capacity challenges, the change associated with the Proposed Development is unlikely to be of a scale to affect population health.

## Proposed assessment methodology

15.6.24 The methodology outlined in this section is based on emerging best practice for the consideration of health in EIA. It has been informed by interim advice from the Institute of Environmental Management and Assessment, 2017: Health in Environmental Assessment, a primer for a proportionate approach<sup>251</sup> and the Public Health England briefing note on health in EIA for local public health teams<sup>252</sup>. This approach will be followed when completing the impact assessment presented in the ES.

## General Approach

15.6.25 This section sets out the methods for providing reasoned conclusions for the identification and assessment of any likely significant effects of the Proposed Development on population health. This includes reasoned conclusions in relation to health protection, health improvement and/or improving services.

15.6.26 The methods provide a framework to identify (at both scoping and assessment):

- The 'likelihood' of the Proposed Development having an effect on health; and
- If an effect is likely, whether it may be 'significant' in EIA terms.



## Definitions

- 15.6.27 Likely significant effects for population health are those that should be brought to the attention of the determining authority as they provide, or are contrary to providing, a high level of protection to population health (based on EIA Directive 2014/52/EC<sup>250</sup>).
- 15.6.28 The chapter uses the WHO definition of health, which states that health is a *"state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity"*<sup>292</sup>.
- 15.6.29 The chapter also uses a WHO definition for wellbeing. The WHO defines wellbeing as a *"state in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community"*<sup>293</sup>.

## Health Determinants

- 15.6.30 Population health can be influenced by a wide variety of direct and indirect factors, from controllable factors such as lifestyle to uncontrollable factors such as genetics. The influences and effects can be wide-ranging and are likely to vary between individuals. In determining 'physical, mental and social wellbeing', contributory factors, known as 'determinants', are considered. Determinants are a reflection of a mix of influences from an individual's society and environment.
- 15.6.31 The 'wider determinants of health' model is used to conceptualise how population health spans environmental, social and economic aspects.
- 15.6.32 Influences that result in a change in determinants have the potential to cause beneficial or adverse effects on health, either directly or indirectly. The degree to which these determinants influence health varies, given the degree of personal choice, location, mobility and exposure.

## Likelihood

- 15.6.33 The first issue to consider in scoping or assessment is the likelihood of the Proposed Development having an effect. A likely effect should be both plausible and probable.
- Plausible relates to their being a relevant source, pathway and receptor; and
  - Probable relates to a qualitative judgement to exclude those effects that could only occur under certain very rare conditions, except where these relate to the Proposed Development's vulnerability to major accidents or disasters (as required by Part 1 paragraph 4(4) EIA Regulation 2017<sup>253</sup>) (see **Chapter 16: Major accidents and disasters** for scoping of such issues).
- 15.6.34 The term 'health pathways' describes how a specific activity of the Proposed Development could change a determinant of health and potentially result in a change in health outcomes (an effect).
- A 'source' represents an activity or factor that could affect the health outcomes of a receptor population;
  - A 'pathway' describes the method or route by which the 'source' could affect the 'receptor' (either causation or association); and
  - A 'receptor' is the recipient of an effect from the 'source', via the 'pathway'.

<sup>292</sup> World Health Organization, 1948. Preamble to the Constitution of the World Health Organization; signed on 22 July 1946 by the representatives of 61 States and entered into force on 7 April 1948. New York.

<sup>293</sup> World Health Organization, 2007. Mental health: strengthening mental health promotion.

15.6.35 **Table 15.2** shows how the Source-Pathway-Receptor model can be used to identify plausible health effects.

Table 15.2 Use of a Source-Pathway-Receptor model to identify plausible health effects

Source	Pathway	Receptor	Plausible health effect?	Rationale
✗	✓	✓	No	There is not a clear source from where a potential health effect could originate.
✓	✗	✓	No	The source of a potential health effect lacks a means of transmission to a population.
✓	✓	✗	No	Receptors that would be sensitive or vulnerable to the health effect are not present.
✓	✓	✓	Yes	Identifying a source, pathway and receptor does not mean an effect is a likely significant effect; the probability of the effect should be qualitatively considered and a professional judgement reached on the significance of effects that are considered likely.

15.6.36 Once a plausible association is established between the Proposed Development's activities and health outcomes the conclusion on 'likelihood' is also informed by a qualitative judgement on the probability of the effect occurring. If the effect could only occur under very rare conditions (or committed mitigation, design principles or regulatory prerequisites would be in place) then the effect may be plausible but not probable and therefore not likely.

## Significance

15.6.37 A determination of significance is required for compliance with the EIA regulations 2017<sup>253</sup> when a potential effect of the Proposed Development is likely (or relates to the Proposed Development's vulnerability to major accidents or disasters).

15.6.38 The 'wider determinants of health' model introduced in **Figure 15.2** shows how in broad terms health affects everything and everything affects health. Every project activity will therefore have some influence on health.

15.6.39 When a potential effect of the Proposed Development is likely, a determination of significance allows the determining authority to place that health effect in context. Effects that are considered significant should be taken into account when determining the application. Effects that are considered non-significant should not be the basis for acceptance or refusal.

15.6.40 The determination of significance has two stages.

- Firstly, the sensitivity of the receptor affected, and the magnitude of the effect upon it are characterised. This establishes whether there is a relevant population and a relevant change in health outcomes to consider; and
- Secondly, a professional judgement is made as to whether or not the change in a population's health is significant. This judgement is based on the collection and presentation of data to evidence reasoned conclusions.

## Sensitivity

15.6.41 **Table 15.3** sets out factors characterising sensitivity for population health. The table informs the professional judgement on scoring high, medium, low or negligible sensitivity. The 'higher' and 'lower' sensitivity characterisations represent instructive positions on a spectrum that would also include more extreme, as well as intermediate, positions.

## Magnitude

15.6.42 **Table 15.4** sets out factors characterising magnitude for population health. The table informs the professional judgement on scoring large, medium, small or negligible magnitude. The 'larger' and 'smaller' magnitude characterisations represent instructive positions on a spectrum that would also include more extreme, as well as intermediate, positions.

Table 15.3 Characterising Sensitivity for Population Health

	Inequalities	Deprivation	Health status	Life stage	Outlook
Higher sensitivity	High levels of inequalities or inequities.	High levels of overall deprivation or a high level of deprivation for a relevant sub-domain of the indices of multiple deprivation. High levels of poor access to financial, social or political resources.	High levels of poor health and/or disability (particularly multiple or complex long-term health conditions). High reliance on (or low capacity in) healthcare facilities, staff or resources.	Presence of dependants (particularly the elderly or children), pregnant women, shift workers or the economically inactive.	Presence of groups with strong views or high degrees of uncertainty about the Proposed Development who may anticipate risks to their health and thus be affected by not only actual changes, but also by the possibility of change.
Lower sensitivity	Low levels of inequalities or inequities.	Low levels of overall deprivation or a low level of deprivation for a relevant sub-domain of the indices of multiple deprivation. Good access to financial, social or political resources.	Low levels of poor health and/or low levels of disability. Low reliance on (or high capacity in) healthcare facilities, staff or resources.	Predominantly a working age population in steady good quality employment.	No indication that strong views are held about the Proposed Development. People are well informed of the issues and potential effects.

Table 15.4 Characterising Magnitude for Population Health

	Severity	Extent	Frequency	Reversibility	Exposure
Larger magnitude	Large change in the risk of developing a new health condition (or injury) or in the progression of an existing condition. Large change in symptoms, quality of life or day-to-day functioning. Large change in inequalities.	Most members of the relevant population affected. Substantial population displacement or influx.	Continuous or daily effects with chronic (long term) changes in health outcomes.	Permanent change in health outcomes once the Proposed Development change ceases. Intergenerational effects.	A low (or high) concentration over a long time, or a high concentration over a short time. Low (or high) exposure to a large population or high exposure to a small population. A high degree of resource sharing with the Proposed Development.
Smaller magnitude	Small change in the risk of developing a new health condition (or injury) or in the progression of an existing condition. Small change in symptoms, quality of life or day-to-day functioning. Small change in inequalities.	Few members of the relevant population affected. Little change in population.	Monthly or yearly affects with acute (short term) changes in health outcomes.	Change in health outcomes reverses once the Proposed Development change ceases. No intergenerational effects.	A low concentration over a short time. Low exposure to a small population. A low degree of resource sharing with the Proposed Development.

15.6.43 The assessment will characterise the relevant changes in health outcomes for each health issue. For each professional judgement on sensitivity and magnitude, the text will set out detail on the one or more relevant factors from **Table 15.3** and **Table 15.4** that informed the scores.

### Judgement framework for significance

- 15.6.44 Having established through the magnitude/sensitivity methods whether there is a relevant population to consider and a relevant change in health outcomes, a professional judgement will be made as to whether or not the change in a population's health is significant.
- 15.6.45 The approach uses a framework for reporting on a range of data sources to ensure reasoned and robust professional judgements are reached. Key sources of data include: scientific literature; baseline conditions; health priorities; consultation responses; regulatory standards; and policy context.
- 15.6.46 Guide questions set out in **Table 15.5** are used to inform the professional judgements on significance. The table informs the professional judgement on scoring effects to be 'significant' or 'not-significant' for population health. In line with best practice, a formulaic matrix approach to determining significance has been avoided.

Table 15.5 Population health guide questions for determining significance

Evidence sources	Guide questions
Scientific literature	Is there a sufficient strength of evidence from sufficiently high-quality studies to support an association between the development, a relevant determinant of health and a relevant health outcome?  Does the literature indicate thresholds or conditions for effects to occur?

Evidence sources	Guide questions
	Are particular population groups identified as being particularly susceptible?
Baseline conditions	Are relevant sensitivities or inequalities identified in the scientific literature present?  Does the baseline indicate that conditions differ from relevant local, regional or national comparators?  Are their geographic or population features of the baseline that indicate effects could be amplified?
Health priorities	Have local, regional or national health priorities been set for the relevant determinant of health or health outcome (e.g. in Joint Strategic Needs Assessments or in Health and Wellbeing Strategies)?
Consultation responses	Has a theme of local, regional or national consultation responses related to the relevant determinant of health or health outcome?
Regulatory standards (if appropriate)	Is the change one that would be formally monitored by regulators?  Are there regulatory or statutory limit values set for the relevant context?  Has EIA modelling predicted change that exceed thresholds from the scientific literature or set by regulators?  Are there relevant international advisory guideline limit values (e.g. by the World Health Organization)?
Policy context	Does local, regional or national government policy raise particular expectations for the relevant project change, determinant of health or health outcome (e.g. levels should be as low as reasonably practicable)?  Is there a relevant international policy context (e.g. treaties or conventions)?

- 15.6.47 The text of the assessment section will provide a structured discussion that responds to these questions for each health issue. The discussion will provide reasoned conclusions for the professional judgement as to whether an issue is significant, or not, for population health. Where appropriate, variation expressed in each evidence source will be reported. This approach is considered proportionate and in line with best practice for the consideration of population health.
- 15.6.48 Ultimately a likely significant health effect is one that should be brought to the attention of the determining authority, as the effect of the Proposed Development is judged to provide, or be contrary to providing, a high level of protection to population health. This may include reasoned conclusions in relation to health protection, health improvement and/or improving services.
- 15.6.49 Where significant adverse effects are identified, mitigation will be considered to reduce the significance of such effects. Similarly, enhancements will be considered where significant and proportionate opportunities to benefit population health are identified.
- 15.6.50 The health chapter in the ES will take as its starting point the residual effects as assessed and determined in relevant EIA topic chapters. This includes taking into account relevant mitigation discussed in other chapters of the ES.

## Population conclusions

- 15.6.51 A population health approach has been used, as it would be disproportionate to reach conclusions on the potential health outcomes of individuals. To take account of potential inequalities, where appropriate, conclusions on a particular health issue will be reached for more than one population. For example:
- One conclusion for the general population (for a defined area); and

- A second separate sub-population conclusion for relevant vulnerable groups (as a single defined class of sensitivities for that issue).

### Cumulative Impact Assessment

15.6.52 Cumulative effects can arise from the same population being affected by:

- Inter-relationships within the same project, such as air quality and noise effects);
- Different development phases (within the same project); or
- Different projects.

15.6.53 Effects relating to use of shared resources, such as roads, may have wider spatial extents than the development areas themselves.

15.6.54 Cumulative effects may arise:

- When effects on the same receptor occur during the same time period, increasing the severity of effect; or
- When effects occur soon after each other, increasing the duration of exposure.

15.6.55 Effects that may be not-significant on their own may contribute to cumulative effects that are significant.

15.6.56 The assessment of cumulative effects will be facilitated by considering a common set of population groups for the health issues scoped into the assessment. A matrix of health issues and population groups will then show how the same population group may experience multiple effects.

## 16. Major Accidents and Disasters

### 16.1 Introduction

- 16.1.1 As a result of the amendment of the Town and Country Planning (Environmental Impact Assessment) Regulations in 2017<sup>294</sup> (the EIA Regulations), it is now a requirement that the potential likely significant effects resulting from, and relating to, major accidents and disasters relevant to a development are considered in the Environmental Impact Assessment (EIA) process.
- 16.1.2 Previously, major accidents and disasters were primarily considered as part of the design process. However, the European Union revised the *EIA Directive (2014/52/EU)* to ensure that these factors are a material consideration in decisions to grant consent for developments requiring EIA, prior to the elements being further considered as part of the later design stage process.
- 16.1.3 As the Proposed Development is considered unlikely to cause significant changes to the risks associated with major accidents and disasters and therefore could not be considered to result in likely significant effects, it is proposed that the topic is scoped out of the EIA. This chapter presents the rationale for this decision and sets out:
- The legislation, policy and guidance relating to the assessment of major accidents and disasters within EIA;
  - The data sources used to inform scoping;
  - The factors influencing baseline conditions in respect to major accidents and disasters; and
  - The rationale for scoping out major accidents and disasters from the Environmental Statement (ES).
- 16.1.4 A major accident has been defined for the purposes of this report as an occurrence resulting from an uncontrolled event caused by a man-made activity or asset leading to serious damage on receptors. The term 'disaster' is used to describe a natural occurrence leading to serious damage on receptors. In both cases, the occurrence could be either immediate or delayed.

### 16.2 Relevant legislation, policy and guidance

- 16.2.1 **Table 16.1** details the legislation, policy and guidance documents which are relevant to the major accidents and disasters topic.
- 16.2.2 There is no directly relevant guidance for the assessment of the effects of major accidents and disasters in EIA and reference has therefore been made to the assessment of the effects of major accidents elsewhere in UK industry and regulations.
- 16.2.3 It is understood that neither Bristol Airport or the Proposed Development will be establishments under the Control of Major Accident Hazard Regulations 2015<sup>295</sup>.

<sup>294</sup> Ministry of Housing, Communities & Local Government, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.SI 571. Available online <http://www.legislation.gov.uk/uksi/2017/571/contents/made> [Checked 23/03/2018]

<sup>295</sup> Health and Safety Executive, 2015. The Control of Major Accident Hazards Regulations 2015. Available online <http://www.hse.gov.uk/pUbns/priced/l111.pdf> [Checked 18/04/2018]



Table 16.1 Relevant legislation, policy, and guidance to the major accidents and disasters topic

Legislation or policy reference	Relevance to topic
<b>Legislation</b>	
<b>The Town and Country Planning (Environmental Impact Assessment) Regulations 2017<sup>294</sup></b>	<p>The EIA Regulations state: <i>'The significant effects to be identified, described and assessed under paragraph (2) include, where relevant, the expected significant effects arising from the vulnerability of the Proposed Development to major accidents or disasters that are relevant to that development'</i> (Regulation 5(4)).</p> <p>In regard to information to include within the ES the EIA, Regulations state: <i>'A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project [...] Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.'</i> (Schedule 4, Para 8).</p>
<b>2014/52/EU Directive on the Assessment of the Effects of Certain Public and Private Projects on the environment<sup>296</sup></b>	The EIA Directive has been written with reference to 'A Community Approach on the Prevention of Natural and Man-made Disasters', 2009 (Para 14 of the directive), for which the consideration of 'man-made disasters' in the 2009 document can be interpreted as 'major accident' in the EIA directive and regulations.
<b>Health and Safety at Work Act 1974<sup>297</sup> (HSWA)</b>	<p>The HSWA provides an obligation to prevent intolerable risk and reduce residual risk so far as is reasonably practicable.</p> <p>Many regulations made under the HSWA<sup>298</sup> are applicable to Bristol Airport and place obligations on employers to assess risks and to implement controls. Associated Approved Codes of Practice and Guidance describe how the Regulations can be met.</p>
<b>Management of Health and Safety at Work Regulations 1999<sup>299</sup></b>	These regulations include a specific requirement that risks to people are proportionately assessed (this implicitly includes risks associated with major hazard and disasters).
<b>Policy</b>	
<b>National Planning Policy Framework (NPPF) (2018) DRAFT<sup>300</sup></b>	<p>The NPPF sets out the Government's planning policies for England and how they are expected to be applied. The latest version is issued in draft format for consultation until May 2018. Paragraph 96 requires that planning policies and decisions should promote public safety and take into account wider security and defence requirements by:</p> <ul style="list-style-type: none"> <li>a) Anticipating and addressing all plausible malicious threats and natural hazards, especially in locations where large numbers of people are expected to congregate. Local policies for relevant areas (such as town centre and regeneration frameworks), and the layout and design of developments, should be informed by the most up-to-date information available from the police and other agencies about the nature of potential threats and their implications. This includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security;</li> <li>b) Recognising and supporting development required for operational defence and security purposes, and ensuring that operational sites are not affected adversely by the impact of other development proposed in the area.</li> </ul>

<sup>296</sup> European Commission, 2014. 2014/52/EU Directive on the Assessment of the Effects of Certain Public and Private Projects on the environment. Available online <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052> [Checked 18/04/2018]

<sup>297</sup> UK Government, 1974. Health and Safety at Work etc. Act 1974. Available online <http://www.legislation.gov.uk/ukpga/1974/37/contents> [Checked 18/04/2018]

<sup>298</sup> The Health and Safety at Work Act is an enabling Act under which almost all other Health and Safety regulations are made.

<sup>299</sup> UK Government, 1999. The Management of Health and Safety at Work Regulations 1999. Available online <http://www.legislation.gov.uk/uksi/1999/3242/contents/made> [Checked 18/04/2018]

<sup>300</sup> Ministry of Housing, Communities and Local Government, 2018. National Planning Policy Framework. Draft text for consultation. Available online [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685289/Draft\\_revised\\_National\\_Planning\\_Policy\\_Framework.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/685289/Draft_revised_National_Planning_Policy_Framework.pdf) [Checked 12/03/2018].

<b>NPPF (2012)<sup>301</sup></b>	Paragraph 164 of the NPPF specifically identifies that local advisors and others should take account of up to date information on the higher risk sites for malicious threats and natural hazards, including steps that can be taken to reduce vulnerability and increase resilience.
<b>North Somerset Council (NSC) Core Strategy January 2017<sup>302</sup></b>	Policy CS3: Environmental impacts and flood risk assessment states development that, on its own or cumulatively, would result in air, water or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other control regimes, or by measures included in the proposals, by the imposition of planning conditions or through a planning obligation.
<b>NSC Sites and Policies Plan Part 1: Development Management Policies July 2016<sup>303</sup></b>	Policy DM31 concerns air safety and sets out that planning permission will not be granted for development that would prejudice the safe operation of Bristol Airport or other safeguarded aerodromes.
<b>Guidance</b>	
<b>Reducing Risks Protecting People<sup>304</sup> (R2P2)</b>	<p>R2P2 describes the Health and Safety Executive's (HSE) decision making process and presents the protocols and procedures followed in decision making in relation to the protection of human life in the UK.</p> <p>The tolerability criteria for risk to people, including the aversion for large numbers of casualties resulting from single incidents, has been referenced in setting the criteria for assessing the significance of effects on people.</p>
<b>Environmental Impact Assessment of Projects, Guidance on Scoping, European Commission<sup>305</sup>, 2017</b>	Guidance on how to undertake a scoping assessment under the requirements of the new EIA Directive to ensure that sufficient information is included. The guidance provided by the European Commission highlights that a risk based approach may be adopted in lieu of the typical sensitivity/extent criteria, where appropriate.
<b>Environmental Impact Assessment of Projects, Guidance on the Preparation of the Environmental Impact Assessment Report, European Commission<sup>306</sup>, 2017</b>	Guidance on how to develop good quality environmental impact assessment reports to ensure appropriate information is available for decision making purposes. The guidance provided by the European Commission highlights that the context for inclusion of major accidents and disasters is to ensure that adequate focus is given to the provisions for events leading to significant risk, with an objective of building resilience in a development against such effects. The bar for what is tolerable to society is therefore set somewhat more onerously for major accidents and disasters than for a smaller event of much lower magnitude.
<b>Chemicals and Downstream Oil Industry forum (CDOIF) – Environmental risk tolerability for COMAH establishments V2<sup>307</sup></b>	Guidelines on the assessment and tolerability of major accidents to the environment (established in relation to COMAH sites).
<b>Guidance on the Interpretation of Major Accidents to the environment for the purposes of COMAH regulations, 1999,</b>	Guidance on what would constitute a major accident to the environment (from the perspective of COMAH regulations).

<sup>301</sup> Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. Available online [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [Checked 12/03/2018].

<sup>302</sup> North Somerset Council, January 2017. Core Strategy. Available online <https://www.n-somerset.gov.uk/wp-content/uploads/2015/11/Core-Strategy-adopted-version.pdf> [Checked 16/04/2018]

<sup>303</sup> North Somerset Council. Development Management Policies - Sites and Policies Plan, Part 1, adopted 2016. Available online <http://www.n-somerset.gov.uk/my-services/planning-building-control/planningpolicy/sites-policies-development-plan-document/sitesandpolicies/> [Checked 19/03/2018].

<sup>304</sup> Health and Safety Executive, 2001. Reducing Risks, Protecting People, HSE's decision-making process. Available online <http://www.hse.gov.uk/risk/theory/r2p2.pdf> [Checked 18/04/2018]

<sup>305</sup> European Commission, 2017. Environmental Impact Assessment of Projects, Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU). Available online [http://ec.europa.eu/environment/eia/pdf/EIA\\_guidance\\_Scoping\\_final.pdf](http://ec.europa.eu/environment/eia/pdf/EIA_guidance_Scoping_final.pdf) [Checked 18/04/2018]

<sup>306</sup> European Commission, 2017. Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). Available online [http://ec.europa.eu/environment/eia/pdf/EIA\\_guidance\\_EIA\\_report\\_final.pdf](http://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf) [Checked 18/04/2018]

<sup>307</sup> Chemical and Downstream Oil Industries Forum, environmental Risk Tolerability for COMAH Establishments [no date given]. Available online [https://www.sepa.org.uk/media/219154/cdoif\\_guideline\\_environmental\\_risk\\_assessment\\_v2.pdf](https://www.sepa.org.uk/media/219154/cdoif_guideline_environmental_risk_assessment_v2.pdf) [Checked 18/04/2018]

Department of the Environment,  
Transport and the Regions<sup>308</sup>,  
1999

## Supporting regulation and guidance

16.2.4 The documents listed in **Table 16.1** are those of primary importance to the EIA process. Additional regulations and guidance relevant to major accidents and disasters include:

### Additional regulation

- Control of Major Accident Hazards (COMAH) Regulations 2015<sup>309</sup>;
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)<sup>310</sup>;
- Civil Aviation Act 2012<sup>311</sup>;
- Control of Asbestos Regulations 2012<sup>312</sup>;
- Control of Substances Hazardous to Health Regulations 2002 (COSHH)<sup>313</sup>;
- The Regulatory Reform (Fire Safety) Order 2005 (FSO)<sup>314</sup>; and
- The Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005<sup>315</sup>.

### Additional guidance

- Guide to Predicting Environmental Recovery Durations for Major Accidents, Energy Institute 2017<sup>316</sup>;
- All Measures Necessary – Environmental Aspects Guidance to the Competent Authority Inspectors and Officers, 2016. HSE/EA/SEPA/Natural Resources Wales/ONR<sup>317</sup>;

<sup>308</sup> Department of the Environment, Transport and the Regions, 1999. Guidance on the Interpretation of Major Accident to the Environment for the Purposes of the COMAH Regulations. Available online <https://www.sepa.org.uk/media/219153/detr-guidance-1999.pdf> [Checked 18/04/2018]

<sup>309</sup> Health and Safety Executive, 2015. The Control of Major Accident Hazards Regulations 2015. Available online <http://www.hse.gov.uk/pUbns/priced/l111.pdf> [Checked 18/04/2018]

<sup>310</sup> Health and Safety Executive, 1998. Lifting Operations and Lifting Equipment Regulations 1998 (LOLER). Available online <http://www.legislation.gov.uk/uksi/1998/2307/contents/made> [Checked 18/04/2018]

<sup>311</sup> UK Government, 2012. Civil Aviation Act 2012. Available online [http://www.legislation.gov.uk/ukpga/2012/19/pdfs/ukpga\\_20120019\\_en.pdf](http://www.legislation.gov.uk/ukpga/2012/19/pdfs/ukpga_20120019_en.pdf) [Checked 18/04/2018]

<sup>312</sup> UK Government, 2012. The Control of Asbestos Regulations 2012. Available online <http://www.legislation.gov.uk/uksi/2012/632/contents/made> [Checked 18/04/2018]

<sup>313</sup> UK Government, 2002. The Control of Substances Hazardous to health Regulations 2002. Available online <http://www.legislation.gov.uk/uksi/2002/2677/regulation/7/made> [Checked 18/04/2018]

<sup>314</sup> UK Government, 2005. The Regulatory Reform (Fire Safety) Order 2005. Available online <http://www.legislation.gov.uk/uksi/2005/1541/contents/made> [Checked 18/04/2018]

<sup>315</sup> UK Government, 2005. The Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005. Available online <http://www.legislation.gov.uk/uksi/2005/2042/contents/made> [Checked 18/04/2018]

<sup>316</sup> Energy Institute, 2017. Guide to predicting environmental recovery durations from major accidents. Supporting guide to the Environmental risk tolerability for COMAH establishments guideline. Available online <https://publishing.energyinst.org/topics/environment/guide-to-predicting-environmental-recovery-durations-from-major-accidents.-supporting-guide-to-the-environmental-risk-tolerability-for-comah-establishments-guideline> [Checked 05/06/2018]

<sup>317</sup> HSE/EA/SEPA/NRW/ONR, 2016. All Measures Necessary – Environmental Aspects Guidance to the Competent Authority Inspectors and Officers. Available online [https://www.sepa.org.uk/media/219152/d130416\\_all-measures-necessary-guidance.pdf](https://www.sepa.org.uk/media/219152/d130416_all-measures-necessary-guidance.pdf) [Checked 18/04/2018]

- Guidelines for Environmental Risk Assessment and Management Green Leaves III, 2011. Dept. of Environment, Food and Rural Affairs<sup>318</sup>;
- CIRIA C736 Containment Systems for the Prevention of Pollution: Secondary, Tertiary and Other Means for Industrial and Commercial Premises<sup>319</sup>;
- Guidelines in Environmental Management for Facilities Storing Bulk Quantities of Petroleum Products and Other Fuels<sup>320</sup>, Energy Institute 2015;
- European Aviation Safety Agency (EASA) Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Authority, Organisation and Operations Requirements for Aerodromes<sup>321</sup>;
- CAP 168 Civil Aviation Authority: Licensing of aerodromes 2014 (or EASA equivalent)<sup>322</sup>;
- CAP 393 Civil Aviation Authority: The Air Navigation Order 2016 (ANO) and Regulations<sup>323</sup>;
- CAP 795 Civil Aviation authority: Safety Management Systems Guidance for organisations 2015<sup>324</sup>;
- Managing Health and Safety in Construction: Construction (Design and Management) Regulations 2015, Guidance on Regulations (L153)<sup>325</sup> 2015; and
- Guidance: Hazardous Substances, ministry of Housing, Communities & Local Government<sup>326</sup>

## 16.3 Main sources of data

16.3.1 The EIA scoping assessment for major accidents and disasters has been undertaken with reference to the description of the Proposed Development (**Chapter 2**) and the sources of data set out in **Table 10.2**.

16.3.2

<sup>318</sup> DEFRA, 2011. Guideline for Environmental Risk Assessment and Management, Green leaves III. Available online [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69450/pb13670-green-leaves-iii-1111071.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69450/pb13670-green-leaves-iii-1111071.pdf) [Checked 18/04/2018]

<sup>319</sup> CIRIA, 1997. CIRIA C736 Containment Systems for the Prevention of Pollution: Secondary, Tertiary and Other Means for Industrial and Commercial Premises. [https://www.ciria.org/Resources/Free\\_publications/c736.aspx](https://www.ciria.org/Resources/Free_publications/c736.aspx)

<sup>320</sup> Energy Institute, 2015. Guidelines in Environmental Management for Facilities Storing Bulk Quantities of Petroleum Products and Other Fuels. Available online [https://publishing.energyinst.org/\\_data/assets/file/0018/140148/Pages-from-WEB-VERSION-Environment-guidelines-for-bulk-storage-facilities.pdf](https://publishing.energyinst.org/_data/assets/file/0018/140148/Pages-from-WEB-VERSION-Environment-guidelines-for-bulk-storage-facilities.pdf) [Checked 18/04/2018]

<sup>321</sup> European Aviation Safety Authority, 2014. Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Authority, Organisation and Operations Requirements for Aerodromes. Available online <https://www.easa.europa.eu/sites/default/files/dfu/2014-012-R-Annex%20to%20ED%20Decision%202014-012-R.pdf> [Checked 18/04/2018]

<sup>322</sup> Civil Aviation Authority, 2014. CAP 168 Civil Aviation Authority: Licensing of aerodromes 2014 (or EASA equivalent). Available online <https://publicapps.caa.co.uk/docs/33/CAP%20168%20Licensing%20of%20Aerodromes.pdf> [Checked 18/04/2018]

<sup>323</sup> Civil Aviation Authority, 2016. The Air Navigation Order 2016. Available Online <http://www.legislation.gov.uk/uk/si/2016/765/contents/made> [Checked 18/04/2018]

<sup>324</sup> Civil Aviation Authority, 2015. Safety Management Systems Guidance for organisations. Available online [https://publicapps.caa.co.uk/docs/33/CAP795\\_SMS\\_guidance\\_to\\_organisations.pdf](https://publicapps.caa.co.uk/docs/33/CAP795_SMS_guidance_to_organisations.pdf) [Checked 18/04/2018]

<sup>325</sup> Health and Safety Executive, 2015. Managing Health and Safety in Construction: Construction (Design and Management) Regulations 2015. Available online <http://www.hse.gov.uk/pubns/priced/l153.pdf> [Checked 18/04/2018]

<sup>326</sup> Ministry of Housing, Communities & Local Government, 2017. Guidance, Hazardous substances. Available Online <https://www.gov.uk/guidance/hazardous-substances> [Checked 26/03/2018]

Table 16.2 Sources of Information

Source	Link
MAGIC Maps	Department of Environment, Food and Rural Affairs MAGIC database, at: <a href="http://magic.defra.gov.uk/">http://magic.defra.gov.uk/</a> [Accessed on 23/03/2018]
What's in your backyard? – Environment Agency	<a href="http://apps.environment-agency.gov.uk/wiyby/default.aspx">http://apps.environment-agency.gov.uk/wiyby/default.aspx</a> [Accessed on 23/03/2018]
Planning Advice Web App – HSE	<a href="http://www.hse.gov.uk/landuseplanning/padhi.htm">http://www.hse.gov.uk/landuseplanning/padhi.htm</a> [Accessed 23/02/2018]
British Geological Survey: Earthquakes in the UK	<a href="http://www.bgs.ac.uk/discoveringGeology/hazards/earthquakes/UK.html">http://www.bgs.ac.uk/discoveringGeology/hazards/earthquakes/UK.html</a> [Accessed 26/03/2018]
British Geological Survey: Geological Map	<a href="http://mapapps.bgs.ac.uk/geologyofbritain3d/index.html">http://mapapps.bgs.ac.uk/geologyofbritain3d/index.html</a> [Accessed 4/12/2017]
National Heritage List for England – Historic England	<a href="https://historicengland.org.uk/listing/the-list/">https://historicengland.org.uk/listing/the-list/</a> [Accessed 26/03/2018]
Avon and Somerset Community Risk Register – Avon and Somerset Local Resilience Forum	<a href="https://www.avonandsomerset.police.uk/media/29281120/community-risk-register-april-17.pdf">https://www.avonandsomerset.police.uk/media/29281120/community-risk-register-april-17.pdf</a> [Accessed 27/03/2018]

## 16.4 Engagement with consultees

- 16.4.1 It is not proposed to undertake any specific consultation on the major accidents and disasters topic, beyond that which is undertaken for other topic chapters. Extensive consultation will be undertaken on the wider project.

## 16.5 Overview of baseline conditions

### Current baseline

- 16.5.1 Bristol Airport is an existing international airport and a description of the airport site and its surroundings can be found in **Chapter 2** of this report. The majority of aircraft stands can accommodate aircraft up to Code C and a single stand can accommodate aircraft up to Code E.
- 16.5.2 The Proposed Development is predominantly within the existing Bristol Airport Limited (BAL) land holding boundary but includes some additional land to the north and south. It covers an area of 192 ha and lies approximately seven miles to the southwest of Bristol city centre. It is situated at elevations between 192m and 165m AOD and is primarily surrounded by rural open areas with dispersed and isolated small villages, hamlets and farmsteads.

### Factors influencing baseline conditions

- 16.5.3 Several factors may alter the baseline conditions over the lifetime of the Proposed Development and influence the exposure, likelihood and consequences of major accidents and disasters. These factors are:
- Climate change - is predicted to lead to an increase in peak rainfall intensities and resulting flood flows over time. The latest guidance on climate change allowances to be applied in England was last updated in April 2016 and provides guidance on the potential enhanced

rainfall intensity, with wetter winters and drier summers. Climate change is expected to alter the prevalence of extreme weather conditions which could lead to a disaster;

- Changing land use - may mean that the surrounding environment could become more agricultural, industrial, residential or recreational in use. Changing ecological baselines resulting from the land use and climate change factors may also impact the local ecology and associated environmental designations of the land. As the surrounding environment changes, so do the receptors which could be affected. If land adjacent to the airport were to receive a higher level of designation, then the sensitivity of receptors could increase; and
- Technological improvement - it is anticipated that there may be technological improvement over the lifetime of the development; this could include electric or alternately fuelled vehicles, autonomous driving vehicles and improvements in instrumented safety systems for aviation. These are likely to reduce the risk posed to the environment (human and non-human receptors); however, they may also introduce new hazards that would need to be managed at the appropriate time. Changes in the operations of the airport (e.g. switching to fully electric vehicles) will change the nature of the vehicular accidents which could occur at the airport.

## 16.6 Rationale for scoping out major accidents and disasters from the EIA

- 16.6.1 Potential effects in respect of major accidents and disasters that are relevant to the Proposed Development include those related to: construction; buildings and infrastructure; hazardous substances; natural disasters; increased air traffic movements; increased passenger numbers; road safety; and occupational hazards. Each potential effect is summarised in-turn below with the rationale provided for scoping out the effect from the EIA.

### Potential construction related major accidents

- 16.6.2 The potential effects of construction activity on the environment and human populations include, for example, indirect effects on the existing fuel storage tanks which could initiate a major accident (e.g. collision with construction vehicle). However, all construction works will be managed in accordance with a Construction Environment Management Plan and relevant regulations such that the risk of such effects occurring is considered to be extremely low and similar to other ongoing development at the airport.

### Potential building/infrastructure related major accidents

- 16.6.3 The potential effects of major accidents associated with the proposed new buildings and surface areas including new car parking structures, roadways, new service yard, new piers and walkways, and terminal building modifications is considered to be very low. Bristol Airport, like all modern airports, operates to very stringent standards of design, safety and security in accordance with UK and international aviation law and the relevant Civil Aviation Authority (CAA) mandated standards for design and operation. The Proposed Development has no bearing on these existing controls and in consequence, the risk of a major accident or disaster will not significantly increase as a result of the introduction of the Proposed Development. In EIA terms, it is therefore considered highly unlikely that significant effects would occur.

### Potential hazardous substance related major accidents

- 16.6.4 The potential effects on the environment or human populations from the Proposed Development could include spill of fuel/chemicals. However, no hazardous chemicals beyond those fuels and



substances already present at the airport will be introduced as part of the Proposed Development. Furthermore, as noted above, the airport operates to very stringent safety standards such that the risk of such accidents occurring and their magnitude is considered to be very low and would not be substantially increased relative to the current baseline. In consequence, significant effects are not predicted.

## Natural disasters

- 16.6.5 The potential effects of natural disasters on the Proposed Development include, for example, extreme weather and flooding. Effects associated with flood risk are considered elsewhere in this Scoping Report (**Chapter 10: Surface water and flood risk**) whilst climate change impacts are considered in **Chapter 18: Climate change**. In summary, the airport suffers no exceptional climatic conditions or significant flood risk that regularly affect its operations. In addition, the surrounding area is free of natural or physical obstructions that might impact on aircraft. Further, it is not expected that the Proposed Development itself would significantly change the likelihood that natural disasters would occur, nor given the location of the airport would it result in new receptors being exposed to such events.

## Increased number of air traffic movements

- 16.6.6 An increase in the number of flights associated with the Proposed Development may have an impact on the likelihood of a major accident involving aircraft occurring and impacting people or the environment. However, the number of aircraft accidents worldwide is extremely low in comparison to other modes of transport and industrial activities and it is envisaged that any increase in the number of movements will operate under the same licensing and controls as the existing airport (extended for the Proposed Development with an equivalent level of provision). Further, aerodrome safeguarding areas and Public Safety Zones (PSZs) have been established to ensure that development does not prejudice air safety (as detailed in Policy DM31 of the Sites and Policies Plan Part 1). PSZs in proximity to the ends of airport runways have been established in order to reduce the number of people on the ground exposed to such risk. These zones represent a contour with a risk value of 1 in 100,000 in which development is restricted. An inner area of risk is also defined within each PSZ immediately at the runway end, bounded by the 1 in 10,000 contour, within which no resident or working population is permitted.
- 16.6.7 For the reasons stated above, in EIA terms no significant effects are expected as a result of the increased air traffic movements associated with the Proposed Development.

## Increased number of passengers

- 16.6.8 A growth in passenger throughput at Bristol Airport could increase the exposure of individuals in the event of a major accident. For example, in the event of a terrorist attack or plane crash, an additional 2 million passengers per annum would be using the airport. Notwithstanding this, the likelihood of such an occurrence does not increase as a result of the Proposed Development itself and in addition, the number of passengers using the airport at any given time only increases by a relatively small number.
- 16.6.9 The key drivers of potential accidents and disasters such as security, biosecurity, food safety and health impacts will all be managed by an extension of the existing management systems and CAA regulation with the same level of protection. Bristol Airport will also retain its designation as a border post and security will be provided in the same manner by the Police and Border Force. Port Health duties will continue to be undertaken by NSC as the Port Health Authority. In consequence, significant effects are not predicted.



## Road safety

- 16.6.10 The impact of the Proposed Development on road safety will be considered in the context of transport impacts rather than needing to be covered by a major accidents and disasters chapter of the ES.
- 16.6.11 Appropriate highway and structural design principles will be employed to ensure that the risk of a major accident is not significantly increased by the Proposed Development. Tankers and vehicles off-site within the local public network are also considered in **Chapter 5: Traffic and transport**. The nature of vehicles and tankers is similar to those already experienced in the local network with no additional hazardous or abnormal loads predicted to be necessary specifically as a result of the Proposed Development. Tanker drivers would be Accord Dangereux Routier<sup>327</sup> (ADR) drivers and familiar with the transport of hazardous material. In consequence, significant effects in the context of major accidents and disasters are not predicted.

## Occupational hazards

- 16.6.12 Occupational risks resulting from day to day activities which may affect one to two people (e.g. slips, trips and falls) and which are managed under the general obligations of the Health and Safety at Work Act are not generally recognised as a major accident. They will be managed by BAL under the Management of Health and Safety at Work (MHSW) regulations in the same manner that they are currently managed and extending the same level of protection to the workforce.

## Summary

- 16.6.13 The consideration of potential effects above has demonstrated that the Proposed Development is unlikely to result in significant effects on, or as a result of, major accidents and disasters. This particularly reflects the relatively limited changes in the risk profile resulting from increased passenger numbers and the very low likelihood of occurrence of an event that could constitute a major accident or natural disaster. Broadly speaking, the risks of such an occurrence are already mitigated by a suite of existing legislation, guidance and policy as well as other controls that are designed to maintain safety and security at airports in the UK including Bristol Airport.
- 16.6.14 Bristol Airport adopts the necessary precautionary measures to ensure the safety of construction and operations and the airfield is governed by a rigorous safety regime, licensed by the CAA. Therefore, the risk of a major aviation safety breach, accident or related disaster involving an aircraft as a result of the Proposed Development is determined to be negligible.
- 16.6.15 In light of the above, it is proposed to scope major accidents and disasters out of the EIA.

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<sup>327</sup> Accord Dangereux Routier – ADR Driver – complies with the European Agreement concerning the International Carriage of Dangerous Goods by Road

# 17. Carbon and other greenhouse gas emissions

## 17.1 Introduction

17.1.1 This chapter sets out the proposed approach to assessing the potential effects on carbon and other greenhouse gas (GHG) emissions. All relevant emissions, including carbon dioxide (CO<sub>2</sub>), arising from the Proposed Development are referred to as 'GHG emissions', except where CO<sub>2</sub> is reported separately.

## 17.2 Relevant legislation, policy and guidance

### Legislation and policy

17.2.1 Key aspects of legislation and planning policies relevant to GHG emissions reporting and the assessment that will be presented within the Environmental Statement (ES) are set out in **Table 9.2**  
Statutory designated sites of nature conservation importance

17.2.2

Table 17.1 Legislation, national and local planning policies relevant to GHG emissions assessment

Legislation or policy reference	Legislation summary or policy information relevant to climate change
<b>International policy:</b>	
<b>European Union (EU) Emissions Trading Scheme (ETS)</b> <sup>328</sup>	The EU ETS is a cap-and-trade mechanism in which an allowance for annual carbon emissions from various sectors have been agreed at the EU level. The 2012 extension of EU ETS incorporated emissions from aviation flights to and from EU countries, although following appeal it only applies to domestic flights.
<b>The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement</b> <sup>329</sup>	<p>The UNFCCC is the major international body responsible for managing climate change and carbon emissions. In 2015, it adopted the Paris Agreement, the aims of which are stated as:</p> <p><i>"This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:</i></p> <p><i>(a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change; and</i></p> <p><i>(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production"</i></p> <p>The agreement sets targets for countries' greenhouse gas emissions, but these are not legally binding or enforceable. The agreement excludes international aviation (but domestic aviation is included).</p>

<sup>328</sup> European Parliament and the Council of the European Union (2003). Establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (the EU Emissions Trading System). Available online at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003L0087&from=EN>

<sup>329</sup> UNFCCC (2015). The Paris Agreement. Available online at : <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> [checked 30/04/2018]

Legislation or policy reference	Legislation summary or policy information relevant to climate change
<b>Environmental Impact Assessment (EIA) Directive 2014</b> <sup>330</sup>	<p>The EIA Directive 2014 sets out the rationale for incorporating climate change into the EIA process. It reads:</p> <p><i>“Climate change will continue to cause damage to the environment and compromise economic development. In this regard, it is appropriate to assess the impact of projects on climate (for example greenhouse gas emissions) and their vulnerability to climate change.”</i></p>
<b>International Civil Aviation Organization (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)</b> <sup>331</sup>	<p>The ICAO is the delegated body for addressing requirements of the UNFCCC and the Paris Agreement with regards to aviation. 191 Member States agreed in 2016 to introduce a global market-based emissions offsetting scheme, known as CORSIA. The UK Government is a member of ICAO and signed up to CORSIA. The aim of CORSIA is to offset any growth from international aviation after 2020 within its scope. By 2035, 90% of international aviation activity will come under the scheme.</p>
<b>National legislation</b>	
<b>Climate Change Act 2008</b> <sup>332</sup>	<p>The Climate Change Act 2008 commits the UK to reduce its net GHG emissions by 80% below 1990 levels by 2050 and requires the Government to establish 5-year carbon budgets. Emissions arising from international aviation and international shipping were not included in the carbon budgets (and the 2050 target) when the Climate Change Act was enacted.</p> <p>In 2011, the UK government issued its Carbon Plan<sup>333</sup>, which sets out how the UK will achieve decarbonisation within the framework of UK energy policy and make the transition to a low carbon economy.</p> <p>The most recent Carbon Budget, the fifth, was released in 2016 and describes the budget for the period 2028-2032.<sup>334</sup></p>
<b>National planning policies and regulations:</b>	
<b>The Town and Country Planning (Environmental Impact Assessment) Regulations 2017</b> <sup>335</sup>	<p>The Town and Country Planning EIA Regulations 2017 are the transposition of the 2014 EIA Directive into UK law, as it relates to town and country planning (infrastructure planning is considered separately).</p> <p>The Regulations refer to ‘climate’ in the following way: ‘climate (for example greenhouse gas emissions, impacts relevant to adaptation)’, and: ‘the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change’; therefore, signalling that both the impact of climate change on the development (including environmental receptors) and the impact of the development on climate change, are to be considered.</p> <p>The Regulations set out the emissions sources to be considered in a GHG assessment.</p>

<sup>330</sup> European Parliament and the Council of the European Union (2014). Environmental Impact Assessment (EIA) Directive 85/337/EEC. Available online at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0052> [checked 30/04/2018]

<sup>331</sup> ICAO (2016). Consolidated statement of continuing ICAO policies and practices related to environmental protection – General provisions, noise and local air quality. Available online at: [https://www.icao.int/environmental-protection/Documents/Resolution\\_A39\\_1.PDF](https://www.icao.int/environmental-protection/Documents/Resolution_A39_1.PDF)

<sup>332</sup> Climate Change Act (2008). Available online at: [https://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga\\_20080027\\_en.pdf](https://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf) [checked 30/04/2018]

<sup>333</sup> HM Government (2011). The Carbon Plan: Delivering our low carbon future. Available online: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf) [Checked 09/04/2018]

<sup>334</sup> HM Government (2016). The Carbon Budget Order 2016. Available online: <http://www.legislation.gov.uk/uksi/2016/785/made> [Checked 01/05/2018]

<sup>335</sup> The Town and Country Planning (Environmental Impact Assessment) Regulations (2017). [online] Available at: [https://www.legislation.gov.uk/uksi/2017/571/pdfs/uksi\\_20170571\\_en.pdf](https://www.legislation.gov.uk/uksi/2017/571/pdfs/uksi_20170571_en.pdf) [Accessed 17 May 2018]

Legislation or policy reference	Legislation summary or policy information relevant to climate change
<b>National Planning Policy Framework (NPPF)</b> <sup>336</sup>	<p>The NPPF is a key part of the government's reforms to make the planning system less complex and more accessible. The framework acts as guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications.</p> <p>The 2012 NPPF states:  <i>"Planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to the economic, social and environmental dimensions of sustainable development.</i></p> <p><i>To support the move to a low carbon future, local planning authorities should: plan for new development in locations and ways which reduce greenhouse gas emissions; actively support energy efficiency improvements to existing buildings; and when setting any local requirement for a building's sustainability, do so in a way consistent with the Government's zero carbon buildings policy and adopt nationally described standards. In determining planning applications, local planning authorities should expect new development to: comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption."</i></p> <p>The draft NPPF released in March 2018 states that new development should be planned for in ways that <i>"can help to reduce greenhouse gas emissions through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards"</i>. Furthermore, local planning authorities should expect new development to <i>"a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption."</i></p>
<b>Aviation Policy Framework (2013)</b> <sup>337</sup>	<p>The 2013 Aviation Policy Framework presents the government's policy for aviation. This document postpones making a decision on whether the UK should retain a national emissions target for aviation.</p> <p>It also sets out the need to better understand and manage the risks associated with climate change. Doing so was deemed essential for the successful long-term resilience of the UK's aviation industry and its contribution to supporting economic growth and competitiveness.</p>
<b>Revised Draft Airports National Policy Statement (rdANPS)</b> <sup>338</sup>	<p>The rdANPS puts Government policy on climate change adaptation and GHG emissions into practice for Nationally Significant Infrastructure Projects (NSIPs). It is the basis for decision-making on development consent order (DCO) applications for the Heathrow Expansion Programme (HEP):</p> <p><i>"The Airports NPS provides the primary basis for decision making on development consent applications for a Northwest Runway at Heathrow Airport, and will be an important and relevant consideration in respect of applications for new runway capacity and other airport infrastructure in London and the South East of England"; and</i>  <i>"It sets out planning policy in relation to applications for any airport nationally significant infrastructure project in the South East of England".</i></p>

<sup>336</sup> Department for Communities and Local Government (2012). National Planning Policy Framework (NPPF). Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) [checked 30/04/2018]

<sup>337</sup> Secretary of State for Transport (2013). Aviation Policy Framework (2013). Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/153776/aviation-policy-framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf) [checked 30/04/2018]

<sup>338</sup> Department for Transport (2017). Revised Draft Airports National Policy Statement (NPS). Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/654123/revised-draft-airports-nps-web-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/654123/revised-draft-airports-nps-web-version.pdf) [checked 30/04/2018]

Legislation or policy reference	Legislation summary or policy information relevant to climate change
	<p>The rdANPS states that the Secretary of State's view of the adequacy of carbon footprint mitigation measures in the design, construction and operation of any relevant development will be a material factor in the decision-making process for DCO projects.</p> <p>Whilst the Proposed Development does not require development consent, it helpful to consider proposals at regional airports in the context of this national policy.</p>
<b>UK Aviation Forecasts (2017)<sup>339</sup></b>	<p>With regard to Bristol Airport, DfT's UK Aviation Forecast states that: "the most significant changes in capacity input assumptions relate to the reduction in Bristol's terminal capacity from 12mppa to 10mppa in line with the current planning cap".</p> <p>Bristol Airport CO<sub>2</sub> emissions are stated as a maximum of 0.5Mt in 2050s<sup>339</sup>.</p>
<b>Local Policies:</b>	
<b>Climate Local North Somerset<sup>340</sup></b>	Climate Local for North Somerset aims to reduce carbon emissions and increase resilience to climate change. The plan sets out commitments for Low Carbon Pathways. Bristol Airport is not specifically mentioned within the progress update for December 2016.
<b>Draft West of England Joint Spatial Plan (2017)<sup>341</sup></b>	<p>The four West of England Councils, including North Somerset, have prepared a Joint Spatial Plan (JSP) for the West of England. It provides a strategic, overarching vision and framework to deliver infrastructure over the next 20 years.</p> <p>The JSP states that all new developments must minimise energy demand and maximise the use of renewable energy, where viable meeting all demands for heat and power without increasing carbon emissions. This includes a contribution to the use of low carbon energy in-line with objectives and provision of the Climate Change Act 2008 and the 2050 Carbon neutral targets. The Proposed Vision for the West of England includes a statement that "new development will be designed to be resilient to, and reduce the impacts of climate change". A combined CO<sub>2</sub> reduction of 50% by 2035 compared to the 2014 baseline is committed to.</p>

## Guidance

17.2.3 Guidance related to the GHG emissions assessment is provided in **Table 17.2**.

**Table 17.2** Guidance relevant to GHG emissions

Source	Summary description
<b>CIBSE<sup>342</sup></b>	CIBSE (2012). TM46: Energy Benchmarks.

<sup>339</sup> Department for Transport (2017). UK aviation forecasts. Available online: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/674749/uk-aviation-forecasts-2017.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/674749/uk-aviation-forecasts-2017.pdf) [Checked 09/04/2018]

<sup>340</sup> North Somerset Council (2013). Climate Local North Somerset Council: Supporting growth, saving money and safeguarding communities. Available online at: <https://www.n-somerset.gov.uk/wp-content/uploads/2016/01/climate-local-commitment.pdf> [checked 30/04/2018]

<sup>341</sup> Bath & North East Somerset Council (2017). West of England Joint Spatial Plan and Transport Study. Available online at: <https://www.jointplanningwofe.org.uk/consult/ti/JSPPublication/viewCompoundDoc?docid=9163508&partId=9415380&sessionId=&vot eid=> [checked 30/04/2018]

<sup>342</sup> CIBSE (2008). TM46: Energy Benchmarks. Available online at: <https://www.cibse.org/Knowledge/knowledge-items/detail?id=a0q20000008I7evAAC> [checked 30/04/2018]

Source	Summary description
<b>CIBSE<sup>343</sup></b>	CIBSE (2012). GVF2012 Guide F: Energy Efficiency in Buildings.
<b>The 2017 IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance<sup>344</sup></b>	Provides guidance on assessment and mitigation of GHG emissions within an EIA context. Includes a focus on proportionate and robust assessment.
<b>PAS 2080:2016 Carbon Management in Infrastructure<sup>345</sup></b>	Provides an approach to management of reduction of GHG emissions from infrastructure projects, working with stakeholders throughout the project lifecycle.
<b>The Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (GHG Protocol)<sup>346</sup></b>	Provides standards and guidance for preparing a GHG emissions inventory.
<b>The European Monitoring and Evaluation Programme (EMEP)/European Environment Agency (EEA) guidebook<sup>347</sup></b>	Provides guidance and data for the calculation of aviation emissions over the cruise and Landing and Take Off (LTO) phases. The EEA and the United Nations' Long-Range Transboundary Air Pollution (LRTAP) project produce the guidebook to support the compilation of greenhouse gas inventories across Europe and across market sectors. The aviation chapter of the guidebook recommends methodologies for calculating CO <sub>2</sub> emissions from aviation, with various 'tiers' or levels of accuracy. The Tier 3A approach shall be used by the assessment, since it provides the highest level of accuracy and is consistent with the forecast data available for the development.
<b>European Commission EIA Guidance<sup>348</sup></b>	The European Commission published guidance on the Preparation of the Environmental Impact Assessment Report in 2017. This incorporates high-level guidance on climate change aspects of the updated EIA regulations.
<b>Civil Aviation Authority: CAP 1524: Information on aviation's environmental impact<sup>349</sup></b>	CAP 1524 collates all information published by CAA on the environmental impact of the UK's civil aviation activity between 2011 and 2014.

## 17.3 Main sources of data

- 17.3.1 Baseline GHG emissions data for 1990-2015 are sourced from the Department for Business, Energy and Industrial Strategy (BEIS) through the National Statistics service<sup>350</sup>.

<sup>343</sup> CIBSE (2012) GVF2012 Guide F: Energy Efficiency in Buildings. Available online at: <https://www.cibse.org/Knowledge/knowledge-items/detail?id=a0q20000008I7oTAAS> [checked 30/04/2018]

<sup>344</sup> IEMA (2017). Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available online: [https://www.iaia.org/pdf/wab/EIA%20Guide\\_GHG%20Assessment%20and%20Significance\\_IEMA\\_16May17.pdf](https://www.iaia.org/pdf/wab/EIA%20Guide_GHG%20Assessment%20and%20Significance_IEMA_16May17.pdf) [Checked 09/04/2018]

<sup>345</sup> BSI (2016). PAS 2080:2016. Carbon management in infrastructure.

<sup>346</sup> WBCSD and WRI (2014). The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard, March 2014. Available online: <http://www.ghgprotocol.org/sites/default/files/ghgp/standards/ghg-protocol-revised.pdf> [Checked 09/04/2018]

<sup>347</sup> European Environment Agency (2017). Emission Factor Database and EMEP/EEA air pollutant emission inventory guidebook – 2016. Available online: <https://www.eea.europa.eu/publications/emep-eea-guidebook-2016/emission-factors-database> [Checked 09/04/2018]

<sup>348</sup> European Commission (2017). Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report. Available online at: [http://ec.europa.eu/environment/eia/pdf/EIA\\_guidance\\_EIA\\_report\\_final.pdf](http://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf)

<sup>349</sup> Civil Aviation Authority (2017), CAP 1524: Information on aviation's environmental impact. Available online: <https://publicapps.caa.co.uk/docs/33/CAP1524EnvironmentalInformation29032017.pdf>

<sup>350</sup> National Statistics (2017). Final UK greenhouse gas emissions national statistics: 1990-2015. Available online: <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-2015> [Checked 09/04/2018]



- 17.3.2 The EMEP/ EEA Emission Factor Database<sup>347</sup> and the International Civil Aviation Organisation (ICAO) Aircraft Engine Emissions Databank<sup>351</sup> will be used as the main sources of data for aviation emissions associated with the Proposed Development.
- 17.3.3 Existing carbon reduction initiatives and Scope 1 (direct) and Scope 2 (indirect) emissions at Bristol Airport will be sourced from the Bristol Airport 2017 Operations Monitoring Report<sup>352</sup> and ongoing preparations for Stage 2 Airport Carbon Accreditation<sup>353</sup> under the Airports Council International (ACI) Europe scheme.
- 17.3.4 Emissions factors for traffic and transport emissions will be sourced from the BEIS Greenhouse gas reporting conversion factors 2017<sup>354</sup>.
- 17.3.5 The Inventory of Carbon & Energy (ICE) database<sup>355</sup>, produced by the University of Bath and last updated in 2011, will be used to assess the embodied carbon of the Proposed Development.
- 17.3.6 For the future baseline, there is uncertainty regarding UK GHG policy in the aviation sector which makes setting a definitive target to judge significance against challenging. Whilst the *Airports Commission: Final Report in 2015*<sup>356</sup> sets a gross total emissions cap of 37.5 million tonnes (Mt) CO<sub>2</sub> from the aviation sector by 2050, the Clean Growth Strategy (2017)<sup>357</sup> suggests that the obligations under the Climate Change Act can be met if aviation emissions are 44 MtCO<sub>2</sub>e. The Department for Transport UK Aviation Forecasts 2017<sup>339</sup> will be used to understand the projected CO<sub>2</sub> levels of the UK aviation sector in 2050. The UK Government's paper on next steps towards an aviation strategy<sup>358</sup> sets out the position that the UK Government sees reducing aviation emissions as an international issue, and that cooperation across the global sector is required to reduce the impact on UK competitiveness. No GHG targets for the UK aviation sector are set.
- 17.3.7 Future baseline GHG emissions, which include existing developments consented for a 10 million passengers (mppa) airport, are sourced from the 2011 Environmental Statement submitted as Planning Application ref: 09/P/1020/OT2<sup>359</sup>. Table 2.1 outlines the aspects of the 2011 planning application that are due to be completed by early 2020, and are thus considered part of the future baseline.
- 17.3.8 Construction vehicle trips delivering construction material to site will be ascertained from **Chapter 5: Traffic and transport**.

<sup>351</sup> International Civil Aviation Organization (ICAO) (2017). ICAO Aircraft Engine Emissions Databank. Available online:

<https://www.easa.europa.eu/easa-and-you/environment/icao-aircraft-engine-emissions-databank>

<sup>352</sup> Bristol Airport Limited (2017). 2017 Operations Monitoring Report. Available online:

<file:///C:/Users/christopher.harris/Downloads/2017%20Operations%20Monitoring%20Report.pdf> [Checked 30/04/2018]

<sup>353</sup> ACI Europe. Airport Carbon Accreditation. Information available online: <http://www.airportcarbonaccreditation.org/> [Checked 24/05/2018]

<sup>354</sup> Department for Business, Energy and Industrial Strategy (2017). Greenhouse gas reporting: conversion factors 2017. Available online : <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017> [Checked 09/04/2018]

<sup>355</sup> University of Bath (2008). Inventory of Carbon & Energy (ICE). Available online at:

<http://www.organicexplorer.co.nz/site/organicexplore/files/ICE%20Version%201.6a.pdf>

<sup>356</sup> Airports Commission (2015). Airports Commission: Final Report. Available online:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/440316/airports-commission-final-report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf) [Checked 09/04/2018]

<sup>357</sup> HM Government (2017). The Clean Growth Strategy. Available online:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/651916/BEIS\\_The\\_Clean\\_Growth\\_online\\_12.10.17.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/651916/BEIS_The_Clean_Growth_online_12.10.17.pdf) [Checked 09/04/2018]

<sup>358</sup> HM Government (2018). Beyond the horizon: The future of UK aviation. Available online:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/698247/next-steps-towards-an-aviation-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/698247/next-steps-towards-an-aviation-strategy.pdf) [check 24/05/2018]

<sup>359</sup> North Somerset Council. Planning Application Documents. 09/P/1020/OT2. Available online: <https://planning.n-somerset.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=ZZZXJLLPJV108>



## 17.4 Engagement with consultees

- 17.4.1 North Somerset Council will be engaged with during the preparation of the ES. The engagement will set out the requirements for GHG assessment, the baseline conditions and the data sources to be used in the assessment. The Council will then be asked to provide comments on the approach taken to assess the significance of effects of GHG emissions on the global climate.

## 17.5 Overview of baseline conditions

- 17.5.1 There are two sets of baseline and future baseline conditions relevant to the GHG assessment:
- The GHG emissions associated with the Proposed Development itself; and
  - The projected GHG emissions from the UK aviation sector, and the extent of emissions from Bristol Airport as a whole within that.

### Zone of Influence

- 17.5.2 All sources of GHG emissions arising from the Proposed Development will be considered. This also includes the emissions resulting from activities outside of the Proposed Development boundary that are emitted as a direct result of the Proposed Development (e.g. flights in cruise phase, embodied carbon of materials used, trips to and from the airport).
- 17.5.3 Given the only receptor for GHG emissions is the global climate, the zone of influence of the emissions from the Proposed Development is effectively the Earth system.

### Current baseline (site of the Proposed Development)

- 17.5.4 Emissions per year for 2017 are taken as the baseline conditions against which the future emissions associated with the Proposed Development are assessed. Scope 1 and Scope 2 emissions are sourced from the 2017 Annual Operations Report. Scope 1 emissions (gas use, fleet vehicles, heating/red diesel, fire training, company cars and refrigerants) amount to 1.81kt CO<sub>2</sub>eq, whilst scope 2 emissions (grid electricity) amount to 4.62kt CO<sub>2</sub>eq. Total for all scopes is listed as 6.43kt CO<sub>2</sub>eq.
- 17.5.5 Further information is required to calculate the aviation and surface access emissions. However, Department for Transport (DfT) Aviation Forecasts, published in October 2017<sup>339</sup>, state total Bristol Airport aviation-based CO<sub>2</sub>e emissions as 0.4Mt in 2016, representing 1.1% of the UK aviation total. Baseline surface access emissions, and a more accurate representation of aircraft emissions, will be produced as part of the ES as the information becomes available.

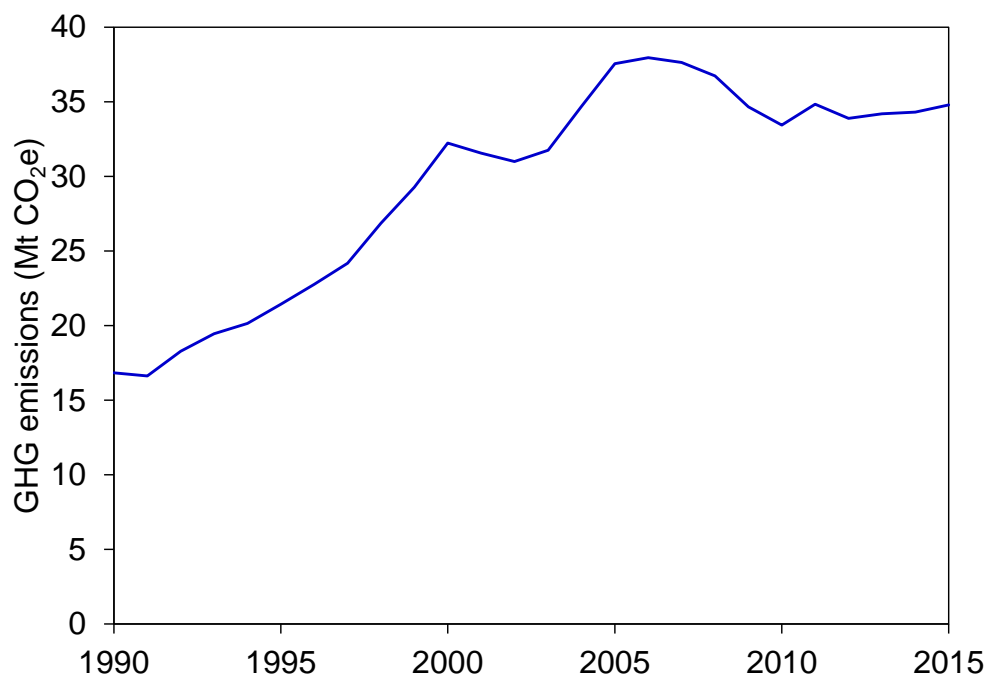
### Future baseline (site of the Proposed Development)

- 17.5.6 Future baseline GHG emissions will be dependent on existing commitments to mitigate GHG emissions from operation whilst developing Bristol Airport to accommodate 10 mppa. The 2011 ES submitted in support of the plans for a 10 mppa airport stated projected emissions of CO<sub>2</sub> as 0.95Mt from all sources, including 0.73Mt from domestic and international aviation. The next largest source was passenger surface access, accounting for 0.1Mt.

### Current baseline (UK policy context)

- 17.5.7 UK GHG emissions from domestic and international aviation rose to a peak of 38Mt in 2006, then fell slightly to 34.8Mt in 2015, the last year for which data are available<sup>360</sup>. Emissions over the 26-year period are shown in **Figure 17.1**.
- 17.5.8 Total GHG emissions for the UK as a whole are currently on course to meet legislated carbon budgets and the 2050 target of an 80% reduction in emissions<sup>361</sup>. However, most of the reduction has come in the power, industry and waste sectors, with transport rebounding towards the GHG emissions level peak in 2007 (this data only considers domestic aviation) largely as a result of rising demand for travel and a slowing of progress in improving the efficiency of vehicles<sup>362</sup>.

Figure 17.1 GHG emissions from domestic and international aviation<sup>355</sup>



### Future baseline (UK policy context)

- 17.5.9 Following the publication of the Revised Draft Airports National Policy Statement<sup>338</sup>, it is assumed that a runway expansion at a major airport in the south-east may take place, and that this can be achieved within the Government's carbon obligations of an 80% reduction in emissions by 2050. The UK aviation target for emissions from aviation sources (i.e. not operational airport emissions) of 37.5Mt CO<sub>2</sub> per annum, as set out by the Committee on Climate Change<sup>363</sup>, could be considered the policy context within which the Proposed Development will operate, although the BEIS Clean

<sup>360</sup> National Statistics (2017). Final UK greenhouse gas emissions national statistics: 1990-2015. Available online:

<https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-2015> [Checked 09/04/2018]

<sup>361</sup> BEIS (2017). Provisional GHG statistics for 2016; BEIS (2017) Final GHG statistics for 1990-2015; CCC calculations.

<sup>362</sup> Committee on Climate Change (2017). Meeting Carbon Budgets: Closing the policy gap. Available online:

<https://www.theccc.org.uk/wp-content/uploads/2017/06/2017-Report-to-Parliament-Meeting-Carbon-Budgets-Closing-the-policy-gap.pdf> [Checked 09/04/2018]

<sup>363</sup> Committee on Climate Change (2009). Meeting the UK aviation target – options for reducing emissions to 2050. Available online at: <https://www.theccc.org.uk/archive/aws2/Aviation%20Report%2009/21667B%20CCC%20Aviation%20AW%20COMP%20v8.pdf> [Checked 09/04/2018]

Growth Strategy<sup>364</sup> states 44Mt CO<sub>2</sub> per annum as a target. There is therefore some uncertainty in the future policy baseline for the assessment of significance of emissions from aviation emissions from airports.

- 17.5.10 Carbon budgets for a range of sectors have been produced under the Fifth Carbon Budget<sup>365</sup>. Non-aviation sources of GHG emissions from the Proposed Development (e.g. buildings, transport) will be assessed in the context of these budgets.

### Factors influencing baseline conditions

- 17.5.11 In the absence of the Proposed Development the baseline aviation emissions from Bristol Airport are likely to remain similar to those reported in the 2011 ES submitted for development of Bristol Airport to support 10 mppa. This represents a worst-case scenario as some of the developments included within the 10 mppa assessment are not being taken forward. The future baseline presented in the ES for this Proposed Development will consider this and therefore the future baseline GHG emissions will be reviewed.
- 17.5.12 In the UK aviation policy context, the 2017 DFT Aviation Forecast describes how the future UK emissions from aviation will change without the Proposed Development. Similarly, the UK carbon budgets<sup>334</sup> and the associated sectoral projections describe GHG emissions on a national level up to 2050<sup>365,7</sup> and the associated sectoral projections describe GHG emissions on a national level up to 2050.

### Additional baseline information requirements

- 17.5.13 Details of the amount of GHG emissions from developments included in the future baseline (i.e. the 10mppa airport) that are not being taken forward are required. The reviewed future baseline will be presented in the ES.

## 17.6 The scope of the assessment, methodology and characteristics of the potential effects

### Identification of receptors that could be subject to likely significant effects

- 17.6.1 Whilst there is only one receptor for the GHG assessment (the global climate), emissions from different sources will be considered individually. As such, the global climate is subject to likely significant effects from each source, and assessments will be carried out for each.

### Potential significant effects requiring further assessment

- 17.6.2 In-line with IEMA guidance<sup>344</sup>, all GHG emissions from the Proposed Development are considered potentially significant. Therefore, on the basis of the rdANPS, which contains the most recent policy guidance for airports despite its geographical limitations, the following emission sources are calculated:
- GHG emissions from constructing the Proposed Development, including embodied carbon;

<sup>364</sup> BEIS (2017). Clean Growth Strategy. Available online: <https://www.gov.uk/government/publications/clean-growth-strategy> [Checked 09/04/2018]

<sup>365</sup> Committee on Climate Change (2015). Sectoral scenarios for the fifth carbon budget. Available online at: <https://www.theccc.org.uk/publication/sectoral-scenarios-for-the-fifth-carbon-budget-technical-report/> [Checked 09/04/2018]

- GHG emissions from non-aviation operation of the Proposed Development, including surface access; and
- GHG emissions from aviation associated with the Proposed Development.

## Potential effects not requiring further assessment

- 17.6.3 The land use change emissions inventory sectors relate to removal of greenhouse gases from the global climate by carbon sinks associated with land use types. The conversion of forested land to infrastructure has a particular GHG impact. Emissions associated with land use change are usually calculated on a national level, so it is expected that the changes in land use type associated with the Proposed Development will be minimal, and so will not be calculated as part of the assessment.

## Proposed assessment methodology

- 17.6.4 The receptor for each emissions source is the global climate system.
- 17.6.5 Total emissions per annum associated with the Proposed Development at peak airport usage and the cumulative emissions over time will be considered up to 2050 (the date for which the UK carbon budget is set for an 80% reduction in emissions compared to 1990 levels).
- 17.6.6 Emissions from non-aviation sources are significantly smaller than those from aviation sources, and are more able to be controlled by the owner/operator during the construction and operation phases of the Proposed Development. Bristol Airport already monitors GHG emissions from its operations, and reports on it annually<sup>352</sup>. Non-aviation sources are broken down into:
- Surface access (staff, passengers, freight);
  - Scope 1 energy use (gas use, fleet vehicles, heating/red diesel, fire training, company cars, refrigerants);
  - Scope 2 energy use (grid electricity); and
  - Guaranteed offsetting commitments.
- 17.6.7 This approach to reporting emissions is in-line with the requirements of assessments under the revised rdANPS. Whilst the Proposed Development does not require development consent, the rdANPS remains the most relevant document for considering the climate change impact of airport developments.
- 17.6.8 There are several established methodologies for measuring and reporting GHG emissions and their significance that will be followed for the assessment. They are described in **Table 17.2**.
- 17.6.9 There are currently no requirements to mitigate emissions at Bristol Airport through offsetting schemes outside the boundary of the airport. It is expected that this will continue for the Proposed Development, but where offsetting is proposed, this will be incorporated into the total emissions calculation.

## Methodology for determining the effect of constructing the Proposed Development on the global climate, including embodied carbon

- 17.6.10 For construction emissions, the cumulative emissions from cradle-to-construction will be considered. This represents the sum of GHG emissions covering extraction of raw and primary materials and their manufacture and refinement into products and construction materials, as well as the transport, supply logistics and construction site works. The ICE database is used to determine the embodied carbon of materials used, construction traffic will be sourced from the traffic and

transport assessment that forms part of the planning application as well as estimated distances of heavy goods vehicle (HGV) journeys.

- 17.6.11 Construction vehicle trips delivering construction material to site will be ascertained from **Chapter 5: Traffic and transport**.
- 17.6.12 Energy use from plant equipment will be estimated using best available emission factors. Pre-construction site visits are not within the scope of assessment.
- 17.6.13 The overall methodology for the assessment of the construction of the Proposed Development is to quantify its GHG emissions and determine the extent which the construction processes committed to are in-line with the UK Green Construction Board low carbon routemap<sup>366</sup> approaches for reducing carbon intensity per £. These reductions are achieved through choosing materials with lower embodied carbon and improving efficiencies on site.

### Methodology for determining the effect of non-aviation emissions from operating the Proposed Development on the global climate

- 17.6.14 Annual emissions from new buildings are calculated using the estimated annual energy consumption of the proposed buildings as set out in the Proposed Development masterplan. This includes buildings and typical loads within the building types (based on CIBSE characterisation).<sup>367,368</sup>
- 17.6.15 Energy use will be calculated using estimation of electricity and heating demand of the building types of the Proposed Development based on CIBSE characterisation. The Proposed Development is outlined in **Chapter 2**. Efficiency features of the new infrastructure will be considered within the assessment. The carbon intensity of UK grid electricity (gCO<sub>2</sub>e/kWh) will depend on the projected rate of decarbonisation over time.
- 17.6.16 Non-buildings operational energy use will be determined through engagement with the relevant Bristol Airport operational teams. The increase in gas use, fleet vehicles, heating, fire training, company cars and refrigerants will be determined by scaling up the existing Scope 1 carbon footprint to incorporate the new features of the airport and applying efficiency gains where relevant.
- 17.6.17 Surface access associated with the operational phase of the Proposed Development will be quantified for all transport modes. This will include the proposed changes to the A38 and additional footways/cycle links. All passenger, freight and staff travel will be included.
- 17.6.18 Emissions will be sourced from the transport assessments carried out as part of the planning application. Emissions factors (kgCO<sub>2</sub> per km) are used for the following vehicle types: HGV, large goods vehicle (LGV), Car and Bus from the 2017 conversion factors published by the Department for Business, Energy and Industrial Strategy for GHG reporting to calculate GHG emissions<sup>369</sup>.
- 17.6.19 The calculations will estimate a number of total kilometres travelled for each mode of transport, based on information from the Traffic and Transport assessment and journey distances for the airport from existing customer surveys. This will be multiplied by emissions factors from the 2017 conversion factors published by BEIS<sup>354</sup>. Reasonable adjustments will be made for vehicle efficiency

<sup>366</sup> The Green Construction Board (2018). Low carbon routemap for the built environment. Available online: <https://www.greenconstructionboard.org/index.php/resources/routemap> [Checked 09/04/2018]

<sup>367</sup> CIBSE (2012). GVF2012 Guide F: Energy Efficiency in Buildings.

<sup>368</sup> CIBSE (2012). TM46: Energy Benchmarks.

<sup>369</sup> Department for Business, Energy and Industrial Strategy (2017). Greenhouse gas reporting: conversion factors 2017. Available online at: <https://www.gov.uk/Government/publications/greenhouse-gas-reporting-conversion-factors-2017>

improvements where necessary.<sup>31</sup>. Reasonable adjustments will be made for vehicle efficiency improvements where necessary.

- 17.6.20 The HGV emissions factor used is for an average HGV type ('All HGVs') fully laden. The LGV emission factor used is for an average (up to 3.5t). Passenger vehicles are considered to be of average size. Fuel types are diesel for HGV and unknown for LGVs and passengers, which represent the worst-case scenario. Local bus emission factors are used, expressed in passenger/km.
- 17.6.21 The emissions factors used for the assessment are:
- HGV: 0.8598 kgCO<sub>2</sub>/km
- LGV: 0.2576 kgCO<sub>2</sub>/km
- Passenger vehicle (car, taxi): 0.1811 kgCO<sub>2</sub>/km
- Bus: 0.12 kgCO<sub>2</sub>/passenger
- 17.6.22 The approach to determining significance for non-aviation emissions associated with the Proposed Development is to make an expert judgement as to whether the GHG emissions reported are in-line with the UK-wide carbon budgets for buildings and transport, as determined by the Committee on Climate Change (CCC). This will consider the mitigations in place to reduce emissions in buildings, produce renewable power on site, and reduce emissions from surface access. The extent to which GHG emissions per passenger are changed will be considered, as will the extent to which emissions are in-line with Policy Principle 5 (Mitigate and adapt to climate change and use a catchment based approach to water management) in the West of England Joint Spatial Plan. The JSP states a 50% reduction in CO<sub>2</sub> emissions by 2050 is aimed for, with a requirement of proposed developments to 'maximise the energy efficiency needs of new development'.

## Methodology for determining the effect of aviation emissions from operating the Proposed Development on the global climate

- 17.6.23 The overwhelming majority of an airport's GHG emissions arise from the combustion of fuel by aircraft. Although research is being undertaken to introduce lower-carbon biofuels, it is likely that fuel will remain largely fossil-derived with only a fairly small percentage of biofuel in the mix over the timescale of this assessment. Aviation emissions sources are broken down into:
- Cruise phase (departure only to avoid double-counting with other airports). The cruise phase is the flight phase following a climb to a set altitude and before its descent;
  - Landing and Take-Off (LTO) cycle; and
  - General aviation and helicopters.
- 17.6.24 As a result of the uncertainty around the mechanism by which the UK aviation sector will achieve aviation emissions in-line with the Government's carbon obligations, it is not possible to define a quantified GHG emission level for Bristol Airport and consider the impact of this upon UK policy. However, a qualitative GHG assessment for the Proposed Development can be undertaken. It should be noted that the rdNPS states:
- "Any increase in carbon emissions alone is not a reason to refuse development consent, unless the increase in carbon emissions resulting from the project is so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets, including carbon budgets."*
- 17.6.25 Therefore, the significance of effects relating to GHGs is not directly related to a quantified emissions value, but to the satisfactory provision of mitigation that meets the requirements of the rdANPS:

*"The Government also acknowledges the local and national environmental impacts of airports and aviation... and believes that capacity expansion should take place in a way that satisfactorily mitigates these impacts wherever possible. Expansion must be deliverable within national targets on greenhouse gas emissions"*

- 17.6.26 Therefore, aviation emissions associated with the Proposed Development will be considered in the context of a UK aviation industry that exists within an overall 80% reduction in total UK GHG emissions by 2050, with emissions from international aviation included. It should be noted that it will not be possible to prescribe a quantified level of aviation GH emissions at the Proposed Development that would be Significant or otherwise due to the many variables that influence the satisfaction of the 80% emissions reduction target and any associated UK aviation targets. Therefore, expert judgement will be used to determine significance based on the extent to which mitigations incorporated to reduce emissions where practicable have been followed.

#### Assessment methodology for calculating emissions from cruise phase

- 17.6.27 The cruise phase of flights is only considered for departing flights, following Airport Cooperative Research Program (ACRP) guidance<sup>370</sup>.
- 17.6.28 The calculation of aircraft CO<sub>2</sub> emissions will use projections of Air Traffic Movements (ATMs) for the development and data on emission factors by aircraft type, as described in the EMEP guidebook. Information of increases to movements will be taken from the description of the Proposed Development.
- 17.6.29 Any emission factors for future aircraft types not included in the EMEP guidebook will be produced based on the ICAO Aircraft Engine Emissions Databank<sup>351</sup>.
- 17.6.30 For aviation sources, only CO<sub>2</sub> emissions are reported. This is consistent with the DfT UK Aviation Forecasts 2017<sup>339</sup>.

#### Assessment methodology for calculating emissions from LTO cycle

- 17.6.31 The LTO cycle is considered for all ATMs that occur as a result of the Proposed Development. Data on emission factors by aircraft type, as described in the EMEP/EEA air pollutant Emission Factor Database<sup>347</sup> and the ICAO Aircraft Engine Emissions Databank, will be used.
- 17.6.32 For aviation sources, only CO<sub>2</sub> emissions are reported. This is consistent with the DfT UK Aviation Forecasts 2017<sup>339</sup>.

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<sup>370</sup> ACRP (2009). Guidebook on Preparing Airport Greenhouse Gas Inventories. Available online: <http://www.trb.org/Main/Public/Blurbs/160829.aspx> [Checked 09/04/2018]



## 18. Climate Change

### 18.1 Introduction

- 18.1.1 This chapter sets out the proposed approach to climate change assessment and sets out the likely significant effects resulting from the Proposed Development. There are two types of assessment considered in this chapter:
- Climate change resilience (CCR) (i.e. the impact of climate change on the Proposed Development). The aim of this aspect is to determine the impact that climate change is likely to have on the ability of the Proposed Development to maintain its function throughout its operational life;
  - In-combination climate change impacts (ICCI) (i.e. the impact of the Proposed Development and climate change on environmental receptors). The aim is to determine where climate change increases the exposure of environmental receptors to an extent that a new significant effect is found or an existing significant effect is exacerbated. This assessment is inherently a cumulative effects assessment, as it uses information gathered from other environmental topics. The rationale for the ICCI assessment is outlined in the relevant IEMA guidance<sup>371</sup>.
- 18.1.2 The scope of the climate change topic interfaces with **Chapter 16: Major accidents and disasters**, which includes consideration of climate change affecting the likelihood and consequence of major events, and **Chapter 10: Surface water and flood risk**, which considers climate change in its flood risk assessment as per Environment Agency guidance<sup>372</sup>.
- 18.1.3 Whilst presented as a separate chapter within the Scoping Report in order to clearly outline the technical requirements for considering climate change within the EIA, the assessments and the ICCI assessments will be incorporated into the respective topic chapters and the CCR assessment will be incorporated into the Design Statement. There will not therefore be a separate chapter dealing with climate change within the Environmental Statement (ES).

### 18.2 Relevant legislation, policy and guidance

#### Legislation and policy

- 18.2.1 Key aspects of legislation and planning policies relevant to climate change and the assessment that will be presented within the ES are set out in **Table 18.1**.

<sup>371</sup> IEMA (2015) IEMA Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation. Available online at: [https://www.iema.net/assets/templates/documents/iema\\_guidance\\_documents\\_eia\\_climate\\_change\\_resilience\\_and\\_adaptation%20\(1\).pdf](https://www.iema.net/assets/templates/documents/iema_guidance_documents_eia_climate_change_resilience_and_adaptation%20(1).pdf) [checked 30/04/2018]

<sup>372</sup> Environment Agency (2017). Guidance. Flood risk assessments: climate change allowances. Available online at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> [checked 30/04/2018]

Table 18.1 Legislation, National and Local Planning Policies relevant to climate change

Legislation or Policy reference	Legislation Summary or Policy Information relevant to climate change
<b>European Legislation</b>	
<b>EIA Directive 2014</b> <sup>373</sup>	<p>The EIA Directive 2014 sets out the rationale for incorporating climate change into the EIA process. It reads:</p> <p><i>“Climate change will continue to cause damage to the environment and compromise economic development. In this regard, it is appropriate to assess the impact of projects on climate (for example greenhouse gas emissions) and their vulnerability to climate change.”</i></p>
<b>UK Legislation</b>	
<b>Climate Change Act 2008</b> <sup>374</sup>	<p>The Climate Change Act 2008 requires the Government, on a regular basis, to assess the risks to the UK from the impact of climate change and report the findings back to Parliament. The Act contains the Adaptation Reporting Power, which allows Government to ask certain organisations to produce reports on both their climate change risks and their adaptation plans.</p>
<b>Climate Change Act Adaptation Reporting Power (ARP)</b> <sup>375</sup> <b>and the associated UK Climate Change Risk Assessments (2012 and 2017)</b> <sup>376</sup>	<p>In 2012 the Civil Aviation Authority (CAA), National Air Traffic Services (NATS) and ten airports published climate change adaptation reports under the Climate Change Act Adaptation Reporting Power (ARP). These were followed up by progress reports submitted to Defra through 2016 and 2017. Six airports responded to the second round of reporting against the power in 2016/17. Bristol Airport was not invited to respond to either round of reporting.</p>
<b>UK Regulation</b>	
<b>The Town and Country Planning (Environmental Impact Assessment) Regulations 2017</b> <sup>377</sup>	<p>The Town and Country Planning (EIA) Regulations 2017 are the transposition of the 2014 EIA Directive into UK law, as it relates to town and country planning.</p> <p>The Regulations refer to ‘climate’ in the following way: ‘climate (for example impacts relevant to adaptation)’, and: ‘the impact of the project on climate (for example the... vulnerability of the project to climate change)’. Climate is listed in the EIA process as a factor for which direct and likely significant effects of the proposed development must be identified, described and assessed. Furthermore, the interaction between climate and the other factors must be identified, described and assessed.</p> <p>The regulations state a description of the likely significant effects relating to the vulnerability of the project to climate change is required.</p>
<b>International Policy</b>	
<b>UNFCCC Paris Agreement</b> <sup>378</sup>	<p>The United Nations Framework Convention on Climate Change (UNFCCC) is the major international body responsible for managing climate change and carbon emissions. In 2015, it adopted the Paris Agreement, the aims of which are stated as:</p> <p><i>“This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:</i></p>

<sup>373</sup> European Commission (2014). Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. Available online at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052>

<sup>374</sup> UK Department for Energy and Climate Change (2008). The Climate Change Act 2008. Available online at: <http://www.legislation.gov.uk/ukpga/2008/27/contents>

<sup>375</sup> UK Department for Environment, Food and Rural Affairs (2017). Climate change adaptation reporting: second round reports. Available online at: <https://www.gov.uk/government/collections/climate-change-adaptation-reporting-second-round-reports>

<sup>376</sup> Committee on Climate Change (2017). UK Climate Change Risk Assessment 2017. Available online at: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report>

<sup>377</sup> UK Department of Communities and Local Government (2017). The Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Available online at: <http://www.legislation.gov.uk/uksi/2017/571/contents/made>

<sup>378</sup> United Nations Framework Convention on Climate Change (UNFCCC) (2015). Paris Agreement. Available online at: [https://unfccc.int/sites/default/files/english\\_paris\\_agreement.pdf](https://unfccc.int/sites/default/files/english_paris_agreement.pdf)

Legislation or Policy reference	Legislation Summary or Policy Information relevant to climate change
	<p>(a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change; and</p> <p>(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production”</p> <p>The agreement sets targets for countries’ greenhouse gas emissions, but these are not legally binding or enforceable. The agreement excludes international aviation (but domestic aviation is included).</p>
<b>UK Policy</b>	
<b>Draft National Planning Policy Framework (2018)</b> <sup>379</sup>	The draft NPPF released in 2018 states that new development should be planned for in ways that “avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure”.
<b>Revised draft Airports National Policy Statement (2017)</b> <sup>380</sup>	<p>The Revised Draft Airports NPS (rdANPS) sets out Government policy on climate change adaptation in relation to aviation expansion at airports in the south east of England. It states: “New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the provision of green infrastructure.”</p> <p>Furthermore, the Statement says: “Detailed consideration must be given to the range of potential impacts of climate change using the latest UK Climate Projections available at the time, and to ensuring any environmental statement that is prepared identifies appropriate mitigation or adaptation measures.”</p>
<b>Aviation Policy Framework</b> <sup>381</sup>	The APF provides the baseline for the Airports Commission to consider issues such as aircraft noise and climate change. The APF states that the aviation industry will use the National Adaption Program to work with Government and other stakeholders to address climate risks. It emphasises the Government’s support for improving understanding and management of climate risks.
<b>Local Policies:</b>	
<b>Climate Local North Somerset</b> <sup>382</sup>	Climate Local for North Somerset aims to reduce carbon emissions and increase resilience to climate change. The plan sets out commitments for Low Carbon Pathways and Climate Resilience.
<b>Draft West of England Joint Spatial Plan (2017)</b> <sup>383</sup>	The joint spatial plan sets out requirements for new developments in the West of England. The plan states that “New development will be designed to be resilient to, and reduce the impacts of climate change”. The strategy prioritises “developing a more resilient environment to help tackle the challenges of future climate change”.

<sup>379</sup> UK Ministry of Housing, Communities & Local Government (2018). National Planning Policy Framework: Draft text for consultation. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685289/Draft\\_revised\\_National\\_Plan ning\\_Policy\\_Framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685289/Draft_revised_National_Plan ning_Policy_Framework.pdf)

<sup>380</sup> Department for Transport (2017). Revised draft Airports National Policy Statement. Available online at: <https://www.gov.uk/government/publications/revised-draft-airports-national-policy-statement>

<sup>381</sup> UK Government (2013). Aviation Policy Framework. Presented to Parliament by the Secretary of State for Transport by Command of Her Majesty. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/153776/aviation-policy-framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf)

<sup>382</sup> North Somerset Council (2013). Climate Local North Somerset Council. Available online at: <https://www.n-somerset.gov.uk/wp-content/uploads/2016/01/climate-local-commitment.pdf>

<sup>383</sup> Bath and North East Somerset Council, Bristol City Council, North Somerset Council, South Gloucestershire Council (2017). West of England Joint Spatial Plan. Available online at: [file:///C:/Users/christopher.harris/Downloads/SD1A\\_The\\_Publication\\_Plan\\_November\\_2017.pdf](file:///C:/Users/christopher.harris/Downloads/SD1A_The_Publication_Plan_November_2017.pdf)

## Guidance

18.2.2 Guidance that relates to this assessment is provided in **Table 13.2**.

Table 18.2 Guidance relevant to the climate change assessment

Source	Summary description
<b>Institute of Environmental Management and Assessment (IEMA)</b> <sup>371</sup>	An IEMA EIA Guide to Climate Change Resilience and Adaptation has been produced, which sets the case for the component aspects of a climate change chapter as laid out in the scope of the assessment.
<b>European Commission</b> <sup>384</sup>	The European Commission published guidance on the Preparation of the Environmental Impact Assessment Report in 2017. This incorporates high-level guidance on climate change aspects of the updated EIA regulations.
<b>UK Department for Communities and Local Government</b>	The 2012 National Planning Policy Framework (NPPF) and relevant planning practice guidance includes a chapter on climate change adaptation and mitigation <sup>385</sup> and a 2014 update specifically for climate change <sup>386</sup> . In 2016, new climate change allowances for flood risk assessments were introduced to the NPPF by the Environment Agency <sup>372</sup> .
<b>European Commission</b>	The EC Guidance on Integrating Climate Change and Biodiversity into EIAs <sup>387</sup> sets out guidance for screening and scoping, analysing baseline trends, alternative and baseline measures, monitoring and adaptive management.
<b>World Health Organization (WHO)</b>	Strengthening Health Resilience to Climate Change: Technical Briefing for the World Health Organization - Conference on Health and Climate <sup>388</sup> . This document sets out high level approaches for considering climate change in the assessment of health impacts.
<b>National Air Traffic Services (NATS)</b> <sup>389</sup>	Climate Change Adaptation Report: July 2011. The NATS report consists of a risk assessment for climate change in the aviation sector, barriers to implementation of adaptation measures, the role of interdependencies, and opportunities.
<b>Cabinet Office</b> <sup>390</sup>	Keeping the Country Running: Natural Hazards and Infrastructure describes approaches to resilience in the UK infrastructure sector.
<b>European Commission</b> <sup>391</sup>	Guidelines for Project Managers: Making vulnerable investments climate resilience (2011). This document sets out guidelines for the incorporation of resilience to current climate variability and future climate change within infrastructure development projects.

<sup>384</sup> European Commission (2017). Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report. Available online at: [http://ec.europa.eu/environment/eia/pdf/EIA\\_guidance\\_EIA\\_report\\_final.pdf](http://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf)

<sup>385</sup> UK Department for Communities and Local Government (2017), Planning practice guidance. Available online at: <https://www.gov.uk/government/collections/planning-practice-guidance>

<sup>386</sup> UK Department for Communities and Local Government (2014), Climate change. Available online at: <https://www.gov.uk/guidance/climate-change>

<sup>387</sup> European Commission (2013), Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment. Available online at: <http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf>

<sup>388</sup> WHO (2015), Strengthening health resilience to climate change: Technical briefing. Available online at: <http://www.who.int/globalchange/publications/briefing-health-resilience/en>

<sup>389</sup> NATS (2011). Climate Change Adaptation Report. Available online at: <https://www.nats.aero/wp-content/uploads/2015/06/NATS-2011-Climate-change-adaptation-report.pdf>

<sup>390</sup> Cabinet Office (2013). Keeping the Country Running: Natural Hazards and Infrastructure. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/61342/natural-hazards-infrastructure.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/61342/natural-hazards-infrastructure.pdf)

<sup>391</sup> European Commission (2011). Non-Paper Guidelines for Project Managers: Making vulnerable investments climate resilient. Available online: <https://climate-adapt.eea.europa.eu/metadata/guidances/non-paper-guidelines-for-project-managers-making-vulnerable-investments-climate-resilient/guidelines-for-project-managers.pdf>

Source	Summary description
<b>IPCC<sup>392</sup></b>	Climate Change 2014: Impacts, Adaptation and Vulnerability provides high-level global best practice and progress on adaptation to climate change.
<b>International Civil Aviation Organization (ICAO)<sup>393</sup></b>	Environmental Report 2010: Chapter 6: Adaptation presents adaptation techniques specific to the global aviation sector.
<b>Environment Agency<sup>372</sup></b>	Guidance: Flood risk assessments: climate change allowances. This guidance document is used to add climate change uplifts to the flood risk assessments required as part of the ES.

## 18.3 Main sources of data

- 18.3.1 Gridded observational weather data from UKCP09<sup>394</sup>, covering the period 1961-2011, is used to establish 'current' conditions for temperature and rainfall. This is used as the 'climate baseline' against which future projections are compared.
- 18.3.2 Climate projections for the area in which the Proposed Development is located have been sourced from UKCP09<sup>395</sup>. The 25km<sup>2</sup> grid cell ID 1582 is used to represent climatic conditions at Bristol Airport. The UKCP09 projections are plausible representations of future climates across the UK, based on GHG emissions scenarios. UKCP09 provides probabilistic information, enabling the analysis of many potential future climates rather than one. Using a range of projections is preferable to a single projection given the inherent uncertainties involved with estimating future GHG emissions and the complexities of modelling the climate system<sup>396</sup>.
- 18.3.3 UKCP09 provides low, medium and high emissions scenarios for use in climate change assessments. The medium and high emissions scenarios will be used for the assessment as data from the low emissions scenario is not considered realistic given observed GHG emissions data. This is in-line with best practice from other major infrastructure projects in the UK.
- 18.3.4 Projections for the '2030s', '2050s' and '2080s' are obtained from the UKCP09 interface. These periods have been chosen to represent the design lives of assets associated with the Proposed Development. Each time period is representative of a thirty-year period (e.g. '2050s' is representative of 2041-2069<sup>397</sup>). The construction phase is in the early 2020s, which is too near-term for a climate change assessment to be of value, and is thus omitted. Data for the following variables are sourced from the 25km<sup>2</sup> UKCP09 projections:
- Daily average temperature (annual, summer and winter);
  - Daily average maximum temperature (summer);
  - Daily average minimum temperature (winter);
  - Daily mean precipitation (annual, summer and winter);
  - Temperature of the warmest day (summer);

<sup>392</sup> IPCC (2014). Climate Change 2014: Impacts, Adaptation and Vulnerability. Available online at: <https://www.ipcc.ch/report/ar5/wg2/>

<sup>393</sup> ICAO (2010). Environment Report 2010. Chapter 6: Adaptation. Available online at: [https://www.icao.int/environmental-protection/Documents/EnvironmentReport-2010/ICAO\\_EnvReport10-Ch6\\_en.pdf](https://www.icao.int/environmental-protection/Documents/EnvironmentReport-2010/ICAO_EnvReport10-Ch6_en.pdf)

<sup>394</sup> UKCP09 (2009). <http://ukclimateprojections.metoffice.gov.uk/>

<sup>395</sup> UKCP09 (2015). Using Climate Projections. Available online at: <http://ukclimateprojections.metoffice.gov.uk/21678>

<sup>396</sup> Jenkins, et al. (2009), UK Climate Projections: Briefing Report. Available online at: <http://ukclimateprojections.metoffice.gov.uk/media.jsp?mediaid=87868&filetype=pdf>

<sup>397</sup> UKCP09 (2014). Time Period. Available online at: <http://ukclimateprojections.metoffice.gov.uk/23207>

- Temperature of the coldest day (winter); and
- Precipitation on the wettest day (summer and winter).

18.3.5 For each variable, the 10<sup>th</sup>, 50<sup>th</sup> and 90<sup>th</sup> probability levels from across the range of climate change projections for the 2050s are obtained from UKCP09, in-line with UKCP09 guidance<sup>398</sup>. This information will be made available in the ES. In-line with the rdANPS, the high emissions scenario is used and the 2080s are considered for assets with long design lives. For flood risk, the climate change allowances as stated in Environment Agency guidance will be used<sup>372</sup>. This is covered in **Chapter 10: Surface water and flood risk**.

18.3.6 The next generation of UK climate projections, UKCP18, is due to be released in November 2018. Until this launch, UKCP09 are still considered to be the most robust climate projections to use in UK projects<sup>399</sup>. The release of UKCP18 will not be available in sufficient time to inform the ES for the Proposed Development.

18.3.7 Qualitative climate change information and trends for other parameters with less readily-available quantified data, such as fog, lightning, storms and wind direction, will be sourced from:

- UKCP09 Technical Notes<sup>400</sup>;
- Coupled Model Intercomparison Project stage 5 (CMIP5)<sup>401</sup>;
- Committee on Climate Change Adaptation Sub-Committee's (CCC ASC) report on 'Developing H++ climate change scenarios (hereafter referred to as 'H++ scenarios')<sup>402</sup>;
- Outputs from the UK Climate Change Risk Assessment (CCRA)<sup>403</sup>;
- Responses to the Adaptation Reporting Power (ARP) by airport operators, such as at Heathrow<sup>404</sup> and Gatwick<sup>405</sup>; and
- H++ scenarios produced by the Met Office<sup>406</sup> define the 'high-end' scenarios (referred to as H++) to describe extreme climate change scenarios. H++ scenarios are typically beyond the 10th to 90th percentile range of the UKCP09 and CMIP5 projections. Their use is required in the rdANPS and is recommended within the relevant IEMA guidance.

## 18.4 Engagement with consultees

18.4.1 North Somerset Council will be engaged with during the preparation of the ES. The engagement will set out the requirements for climate change assessment, the baseline conditions and the future

<sup>398</sup> UKCP09, Before you start using UKCP09. Available online at: <http://ukclimateprojections.metoffice.gov.uk/21679>

<sup>399</sup> UKCP09 (2017): Is UKCP09 still an appropriate tool for adaptation planning? Available online at: <http://ukclimateprojections.metoffice.gov.uk/24127>

<sup>400</sup> UKCP09 (2014) UKCP09 published reports. Available online at: <http://ukclimateprojections.metoffice.gov.uk/22530>

<sup>401</sup> Program for Climate Model Diagnosis and Intercomparison (PCMDI), CMIP5 - Coupled Model Intercomparison Project Phase 5 – Overview. Available online at: <https://cmip.llnl.gov/cmip5/>

<sup>402</sup> Committee on Climate Change (2015), Developing H++ climate change scenarios for heatwaves, droughts, floods, windstorms and cold snaps (Met Office). Available online at: <https://www.theccc.org.uk/publication/met-office-for-the-asc-developing-h-climate-change-scenarios/>

<sup>403</sup> The Committee on Climate Change Adaptation Sub-Committee (2017), UK Climate Change Risk Assessment, Chapter 4: Infrastructure. Available online at: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Chapter-4-Infrastructure.pdf>

<sup>404</sup> Heathrow (2016), Climate Change Adaptation and Resilience Progress Report. Available online at: [https://www.heathrow.com/file\\_source/Company/Static/PDF/Communityandenvironment/Climate-Change-Adaptation-Report-2016.pdf](https://www.heathrow.com/file_source/Company/Static/PDF/Communityandenvironment/Climate-Change-Adaptation-Report-2016.pdf)

<sup>405</sup> Gatwick (2016), Climate Change Adaptation Progress Report. Available online at: [https://www.gov.uk/Government/uploads/system/uploads/attachment\\_data/file/530908/climate-adrep-gatwick-airport.pdf](https://www.gov.uk/Government/uploads/system/uploads/attachment_data/file/530908/climate-adrep-gatwick-airport.pdf)

<sup>406</sup> Met Office (2015). Developing H++ climate change scenarios for heat waves, droughts, floods, windstorms and cold snaps. Available online at: <https://www.theccc.org.uk/publication/met-office-for-the-asc-developing-h-climate-change-scenarios/>



projections to be used in the assessment. The Council will then be asked to provide comments on the approach taken to assess the significance of effects of climate change effects.

## 18.5 Overview of baseline conditions

- 18.5.1 For the ICCI assessment, the baseline is the effects described in each topic chapter, that each assume current climate conditions (i.e. **Chapters 5 to 16**). This assessment adds climate change to the baseline conditions to produce an 'emerging baseline'. The assessment therefore considers the combined effect of climate change (i.e. the conditions in the 'emerging baseline') and the Proposed Development on environmental receptors.
- 18.5.2 For the CCR assessment, the emerging baseline is considered within the design as it is developed. The resultant design implications are included within the Design Statement.

### Zones of influence

#### CCR

- 18.5.3 The study area for the CCR assessment comprises:
- The land within the existing Bristol Airport boundary; and
  - The land being considered for the Proposed Development.
- 18.5.4 The relevant 25km<sup>2</sup> UKCP09 grid square for the Proposed Development is the source of climate change data.

#### ICCI

- 18.5.5 The study area for the ICCI assessment comprises the study area boundaries defined by each of the environmental topics in the technical chapters.
- 18.5.6 The most relevant 25km<sup>2</sup> UKCP09 grid square for the Proposed Development provides the relevant climate data for the assessment. Where a receptor lies outside of this area, the relevant grid square within which it is located will be used as the source of current and future climate data required for the assessment.

### Current baseline

- 18.5.7 Bristol Airport is located approximately seven miles southwest of Bristol city centre within a temperate marine climate<sup>407</sup>. The Proposed Development site can be characterised as having mild damp winters, and warm, drier, sunnier summers similar to much of the southern British Isles. Close to continental Europe, it can be exposed to continental weather influences that bring cold spells in winter and hot, humid weather in summer.
- 18.5.8 The region has a typical average annual temperature of 10.5°C<sup>408</sup>, typical mean maximums of 19-21.5°C. Average winter temperatures are 4°C, with mean minimums of 1-2°C<sup>408</sup> (January).
- 18.5.9 Average annual rainfall over the course of a year in the region is approximately 700mm.

<sup>407</sup> Kottek et al. (2006). World Map of the Köppen-Geiger climate classification updated. Meteorologische Zeitschrift. Vol. 15, No 3, 259-263. Available on line at: [http://koeppen-geiger.vu-wien.ac.at/pdf/Paper\\_2006.pdf](http://koeppen-geiger.vu-wien.ac.at/pdf/Paper_2006.pdf)

<sup>408</sup> Met Office. South-west England regional climate. <https://www.metoffice.gov.uk/climate/uk/regional-climates/sw>



18.5.10 All other topic assessments and the Proposed Development description assume these baseline conditions as the conditions for construction and operation.

### Emerging baseline (i.e. project climate conditions)

18.5.11 Projected conditions at Bristol Airport during the operational phase of the Proposed Development are presented here. They represent the 'emerging baseline' on which the climate resilience and ICCI assessments are based. They are described as changes from the climate baseline, which in UKCP09 is representative of 1960-1990. UKCP09 projections for the Proposed Development site in the 2030s, 2050s and 2080s are shown in **Table 18.3**.

Table 18.3 Emerging baseline conditions: climate change projections for Bristol Airport. A black trend arrow denotes the sign of trend is consistent across the 10<sup>th</sup> – 90<sup>th</sup> percentile range of UKCP09 climate projections. A grey trend arrow denotes that the trend is not consistent across the 10<sup>th</sup> -90<sup>th</sup> percentile range of UKCP09 climate projections.

		2030s		2050s		2080s	
		Trend	Central Estimate	Trend	Central Estimate	Trend	Central Estimate
Temperature	Mean annual	↑	+ 1.82°C	↑	+ 2.78°C	↑	+ 4.39°C
	Mean summer	↑	+ 2.04°C	↑	+ 3.16°C	↑	+ 5.1°C
	Mean winter	↑	+ 1.52°C	↑	+ 2.31°C	↑	+ 3.41°C
	Mean maximum summer	↑	+ 2.69°C	↑	+ 4.15°C	↑	+ 6.6°C
	Mean minimum winter	↑	+ 1.81°C	↑	+ 2.72°C	↑	+ 4.1°C
	Hottest day	↑	+ 2.62°C	↑	+ 3.63°C	↑	+ 5°C
	Coldest night	↑	+ 1.73°C	↑	+ 2.32°C	↑	+ 2.79°C
Precipitation	Mean annual precipitation	↕	+ 0.16%	↕	- 0.04%	↕	+0.79%
	Mean summer precipitation	↓	- 10.85%	↓	- 19.63%	↓	-29.38%
	Mean winter precipitation	↑	+ 9.15%	↑	+ 17.16%	↑	+ 27.51%
	Precipitation on wettest day summer	↕	- 2.98%	↓	- 6.36%	↓	- 13.73%
	Precipitation on wettest day winter	↑	+ 5.37	↑	+ 13.20%	↑	+ 22.82%

18.5.12 A number of other variables are relevant to the emerging baseline that are not available in the UKCP09 information:

## Wind

- 18.5.13 There is considerable uncertainty in changes to wind speed and direction. UKCP09 does not include probabilistic projections of changes to wind speed in the core projections dataset. Probabilistic projections of changes to wind speed for different UK regions are available in an additional UKCP09 report.
- 18.5.14 Low resolution projections for wind speed are gathered from the UKCP09 additional product: 'UKCP09: Probabilistic Projections of Wind Speed'<sup>409</sup>. Winter average wind speed is not anticipated to change considerably and a small reduction is projected for summer average wind speed. There are no available UKCP09 projections for extreme wind speeds.

## Fog

- 18.5.15 Probabilistic projections for fog are not available from UKCP09. However, UKCP published a report addressing future changes in fog frequency from a UKCP09 ensemble of regional climate model (RCM) projections<sup>410</sup>. A visibility threshold of 1,000m as an indicator of the presence of fog is used.
- 18.5.16 Fog frequency in the SW England region is likely to decrease in the spring, summer and autumn months by 2080. A 40% reduction is projected for spring, 69% reduction for summer, and 28% reduction for autumn. Fog frequency for winter months is projected to increase by 4% compared to current conditions. There is significant uncertainty in these projections, with only the average of 11 Regional Climate Models being described here.

## Lightning

- 18.5.17 As in the case of fog, probabilistic projections for changes in lightning are not available. However, a report describing future changes projected by UKCP09 RCMs is available<sup>411</sup>. It suggests that lightning may become more frequent across the year at Bristol in the future (in the 2080s), with the greatest increase in lightning frequency projected for the autumn. While most models point towards an increase in lightning, the uncertainty in these projections is substantial.

## Factors influencing baseline conditions

- 18.5.18 The impacts of climate change will continue to affect the site of the Proposed Development as described in the emerging baseline above.

## Additional baseline information requirements

- 18.5.19 No further information has been identified as required for completing the baseline.

## 18.6 The scope of the assessment, methodology and characteristics of the potential effects

- 18.6.1 The aim of the assessment is to determine where climate change exacerbates effects of impacts on environmental receptors or the built environment to an extent that a new significant effect is

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<sup>409</sup> UKCP09 (2010). UKCP09: Probabilistic projections of wind speed. Available online at:

<http://ukclimateprojections.metoffice.gov.uk/media.jsp?mediaid=87876&filetype=pdf>

<sup>410</sup> UKCP09 (2010). Future changes in fog frequency from the UKCP09 ensemble of regional climate model projections. Available online at: <http://ukclimateprojections.metoffice.gov.uk/media.jsp?mediaid=87948&filetype=pdf>

<sup>411</sup> UKCP09 (2010). Future changes in lightning from the UKCP09 ensemble of regional climate model projections. Available online at: <http://ukclimateprojections.metoffice.gov.uk/media.jsp?mediaid=87950&filetype=pdf>

considered likely. Climate change has the potential to exacerbate both magnitude of impact and the sensitivity of receptors and the built infrastructure.

- 18.6.2 The assessment of likely significant effects associated with the Proposed Development will consider the operational phase of the Proposed Development. The construction phase is scoped out due to its short-term nature.

## Identification of receptors that could be subject to likely significant effects

### CCR

- 18.6.3 All built elements of the Proposed Development (as detailed in **Chapter 2**) are considered to be receptors for the assessment. Operational changes to night flights are not relevant to the assessment.
- 18.6.4 The assessment will also consider any critical assets or interdependent infrastructure upon which Bristol Airport is dependent for successful operation (outside of the Proposed Development itself). This will include existing assets or infrastructure connections and those planned for the future (to be identified in the cumulative effects assessment).

### ICCI

- 18.6.5 Environmental receptors will be identified from the assessments for each topic within the ES. Potential receptors are those which are scoped in for other topics, as-long-as they have the potential to be impacted by a climate hazard listed in **Section 18.3**.
- 18.6.6 Using an integrated work process between the climate change topic and the other relevant topic, and the climate projections described in **Section 18.3**, the following considerations are taken into account in identifying potential receptors:
- The extent to which the receptor could be affected by changes that are expected to result from the Proposed Development;
  - The sensitivity of the receptors to the changes that are likely to occur; and
  - The extent to which the change in climate impacts exacerbates the effect to each receptor so that it can be considered significant. Potential impacts of climate change that would impact upon the receptor were the Proposed Development not present are scoped out of the assessment. An example of this is the impact of climate change on landscapes physically unaltered by the presence of the airport, or impacts of heatwaves on human health and communities near the Proposed Development.

## Potential significant effects requiring further assessment

### CCR

- 18.6.7 The potentially significant effects of climate change and the receptors potentially affected are listed below. As the assessment progresses, should more effects be identified they will be considered as appropriate.
- High temperatures and heatwave events resulting in effects on overheating of terminals and buildings;
  - Extreme precipitation events overwhelming drainage systems across the Proposed Development;

- High temperature and heatwave events resulting in a reduction in the resilience of aircraft operations (e.g. fire risk on site, flashpoint of aviation fuel being exceeded, overheating of aircraft on stands);
- Increased variability of snow events reducing resilience of winter contingency;
- Extreme precipitation events creating hazardous conditions on airside infrastructure;
- Water shortage in drought conditions causing restrictions to water intensive activities;
- Extreme weather or climatic events (strong winds, heatwaves, droughts, intense rainfall events) reducing resilience of airside operations;
- Extreme weather events or climatic events (strong winds, heatwaves, droughts, intense rainfall events) and flooding resulting in effects on resilience of surface access connecting infrastructure (e.g. local roads and junctions or train routes and stations); and
- Extreme weather or climatic events (strong winds, heatwaves, droughts, intense rainfall events) and flooding resulting in effects on resilience of utilities servicing the airport (e.g. power, gas, telecommunications).

## ICCI

18.6.8 The potentially significant effects to those receptors identified in other topic chapters requiring further assessment are:

- Changes in seasonal patterns of rainfall and temperature causing changes in soil moisture levels, length of growing season and irrigation requirements for newly planted vegetation and green infrastructure;
- Changes in seasonal patterns of rainfall and temperature causing altered quality and quantity of habitats;
- Changes in seasonal patterns of rainfall and temperature causing altered high and low flows and levels of water bodies in the local water environment; and
- Changes in seasonal patterns of rainfall, temperature and wind causing altered air quality effects, with a knock-on impact on human health.

18.6.9 As the assessment progresses, should more effects be identified they will be considered as appropriate. All assessments will be contained within the relevant topic chapters in the ES (e.g. changes in seasonal patterns of rainfall and temperature causing altered quality and quantity of habitats will be considered within **Chapter 9: Biodiversity**).

## Potential effects not requiring further assessment

18.6.10 No further assessment is required concerning ICCIs in **Chapter 6: Noise, Chapter 8: LVIA, Chapter 12: Land quality, Chapter 14: Socio-economics** and **Chapter 17: Greenhouse gases**. These topics have no effects which are likely to be affected by climate change.

## Proposed assessment methodology

18.6.11 The methodology outlined for CCR and ICCI in this section has been developed during the undertaking of previous EIAs and is in-line with IEMA<sup>371</sup> and European Commission<sup>348</sup> guidance. It also considers the further guidance listed in **Table 18.2**. It will be followed when completing the assessment presented in the ES.

## CCR

- 18.6.12 The high-level CCR assessment evaluates the extent to which the Proposed Development is adversely affected by climate change (i.e. by the projected change in climate variables described in **Section 18.3**) within its design life. Existing Bristol Airport infrastructure is considered only when its underlying climate resilience may influence aspects of the climate resilience of the new elements.
- 18.6.13 A qualitative assessment will be produced that will consider best practice and guidance to ensure that it is embedded into the design process of the Proposed Development, both before and after planning approval. The high-level assessment considers:
- Trends from UKCP09 Climate change projections described in **Section 18.3**;
  - The extent to which the relevant design standard considers climate change;
  - Potential impact on Bristol Airport's Business as Usual; and
  - Best practice adaptation approaches from across the aviation and infrastructure sectors. Key documents are described in **Table 18.2** and further literature reviews will identify other relevant guidance.
- 18.6.14 A matrix will set out the adaptation approach for each asset type given the design information available. This information will be used to ensure the design is resilient to the impacts of climate change.
- 18.6.15 Each asset type (e.g. terminals, car access roads etc.) will be assessed and set out in the matrix. The approaches will be characterised as:
- Asset type is resilient to climate change using existing design standards;
  - Asset type is potentially subject to a climate change impact, with more design information required in-order to make a design change;
  - Asset type is subject to a climate change impact that can be made resilient through a change in design; and
  - Asset type is subject to a climate change impact, but which should be upgraded / replaced at a later date.
- 18.6.16 The assessment will consider the relevant IEMA guidance<sup>371</sup> and the European Commission guidelines for climate resilient investments<sup>391</sup>.

## ICCI

- 18.6.17 The ICCI assessment considers the extent to which climate change exacerbates the magnitude of impacts the Proposed Development will have on receptors over its design life, which for the purposes of the climate change assessment is considered the duration of the 21<sup>st</sup> century (the available time period in the UKCP09 projections).
- 18.6.18 The effect of climate change will be integrated into the environmental assessments for each relevant chapter as they develop.
- 18.6.19 A literature review of recent science, guidance and policy relating to climate change impacts on each topic will be carried out. The climate change specialists and topic leads will use available published data on the link between the environmental impact and the effect (for example, in the case of impact of reduced precipitation on broadleaved woodland, taking into account whether there is published evidence on the deterioration of existing woodland or reduced growth rate of

newly planted woodland during reduced precipitation time periods), climate projections and expert judgement to determine a qualitative description of the climate impact facing each receptor.

- 18.6.20 The criteria used to define the consequence of an ICCI for specific receptors will be based on the criteria produced for each environmental topic. The assessment of the consequence of the ICCI will be based on the extent to which climate change exacerbates the effect already identified in the topic assessments. The spatial extent, duration and time horizon of the climate change impact will be considered when determining whether the consequence of the DCO Project on the environmental receptor in question should be increased.
- 18.6.21 ICCIs where the consequence is such that the effect is deemed significant against the relevant environmental topic criteria will be considered significant in-combination climate change effects, unless it is unlikely that the impact will occur within the operational lifespan of the Proposed Development.
- 18.6.22 The assessment will consider any committed or embedded mitigation measures proposed by the environmental topic or the scheme design, and whether any of these already address negative effects on the ability of resources and receptors to adapt to climate change.
- 18.6.23 There is substantially more planning guidance for considering climate change in flood risk assessments than any other EIA topics, and thus the approach for surface water and flood risk is different to the other topics. The NPPF guidance on climate change allowances will therefore be used<sup>379</sup>. Delivering consistent conclusions of significance relies on expert judgement, and the use of climate trends rather than a more quantitative assessment is justified as there are rarely usable metrics of climate change that will be applied to determine significance or otherwise.

## 19. Summary

This section presents a summary of those effects that it is proposed to scope out of any further assessment. Further information and details about the scoped-out effects can be found within the relevant technical chapters.

Table 19.1 Summary of potential effects that have been scoped out of further consideration

Topic	Scoped-out effects
<b>Traffic and transport</b>	<b>Potential effects arising from hazardous loads.</b> Any hazardous loads which could be generated will be managed in accordance with relevant legislation and best practice guidance.
<b>Noise</b>	<b>Potential effects from operational noise or vibration by aircraft, road traffic or construction activities upon human and non-human receptors.</b>
<b>Air Quality</b>	<p><b>Potential effects of odours and air quality as a result of the construction phase.</b> Construction activities are anticipated to be small compared to current operational activity, therefore any effects are likely to be negligible.</p> <p><b>Potential effects from specific air pollutants (carbon monoxide, sulphur dioxide, lead, benzene and 1,3 butadiene) on human and non-human receptors.</b> A clear expert consensus (Defra) shows that NO<sub>x</sub>/NO<sub>2</sub>, and to a lesser extent PM, are the only local air quality pollutants likely to be of potential concern from airport operations.</p>
<b>Landscape and Visual Impact Assessment</b>	<p><b>Potential effects on communities, long distance trails, sustrans cycle routes and open access areas within the study area that are entirely outside the preliminary ZTV.</b></p> <p><b>Potential effects on the three registered parks and gardens within the study area.</b> These are scoped out due to being located well outside of the preliminary ZTV.</p> <p><b>Potential effects on rural residential visual receptors located within the preliminary ZTV.</b> Excluding those which are listed in <b>Section 8.6.13</b>, other residential properties are excluded from the visual assessment due to their separation distance from the Proposed Development.</p> <p><b>Potential effects on recreational visual receptors using Public Rights of Way (PRoW) routed through parts of the ZTV.</b> Recreational visual receptors on PRoW located more than 1.5km from the Proposed Development are scoped out of the visual assessment.</p>



Topic	Scoped-out effects
Biodiversity	<p><b>Potential effects on ecological features associated with aquatic habitats resulting from contamination in the construction or operational phases.</b> No further assessment is required due to the adoption of appropriate pollution prevention and control measures in place at Bristol Airport.</p> <p><b>Potential effects on invertebrate species during the construction or operational phases.</b> The site has limited ability to support notable species assemblages.</p> <p><b>Potential effects on reptiles during the construction or operational phases.</b> The site has limited ability to support notable species; there is presently a likely absence from the Bristol Airport land based upon negative results in surveys conducted between 2007-2017.</p> <p><b>Potential effects due to the loss of common habitats.</b> Areas of ruderal vegetation, scattered scrub and ephemeral vegetation will likely have small losses and therefore any effects are scoped out.</p> <p><b>Potential effects on Lulsgate Quarry and Hartcliff Rocks Quarry SSSIs during the construction and operational phases.</b> The quarries are a sufficient distance from the site, with no potential source-receptor pathway present that could result in changes to the geological SSSI interest.</p> <p><b>Potential effects associated with air quality on other designated sites.</b> Any effects will be discussed within the Air Quality chapter of the ES.</p>
Surface water and flood risk	No effects scoped out at this stage.
Groundwater	No effects scoped out at this stage.
Land Quality	<b>Potential effects arising from radioactive contamination.</b>
Archaeology and Cultural Heritage	<b>Potential effects arising from the change to setting of designated heritage assets.</b> Increase in size and scale of buildings and noise and lighting levels are not currently expected to be sufficient to cause potentially significant change on the setting of designated heritage assets. Effects will not be considered further but will be re-appraised subject to changes in the design.
Socio-economics	<p><b>Potential effects on service demand (e.g. schools, hospitals etc.) during the construction phase.</b> The Proposed Development is not expected to result in a significant increase in the number of local residents.</p> <p><b>Potential effects on local community facilities (e.g. cultural or religious facilities) during the construction phase.</b> There will be no</p>

Topic	Scoped-out effects
	<p>change in the provision of these services arising from the Proposed Development.</p> <p><b>Potential effects of in-migration associated with employment during the construction phase.</b> Demand for personnel to fulfil the employment opportunities generated is likely to be met from across the labour catchment area rather than from in-migration of new employees in significant numbers.</p>
Human Health	<p>Where other chapters indicate no plausible link between source, pathway and receptor it is unlikely that there would be a population health effect and such effects are scoped out. If effects would require rare conditions for the link between source, pathway and receptor to occur these are also scoped out as not being probable.</p>
Major Accidents and Disasters	<p><b>Potential effect of construction activity on the environment and human populations.</b> All construction works will be managed in accordance with a Construction Environment Management Plan and relevant regulations such that the risk of such effects occurring is considered to be extremely low and similar to other ongoing development at the airport.</p> <p><b>Potential effect of building / infrastructure related major accidents.</b> Bristol Airport operates to very stringent standards of design, safety and security in accordance with UK and international aviation law and the relevant Civil Aviation Authority (CAA) mandated standards for design and operation.</p> <p><b>Potential effect on the environment and human populations from the spill of hazardous substances.</b> The airport operates to very stringent safety standards such that the risk of such accidents occurring and their magnitude is considered to be very low and would not be substantially increased relative to the current baseline.</p> <p><b>Potential effect of a major accident involving aircraft during the operational phase.</b> It is envisaged that any additional flights will operate under the existing licencing and controls as the existing airport. These controls will be extended for the Proposed Development with an equivalent level of provision.</p> <p><b>Potential effect of increased throughput of passengers increasing the likelihood of a major accident.</b> Aspects such as security, biosecurity, food safety, and health impacts will be managed by an extension of the existing management systems with the same level of protection. Bristol Airport will also retain its designation as a border post and security will be provided in the same manner by the police and Border Force. Port Health duties will continue to be undertaken by NSC as the Port Health Authority.</p> <p><b>Potential effect of the Proposed Development on road safety.</b> It is anticipated that suitable highway and structural design principles will</p>

Topic	Scoped-out effects
	<p>be employed to ensure that the risk of a major accident is not significantly increased by the Proposed Development. Collisions leading to injury would be dealt with by means of the normal police response. Tanker drivers would be Accord Dangereux Routier<sup>412</sup> (ADR) drivers and familiar with the transport of hazardous material.</p> <p><b>Potential effect of occupational risks on the construction workforce and other applicable human receptors.</b> These are managed under the general obligations of the Health and Safety at Work Act are not generally recognised as a major accident. They will be managed by the airport under the Management of Health and Safety at Work (MHSW) regulations in the same manner that they are currently managed and extending the same level of protection to the workforce.</p> <p><b>As all significant effects have been scoped out there will be no Major Accidents and Disasters chapter within the Environmental Statement.</b></p>
<b>Greenhouse Gases</b>	No effects scoped out at this stage.
<b>Climate Change</b>	No effects scoped out at this stage.

<sup>412</sup> Accord Dangereux Routier – ADR Driver – complies with the European Agreement concerning the International Carriage of Dangerous Goods by Road

## 20. ES Structure

To ensure consistency throughout the environmental impact assessment (EIA) process this chapter outlines the proposed structure for the Environmental Statement (ES). The ES will broadly follow the same structure as this Scoping Report.

20.1.1 The ES will present the information required to enable North Somerset Council (NSC) to identify any likely significant impacts resulting from the construction and operation of the Proposed Development. It is expected that the ES will be structured as follows:

- ES Non-Technical Summary (NTS) – a summary of the key issues and findings of the EIA
- ES Volume 1 – will comprise the full text of the EIA with chapter headings as follows:
  - ▶ 1. Introduction;
  - ▶ 2. Description of the proposed development;
  - ▶ 3. Alternatives;
  - ▶ 4. Approach to preparing the ES;
  - ▶ 5. Planning policy context;
  - ▶ 6. Traffic and transport;
  - ▶ 7. Noise;
  - ▶ 8. Air quality;
  - ▶ 9. Landscape and visual;
  - ▶ 10. Land quality;
  - ▶ 11. Biodiversity;
  - ▶ 12. Surface water and flood risk;
  - ▶ 13. Groundwater;
  - ▶ 14. Archaeology and cultural heritage;
  - ▶ 15. Socio-economics;
  - ▶ 16. Human health;
  - ▶ 17. Carbon and greenhouse gases;
  - ▶ 18 Cumulative effects;
  - ▶ 19. Summary of significant effects and proposed mitigation; and
  - ▶ Glossary.
- ES Volume 2 – Figures.
- ES Volume 3- Technical Appendices providing supplementary information for the various technical studies.
- Figures annex.

- 20.1.2 Please note that, depending on page numbers and file sizes, it may be necessary to split the Volumes proposed above for printing and electronic access purposes. Should this be the case the volume numbering convention will be to add a letter number after the volume, for example Volume 1 A, 1B etc.

## Glossary

Term	Definition
A-weighting	The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A)
AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekly Traffic
ABG	Avon Bat Group
ACI	Airports Council International
ACRP	Airport Cooperative Research program
ADMS	Atmospheric Dispersion Modelling System.
ADR	Accord Dangereux Routier
AEDT	Aviation Environmental Design Tool
AEL	Associated Emission Levels
AEP	Annual Exceedance Probability
ALARP	As low as reasonably practicable
ALC	Agricultural Land Classification
Ambient noise	Usually expressed using the $L_{Aeq,T}$ unit, commonly understood to include all sound sources present at any particular site, regardless of whether they are actually defined as noise.
AMC	Acceptable Means of Compliance
ANO	Air Navigation Order
ANPS	Airports National Policy Statement
AOA	Airport Operators Association
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
APF	Aviation Policy Framework

Term	Definition
APIS	Air Pollution Information System
APU	Auxiliary Power Unit
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Standards
ARP	Adaption Reporting Power
ASR	Annual Status Report
ASU	Airside Safety Unit
ATM	Air Traffic Movement
AURN	Automatic Urban and Rural Network
AWI	Ancient Woodland Inventory
AWT	Avon Wildlife trust
Background noise	This is the steady noise attributable to less prominent and mostly distant sound sources above which identifiable specific noise sources intrude. It is usually expressed using the LA90 unit.
BAL	Bristol Airport Limited
BAT	Best Available Technique
BCC	Bristol City Council
BCMP	Bird Control Management Plan
BCT	Bat Conservation Trust
BEIS	Department for Business, Energy and Industrial Strategy
bgl	below ground level
BGS	British Geological Survey
BNES	Bath and North East Somerset
BRERC	Bristol Regional Environmental Records Centre
C <sub>6</sub> H <sub>6</sub>	Benzene



Term	Definition
CAA	Civil Aviation Authority
CCC	Committee on Climate Change
CCC ASC	Committee on Climate Change Adaptation Sub-Committee
CCR	Climate Change Resilience
CCRA	Climate Change Risk Assessment
CDOIF	Chemicals and Downstream Oil Industry Forum
CEMP	Construction Environmental Management Plan
CIBSE	Chartered Institute of Building Services Engineers
CIEH	Chartered Institute of Environmental Health
CIfA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research and Information Association
CLR	Contaminated Land Report
CMIP5	Coupled Model Intercomparison Project stage 5
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
COs	Conservation Objectives
CoCP	Code of Construction Practice
COMAH	Control of Major Accident Hazards
COMEAP	Committee on the Medical Effects of Air Pollutants
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
COSHH	Control of Substances Hazardous to Health
CPRE	Campaign for the Protection of Rural England
CRTN	Calculation of Road Traffic Noise
CS	Core Strategy
CSM	Conceptual Site Model

Term	Definition
dB / Decibel	Decibel - The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of $2 \times 10^{-5}$ Pascals) and the threshold of pain is around 120 dB. The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in watts. The sound power level, $L_w$ is expressed in decibels, referenced to 10-12 watts.
dB(A)	A-weighted decibel
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DeMP	Development Management Policies
Dermal contact	Substance coming into contact with skin
DfT	Department for Transport
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Drainage Strategy
DTM	Digital Terrain Model
EA	Environment Agency
EAL	Environmental Assessment Levels
EASA	European Aviation Safety Agency
EC	European Commission
EEA	European Environment Agency
EFT	Emission Factor Toolkit
EI	Energy Institute
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Program

Term	Definition
EPA	Environmental Protection Act 1990
EPR	Environmental Permitting (England and Wales) Regulations, 2010
EPUK	Environmental Protection UK
ES	Environmental Statement
ETS	Emissions Trading Scheme
EU	European Union
F	Fast
FDI	Foreign Direct Investment
FRA	Flood Risk Assessment
Frequency, Hz	Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules that transmit the sound and is measured as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).
FSO	Fire Safety Order
FTE	Full Time Equivalent
GHG	Greenhouse gas
GIS	Geographical Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment
GM	Guidance Material
GP	General Practitioner
GPDO	General Permitted Development Order
GP3	Groundwater Protection, Principles and Practice
GSE	Ground Support Equipment
GVA	Gross Value Added
ha	hectare

Term	Definition
HE	Highways England
HEP	Heathrow Expansion Programme
HGV	Heavy Goods Vehicle
HiE	Historic England
HIA	Health Impact Assessment
HM	Her Magestey's
HRA	Habitat Regulations Assessment
HSE	Health and Safety Executive
HSWA	Health and Safety at Work Act
Hz	Hertz
IAQM	Institute of Air Quality Management
ICAO	International Civil Aviation organisation
ICCI	In-combination Climate Change Impacts
ICE	Inventory of Carbon & Energy
IEA	Institute of Environmental Assessment
IEMA	Institute of Environmental Management and Assessment
IHS	Integrated Habitat System
IPCC	Intergovernmental Panel on Climate Change
JLTP	Joint Local Transport Plan
JSA	Job Seekers Allowance
JSP	Joint Spatial Plan
JTS	Joint Transport Study
kHz	Kilohertz
km	Kilometre
LAD	Local Authority Districts
L <sub>Aeq,T</sub>	Equivalent continuous A-weighted sound pressure level

Term	Definition
LA90	Level exceeded 90% of the time (background noise)
LAQM	Local Air Quality Management
L <sub>Amax,T</sub>	The maximum A-weighted sound pressure level, normally associated with a time weighting, F (fast), or S (slow), such as L <sub>AF,max</sub> or L <sub>AS,max</sub>
L <sub>Aeq,16h</sub>	The equivalent continuous A-weighted sound pressure level over a period from 07.00 to 23.00 hours, commonly referred to as the daytime.
L <sub>Aeq,8h</sub>	The equivalent continuous A-weighted sound pressure level over a period from 23.00 to 07.00 hours, commonly referred to as the night-time.
LCA	Landscape Character Areas
LCT	Landscape Character Type
LFRMS	Local Flood Risk Management Strategy
LGV	Large Goods Vehicle
LiCA	Life Cycle Assessment
LLFA	Lead Local Flood Authority
LSOA	Lower level super output area
LNR	Local Nature Reserves
LOAEL	Lowest Observed Adverse Effect Level
LOLER	Lifting Operations and Lifting Equipment Regulations
LPA	Local Planning Authority
LQA	Land Quality Assessment
LRTAP	Long-Range Transboundary Air Pollution
LSOA	Lower Layer Super Output Areas
LTO	Landing and Take Off
LVIA	Landscape and Visual Impact Assessment
MA&D	Major Accident and Disasters
Made Ground	Manmade desposits such as embankments, spoil heaps, etc on a natural surface

Term	Definition
MAGIC	A website that provides geographic information about the natural environment from across government
MHCLG	Ministry of Housing, Communities and Local Government
MHSW	Management and Safety at Work
mppa	million passengers per annum
MSCP	Multi-story car park
MT	Motor Transport
Mt	Million tonnes
N	Nitrogen
N60 & N70	Nx contours define ground receptors exposed to a number of events with a maximum noise level of x dB L <sub>ASmax</sub> or greater
NAEI	National Atmospheric Emissions Inventory
NATS	National Air Traffic Services
NCA	National Character Area
NE	Natural England
NERC	Natural Environment and Rural Communities
NHBC	National House-Building Council
NHS	National Health Service
NMA	Non-material amendments
NMR	National Monument Record
NNR	National Nature Reserve
NO	Nitrous oxide / nitrogen monoxide
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Oxide of nitrogen
NOMIS	Official labour market statistics
NPPF	National Planning Policy Framework

Term	Definition
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NRHE	National Record of the Historic Environment
NSC	North Somerset Council
NSHER	North Somerset Historic Environment Records
NSIP	Nationally Significant Infrastructure Project
NTS	Non-Technical Summary
NVC	National Vegetation Classification
NVZ	Nitrate Vulnerable Zone
ONS	Office for National Statistics
OS	Ordnance Survey
PAH	Polycyclic Aromatic Hydrocarbons
PAS	Publicly Available Specification
PAWS	Plantation on Ancient Woodland Sites
Pb	Lead
PC	Process Contribution
PCM	Pollution Climate Mapping
PCMDI	Program for Climate Model Diagnosis and Intercomparison
PEC	Predicted Environmental Contribution
PFRA	Preliminary Flood Risk Assessment
PM	Particulate Matter (subscript denoting diameter in $\mu\text{m}$ )
PPG	Planning Practice Guidance
PPS	Planning Policy Statements
PRoW	Public Rights of Way
PSDH	Project for the Sustainable Development of Heathrow



Term	Definition
PWS	Private Water Supply
QRA	Quantitative Risk Assessment
R2P2	Reducing Risks Protecting People
RAF	Royal Air Force
RB	Registered Battlefields
RBMP	River Basin Management Plan
RBMP	Registered Battlefield
RCM	Regional Climate Model
rdANPS	Revised Draft Airports NPS
RDB	Red Data Book
RIGS	Regionally Important Geological Site
RPB	Regional Planning Bodies
RPG	Registered Parks and Gardens
RSPB	Royal Society for the Protection of Birds
S	Sulphur
SAC	Special Area of Conservation
SEL	Sound Exposure Level
SEP	Strategic Economic Plan
SFRA	Strategic Flood Risk Assessment
SI	Statutory Instrument
Sound	This is a physical vibration in the air, propagating away from a source, whether heard or not.
Sw	Slow
SM	Scheduled Monuments
SNCI	Sites of Nature Conservation Interest
SO <sub>2</sub>	Sulphur dioxide
SPA	Special Protection Area

<b>Term</b>	<b>Definition</b>
SPD	Supplementary Planning Document
SPR	Source-Pathway-Receptor
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSSI	Sites of Special Scientific Interest
Swallet	A hole or void resulting from a collapsed feature, often associated with water
TA	Transport Assessment
UKCP09	UK Climate Projections 2009
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WB	Water body
WFD	Water Framework Directive
WHO	World Health Organisation
WHS	World Heritage Site
WS	Wildlife Site
WW	Wessex Water
WWII	World War Two
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility