Appendix B

REVIEW OF BASELINE

TABLE OF CONTENTS

1 INTRODUCTION

1.1 INTRODUCTION

1.1.1 The baseline review describes the existing sustainability characteristics at a national level and any existing problems or issues. It then looks at predicted future trends and issues. The issues relating to the short-listed options are summarised from the work undertaken by the Airports Commission in order to identify key issues to be taken forward to the Appraisal of Sustainability (AoS).

1.1.2 The baseline review presents desk-based information from a variety of sources. The baseline year is taken to be 2014 but the sources of information may be from different dates depending on availability, and as a consequence are not always consistent with this year.

2 COMMUNITY AND QUALITY OF LIFE

2.1 NATIONAL BASELINE & ISSUES

2.1.1 The National Census (2011) indicated that the population of the UK was 63.2 million and in England was 53 million.[1]

2.1.2 The ONS acknowledge that housing supply is a key issue for policy in the UK. This is in part is due to building in the UK being on a long term downward trend since 1970. The number of houses built across the UK declined from 378,000 in financial year 1969/70 to 141,000 in 2013/14. From financial year 2002/03, the number of completions saw a short term upward trend, peaking in 2007/08, after which the number of houses built tailed off dramatically because of the financial crisis. [2]

2.1.3 'Community' can be defined by geographic areas, socio-economic groups, or by common characteristics, such as the 'protected characteristics' identified by the Equalities Impact Assessment Regulations. These 'protected characteristics' included age, gender, religion or belief, ethnicity, sexual orientation, gender reassignment, and pregnancy or maternity.

2.1.4 Quality of Life is defined by the World Health Organisation as an "individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment"[3]. At a national level, health and wellbeing are reported on by the ONS.

2.1.5 Well-being and health was assessed as part of a 2015 ONS survey [4]. The survey is based on reporting across a range of indicators. The status of the indicators reported on in the survey included factors described as 'What We Do', 'Health', 'Our Relationships', 'Personal Wellbeing', 'Natural Environment', 'Governance', 'Education and Skills', 'Economy', 'Personal Finance' and 'Where We Live'.[5]

2.1.6 The survey indicated that healthy life expectancy in the UK improved between 2006 to 2008 and 2009 to 2011; while the proportion of people satisfied with their health in the financial year ending 2013 (59.3%) showed no overall change.

2.1.7 However, it is important to also note that the Survey identified a significant proportion of the population that continued to experience health concerns. Three in ten people (31.4%) were dissatisfied with their health in the financial year ending 2013 and around two in ten people (18.8%) reported having a long-term illness or a disability that was either work-limiting or limited their day to day activities in July to September 2014.

2.1.8 Compared with a year earlier, 33% of indicators relating to well-being had improved, 42% showed no overall change, 21% were not assessed and 5% deteriorated[6].

2.2 FUTURE BASELINE & ISSUES

2.2.1 The ONS projects that the population of the UK will reach 70 million by 2027. Recent trends indicate that life expectancy in the UK is increasing, and people are generally living longer and healthier lives, but there remain health inequalities.

2.2.2 It is expected that there will be increasing demand for housing and other services, and pressures on supply in line with the population growth that is expected. The Cambridge Centre for Housing and Planning Research (2013) indicated that up until 2031 housing requirements are, on average, around 240,000 to 245,000 per year, with around 60% of all demand and need in the four former southern regions (South East, South West, London, East of England)[7].

2.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

2.3.1 Populations in close proximity to airport expansion may grow as a result of the employment opportunities provided. This may lead to key services (housing, education, health facilities) and community facilities being inadequate to meet demand. However, if the environmental impacts associated with airport expansion are not properly managed, there may be migration from the areas where the population is affected. Conversely, through providing employment opportunities airport expansion could beneficially contribute to inward migration to the areas which are within commuting distance.[8]

2.3.2 Increased air traffic generates costs to society effecting quality of life, health and wellbeing, in particular through noise, air quality pollution9. Sustainable, well designed, integrated airports will reduce the adverse effects of airports on quality of life.

2.3.3 A number of nationally significant recreational facilities are located in close proximity to the airports, for example Kew Gardens, Windsor Castle, and National Trails. Direct or indirect effects on these facilities have the potential to effects on communities, and quality of life.

Community and Quality of Life - Key issues for AoS:

- → Loss of, or increased demand for housing and community services and facilities;
- → Direct or indirect effects on the future viability of distinct communities, for example due to loss of community services, facilities and housing;
- → Loss or indirect effects on nationally important recreational facilities;

[6] ONS, 2015. *Measuring National Well-being: Life in the UK, 2015* [online]. Accessed: 13/05/2015
[7] Cambridge Centre for Housing and Planning Research, 2013. *Town & Country Planning - Tomorrow Series Paper 16 - New estimates of housing demand and need in England, 2011 to 2031* [online] Accessed: 13/05/2015
[8] Airports Commission, 2014. *Community : Impact Assessment* [online] Accessed: 13/05/2015
[9] PricewaterhouseCoopers LLP on behalf of the Airports Commission (2014) *11: Quality of Life Assessment* [online] Accessed: 13/05/2015

- Potential for disproportionate effects on certain social groups;
- Adverse or beneficial changes to quality of life in communities affected by airport expansion

3 ECONOMY

3.1 NATIONAL BASELINE & ISSUES

3.1.1 Gross Domestic Product (GDP) in the UK grew steadily during the 2000s until a financial market shock affected UK and global economic growth in 2008 and 2009. Economic growth resumed towards the end of 2009, but generally at a slower rate than the period prior to 2008. This growth was also erratic, with several quarters between 2010 and 2012 recording stagnant or declining GDP. Since 2013, GDP has grown steadily, passing its pre-downturn peak in Quarter 3 (July to Sep) 2013.

3.1.2 Unemployment has been falling in the UK. In February 2015 there were 1.84 million unemployed people, 416,000 fewer than a year earlier (Office of National Statistics (ONS), 2015).

3.1.3 Gross Value Added (GVA) measures the value of goods and services produced at a regional and sub-regional level. Based on the ONS release of December 2014, the GVA per head data for 2013 shows that this increased in all NUTS1 regions (NUTS refers to the Nomenclature of Territorial Units for Statistics and is used to show the subdivisions of countries for statistical purposes. 'NUTS1' refers to the highest geographical level).

3.1.4 The largest percentage increases were in the North West and Wales (both at 3.4%), the North East and the West Midlands (both at 2.8%), whilst Northern Ireland had the smallest percentage increase (at 0.9%). All other regions had increases of between 2% and 3%.

3.1.5 In the 37 NUTS2 sub-regions, GVA per head increased in all sub-regions. The largest percentage increases were in West Wales and The Valleys (4.2%), Greater Manchester (4.1%) and West Midlands (4.0%). The lowest percentage increases were in Lincolnshire and Northern Ireland, both of which increased by 0.9%.

3.1.6 At the lowest NUTS level (NUTS3), of the 139 local areas in the UK, GVA per head increased in 126 areas in 2013. The largest percentage increases were in East Lothian and Midlothian (8.5%), Southampton (7.8%) and the Shetland Islands (7.6%).

3.1.7 Of the 13 local areas where GVA per head decreased, the largest percentage decreases were in Darlington (-4.7%) and County of Herefordshire (-4.5%).

3.2 FUTURE BASELINE & ISSUES

3.2.1 The Organisation for Economic Cooperation and Development indicates that the average growth in GDP per capita from 2011 to 2030 will be 1.8% and between 2011 and 2060 it will be 1.6%.

3.2.2 From a shorter term perspective (given various economic uncertainties, GDP forecasts tend to be made more over the short term), the latest forecasts (May 2015) from the Bank of England show that GDP is now expected to expand by 2.5% in 2015. This represents a reduction from the previous forecast whereas growth of 2.9% was expected. The Bank has also reduced its forecast for 2016 from 2.9% to 2.6% and for 2017 from 2.7% to 2.4%.

3.2.3 Although regional GVA forecasts tend not to be given, the regional trends identified above are likely to continue.

3.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

3.3.1 Improved airport capacity is expected to stimulate various factors influencing economic growth both around the airports themselves[10] as well as nationally[11]. National economic benefits will occur due to better international connectivity and the trade benefits these will generate to the overall economy, this has been established in previous studies[12]. Amongst other influencing factors, which are considered further within the Airport Commission's (2014) Report[13], it is considered that an increase in aviation connectivity would contribute to GDP, as shown in Figure 2 of the Report. The mechanisms which support the beneficial effect on GDP include:

- Encouraging Foreign Direct Investments in the UK (greater connectivity will encourage foreign firms to operate in the UK);
- Increasing passenger flows (capacity enhancements will help attract more visitors to the UK);
- Increasing international trade by enhancing accessibility between businesses in the UK and internationally; and
- Encouraging the movement of labour, providing flexibility to labour markets in the UK.[14]

3.3.2 Airport expansion is expected to impact beneficially on local economies, in particular through generation of employment and business opportunities. These impacts will occur during both construction (given that a large number of workers will be employed to construct the runway) and operations. An expanded airport will, for example, generate additional direct, indirect and induced employment. Catalytic employment (i.e. certain firms choose to be located close to a hub airport if there is good connectivity with other countries and markets) will also be enhanced. [15]

3.3.3 The enhanced connectivity provided by airport expansion will improve the UK's trade position as it will be easier for companies to do business with their counterparts overseas.

3.3.4 The growth in employment at an enhanced airport is likely to increase demand for housing and amenities given that additional workers will want to live in close proximity to the airport. These socio-economic impacts should be considered when assessing Community and Quality of Life, and are referred to below (Section 3).

[10] Airports Commission, 2014. *Local Economy Impacts: Assessment November 2014* [online] Accessed 13.05.2015
[11] Airports Commission, 2014. 2. Economy: Wider Impacts Assessment [online] Accessed 13.05.2015
[12] Ernst & Young (2012). *Economic and social analysis of potential airport sites: Sydney Aviation Capacity Study. Report for the Australian Government Department of Infrastructure and Transport.*
[13] Airports Commission, 2014. 2. Economy: Wider Impacts Assessment [online] Accessed 13.05.2015
[14] Airports Commission, 2014. 2. Economy: Wider Impacts Assessment [online] Accessed 13.05.2015
[15] Airports Commission, 2014. *Local Economy Impacts: Assessment November 2014* [online] Accessed 13.05.2015

Economy - Key issues for AoS:

- There is a need for strong and sustainable national economic growth and for sustainable growth in employment.
- There is a need for sustainable local economic growth.
- There is a need to increase the UK's productivity in a sustainable manner.
- There is a need to promote sustainable tourism.

4 NOISE

4.1 NATIONAL BASELINE & ISSUES

4.1.1 Under the Environmental Noise (England) Regulations 2006, Defra have produced noise maps for major transportation sources[16]. Major airports with movements per annum above 50,000, excluding training on light aircraft, were included. The first round of mapping was published in 2007, and the second round maps were published in 2012.

4.1.2 Following the production of the strategic maps, action plans have been produced which include:

- A description of the major airport;
- A summary of the results of the noise mapping;
- An estimation of the number of people exposed to noise;
- An identification of noise problems that need to be improved;
- Any noise reduction measures already in force;
- Any projects in preparation;
- Actions to be taken in the next five years; and
- A long term strategy.

[16] Defra, 2015. *Noise Mapping England: Maps and charts*. [online] Accessed: 13/05/2015

4.2 FUTURE BASELINE & ISSUES

4.2.1 Under the direction of the International Civil Aviation Organisation (ICAO Annex 16), noise from aircraft has been significantly reduced, starting with the Chapter 2 and Chapter 3 noise standards in the 1970's, and the adoption in 2001 of the Balanced Approach to Noise Management. These noise benefits are predicted to continue into the future as older aircraft are removed from service, or older jet engines are replaced with the latest, quieter and more fuel efficient models.

4.2.2 For the populations exposed to aircraft noise, the reductions in noise emissions per aircraft have not necessarily resulted in lower noise exposure as the number of flights at some airports has increased to use up the existing capacity. Also, with the move to redevelop brownfield land near existing infrastructure for residential use, and other pressures on the housing stock, it is predicted that the population density will increase in the future. This could potentially bring more people into the area that are exposed to aircraft noise.

4.2.3 Sustainable Aviation (2013) has published a Report which articulates a vision for how the aviation industry can maintain sustainable growth between now and 2050 whilst managing noise from aircraft operations[17]. Included in the road map is a section on Sustainable Aviation's view of the potential for reducing aircraft noise at source. It also includes an industry commitment to working to achieve the goals of Flightpath 2050 (equivalent to 0.3 dB improvement in noise emissions per aircraft operation per year) and the Federal Aviation Administration (FAA) Continuous Lower Energy, Emissions, and Noise (CLEEN) Program, which aims to develop and demonstrate by 2015 technology that reduces noise by 42 dB cumulatively relative to the Chapter 3 standard. This program is sponsored by five of the largest manufacturers.

4.2.4 Whilst future air and ground noise from the aviation activity is included in the study, it should not be ignored that increased aviation activity will also bring more road traffic to the area and increased passengers on public transportation. The noise impacts may therefore be higher in some residential areas close to transportation routes.

4.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

4.3.1 The Airport Commissions baseline reports for Gatwick and Heathrow describes how noise exposure will change at the national[18] and local levels[19] in the absence of a scheme, and identified the underlying reasons for these changes. Aviation noise associated with the do-minimum scenarios for the base year (2030), an intermediate year (2040), and end year (2050) were considered, in addition to the current noise situations at each airport are described.

4.3.2 For the Local Assessment, airborne noise contours were calculated by the Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority (CAA) on behalf of the Airports Commission. The National Assessment considers the UK situation, and so it extends to a number of major airports including those whose development has been shortlisted. This is to give context to the noise exposure at the Gatwick and Heathrow and also to reflect the national implications should one of the shortlisted options at these airports proceed.

4.3.3 It is expected that there will be significant changes in the aircraft operated over the period, and by 2050, an increased percentage of the aircraft operating will be new or re-engined aircraft. The new and re-engined aircraft are likely to be quieter than current aircraft. This change will lead (all things being equal) to smaller areas being subject to current noise levels in the future assessment years. Nationally, the improvements in aircraft technology will offset noise generated by Air Traffic Movements (ATM) nationally. As well as reducing noise at source, further noise benefits by 2050 would be expected from the increased use of quieter operating procedures such as steeper approaches, continuous climb and delayed deployment of landing gear. Improved navigational technology and airspace modernisation will also change how and where aircraft fly, providing the potential to reduce the impact on communities on the ground.

Noise - Key issues for AoS:

→ Increased noise from aviation, surface transport and construction in the locality of the airports affecting increased population densities.

[17] Sustainable Aviation, 2013. *Noise Road-Map – A blueprint for managing noise from aviation sources to 2050* [online] Accessed: 13/05/2015
[18] Airports Commission, 2014. *5. Noise: Local Assessment* [online] Accessed: 13/05/2015
[19] Airports Commission, 2014. *5. Noise: National Assessment* [online] Accessed: 13/05/2015

5 CARBON

5.1 NATIONAL BASELINE & ISSUES

5.1.1 In the UK in 2011, GHG emissions amounted to 564MtCO2e (Million Tonne Carbon Dioxide Equivalent). This is a 30% reduction from 1990 where 780.7MtCO2 e was released. Between 2000 and 2011, GHG emissions reduced by 22%. It should be noted that these amounts include emissions from land use, land use change and forestry.[20]

5.1.2 In 2011, emissions from UK road transport (by source) were 109 MtCO2e. The aviation sector (by source) contributed 1.7 MtCO2e from domestic flights and an estimated 33 MtCO2e from flights departing the UK[21].

5.1.3 Between 2000 and 2011, the level of emissions from domestic flights remains largely unchanged, with a small (0.4 MtCO2e) decrease from 2.1 MtCO2e in 2000, to 1.7 MtCO2e in 2011. Emissions from flights leaving the UK increased by 10% between 2000 and 2011, from 30 MtCO2e to 33 MtCO2e.

5.1.4 Most airports in the UK are covered by the following schemes:

- Carbon Reduction Commitment (CRC) Energy Efficiency Scheme – a requirement to buy allowances based on qualifying carbon emissions, alongside other reporting and documentation requirements.
- European Union Emissions Trading Scheme (EU ETS) as applied to aviation. The EU-ETS is a carbon 'cap and trade' system launched in 2005 aimed at reducing greenhouse gas emissions from the 'traded sector' to a given level (cap) in the most cost-effective way (trade) amongst its participants. The level of the cap reduces over time. Aviation was included in the scheme from 2012, with emissions from flights originating from or arriving at EU Member States.
- ACI's Airport Carbon Accreditation Scheme - A programme that enables airports to certify their carbon footprint, Airports must have their carbon footprints independently verified in accordance with ISO14064 (Greenhouse Gas Accounting) to gain certification. There are four levels of Certification available from basic carbon footprinting, putting in place a carbon management plan, achieving reductions, to full carbon neutrality. For the period 2013-2016 the legislation has also been amended so that only emissions from flights within the EEA fall under the EU ETS. Exemptions for operators with low emissions have also been introduced.

[20] Department for Energy and Climate Change, 2013. *Final UK greenhouse gas emissions national statistics: 1990-2013* [Online] . Accessed: 08/06/15

[21] Department for Transport, 2012. *Total greenhouse gas emissions from transport: Disaggregated data, giving breakdown by modes of transport* [Online]. Accessed: 14/05/2015.

5.2 FUTURE BASELINE & ISSUES

5.2.1 The Climate Change Act 2008 ("the Act")[22] established a legally binding target to reduce the UK's greenhouse gas emissions by at least 80% below base year (1990) levels by 2050. The UK's "carbon budgets" set targets on the way to 2050. While domestic aviation emissions are included within the UK's carbon budgets, international aviation emissions are excluded. However, the Act requires that international aviation emissions be taken into account when setting carbon budgets. Therefore, in effect, the budgets for other sectors have been constrained so that, to 2027, the UK is on a trajectory that could be consistent with a 2050 target that includes emissions from international aviation and shipping.

5.2.2 In January 2009, the Government adopted a target to reduce UK aviation emissions back to 2005 levels in 2050. The target was set to support the UK with complying with the Act and it remains the working assumption for UK aviation emissions in 2050.

5.2.3 At present, aviation is a relatively small contributor to total greenhouse gas emissions (both at the UK and global levels). However, as is described below, emissions are projected to grow and aviation is likely to be significant contributor for coming decades. Demand for air travel is forecast to increase within the range of 1% to 3% a year, up to 2050, compared with historical growth rates of 5% a year over the last 40 years. Emissions from flights departing the UK are forecast to increase from 33.3 MtCO2e in 2011 to 47 MtCO2e by 2050[23], although these emissions are currently excluded from the UK's carbon budgets. [24]

5.2.4 The construction, operation and maintenance of a new runway/airport expansion will have emissions associated with materials (embodied), transportation and energy use. These emissions, where under the non-traded sector, will be counted under the UK's carbon budgets.

5.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

5.3.1 Carbon emissions relating to air travel, surface access and buildings operation, have been modelled by the AC for Heathrow and Gatwick for a do minimum scenario, without new runway expansion for a 60-year period from 2025/2026 to 2085/2086. The most significant volume of emissions is related to air travel, but these decrease slightly over the period, linked to assumed improved fuel efficiency and changes to airline fleets (a mode change to larger aircraft on long haul routes resulting in overall fewer ATMs). Surface access emissions remain the second largest source of CO2 and reduce over the assessment period, with fluctuations linked to annual passenger numbers. Emissions from staff surface access and freight are also likely to increase but these are not quantified due to lack of data. Emissions from buildings and airport operations also reduce over time, most significantly due to the presumed decarbonisation of grid electricity. There is also an allowance for construction[27].

5.3.2 There are various sources of emissions (e.g. materials, transportation, energy) associated with the construction, operation and maintenance an expansion in airport capacity at Heathrow or Gatwick Airports.

---

[22] Climate Change Act 2008 [online]
[23] Department for Transport, 2013. *UK Aviation Forecasts* [online]
[24] Under the reporting guidelines agreed by the UNFCCC, emissions from international aviation are not included in the UK's emissions total, as reported in 5.1.1. They are reported as memo items in national greenhouse gas inventories. Parties to the UNFCCC are required to act to limit or reduce emissions from

Carbon - **Key issues for AoS:**

- Carbon emissions in relation to CRC, EU-ETS, Airport Accreditation Scheme.
- Emissions associated with construction activities, operation and maintenance.
- Emissions from flights leaving the UK are due to increase, although they are currently excluded from UK carbon budgets.
- Emissions from Surface Access.

international services working through the International Civil Aviation Organisation (ICAO) and International Maritime Organisation (IMO).

6 AIR QUALITY

6.1 NATIONAL BASELINE & ISSUES

6.1.1 For air quality, there are indicators relevant to local air quality i.e. the concentration of pollutants in air, and to national emissions of pollutants i.e. the mass of pollutant emitted by all sources each year at a regional/national level.

6.1.2 The EU's 2008 Ambient Air Quality Directive, transposed in UK regulations in the Air Quality Standards regulations, sets limit values for the concentration of certain pollutants in air, with dates by which the concentrations should be attained. Additional national legislation sets policy targets, known as Air Quality Objectives (AQO) for pollutant concentrations. In general, the EU Limit Values and AQO are numerically identical.

6.1.3 Under Part IV of the Environment Act, there is a requirement on Local Authorities to review and assess air quality in their area and to declare Air Quality Management Areas (AQMAs) where an AQO is exceeded. As the time of writing, there are 619 AQMAs within 256 Local Authorities in the UK. This has increased since 2008 when the UK had 223 Local Authorities with AQMAs. The vast majority of AQMAs (>93%) are declared as a result of exceedances of the AQO for annual mean nitrogen dioxide concentration. Exceedance of the daily mean objective for PM_{10} is the next most common reason (>15%, with some overlap with those declared for NO_2)[25]. Moreover, traffic is the most significant local pollution source within the majority of AQMAs.

6.1.4 The EU's Air Quality Directive requires all member states to undertake air quality assessments and to report the findings to the commission on an annual basis. The UK's submission in 2014 (based on data to 2013[26]) indicated that EU Limit Values for various pollutants, including NO_2, ozone, nickel and benzo-a-pyrene were exceeded in one or more zones (out of a total of 43) across the UK. As for AQMAs, most exceedances were associated with NO_2 (31 zones).

6.1.5 Across all urban monitoring sites in the UK, there has been a general decreasing trend in NO_2 concentrations over time. Taking into account changes to the monitoring programme over time, the data reveals that the majority of the decreases occurred between the early 1990s and 2003, with a period of steady concentrations ensuing between 2003 and 2010. However, since 2010 there are indications of a return to a decreasing trend. During the same period, UK NO_X emissions have shown a consistent decreasing trend.

6.1.6 PM_{10} concentrations also show a decreasing trend, but year on year variability is higher than for NO2 due to the influence of meteorological conditions and transboundary transport into the UK.

6.1.7 As of 2013, emissions of all pollutants covered by the Gothenburg Protocol showed a decreasing trend over time and were within the target levels set for 2010[27]. Moreover, good progress has been made towards meeting the more stringent targets for 2020 and beyond.

[25] Defra, 2015. *Air Quality Management Areas* [online]. Accessed 15/05/15
[26] Defra, 2014. *Air Pollution in the UK 2013, September 2014*
[27] Defra, 2014. *UK Informative Inventory Report (1990 to 2013), Ricardo-AEA for Defra*

6.2 FUTURE BASELINE & ISSUES

6.2.1 Defra provides forecasts of local air quality for the assessment of compliance with EU limit values. Significant improvements in local air quality are expected over time. However, full compliance with EU Limit Values, in all zones, is not predicted until after 2030. Exceedance of the limits is most persistent in Greater London, West Midlands and West Yorkshire[28]. The reduction in zones exceeding the limit is, however, critically dependent on projected reductions in emissions from road transport and the adoption of low emission vehicles. The pollutant of greatest concern is NO2, but compliance with the Stage 2 limit value of $PM_{2.5}$ is also in doubt.

6.2.2 Projected UK pollutant emissions meet the 2020 target values of the Gothenburg Protocol[29]. Compliance with the targets for NO_X and $PM_{2.5}$ is, however, marginal. In subsequent years, NO_X emissions are expected to fall further. However, $PM_{2.5}$ emissions are projected to increase such that, by 2030, emissions are likely to exceed the target.

6.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

6.3.1 The emissions which impact on air quality originate from various sources including: cars; goods vehicles; aircraft; heat and power generation plants; incinerators; and many more. Emissions from all sources influence the UK's total pollutant emissions, whereas it is the combination of total emissions and the distance of the source to receptors (receptors are locations where human health might be affected) which influences local air quality impacts at any subsequent impacts on receptors.

6.3.2 In relation to airport expansion, the principal emission source in proximity to sensitive receptors is road traffic. Emission sources on the airside of any development, whilst giving rise to significant total emissions, will inherently be located at some distance from receptors. Consequently, for all future option, road traffic is the dominant emission source causing poor local air quality, as it is in general across the UK. It will be an important aspect to consider with the development of any option.

6.3.3 Notwithstanding this, total emissions from both on and off airport sources will also need to be considered in terms of their impact on UK contributions to transboundary pollution.

6.3.4 National and local assessments have been undertaken for the baseline to allow a comparative assessment between the 'do minimum' (without airport expansion) and 'do something' (with airport expansion) scenarios for the 2030, 2040 and 2050 baseline years[30]. These baseline assessments highlight ongoing risk of exceedance of AQO at roadside locations, and the risk of exceedance of national emissions targets which may indeed be tightened prior to the developments coming forward.

[28] Defra, 2014. *Updated projections for Nitrogen Dioxide (NO2) compliance* [online] Accessed 15/05/15

[29] Misra A, Passant N R, Murrells T P, Thistlethwaite G, Pang Y, Norris J, Walker C, Stewart R A, MacCarthy J, Pierce M, 2012. *UK Emission Projections of Air Quality Pollutants to 2030* [online] Accessed 10/06/2015

[30] Jacobs, Nov 2014, *6. Air Quality: Baseline, Prepared for the Airports Commission* [online]

Air Quality - Key issues for AoS:

- The effects on local air quality from surface access and airport operations and how this impacts upon achieving compliance with air quality standards;
- Contributing to an increase in national emissions totals;
- Contributing to, or producing new exceedances of EU Air Quality Limit Values;
- Contributing to impacts on ecosystems and human health.

7 BIODIVERSITY

7.1 NATIONAL BASELINE & ISSUES

England has a high diversity of habitats and many distinctive species, reflecting its geographical position. Many are of European or world-wide importance. For example:

- England has globally important populations of breeding seabirds, wintering waders and wildfowl, and 18% of the world's heathland;
- England possesses important populations of bats and oceanic lichens, and more than half the European species of bryophytes including one moss not recorded anywhere else in the world;
- England is rich in veteran trees in ancient woodland and parklands;
- England has more chalk rivers than any other country in Europe and over half the European resource of chalk coasts;
- Nearly 20% of Europe's Atlantic and North Sea estuaries are in England[31].

7.1.1 There are a number of internationally and nationally designated sites for nature conservation in England. In England (2013), there were:

- 85 Special Protection Areas (SPAs);
- 240 Special Areas of Conservation (SACs);
- 71 Ramsar sites;
- Over 4,100 Sites of Special Scientific Interest (SSSI) of which 97% are in favourable or recovering condition; and
- 224 National Nature Reserves.

7.1.2 There are also a number of Local Nature Reserves (LNRs) and non-statutory locally designated sites for nature conservation.

7.1.3 UK BAP priority habitats cover a wide range of semi-natural habitat types, and were those that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP)[32]. Much of the work is now focused on the county level.

7.2 FUTURE BASELINE & ISSUES

It is assumed that for statutory internationally and nationally designated sites there would be no decline in their condition over time due to the protection they are afforded[33]. It is assumed that measures to respond to Natural England's Biodiversity 2020 target of securing 50% of SSSIs in a favourable condition, and 95% in a favourable or recovering condition[34] would have been successful. It is likely that the legal benefits that European designations provide to conservation will come to be of growing importance as the demands for undeveloped land become increasingly

[31] Natural England, 2013. *England's Biodiversity* [online] Accessed on: 29/08/13.
[32] JNCC, 2015. *UK BAP priority habitats* [online]
[33] Jacobs, 2014. *7. Biodiversity: Assessment*, prepared for the Airports Commission. [online]
[34] Natural England, 2013, *Biodiversity 2020: A Strategy for England's wildlife* [online] Accessed on: 13/10/15

pressured in line with population rise and associated development needs. It is assumed all designated sites will remain protected.

7.2.1 There is likely to be an increasing integration of the Natura 2000 Network with sites that are located outside the boundaries of designated sites. The importance of wildlife conservation outside designated sites is recognised in the Habitats Directive (European Council Directive 92/43/EEC), e.g. in the measures required to protect species listed on Annexes IV and V (Articles 12-16). Article 10 acknowledges that the series of Natura 2000 sites should function as an ecologically coherent network. It stresses the importance of managing landscape features such as river banks, hedgerows and ponds, to facilitate species migration and dispersal, and generally to provide an ecological infrastructure which supports the protected sites network. In addition, The Natural Environment White Paper, Commitment 32[35] recognises the important role that transport networks can play in contributing to coherent and resilient ecological networks.

7.2.2 Overall climate change could lead to:

- Changes in phenology (including changes in the timings of seasonal events causing loss of synchronicity and increased competitive advantage for some species at the expense of others);
- Shifts in suitable climate conditions for individual species leading to change in species distribution, abundance and range;
- Changes in the community structure and ecosystem function of habitats which species occupy.
- Changes to the composition and structure of plant and animal communities (including arrival of non-natives, loss of native species and increase in pest species);
- Changes to habitats and ecosystems, such as altered water regimes, increased rates of decomposition in bogs and higher growth rates in forests; and
- Loss of physical space due to sea level rise and increased storminess[36].

[35] Department for Environment Food and Rural Affairs, 2014. *Natural Environment White Paper* [online] Accessed 13.10.15

[36] Inter-Agency Climate Change Forum, 2010. *Biodiversity and Climate Change: A Summary of Impacts in the UK.*

7.2.3 Climate change effects are compounded by the influences of population growth and the built environment that increasing populations generate. Pressures for undeveloped land are likely to be greater than ever before and this poses a threat to those areas of non-designated land that fulfil so many valuable functions to ecosystems. Increasingly water resources will need to be safe-guarded and managed to maximum efficiency.

7.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

7.3.1 There are a number of statutory sites for nature conservation within 15km of Heathrow and Gatwick, with additional SAC's up to 30km designated for bat populations[37].

7.3.2 There are a number of LNRs and non-statutory sites for nature conservation within 5km of Heathrow and Gatwick.

7.3.3 There are a number of Priority Habitats within the footprint and up to 5km from the schemes including floodplain grazing marsh, deciduous woodland, semi-improved grassland, calcareous grassland, acid grassland, reedbeds, traditional orchards, lowland heath, lowland fen and lowland meadows.

7.3.4 Protected species within 2km of the option boundaries at Gatwick and Heathrow include various species of bat, great crested newts, hazel dormouse, otter, water voles and reptiles (including grass snake, adder and slow worm), and various species of birds.

7.3.5 There is ancient semi-natural woodland within 5km of Gatwick and Heathrow.

7.3.6 A monetary value was calculated for the loss of services provided by ecosystems. The most significant ecosystem services based on the monetisation are aesthetics, opportunities for recreation, waste treatment, lifecycle maintenance, regulation of water flows, climate regulation and fresh water supply[38].

Biodiversity - Key issues for AoS:

- → Effects on statutory and non-statutory designated sites for nature conservation.
- → Effects on Priority Habitats, on the connectivity between habitats and on spaces for future growth of habitats to provide for protected species and priority species.
- → Effects on areas of woodland and semi-natural woodland.
- → Loss of ecosystem services and valuation of these.

[37] Jacobs, Nov 2014, *7. Biodiversity: Assessment*, prepared for the Airports Commission. [online]
[38] Jacobs, Nov 2014, *7. Biodiversity: Ecoystem Services*, prepared for the Airports Commission. [online]

8 SOIL

8.1 NATIONAL BASELINE & ISSUES

8.1.1 SSSIs provide statutory legal protection for geologically important sites in the UK. Regionally important geological and geomorphological sites (RIGS) are non-statutory locally designated sites of local, national and regional importance for geodiversity (also referred to as Local Geological Sites in England)[39].

8.1.2 Soil is a non-renewable resource. It is vulnerable to erosion, degradation, contamination and sealing. Soil sealing is the covering of the soil surface with an impervious material or the changing of its nature so that the soil becomes impermeable[40]. Urban development and construction of transport infrastructure are the main causes of almost irreversible net soil loss and sealing. Soil sealing prevents the soil from performing other functions such as food and fibre production or the ecological functions of soil, including storage of carbon and as a habitat.

8.1.3 Natural England maintain a system for identifying and classifying agricultural land [41]. The top three tiers of this land, Grade 1, 2 and 3a are classified as Best and Most Versatile land. Agricultural land is a finite resource, and loss of valuable agricultural land generally cannot be mitigated, this land is generally protected from development, where possible through the National Planning Policy Framework (NPPF) [42].

8.2 FUTURE BASELINE & ISSUES

8.2.1 Soils in England face the following three main threats which are magnified by climate change[43]:

- → Soil erosion by wind and rain. Erosion affects both the productivity of soils but also water quality and aquatic ecosystems;
- → Compaction of soil reduces agricultural productivity and water infiltration, and increases flood risk through higher levels of run off; and
- → Organic matter decline. The loss of soil organic matter reduces soil quality, affecting the supply of nutrients and making it more difficult for plants to grow, and increases emissions to the atmosphere.

[39] Geoconservation UK, 2015. The Association of UK RIGS Groups [online]
[40] Defra, 2006. *The Environment: Quality and safety: Land: Soil: Built environment: Soil sealing*. [online]
[41] Natural England, 2009. *Agricultural Land Classification: protecting the best and most versatile agricultural land (TIN049)*[online] Accessed 13.10.2015
[42] Department for Communities and Local Government, 2014. National Planning Policy Framework [Online]
[43] Defra, 2009, *Safeguarding our Soils: A Strategy for England.* [online]

8.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

8.3.1 SSSIs, including those with geological interest, were identified up to 15km from the Heathrow and Gatwick[44].

8.3.2 Land use was estimated from the existing airport footprints. Within 250m area of the footprint a large proportion (44% for Gatwick and 32% for Heathrow) of the land is under agriculture and forestry use. The remaining main land uses are largely already developed comprising transport uses (the airports) and residential[45].

Soil - Key issues for AoS:

- → Effects on sites designated for geodiversity.
- → Loss of soils from sealing, including those valuable to agriculture (Agricultural Land Classfication).
- → Damage to soils from erosion, degradation or contamination during construction or operation.

[44] Jacobs, Nov 2014, 7. *Biodiversity: Assessment, prepared for the Airports Commission*. [online]
[45] Jacobs, 2014. 10. *Place: Baseline, Section 4. Prepared for the Airports Commission*. [online]

9 LANDSCAPE

9.1 BASELINE & ISSUES

9.1.1 England is divided into 159 National Character Areas[46]. Data is presented for each area and is limited at a national level. However, previous analysis for the period 1999-2003[47] showed that:

- → Existing landscape character is being maintained in 51% of England's landscapes;
- → A further 10% of existing character is being enhanced;
- → 20% of England's landscapes are showing signs of neglect, with past loss of character not being reversed; and
- → 19% of new landscape characteristics are emerging.

9.1.2 The above indicators suggest that the character of English landscape is being sustained, as they present an improvement on the 1990-1998 baseline. This stated that 36 per cent of England's character areas were stable and 64% were showing signs of neglect.

9.1.3 There are a number of national level designations in England including National Parks, Areas of Outstanding Natural Beauty (AONB) and Heritage Coasts. Local designations include Areas of Great Landscape Value (AGLV).

9.1.4 Landscape and townscape character is also assessed on local level and additional character assessments exist within other administrative boundaries, for example local authorities or settlements. This includes assessment of the historic interest landscape[48] and townscapes[49].

9.1.5 Urban areas produce the lightest pollution with satellite measurements of artificial light at night showing all the main urban areas of Greater London, Birmingham, Merseyside and Tyneside saturating the night sky with artificial lighting. Devon, Cornwall and the North West are the only areas in England showing very low light pollution.

9.2 FUTURE BASELINE & ISSUES

9.2.1 Landscape and townscape character will be subject to pressure from urban development. This will be both direct (physical impact and impact on visual setting) and indirect (e.g. effects of increased traffic or noise).

9.2.2 There are a number of impacts of climate change on landscape character. These include direct impacts such as flooding events, longer growing seasons or low river flows. Although climate change impacts, such as increased summer temperatures, may not influence landscape character directly, there could be indirect effects on landscape components such as agricultural land use, changes in recreation and tourism[50].

---

[46] Natural England, 2015. *National Character Area profiles* [online]
[47] Natural England, 2006. *Landscape: England's landscapes: Landscape character: Countryside quality counts.*
[48] Historic England, 2015. *Historic Landscape Characterisation* [online] Accessed 14.10.2015
[49] Historic England, 2015. *Historic Townscape Characterisation* [online] Accessed 14.10.2015
[50] Natural England, 2002. *Landscape Character Assessment topic papers* [online]

9.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS[51]

9.3.1 A study area for the determination of the landscape baseline has been defined as a 5km offset from the proposed schemes. The landscape designations and character areas present within the study areas were identified from a review of data published by Natural England and the relevant county councils or unitary authorities. Tranquillity and Dark Skies information has been obtained through mapping published by the Campaign to Protect Rural England.

9.3.2 Gatwick Airport sits within a largely rural landscape with two proximal urban areas: Horley to the north; and Crawley to the south. Much of the local rural area is protected by National or Local designations although there is development pressure associated with the airport, the proximity to London and the main north-south road/rail corridor. It is expected that future development will be focussed on the existing urban centres to avoid impacting on the dispersed settlement nature of the rural and woodland areas. Climate change is leading to changes in crops and woodland species mix.

9.3.3 Heathrow sits within a largely man-made landscape of a predominantly urban/industrial nature. The nearby River Thames corridor to the south and the Colne Valley Regional Park to the west are a focus for recreational open space and tranquillity. Historic parkland at Windsor, Richmond and Hampton Court, ancient woodland at Burnham Beeches, many former minerals workings restored as lakes, and the South West London Waterbodies SPA/Ramsar site are also of value. Pressure for future development remains high due to the proximity of London, major transport links and the airport.

Landscape - Key issues for AoS:

- → Effects on designated landscapes and their setting.
- → Effects on local landscape and townscape character and quality.
- → Loss of tranquillity and increase in light pollution.

[51] Jacobs, 2014. *10. Place: Baseline, Section 3. Prepared for the Airports Commission*. [online]

10 HISTORIC ENVIRONMENT

10.1 NATIONAL BASELINE & ISSUES

10.1.1 In summary, England has the following designated heritage assets (2014 data from Heritage Counts[52]):

- 18 World Heritage Sites in England (an increase of 4 since 2002);
- 19,833 Scheduled Monuments (an increase of 486 since 2002)[53];
- 1,628 Registered Parks and Gardens (an increase of 137 since 2002);
- 9,840 Conservation Areas;
- 46 Registered battlefields;
- 5 Areas of Archaeological Importance (Canterbury, Chester, Exeter, Hereford and York)[54]; and
- 375,880 Listed Buildings (an increase of 5,148 since 2002).

10.1.2 Non-designated heritage assets are by far the most commonly encountered asset, and their numbers significantly outweigh those of designated assets. The NPPF states that judgement should be used to determine the scale of any harm or loss, and the significance of non-designated assets. A record of non-designated heritage assets is maintained for each county across the UK on the Historic Environment Record database. For London the Greater London HER is held by the Greater London Archaeological Advisory Service (GLAAS)[55]. Non-designated assets can comprise locally defined assets such as historic landscapes, locally listed buildings and structures and assets of archaeological interest.

10.2 FUTURE BASELINE & ISSUES

10.2.1 Both designated and non-designated heritage assets will be subject to pressure from urban development and associated transport and power generation scheme requirements. This will be both direct (physical impact and impact on setting) and indirect (e.g. effects of drainage).

10.2.2 The historic environment is vulnerable to a variety of issues including development pressure, lack of investment and climate change. Heritage assets could be subject to potential risk from climatic change in varying degrees [56].

10.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

10.3.1 Existing designated heritage assets within the proposed scheme footprints, a 300m buffer and a 2km buffer included:

- World Heritage Sites;

---

[52] English Heritage, 2012. *Heritage Counts England: Tenth Anniversary Edition 2014* [Online].
[53] UNESCO, 2013.Culture: *World Heritage Centre: The List: World Heritage List* [Online].
[54] English Heritage, not dated, *Professional: Advice: Guide to Heritage Protection* [Online].
[55] https://historicengland.org.uk/services-skills/our-planning-services/greater-london-archaeology-advisory-service/greater-london-historic-environment-record/

- Scheduled Monuments;
  - Listed Buildings;
  - Conservation Areas; and
- Registered Parks and Gardens

10.3.2 For Gatwick Airport Second Runway there are 181 listed buildings within 2km of the scheme. These included five Grade I listed buildings and ten Grade II*. In addition, there are seven Conservation Areas and four Scheduled Monuments within this study area.

10.3.3 For Heathrow Airport Northwest Runway there are 225 listed buildings within 2km of the scheme including three Grade I and fourteen Grade II* listed buildings. There are also twelve Conservation Areas and four Scheduled Monuments within this study area.

10.3.4 For Heathrow Airport Extended Northern Runway there are 190 listed buildings within 2km of the scheme including four Grade I and six Grade II* listed buildings. There are also 11 Conservation Areas, three Scheduled Monuments and one historic park and garden within the study area[57].

10.3.5 It should be noted that there are nationally and internationally designated sites (such as Kew Gardens World Heritage Site) outside this study area which could be affected.

10.3.6 It is likely that non-designated heritage assets are present within the 2km study area for Heathrow and Gatwick. There is potential for unknown archaeological remains to be present.

Topic - Key issues for AoS:

- Effects on the significance of designated heritage assets and their settings, including within the historic landscape or townscape.
- Indirect effects on the significance of designated assets and their settings, including generation of traffic and air quality.
- Effects on the significance of non-designated heritage assets and potential for unknown buried remains, and their setting.
- Potential to enhance the significance of heritage assets.

[56] English Heritage, 2008, *Climate Change and the Historic Environment*
[57] Jacobs, November 2014, *10. Place: Baseline, Section 4. Prepared for the Airports Commission.* [online]

11 WATER

11.1 NATIONAL BASELINE & ISSUES

11.1.1 The Water Framework Directive (WFD) classifies ecological and chemical water quality. The results for assessed rivers in England and Wales show that for overall ecological classification 26% of rivers are good or better, 60% are moderate, 12% are poor and 2% are bad.

11.1.2 Results for all assessed surface water bodies show that 29% meet good ecological status or better, which includes 36% of lakes and 27% of estuaries and coastal waters. Results for assessed groundwaters show that 65% meet good quantitative status (in relation to groundwater abstraction pressures) and 59% meet good status for chemicals. These figures include the ecological potential where water bodies are artificial or heavily modified[58]. The WFD requires all water bodies to achieve either good ecological status or good ecological potential by 2027. The WFD also requires all water bodies to meet an interim targets in 2021; the interim target for each water body will be detailed in the 2015 River Basin Management Plans, which is due to be published in December 2015.

11.1.3 Water availability is monitored by the Environment Agency (EA) through Catchment Abstraction Management Strategies (CAMS). CAMS show how much freshwater resource is reliably available, how much the environment needs and the amount of water that can be licensed for abstraction.

11.1.4 The EA estimated that 1 in 6 properties in England is at risk of flooding from coastal, river and surface water[59]. In England, the EA maps areas at risk of flooding from tidal, main rivers and coordinate with Lead Local Flood Authorities surface water sources. The British Geological Society hold mapping showing the areas at risk of groundwater flooding.

11.2 FUTURE BASELINE & ISSUES

11.2.1 Climate change is likely to increase the frequency and severity of floods and droughts. Climate change could increase the number of properties in England with a significant chance of flooding from rivers or the sea: from 330,000 now to between 630,000 and 1.2 million by the 2080s, according to the climate change scenarios used in the Climate Change Risk Assessment[60].

11.2.2 Climate change is likely to alter annual and seasonal rainfall patterns, but the extent and timing of changes remain uncertain. Water companies estimate that without action to prepare nearly half of water resource zones could be at risk of deficit during a drought by the 2020s due to the combined effect of climate change and population growth[61].

11.2.3 A decrease in rainfall draining to rivers also decreases dilution and affects water quality, including oxygen available for aquatic organisms. Furthermore, a fall in the amount of rainfall draining to rivers will also impact on rainwater recharge of the aquifers, which will in turn negatively impact on wildlife.

11.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

11.3.1 Water bodies are likely to be put under considerable pressure over the next century through increased water demand and discharge from the existing airport and surrounding infrastructure. This pressure could affect the biological, physico-chemical and hydromorphological elements assessed under the WFD, which could prevent these water bodies from achieving 'Good Ecological Status' in the future[62].

11.3.2 Passenger numbers and average water consumption per passenger were used to assess the water demand. An assessment of readily available data relating to projected passenger number increases, proposed water efficiency measures and climate change were used to estimate the baseline water demand at 2025 and beyond to 2085. Given the current water resource planning process and recent legislation reforming abstraction controls and improving protection of water resources, it is likely that the increased demand will need to be spread regionally rather than increasing pressure on local resources beyond sustainable levels.

11.3.3 There are areas of flood risk associated with all options from fluvial (river) and surface water flooding, in addition to groundwater at Heathrow. In the future, climate change may increase peak river flows and rainfall. In addition, flood alleviation schemes are also being implemented (the Upper Mole Flood Alleviation Scheme and the Gatwick Stream Flood Alleviation Scheme).

Consideration of how flood risk may change over the period 2025 through to 2085 indicates that peak river flows could increase by 10% up to 2025 and by 25% up to 2085 and rainfall by 5% and 20% respectively. However, there is uncertainty associated with these climate change predictions and sensitivity to higher values should be considered.

Water - Key issues for AoS:

- → Impacts upon the chemical and ecological quality of waterbodies which are at risk from physical alteration, discharges, run-off and infiltration from diverse sources, and abstraction reducing dilution.
- → Effects on water resources from increased use or associated with a rise in passenger numbers and other operations.
- → Increased risk of flooding affecting the airport expansion options and other areas, e.g. downstream.

[58] HM Government, 2013.*Water Framework Directive – Surface water classification status and objectives* [Online].
[59] Environment Agency, 2014. *Flooding in England: A National Assessment of Flood Risk; also* NaFRA, 2013*. Reported in National Audit Office, Nov 2014, Defra, Strategic Flood Risk Management.* [online]
[60] Defra, 2012. *UK Climate Change Risk Assessment: Government Report* [online]
[61] Committee on Climate Change, 2012. *Climate change – is the UK preparing for flooding and water scarcity?* [online]
[62] Jacobs, 2014. *9. Water and Flood Risk: Baseline, prepared for the Airports Commission*. [online]

12 RESOURCES AND WASTE

12.1 NATIONAL BASELINE & ISSUES

COMMERCIAL AND INDUSTRIAL WASTE[63]

12.1.1 In 2012, total commercial and industrial (C&I) waste generation in the UK was estimated to be 47.6 million tonnes; England accounted for 39 million tonnes of this total[64]. This is an increase of 5% (from 45 million tonnes) since the previous national survey in 2009. In 2012, C&I waste accounted for 24% of all UK waste[65].

CONSTRUCTION AND DEMOLITION WASTE[66]

12.1.2 In 2012, it is estimated that 100 million tonnes of construction and demolition waste arisings were produced in the UK, contributing to around half of the total waste arising[65]. Construction and demolition waste has remained relatively consistent (circa 100 million tonnes) for all accounting years between 2004 and 2012[64].

MATERIALS FOR CONSTRUCTION

12.1.3 Minerals and metals are non–renewable natural resources that are vital for the construction, manufacturing and energy industries. Many industrial minerals used in industrial and manufacturing processes may only be reused as construction fill. One significant exception is glass, which can be readily melted for re-use or crushed and recycled in a variety of applications, for example. Another exception is steel, which is the primary metal used in construction. In the UK, it is widely recycled (91%) and reused (5%) at end of first life[67].

12.1.4 Land permitted for mineral extraction accounts for about 0.3% of the total land area in the UK[68].

12.2 FUTURE BASELINE & ISSUES

12.2.1 The UK Government "…is committed to meeting its target under the Waste Framework Directive of recovering at least 70% by weight, of construction and demolition waste by 2020"[69].

12.2.2 Defra's central forecast is that "…C&I waste arisings in 2020 will be 43.9 million tonnes. This is lower than levels estimated in 2009."[70]

12.2.3 Currently, the UK is meeting and exceeding EU targets (70% by 2020), with a 'non-hazardous construction and demolition waste arisings' recovery rate of 86.5%, equating to 38 million tonnes recovered in 2012[65].

12.3 RELEVANCE TO GATWICK AND HEATHROW AIRPORTS

12.3.1 A baseline for each airport was prepared using publicly available waste data from the latest HAL (Heathrow Airport Ltd, 2011) and GAL (Gatwick Airport Ltd, 2010 and 2012)[71] sustainability reports.

12.3.2 Jacobs (2014) modelled waste by combining per passenger estimates with passenger number forecasts to project annual total waste and recycling tonnages from 2025 to 2050. Beyond that date the level of uncertainty was considered too high to produce meaningful data.

12.3.3 Airport waste was modelled for a number of scenarios and was shown to be declining due to sustainable waste management practice and waste minimisation. Airport waste will, however, constitute only a small proportion of total waste arisings in the South East of England. However, a number of the industry reports draw attention to the fact that most biodegradable waste will appear in the residual waste stream and that there should be specific consideration of residual waste treatment capacity in the UK.

12.3.4 Both SITA and Eunomia highlight the likelihood that by 2025 there will be a capacity deficit of residual waste treatment technologies, and this should be recognised when considering long-term airport capacity increase.

12.3.5 HAL and GAL options will require the construction of significant infrastructure. Accordingly, this will require the consumption of significant volumes of material resources. Costs have been provided for each option including aspects which generate waste and those which require material resources including demolition, runways, taxiways and aprons, stands, new buildings, drainage systems, new roads, car parks and utilities[72].

12.3.6 Applying innovation, creativity and careful planning to the management of materials and waste arisings during the lifecycle phases of built environment projects (planning through to end of life transition), contributes to the long-term industry goal to achieve a Circular Economy[73] within the UK, Europe and beyond. The principles which are proposed in the draft Circular Economy package should be applied to development.

Resources and Waste - Key issues for AoS:

- → Responding to the need to maximise the consumption and use of more sustainable (recovered and low environmental impact) material resources, and minimise the consumption of virgin material resources
- → Generation of construction, demolition and excavation wastes on-site, and potential indirect effects arising from off-site treatment and import of materials.
- → Local waste storage capacity issues and indirect effects of landfill or treatment of off-site hazardous and non-hazardous wastes during construction and operation.
- → Opportunities for on-site management of operational wastes and additional sustainability effects associated with this.

[63] Department of Environment Food and Rural Affairs (Defra), 2011. *Survey of commercial and industrial waste arisings 2010 – revised final results*. [online]
[64] Department of Environment, Food & Rural Affairs (Defra), 2015 Digest of Waste and Resource Statistics – 2015 edition [online]
[65] Department of Environment Food and Rural Affairs (Defra), 2015. *UK Statistics on Waste – 2010 to 2012.* [online]
[66] Department for Environment Food and Rural Affairs, 2012.*Construction and Demolition Waste.* [online]
[67] Institute of Civil Engineers, 2014. *Briefing: Reuse and recycling rates of UK steel demolition arisings* [online]
[68] Office for National Statistics, 2013.*UK Environmental Accounts 2013* [Online].
[69] Department for Environment and Rural Affairs, 2013. *Waste Management Plan for England*.[online]
[70] Department for Environment and Rural Affairs, 2013. *Forecasting 2020 Waste Arisings and Treatment Capacity*. [online]
[71] Jacobs, November 2014, *10. Place: Baseline*, Section 5. *Prepared for the Airports Commission.* [online]
[72] Jacobs, 2014. *Additional airport capacity: cost and commercial viability analysis* [online]
[73] European Commission (2016) *Circular Economy Strategy* [online]