TR020002 – SMAa representation to the Secretary of State for Transport

Response to Jennifer Dawes [JD]

Re-determination of the Application by RiverOak Strategic Partners Limited ("the Applicant") for an Order granting Development Consent for the reopening and development of Manston Airport in Kent.

Save Manston Airport association (SMAa) has over 3,700 members who are in full support of the Development Consent Order to reopen Manston Airport, many wanting jobs for themselves, their family or other Kentish people. Thus, we wish to make further representations to assist in the re-determination of the DCO.

1.0 Background - No Climate Expert

As you are aware, it was Jenny Dawes (JD) who instigated the Judicial Review (JR) against the original decision to grant the DCO. It is worth noting that the JR case, on behalf of JD, was accepted as being covered by the Aarhus Convention as it involved environmental information and decision making by a public body. It is, therefore, surprising that JD thought it was more important to employ Louise Congdon (LC) from York Aviation (YAL) as her only "expert" witness rather than employing an expert on Climate Issues to address Matter 3.

N.B. We will make a separate response to the report produced by LC.

2.0 Matter 1

2.1 ANPS

JD states "*The ANPS itself does not mention Manston airport. That is because the Airport's Commission ("AC") reviewed the case for Manston as a dedicated freight airport and dismissed it as an option for further consideration because the proposal: "did not fit with the Commission's remit or offer a solution to the key question of providing additional long-term capacity and connectivity for the UK*."

What JD fails to mention or fails to understand is that the Airports Commission started its work in 2012, produced its interim report in 2013 and its Final Report in July 2015[1]. That is over 3 years before this development for Manston was accepted for Examination, so the point is irrelevant.

2.2 Thanet District Council (TDC) Local Plan

JD states "*At the local level, Thanet District Council's Local Plan was adopted in July 2020. The Local Plan recognised the DCO application and the need for review of the Local Plan "whether or not the DCO is confirmed" (SP07)*".

This is merely in line with TDC Policy SP03 - Local Plan Review

"*Within six months of the adoption of the Local Plan, the Council shall undertake and complete a*

[1] ANPS – page 5

review of the Plan with information published as part of an updated Local Development Scheme setting out a timetable for the completion of the review and any update as may be required".

It is significant that JD omitted the first part of SP07 which states that "*Manston Airport as identified on the Policies Map is safeguarded for airport related uses*". JD also seem to fail to grasp that the applicant owns the airport land.

2.3 The alleged lack of need for Manston

JD states "The lack of need is supported by the findings of York Aviation in their report attached at Annex I".

We address the York Aviation report written by Louise Congdon in a separate response[2] so will not comment further here.

2.4 Parkway Station

JD states "planning permission was approved in October 2020, construction is underway, and the station is due to complete in 2023 providing improved connectivity between East Kent, London and the wider Kent area".

We totally agree that Parkway Station will improve connectivity for a re-opened Manston Airport.

2.5 The London Resort

JD states "the DCO application was submitted in December 2020 and accepted in January 2021. The build is projected to take six years with 2,500-3,700 jobs during construction and 4,835 full time jobs in 2025 and 10,170 full time jobs in 2037".

It is hard to imagine how this is relevant. Thanet has a very high unemployment rate, particularly in the 18-24 age group and, as indicated in our representation on [Matter 1] section 2.5, the applicant has a commitment to employ local people. This is, at best, an extremely weak argument put forward by JD and is not a significant consideration.

2.6 Levelling-up funds

JD states "Thanet District Council submitted two bids worth £26.1m for levelling-up investment in Ramsgate and Margate in June 2021.

Totally irrelevant.

2.7 Ebbsfleet Garden City

Totally irrelevant.

2.8 The Lower Thames Crossing

It is hard to see that the opening of the Lower Thames Crossing will make any material difference

[2] SMAa response Jennifer Dawes – Annex 1 Report by Louise Congdon (LC)

to the decision of granting the DCO, but once opened it will improve connectivity between Manston and the East of England.

3.0 Matter 2

For this section JD relies entirely on the LC report and as stated earlier, we cover this report in a separate representation[3].

4.0 Matter 3

4.1 Misrepresenting the RSP position

JD states "RSP's Environmental Statement ("ES") recognises that the Development cannot be implemented without having a material impact on the Government's ability to meet its carbon targets (ES, 16.4.25 and table 16.16)".

This is, at best, a misrepresentation of what was said in ES, 16.4.25[4]:

"*As a result of the uncertainty around the mechanism by which the UK aviation sector will achieve emissions in-line with the Government's carbon obligations, it is not possible to define a quantified GHG emission level for Manston Airport that is in-line with UK policy. This is not detrimental to the GHG assessment for the Proposed Development, as the Airports National Policy Statement 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."*

It also misrepresents what is shown in table 16.16[5]:

Table 16.16 Summary of significant effects

Receptor and effects	Significance Level	Rationale
The effects of climate change and the Proposed Development on environmental receptors (in-combination climate change impacts).	Not significant	Mitigations for the impacts of climate change on receptors have been incorporated into the design of the Proposed Development. The Climate Resilience Strategy, which has been committed to, will further strengthen action on climate change throughout the detailed design, construction and operation of the Proposed Development.
The effects of GHG emissions from the Proposed Development on the climate.	Not significant	The Proposed Development inevitably has an impact on the global climate, even if 730.1 $KtCO_2$ per annum from aviation emissions only represents 1.9% of the total UK aviation carbon target of 37.5 Mt CO_2 for 2050. It is therefore deemed that the 'further mitigation' scenario is required in order to reduce the carbon footprint of the Proposed Development where practical. The Proposed Development's effect on the global climate is **not significant** given that the further mitigation, in the form of a Carbon Minimisation Action Plan, has been committed to following DCO approval. This Action Plan is to be agreed by the Secretary of State, which goes beyond good practice and aims to significantly reduce GHG emission associated with the design, construction and operation of the scheme. Quantified reductions in emissions have not been provided at this stage, as they are more able to be defined at the detailed design stage.

[3] SMAa response Jennifer Dawes – Annex 1 Report by Louise Congdon (LC)– section 4
[4] [APP-034] – section 16-12
[5] [APP-034] – section 16-3

As can be seen, RSP state that the "*Proposed Developments effect on the Global Climate is not significant*". It will, therefore not have "*a material impact on the Government's ability to meet its carbon targets"*. **Therefore, the assertion by JD is false**.

4.2 Aviation planning assumption is outdated

JD states "*The planning assumption of 37.5 MtCO2e by 2050 for aviation that was used by the ExA as the basis for its analysis is no longer appropriate*".

We showed, in SMAa [Matter 3] section 1, that even without mitigation the development represents only 0.05% (year 2) and 0.14% (year 20) of the total UK emissions. We then outlined the extensive mitigation measures that will be put in place and its commitment to a Climate Change Adaption Strategy following the granting of the DCO:

"An adequate target for the reduction of the 78.6 $ktCO_2$ per annum from non-aviation sources and the 808.7 $ktCO_2$ per annum from all sources will be set within the Carbon Minimisation Plan by the applicant and signed off by the Secretary of State"[6].

4.3 No net increase in airport capacity

JD quotes from the Climate Change Committee (CCC);

"*There should be no net expansion of UK airport capacity unless the sector is on track to sufficiently outperform its net emissions trajectory and can accommodate the additional demand*"[7].

We outlined in detail in SMAa [Matter 3] section 2 the measures the Government have already implemented and will be doing so to meet the Net Zero target. In addition, Making Best Use (MBU) of existing runways is Government Policy:

"*Under the carbon-traded scenario, UK aviation emissions could continue to grow provided that compensatory reductions are made elsewhere in the global economy. This could be facilitated by a carbon trading mechanism in which aviation emissions could be traded with other sectors*"[8].

Without constraints, the CCC predict that there would be a growth in aviation of 65% by 2050 compared with 2018 levels. The sixth carbon budget recommends that this growth in the aviation sector is limited to 25% by 2050 to enable Net Zero by 2050[9].

The Manston Airport development involves a maximum of 17,170 Cargo ATMs and 9,298 Passenger ATMs which gives a total of 26,468 ATMs. According to CAA data there were 2,267,893 ATMs in 2019[10] so the development represents 1.2% of total ATMs which could easily be accommodated in the 25% growth allowed for in the sixth carbon budget.

4.4 Significant gaps between ambition and policy

JD states "*The UK is not on track, both in the aviation sector and other sectors, to meet its carbon reduction targets let alone outperform these targets*".

[6] [REP11 – 008] – page 91
[7] Sixth Carbon Budget - aviation
[8] Making Best Use of existing runways – page 6 section 1.15
[9] The sixth carbon budget – aviation - page 21
[10] CAA ATM data

To justify this she quotes from a CCC report " *if progress does not extend outside the power sector, the Sixth Carbon Budget will be missed by a huge margin*".

However, this is just a sidebar, and it is important to read the full text to understand the context:

"*To meet the Sixth Carbon Budget and to deliver the UK's 2030 Nationally Determined Contribution to the Paris Agreement, progress will have to extend quickly beyond the power sector. If annual changes in emissions return to the same per-sector trend as the previous decade, the Sixth Carbon Budget will be missed by a huge margin*"[11].

This does not support the assertion that the UK is not on track.

The Government firmly believe they are on track to deliver Net Zero by 2050:

"*The UK over-achieved against its first and second Carbon Budgets and is on track to outperform the third Carbon Budget which ends in 2022. This is due to significant cuts in greenhouse gases across the economy and industry, with the UK bringing emissions down 44% overall between 1990 and 2019, and two-thirds in the power sector"*[12].

JD refers to the report by LC "*In addition, electric and hydrogen powered aircraft are unlikely to be suitable for cargo carrying out to 2050 (para.4.33)*".

This is clearly not true. DHL has ordered 12 all-electric freighter aircraft with the first delivery scheduled in 2024[13].

JD states "*Furthermore, key decarbonisation strategies and plans are not yet published or have been delayed, including the Transport Decarbonisation Plan and the Net Zero Aviation Strategy*".

The Transport Decarbonisation plan was published on the 14th July 2021 and on the same day the Government launched a consultation on "Jet zero: our strategy for net zero aviation".

4.5 Omissions by JD

JD has not mentioned the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) nor the Jet Zero Council (JZC). There is only a passing reference to Sustainable Aviation Fuels (SAF). We cover these in detail in SMAa [Matter 3] section 2.

These are very important issues and help to illustrate why JD should have employed an expert to address the question posed by the Secretary of State.

5.0 Matter 4

It would appear that JD ran out of time or ideas and has not mentioned anything that appears significant.

[11] CCC Progress in reducing emissions – page 61
[12] Government press release – sixth carbon budget
[13] DHL all-electric freighter aircraft

6.0 Conclusion

- JD did not think the Matter 3 question was important enough to employ an expert to address it.
- The point JD makes regarding the ANPS is irrelevant.
- The point raised by JD in section 2.2 about reviewing the Policy is pointless. The airport is safeguarded for airport related uses and the applicant owns the airport land.
- The reference to Parkway Station strengthens the case for Manston rather than undermining it.
- Regarding the London Resort, JD put forward an extremely weak argument and it is not a significant consideration.
- Reference to the levelling up fund and Ebbsfleet Village were totally irrelevant.
- It is hard to see that the opening of the Lower Thames Crossing will make any material difference to the decision of granting the DCO.
- JD misrepresented the effect the development would have on the Government's ability to meet its carbon targets.
- JD failed to consider commitments made by RSP for a Carbon Minimisation Action Plan and to a Climate Change Adaption Strategy.
- JD has underplayed the significance of the MBU for the development.
- JD has not factored in the fact that the development, even without mitigation, represents a tiny proportion of the overall UK GHG emissions and a tiny proportion of the total passenger and cargo ATMs in the UK.
- JD has failed to make the case that the Government is not on track to meet its Net Zero target.
- JD, by not employing an expert on Climate, has made serious omissions which seriously undermine her case.

For all the reasons outlined above, we urge the Secretary of State to consider the arguments that we have put forward and conclude that the representation by JD does not stop the granting of the DCO for Manston.

<u>From the SMAa Committee on behalf of the 3,700 members</u>

Dr Beau Webber (Chairman)

[redacted]

Addendum

TR020002 – SMAa representation to the Secretary of State for Transport

Response to Jennifer Dawes [JD]

Since writing our report in July 2021, important events have occurred, and we felt it important for us to make them available to you.

4.0 Matter 3

4.4 Significant gaps between ambition and policy

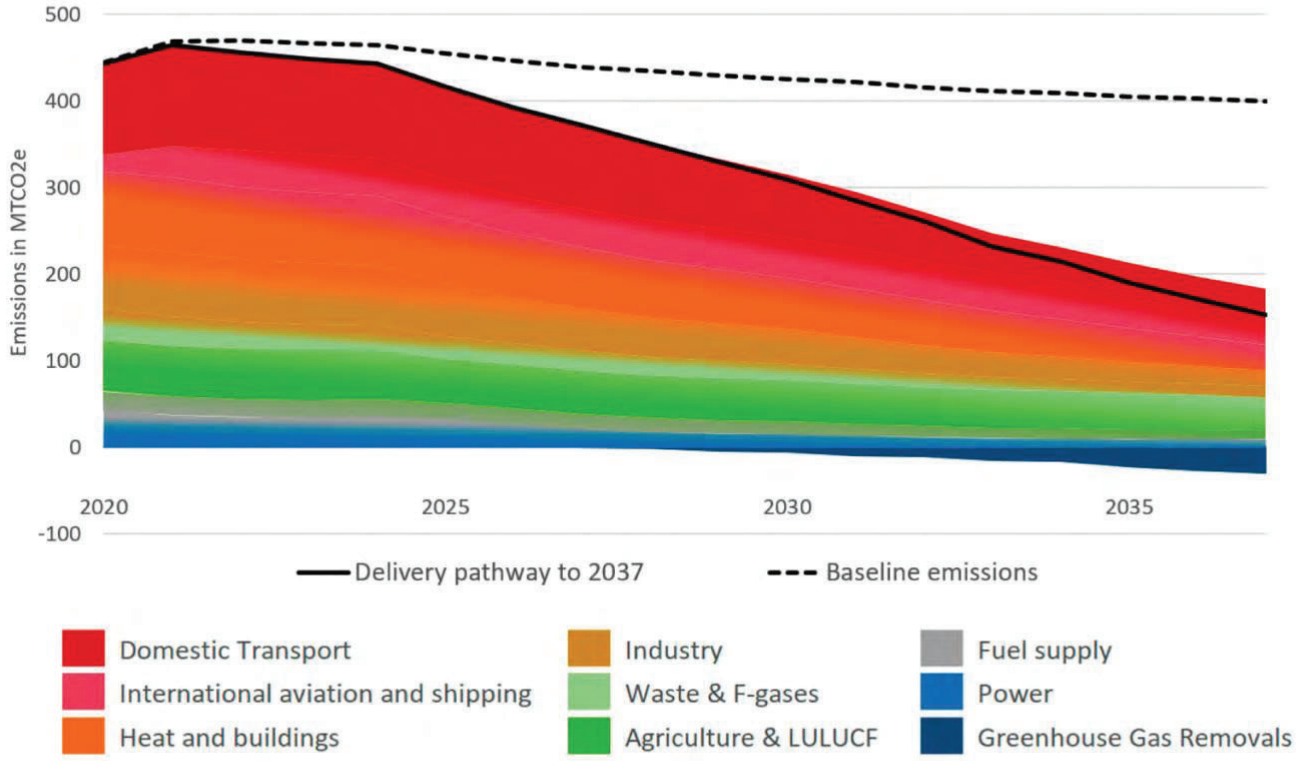
The CCC stated that "*To meet the Sixth Carbon Budget and to deliver the UK's 2030 Nationally Determined Contribution to the Paris Agreement, progress will have to extend quickly beyond the power sector".*

a) Net Zero Strategy: Build Back Greener

The government has now published its net-zero strategy which indicates how the UK will achieve Net Zero by 2050. The Sixth Carbon Budget covers the period up to 2037 and the government's pathway is shown:

Net Zero Strategy: Build Back Greener

Figure 1: Indicative delivery pathway to 2037 by sector



Source: BEIS Analysis (2021)

The strategy explains the specific role each of the sectors, not just power, must play in delivering net-zero by 2050. "*Taken together the transitions set out below for every sector of the UK economy meets Carbon Budgets 4 and 5 and puts us on the path for Carbon Budget 6 – and ultimately on course for net zero by 2050*".[14]

In reference to the aviation sector, it states:

"*We will address aviation emissions through new technology such as electric and hydrogen aircraft, the commercialisation of sustainable aviation fuels, increasing operational efficiencies, developing and implementing market-based measures and GHG removal methods, while influencing consumers to make more sustainable choices when flying".*[15]

b) IATA resolution to achieve net-zero

At the IATA Annual General Meeting held in October 2021, the members representing 290 airlines (82% of global air traffic) approved a resolution for the air transport industry to achieve net-zero carbon emissions by 2050.[16]

In their presentation they outline that there is a big role for Sustainable Aviation Fuels (SAF) and they plan for SAF to bring about a reduction in carbon emissions by 65%. Use of new propulsion systems such as Hydrogen or electric will make up approximately 13% with efficiency improvements accounting for a further 3%. The rest will be achieved through carbon capture and storage (11%) and offsets (2%).

IATA also reaffirmed their support for CORSIA in their resolution.

The above illustrates that the aviation industry is committed to achieving net-zero carbon emissions in the aviation sector and shows that progress is being made outside of the power sector.

It is significant that both IATA and government have identified the same key areas in aviation that will enable the UK to reach Net Zero. Whether freighters land at Manston or elsewhere in the UK will have no bearing whatsoever on the ability of the UK to reach Net Zero.

Manston will play its part with its development being as carbon neutral as possible and having the infrastructure to supply SAF and Hydrogen fuels, but it is airlines not airports, with government and industry support, that will deliver net-zero carbon emissions from aircraft.

c) Carbon reduction – recent developments:

To achieve net-zero it is vital that rapid progress is made in utilising SAF and in the design and development of new technologies such as new propulsion systems:

i) British Airways runs first flight with SAF

In September BA operated its first passenger flight using sustainable aviation fuel between Heathrow and Glasgow and the flight resulted in 62% fewer carbon emissions compared to a similar journey in 2010 according to BA.[17]

[14] Net Zero Strategy: Build Back Greener – page 18
[15] Net Zero Strategy: Build Back Greener – page 156
[16] IATA press release October 2021
[17] Airport Technology September 2021

ii) ASL Aviation Holdings to fly Hydrogen-powered planes

In October ASL Aviation Holdings announced that it is to use an ATR 72-600F plane converted to operate using Hydrogen fuel and intend to purchase up to 10 conversion kits to make their other ATR 72 freighters run on Hydrogen.[18]

According to the manufacturer ATR 72-600F freighters can carry 9 tonnes and are 9dB quieter than the most stringent ICAO requirements.[19]

Zero carbon emissions quiet freighter aircraft technology already exists and "*industry experts expect the hydrogen aircraft market to reach over $174 billion by 2040*".[20]

But it is not just in the aviation sector where progress is being made:

iii) Yara International to launch first zero-emission, crewless cargo ship

In August Yara International announced that it "*expects to sail the first autonomous, fully electric ship in Norway by the end of 2021*".[21] It would have sailed in 2020 but COVID delayed the trip. The ship can carry 103 standard-sized containers and travel at a speed of 13 knots.

Manston could utilise this technology (not necessarily the autonomous part) immediately to operate ships from Ramsgate to the Thames if Hydrogen systems took longer to come onstream.

iv) An Electric HGV drives 683 miles on a single charge

A 19-ton electric truck reached a total of 683 miles on a single charge (a world record) and the team behind it have "*set a joint signal for a future with sustainable drive systems in delivery traffic and demonstrated the suitability of today's technologies for everyday use*".[22]

The focus globally is on incorporating green technologies into all methods of transport and this reaffirms our belief that the proposed development at Manston will not have a significant negative effect on the global climate.

For all the reasons outlined above, we urge the Secretary of State to consider the arguments that we have put forward and conclude that the representation by JD does not stop the granting of the DCO for Manston.

<u>From the SMAa Committee on behalf of the 3,700 members</u>

Dr Beau Webber (Chairman)

[redacted]

[18] Aerotime October 2021
[19] ATR 72-600F specifications
[20] Aerotime October 2021
[21] Inceptive Mind August 2021
[22] Inceptive Mind September 2021

References for SMAa representation to the Secretary of State for Transport
Response to Jennifer Dawes (JD)

		Pages
1.	ANPS	11-101
2.	SMAa response to Jennifer Dawes - Annex 1 - Report by LC	102-113
3.	Sixth Carbon Budget - aviation	114-153
4.	Making Best Use of existing runways	154-164
5.	CAA ATM data	165-167
6.	CCC Progress in reducing emissions	168-170
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8.	Net Zero Strategy: Build Back Greener	172-173
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Department for Transport

Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England

Presented to Parliament pursuant to Section 9(8) of the Planning Act 2008

Moving Britain Ahead

June 2018

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1. Introduction

Background

1.1 The UK aviation sector plays an important role in the modern economy, contributing around £20 billion per year[1] and directly supporting approximately 230,000 jobs.[2] The positive impacts of the aviation sector extend beyond its direct contribution to the economy by also enabling activity in other important sectors like business services, financial services, and the creative industries. The UK has the third largest aviation network in the world, and London's airports serve more routes than the airports of any other European city.

1.2 However, London and the South East are now facing longer term capacity problems. Heathrow Airport is operating at capacity today, Gatwick Airport is operating at capacity at peak times, and the whole London airports system is forecast to be full by the mid-2030s.[3] There is still spare capacity elsewhere in the South East for point to point and especially low cost flights. However, with very limited capability at London's major airports, London is beginning to find that new routes to important long haul destinations are being set up elsewhere in Europe. This is having an adverse impact on the UK economy, and affecting the country's global competitiveness.[4]

1.3 In September 2012, the Coalition Government established the independent Airports Commission to examine the scale and timing of any requirement for additional capacity to maintain the UK's position as Europe's most important aviation hub, and identify and evaluate how any need for additional capacity should be met in the short, medium and long term.[5]

1.4 In its Interim Report in December 2013, the independent Airports Commission concluded that there was a need for one additional runway to be in operation in the South East of England by 2030.[6] It also confirmed three shortlisted capacity schemes for further analysis: a Second Runway at Gatwick Airport (proposed by Gatwick Airport Ltd.), a Northwest Runway at Heathrow Airport (proposed by Heathrow Airport Ltd.), and an Extended Northern Runway at Heathrow Airport (proposed by Heathrow Hub Ltd.). The Airports Commission then consulted further on the three shortlisted schemes, plus proposals for a new airport in the inner Thames Estuary. In September 2014, the Airports Commission concluded not to consider further an inner Thames Estuary scheme.[7]

1.5 In its Final Report in July 2015, the Airports Commission unanimously concluded that the proposal for a Northwest Runway at Heathrow Airport, combined with a significant

[1] ONS, Input-Output Supply and Use tables, 2014
[2] ONS, Business Register and Employment Survey, 2014
[3] *https://www.gov.uk/government/publications/airport-expansion-updated-cost-and-benefits-appraisal Updated Appraisal Report,* p11
[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf *Airports Commission: Final Report*, p3
[5] https://www.gov.uk/government/organisations/airports-commission
[6] https://www.gov.uk/government/publications/airports-commission-interim-report
[7] https://www.gov.uk/government/publications/inner-thames-estuary-airport-summary-and-decision

package of measures to address its environmental and community impacts, presented the strongest case and offered the greatest strategic and economic benefits.

1.6 The Airports Commission's remit also required it to look at how to make best use of existing airport infrastructure, before new capacity becomes operational.[8] The Commission noted in its final report that a new runway will not open for at least 10 years. It therefore considered it imperative that the UK continues to grow its domestic and international connectivity in this period, which it considered would require the more intensive use of existing airports other than Heathrow and Gatwick.[9]

1.7 On 14 December 2015, the Government accepted the Airports Commission's recommendation for increased capacity in the South East of England, and its shortlisted scheme options. The Government also confirmed that it would begin work on the building blocks of an Airports National Policy Statement ('Airports NPS'), and this is what happened.[10]

1.8 The Government believes that an NPS is the most appropriate method to put in place the planning framework for a new runway in the South East of England.[11] All three shortlisted airport schemes would have been classed as nationally significant infrastructure projects under the Planning Act 2008, and the Government's view is that an Airports NPS, and a development consent application made under the Planning Act 2008, is the most appropriate route to deliver the Government's preferred scheme.

1.9 In its announcement on 14 December 2015, the Government made clear that it would be important to undertake further work regarding the final location of the preferred scheme. This included additional work on air quality, noise, carbon, and mitigating impacts on affected local communities.

1.10 On 25 October 2016 the Government announced that a Northwest Runway at Heathrow Airport, combined with a significant package of supporting measures, was its preferred scheme to deliver additional airport capacity in the South East of England. It also confirmed that this would be included in a draft Airports NPS, to be the subject of consultation according to the procedures laid down in the Planning Act 2008.[12]

1.11 The draft Airports NPS and supporting Appraisal of Sustainability were published on 2 February 2017 and a 16 week public consultation was launched. On publishing the draft Airports NPS, the Government made a commitment to continue updating its evidence base on airport capacity, including revised passenger demand forecasts and the impact of the publication of the final Air Quality Plan (the UK plan for tackling roadside nitrogen dioxide concentrations). On 24 October 2017, the Government published and conducted an 8 week public consultation on a revised draft Airports NPS and other documents which were published alongside it. The revisions were made on the basis of changes to the evidence base and as a result of initial consideration of the responses to the February consultation and other broader government policy changes. Having considered the responses to both the February and October consultations, and the report published by the Transport Committee on 23 March 2018, the Government has made some further changes, principally to provide greater clarity and reflect updates to wider Government policies.

[8] *Airports Commission: Interim Report*, paragraph 5.2
[9] *Airports Commission: Final Report*, paragraph 16.40
[10] https://www.gov.uk/government/speeches/aviation-capacity
[11] Throughout this document, unless specified otherwise, the term "NPS" refers to the Airports NPS. Other NPSs, for example the National Networks NPS, are referred to in full as required
[12] https://www.gov.uk/government/speeches/airport-capacity

Purpose and scope of the Airports NPS

1.12 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. Other NPSs may also be relevant to decisions on airport capacity in this geographical area.

1.13 The Airports NPS sets out:

- The Government's policy on the need for new airport capacity in the South East of England;
- The Government's preferred location and scheme to deliver new capacity; and
- Particular considerations relevant to a development consent application to which the Airports NPS relates.

1.14 It sets out planning policy in relation to applications for any airport nationally significant infrastructure project in the South East of England, and its policies will be important and relevant for the examination by the Examining Authority, and decisions by the Secretary of State, in relation to such applications.

1.15 In particular, the Secretary of State will use the Airports NPS as the primary basis for making decisions on any development consent application for a new Northwest Runway at Heathrow Airport, which is the Government's preferred scheme. The policies in the Airports NPS will have effect in relation to the Government's preferred scheme, having a runway length of at least 3,500m and enabling at least 260,000 additional air transport movements per annum.[13] It will also have effect in relation to terminal infrastructure associated with the Heathrow Northwest Runway scheme and the reconfiguration of terminal facilities in the area between the two existing runways at Heathrow Airport. For the avoidance of doubt, the Airports NPS does not identify any statutory undertaker as the appropriate person or appropriate persons to carry out the preferred scheme.

1.16 It is possible that an applicant for development consent in respect of the preferred scheme will promote more than one application for development consent, dealing with different components individually. To the extent that this is the case, the Secretary of State will apply the Airports NPS to such applications to the extent that he or she determines to be appropriate in the circumstances.

1.17 For a scheme to be compliant with the Airports NPS, the Secretary of State would expect to see these elements comprised in its design, and their implementation and delivery secured, particularly with regard to runway length and increased capacity of air transport movements. Other NPSs may also be relevant to decisions on nationally significant infrastructure projects at airports but, if there is conflict between the Airports NPS and other NPSs, the conflict should be resolved in favour of the NPS that has been most recently designated.

1.18 Under section 104 of the Planning Act 2008, the Secretary of State must decide any application in accordance with any relevant NPS unless he or she is satisfied that to do so would:

[13] The Airports NPS stipulates the length of the new runway to ensure that the new infrastructure can accommodate the largest commercial aircraft, as they operate many of the long haul flights that support the UK's position as a major aviation hub

- Lead to the UK being in breach of its international obligations;
- Be unlawful;
- Lead to the Secretary of State being in breach of any duty imposed by or under any legislation;
- Result in adverse impacts of the development outweighing its benefits; or
- Be contrary to legislation about how the decisions are to be taken.[14]

1.19 The Airports NPS refers in some places to other relevant documents. These other documents may be replaced, updated or amended over the lifetime of the Airports NPS, and so successor documents should be referred to when this is the case.

1.20 Unlike the regime for the granting of planning permission under the Town and Country Planning Act 1990, there is no provision in the Planning Act 2008 for the making of an 'outline' application for development consent, followed by 'reserved matters' approval. This does not mean, however, that development cannot be phased, so that particular parts are brought forward at different times, or that the details of a proposal cannot be reserved for determination later. Guidance by the Ministry of Housing, Communities and Local Government recognises that development projects advanced through the development consent order process may be phased, but emphasises that every phase of the project contained in a development consent application must be considered in the application for the order and the order itself.[15]

Duration

1.21 The Airports NPS covers development that is anticipated to be required by 2030 as well as other development required to support it. It will remain in place until it is withdrawn, amended or replaced. It will be reviewed, in accordance with the Planning Act 2008, when the Secretary of State considers it appropriate to do so. When considering whether to review the Airports NPS, the Secretary of State will look at whether there has been a significant change in any circumstances on which the policy was based and whether such change was anticipated when the Airports NPS was designated.

Territorial extent

1.22 The Airports NPS covers England only. Some aspects of aviation noise policy are devolved but others are reserved.[16]

1.23 Aviation policy is largely a reserved matter, though planning policy is not. Specifically:

- The National Assembly for Wales has devolved powers relating to airports in terms of land use planning and surface access policy;
- The Scottish Parliament has competence for planning in Scotland, and some powers in relation to aerodromes are also devolved to the Scottish Parliament; and
- The Northern Ireland Executive and Assembly have devolved powers relating to airports in terms of regional land use planning, surface access policy and funding,

[14] Planning Act 2008, section 104 – decisions in cases where an NPS has effect
[15] https://www.gov.uk/government/publications/guidance-on-the-pre-application-process-for-major-infrastructure-projects
[16] For the avoidance of doubt, references to matters which are "reserved" in this section refer to those matters of legislative responsibility reserved to the Westminster Parliament under the UK's devolution arrangements

and environmental policy. The Northern Ireland Executive also has responsibility for airport economic regulation, has powers over land in relation to aviation safety, has the ability to grant aid for airports infrastructure, and may exercise certain controls relating to the management of airports.

European Union

1.24 On 29 March 2017 the Government formally notified the European Council of its intention to withdraw from the European Union, as provided for under Article 50 of the Treaty on European Union. Until the UK has left the EU, it remains a full Member of the European Union and all the rights and obligations of EU membership remain in force. Therefore, for the time being, European Union legislation applies to the development of this policy and to decision making in relation to the preferred scheme.

1.25 The UK and EU negotiating teams reached agreement in March 2018 on the terms of a transition or implementation period that will start on 30 March 2019, when the UK formally ceases to be a member of the EU, and last until 31 December 2020. The agreed text states that "Union law shall be applicable to and in the United Kingdom during the transition period". The limited exceptions to this are set out in the published text.

1.26 The Government has also introduced legislation to ensure that the UK exits the EU with maximum certainty and continuity. The EU Withdrawal Bill ends the supremacy of European Union (EU) law in UK law and converts EU law as it stands at the moment of exit into domestic law. The same rules and laws will apply on the day after exit as on the day before. It will then be for democratically elected representatives in the UK to decide on any changes to that law, after full scrutiny and proper debate.

Appraisal of Sustainability

1.27 An Appraisal of Sustainability is required by the Planning Act 2008 in relation to any NPS. An Appraisal of Sustainability, which describes the analysis of reasonable alternatives to the preferred scheme, has been carried out to inform the Airports NPS. The Appraisal of Sustainability informs the development of the Airports NPS by assessing the potential economic, social and environmental impacts of options to increase airport capacity.

1.28 The Appraisal of Sustainability also incorporates a strategic environmental assessment (pursuant to Directive 2001/42/EC as transposed by SI 2004/1633).[17] The Appraisal of Sustainability was published alongside the Airports NPS.

1.29 The overall conclusions of the Appraisal of Sustainability show that (provided any scheme remains within the parameters and boundaries in this policy), whilst there will be inevitable harm caused by a new Northwest Runway at Heathrow Airport in relation to some topics, the need for such a scheme, the obligation to mitigate such harm as far as possible, and the benefits that such a scheme will deliver, outweigh such harm. However, this is subject to the assessment of the effects of the preferred scheme, identification of suitable mitigation, and measures to secure and deliver the relevant mitigation.

[17] Directive 2001/42/EC of the European Parliament and of the Council on the assessment of the effects of certain plans and programmes on the environment

1.30 The preferred scheme has been subject to further refinement by Heathrow Airport since the conclusion of the work of the Airports Commission. These refinements were not captured within the Airports Commission's appraisals and are not expected to significantly alter the key appraisal findings. The Government expects any applicant to carry out a further and more detailed study, and to secure appropriate mitigation measures, ahead of seeking development consent.

Habitats Regulations Assessment

1.31 The Airports NPS has also been assessed under the Habitats and Wild Birds Directive and Regulations.[18] A Habitats Regulations Assessment has been undertaken at a strategic level, and was published alongside the Airports NPS.

1.32 The strategic level Habitats Regulations Assessment, conducted in accordance with the Conservation of Habitats and Species Regulations 2010,[19] concluded that the potential for the preferred scheme to have adverse effects on the integrity of European sites for the purposes of Article 6(3) of the Habitats Directive could not be ruled out. This is because more detailed project design information and detailed proposals for mitigation are not presently available and inherent uncertainties exist at this stage. The Airports NPS has thus been considered in accordance with Article 6(4) of the Habitats Directive. Consideration has been given to alternative solutions to the preferred scheme, and the conclusion has been reached that there are no alternatives that would deliver the objectives of the Airports NPS in relation to increasing airport capacity in the South East and maintaining the UK's hub status. In line with Article 6(4) of the Directive, the Government considers that meeting the overall needs case for increased capacity and maintaining the UK's hub status, as set out in chapter two, amount to imperative reasons of overriding public interest supporting its rationale for the designation of the Airports NPS. At detailed design stage, and in so far as it may be necessary, the matters set out in the Airports NPS will be relevant to determining whether there are alternative solutions and imperative reasons of overriding public interest, provided that the design remains consistent with the objectives of the Airports NPS.

1.33 Any development brought forward through an Airports NPS that was likely to have a significant effect on a European site, either alone or in combination with other plans or projects, would be subject to a project-level Habitats Regulations Assessment at the detailed design stage. If it could not be concluded that there would be no adverse effects on site integrity, the project would not receive development consent on this basis, unless (a) there were no alternative solutions, (b) there were imperative reasons of overriding public interest in support, and (c) the necessary compensatory measures to protect the site were secured.

Equality Assessment

1.34 The Airports NPS has been informed by an Equality Assessment, which was published alongside the Airports NPS.

1.35 Under the Equality Act 2010, public bodies have a statutory duty to ensure race, disability and equality are considered in the exercise of their functions. The Equality

[18] Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna; and Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds

[19] http://www.legislation.gov.uk/uksi/2010/490/contents/made Since the revised draft Airports National Policy Statement was published, the Conservation of Habitats and Species Regulations 2017 have come into force

Assessment considered the potential equalities implications of airport expansion, including the effect on persons or groups of persons who share certain characteristics protected by the Equality Act 2010. The Equality Assessment concludes that all of the shortlisted schemes will have effects on these groups, but that such effects can be managed and can ultimately be within appropriate limits. The Airports NPS requires that final impacts on affected groups should be the subject of a detailed review, carefully designed through engagement with the local community, and approved by the Secretary of State. It should be possible to fully or partially mitigate negative equalities impacts through good design, operations and mitigation plans.

Health Impact Analysis

1.36 The Airports NPS has been subject to a Health Impact Analysis, which was published alongside the Airports NPS.

1.37 The Health Impact Analysis identified impacts which would affect the population's health, including noise, air quality and socio-economic impacts. In order to be compliant with the Airports NPS, a further project level Health Impact Assessment is required. The application should include and propose health mitigation, which seeks to maximise the health benefits of the scheme and mitigate any negative health impacts.

Relationship between the Airports NPS and the Aviation Policy Framework

1.38 The Airports NPS sets out Government policy on expanding airport capacity in the South East of England, in particular by developing a Northwest Runway at Heathrow Airport. Any application for a new Northwest Runway development at Heathrow will be considered under the Airports NPS. Other Government policy on airport capacity has been set out in the Aviation Policy Framework, published in 2013.[20] The Airports NPS does not affect Government policy on wider aviation issues, for which the 2013 Aviation Policy Framework and any subsequent policy statements still apply.[21]

1.39 On 21 July 2017, the Government issued a call for evidence on a new Aviation Strategy.[22] Having analysed the responses, the Government has confirmed that it is supportive of airports beyond Heathrow making best use of their existing runways. However, we recognise that the development of airports can have positive and negative impacts, including on noise levels. We consider that any proposals should be judged on their individual merits by the relevant planning authority, taking careful account of all relevant considerations, particularly economic and environmental impacts.

[20] https://www.gov.uk/government/publications/aviation-policy-framework
[21] This includes changes to the UK airspace policy published in the Government's response to the consultation, *UK Airspace policy: a framework for balanced decisions on the design and use of airspace*
[22] *Beyond the Horizon: The Future of Aviation* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/636625/aviation-strategy-call-for-evidence.pdf - see paragraphs 7.19 to 7.21

Development covered by the Airports NPS

1.40 The Airports NPS has effect in relation to the delivery of additional airport capacity through the provision of a Northwest Runway at Heathrow Airport. It also applies to proposals for new terminal capacity located between the new Northwest Runway and the existing Northern Runway at Heathrow Airport, as well as the reconfiguration of terminal facilities in the area between the two existing runways at Heathrow Airport. Each of these elements is also capable of constituting a nationally significant infrastructure project.

1.41 The Airports NPS does not have effect in relation to an application for development consent for an airport development not comprised in an application relating to the Heathrow Northwest Runway, and proposals for new terminal capacity located between the Northwest Runway at Heathrow Airport and the existing Northern Runway and reconfiguration of terminal facilities between the two existing runways at Heathrow Airport. Nevertheless, the Secretary of State considers that the contents of the Airports NPS will be both important and relevant considerations in the determination of such an application, particularly where it relates to London or the South East of England. Among the considerations that will be important and relevant are the findings in the Airports NPS as to the need for new airport capacity and that the preferred scheme is the most appropriate means of meeting that need.

1.42 As indicated in paragraph 1.39 above, airports wishing to make more intensive use of existing runways will still need to submit an application for planning permission or development consent to the relevant authority, which should be judged on the application's individual merits. However, in light of the findings of the Airports Commission on the need for more intensive use of existing infrastructure as described at paragraph 1.6 above, 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. As indicated in paragraph 1.39 above, the Government's policy on this issue will continue to be considered in the context of developing a new Aviation Strategy.

2. The need for additional airport capacity

The importance of aviation to the UK economy

2.1 International connectivity, underpinned by strong airports and airlines, is important to the success of the UK economy. It is essential to allow domestic and foreign companies to access existing and new markets, and to help deliver trade and investment, linking us to valuable international markets and ensuring that the UK is open for business. It facilitates trade in goods and services, enables the movement of workers and tourists, and drives business innovation and investment, being particularly important for many of the fastest growing sectors of the economy.

2.2 International connectivity attracts businesses to cluster round airports, and helps to improve the productivity of the wider UK economy. Large and small UK businesses rely on air travel, while our airports are the primary gateway for vital time-sensitive freight services. Air travel also allows us ever greater freedom to travel and visit family and friends across the globe, and brings millions of people to the UK to do business or enjoy the best the country has to offer.

2.3 The UK benefits from a strong and substantially privatised airport sector, with a regulatory system that supports growth while ensuring the interests of passengers are at its heart. The Government believes that this is the right approach for the airport sector, but that Government has an important role to play in strategic decisions like planning future airport capacity.

2.4 The UK has the third largest aviation network in the world after the USA and China,[23] and London's airports serve more routes than any other European city.[24] The UK's airports handled over 268 million passengers in 2016, a 6.7% increase from the previous year.[25] The sector benefits the UK economy through its direct contribution to GDP and employment, and by facilitating trade and investment, manufacturing supply chains, skills development, and tourism.

2.5 In 2014 the UK aviation sector generated around £20 billion[26] of economic output, and directly employed around 230,000 workers,[27] supporting many more jobs indirectly. The UK has the second largest aircraft manufacturing industry in the world after the USA, and will benefit economically from growth in employment and exports from future aviation growth.[28] Air Passenger Duty remains an important contributor to Government revenue, raising over £3 billion in2015/16.[29] Heathrow Airport directly supports around 75,000 jobs on site.[30]

[23] *The Global Competitiveness Report 2014-2015*, World Economic Forum, 2015, based on available airline seat kilometres
[24] *Airports Commission: Final Report*, p55
[25] https://www.caa.co.uk/Data-and-analysis/UK-aviation-market/Airports/Datasets/UK-Airport-data/Airport-data-2016/
[26] ONS, Input-Output Supply and Use tables, 2014
[27] ONS, Business Register and Employment Survey, 2014
[28] UK Aerospace Industry Survey, Aerospace, Defence, Security Trade Association, 2010
[29] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/691309/Feb18_Receipts_NS_Bulletin_Final.pdf
[30] https://www.heathrowexpansion.com/local-community/local-benefits/

2.6 Businesses from across the UK utilise our aviation network to access markets worldwide. The UK's strong services sector, which provides significant export earnings for the country, is particularly reliant on aviation. The sector includes, among others, financial services, insurance, creative industries, education, and health – all of which rely on face-to-face engagement with customers for success.

2.7 Air freight is also important to the UK economy. Although only a small proportion of UK trade by weight is carried by air, it is particularly important for supporting export-led growth in sectors where goods are of high value or time critical. Heathrow Airport is the UK's biggest freight port by value.[31] Over £178 billion of air freight was sent between UK and non-European Union countries in 2016, representing over 45% of the UK's extra-European Union trade by value.[32] This is especially important in the advanced manufacturing sector, where air freight is a key element of the time-critical supply chain. By 2030, advanced manufacturing industries such as pharmaceuticals or chemicals, whose components and products are predominantly moved by air, are expected to be among the top five UK export markets by their share of value.[33] In the future, UK manufacturing competitiveness and a successful and diverse UK economy will drive the need for quicker air freight.

2.8 Aviation also brings many wider benefits to society and individuals, including travel for leisure and visiting family and friends. This drives further economic activity. In 2013, for example, the direct gross value added of the tourism sector, one of the important beneficiaries of a strong UK aviation sector, was £59 billion.[34] Likewise, 2015 saw the value of inbound tourism rise to over £22 billion,[35] with the wider UK tourism industry forecast to grow significantly over the coming decades.

2.9 The importance of aviation to the UK economy, and in particular the UK's hub status, has only increased following the country's decision to leave the European Union. As the UK develops its new trading relationships with the rest of the world, it will be essential that increased airport capacity is delivered, in particular to support development of long haul routes to and from the UK, especially to emerging and developing economies.

The need for new airport capacity

2.10 However, challenges exist in the UK's aviation sector, stemming in particular from capacity constraints. These constraints are affecting our ability to travel conveniently and to a broader range of destinations than in the past. They create negative impacts on the UK through increased risk of flight delays and unreliability, restricted scope for competition and lower fares, declining domestic connectivity, erosion of the UK's hub status[36] relative to foreign competitors, and constraining the scope of the aviation sector to deliver wider economic benefits.

2.11 The UK now faces a significant capacity challenge. Heathrow Airport is currently the busiest two-runway airport in the world, while Gatwick Airport is the busiest single runway airport in the world. London's airports are filling up fast, and will all be full by the mid-2030s if we do not take action now.[37]

[31] https://www.uktradeinfo.com/Statistics/BuildYourOwnTables/Pages/Home.aspx
[32] https://www.uktradeinfo.com/Statistics/Pages/Statistics.aspx
[33] HSBC Trade Forecast Tool, Accessed 2015
[34] Estimates of the Economic Importance of Tourism 2008-2013, Office for National Statistics, December 2014
[35] https://www.visitbritain.org/2015-snapshot. This figure represents tourism by all modes of transport. The equivalent figure for inbound tourists by air is £19 billion in 2015
[36] Defined as the frequency of flights and the density of a route network
[37] *Updated Appraisal Report*, p11

2.12 Aviation demand is likely to increase significantly between now and 2050.[38] All major airports in the South East of England[39] are expected to be full by the mid-2030s, with four out of five full by the mid-2020s. By 2050 demand at these airports is expected to outstrip capacity by at least 34%, even on the department's low demand forecast.[40] There is relatively little scope to redistribute demand away from the region to less heavily utilised capacity elsewhere in the country.[41]

2.13 The UK's hub status, stemming from the convenience and variety of its direct connections across the world, is already being challenged by restricted connectivity.[42] Hub airports at Paris, Frankfurt and Amsterdam have spare capacity and are able to attract new flights to growth markets in China and South America.[43] These competitors have benefited from the capacity constraints at Heathrow Airport, and have seen faster growth over the past few years. The UK's airports also face growing competition from hubs in the Middle East like Dubai, Abu Dhabi, Doha and Istanbul. Heathrow Airport was overtaken by Dubai in 2015 as the world's busiest international passenger airport.[44]

2.14 The consequences of not increasing airport capacity in the South East of England – the 'do nothing' or 'do minimum scenarios' – are detrimental to the UK economy and the UK's hub status. International connectivity will be restricted as capacity restrictions mean airlines prioritise their routes, seeking to maximise their profits. Capacity constraints therefore lead to trade-offs in destinations, and while there is scope to respond to changing demand patterns, this necessarily comes at the expense of other connections. Domestic connectivity into the largest London airports will also decline as competition for slots encourages airlines to prioritise more profitable routes.

2.15 Operating existing capacity at its limits means there will be little resilience to unforeseen disruptions, leading to delays. Fares are likely to rise as demand outstrips supply, and the lack of available slots makes it more difficult for new competitors to enter the market.

2.16 The Government believes that not increasing capacity will impose costs on passengers and on the wider economy. The Airports Commission estimated that direct negative impacts to passengers, such as fare increases and delays, would range from £21 billion to £23 billion over 60 years.[45] Without expansion, capacity constraints would impose increasing costs on the rest of the economy over time, lowering economic output by making aviation more expensive and less convenient to use, with knock-on effects in lost trade, tourism and foreign direct investment.

2.17 It is very challenging to put a precise figure on these impacts, but using alternative approaches the Airports Commission estimated these costs to be between £30 billion and £45 billion over 60 years.[46] The Airports Commission urged caution interpreting these figures, which overlap with the direct passenger costs reported above and so are not wholly additional. But they do illustrate that not increasing airport capacity carries real economic costs to the whole economy beyond aviation passengers. Having reviewed this further, the Government accepts this analysis and considers that

[38] *Updated Appraisal Report*, p8
[39] Defined as Gatwick, Heathrow, London City, Luton and Stansted
[40] *Updated Appraisal Report*, p11
[41] *Airports Commission: Interim Report*, pp117-126
[42] For more analysis on the UK's hub status, see *Airports Commission: Interim Report*, pp90-92
[43] *Airports Commission: Final Report*, p249
[44] http://www.aci.aero/News/Releases/Most-Recent/2016/09/09/Airports-Council-International-releases-2015-World-Airport-Traffic-Report-The-busiest-become-busier-the-year-of-the-international-hub-airport
[45] *Airports Commission: Final Report*, p81; present value over 60 years
[46] *Airports Commission: Final Report*, p81

recent demand growth in the South East suggests an even greater possible cost if expansion is not undertaken.[47]

2.18 The Government also acknowledges the local and national environmental impacts of airports and aviation, for example noise and emissions, 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 and in accordance with legal obligations on air quality.

The Airports Commission

2.19 To address these issues, in September 2012, the Coalition Government established the independent Airports Commission, led by Sir Howard Davies. The Airports Commission had two objectives:

- To produce an Interim Report, setting out the nature, scale and timing of steps needed to maintain the UK's global hub status alongside recommendations for making better use of the UK's existing runway capacity over the next five years; and
- To produce a Final Report, setting out recommendations on how to meet any need for additional airport capacity in the longer term.[48]

2.20 The Airports Commission was asked to take appropriate account of the national, regional and local implications of any expansion. As well as seven discussion papers and an appraisal framework, the Airports Commission delivered its recommendations to Government in its Interim Report in December 2013 and its Final Report in July 2015. It also published a summary and decision paper in September 2014 on whether to add an inner Thames Estuary airport proposal to a shortlist for further appraisal.[49]

Alternatives to additional runway capacity

2.21 The Airports Commission explored potential alternatives to additional runway capacity, which included:

- Doing nothing;
- A 'do minimum' set of alternatives with very limited provision for additional capacity;
- Redistribution methods, for example changing the rate of Air Passenger Duty, changing slot allocation regimes, traffic distribution rules, and prohibiting certain types of flights;
- Investment in high speed rail and improved surface access options; and
- New technologies.[50]

2.22 The Airports Commission found that none of these options delivered a sufficient increase in capacity, and that many required investment far in excess of the cost of runway expansion. However, the Airports Commission did note that the need to make best use of existing infrastructure would remain.[51]

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[47] *Updated Appraisal Report*, p11
[48] https://www.gov.uk/government/organisations/airports-commission/about/terms-of-reference
[49] https://www.gov.uk/government/publications/inner-thames-estuary-airport-summary-and-decision
[50] *Airports Commission: Final Report*, p84
[51] *Airports Commission: Final Report*, paragraph 16.1 and 16.40

The Airports Commission's shortlisting process

2.23 The Airports Commission consulted widely on its appraisal framework, which contained its criteria for sifting proposed schemes,[52] and the Government is satisfied that the appraisal framework was appropriate. The Airports Commission received 52 proposals, with three options developed by the Airports Commission itself. The Airports Commission took advice from a number of relevant stakeholders, including NATS Holdings, the Civil Aviation Authority, Network Rail, and the Highways Agency (as it then was). The Government believes that the Airports Commission has analysed all the options put forward to the appropriate degree of detail, and discounted non-shortlisted schemes fairly and objectively according to the sift criteria. The Government does not consider that any of the non-shortlisted schemes represents a reasonable alternative to its preferred scheme.

2.24 The three shortlisted schemes were:

- Gatwick Second Runway scheme;
- Heathrow Northwest Runway scheme (which the Airports Commission recommended and is the Government's preferred scheme); and
- Heathrow Extended Northern Runway scheme.

2.25 The Government has made clear in its announcement of 14 December 2015 that it agrees with the Airports Commission's three shortlisted schemes for expansion, and has taken forward its further work on this basis. As set out at paragraph 1.40 of this document, the Airports NPS will only have effect in relation to a scheme located at Heathrow Airport for the provision of a Northwest Runway, and not the other shortlisted schemes.

The Airports Commission's conclusions

2.26 In its Interim Report in December 2013,[53] the Airports Commission concluded that there was a need for one additional runway to be in operation in the South East of England by 2030. It also set in train a period of further consultation on three shortlisted schemes (Gatwick Second Runway scheme, Heathrow Northwest Runway scheme, and Heathrow Extended Northern Runway scheme), as well as the option of a new airport in the inner Thames Estuary. In September 2014, the Airports Commission concluded that a new airport in the inner Thames Estuary did not perform sufficiently well to warrant consideration alongside the three schemes that it decided to shortlist.

2.27 In its Final Report in July 2015, the Airports Commission concluded that the proposed Northwest Runway at Heathrow Airport presented the strongest case for expansion and would offer the greatest strategic and economic benefits to the UK. A copy of the illustrative Heathrow Northwest Runway scheme masterplan is included at Annex B. The Airports Commission also made clear that expansion would have to involve a significant package of supporting measures to address the environmental and community impacts of the new runway.

2.28 The Commission's remit also required it to look at how to make best use of existing airport infrastructure, before new capacity becomes operational.[54] The Commission noted in its final report that a new runway will not open for at least 10 years. It

[52] https://www.gov.uk/government/publications/sift-criteria-for-long-term-capacity-options-at-uk-airports
[53] *Airports Commission: Interim Report*, p11
[54] *Airports Commission: Interim Report*, paragraph 5.2

therefore considered it imperative that the UK continues to grow its domestic and international connectivity in this period, which it considered would require more intensive use of existing airports other than Heathrow and Gatwick.[55]

The Government's work

2.29 The Government has reviewed the Airports Commission's work and the representations Government has received on the issue of airport capacity, and is confident that the Airports Commission's arguments and reasoning are clear and thorough.

2.30 The Airports Commission undertook an extensive appraisal over two and a half years, consulting widely and analysing all the evidence before making its final recommendations. Since then, the Government has reviewed the Airports Commission's work and concluded that its evidence base on the case for expansion and its use of this evidence are both sound.[56] This has given the Government the assurance required to use the evidence to inform its further work, which is set out in more detail later. The Government has therefore considered the Airports Commission data in great depth and also carried out its own further work, all of which informs the Airports NPS.

2.31 In coming to these decisions, the Government has fully considered the Airports Commission's Interim and Final Reports, as well as the inner Thames Estuary summary and decision paper. The Government also received a range of information from a variety of stakeholders in response to those reports, which was taken into account by the Government in reaching its preference.

2.32 Having reviewed the work of the Airports Commission and considered the evidence put forward on the issue of airport capacity, the Government believes that there is clear and strong evidence that there is a need to increase capacity in the South East of England by 2030 by constructing one new runway. The Government also agrees with the Airports Commission that this can be delivered within the UK's obligations under the Climate Change Act 2008.[57] The Government considers that following the country's decision to leave the European Union the country will increasingly look beyond Europe to the rest of the world, and so the importance of maintaining the UK's hub status, and in that context long haul connectivity in particular, has only increased.

2.33 The next chapter of the Airports NPS sets out how the Government has identified the most effective and appropriate way to address the overall need for increased airport capacity, and maintain the UK's hub status, while meeting air quality and carbon obligations and identifies that the Northwest Runway at Heathrow is the Government's preferred scheme.

[55] *Airports Commission: Final Report*, paragraph 16.40
[56] https://www.gov.uk/government/publications/airport-expansion-further-review-and-sensitivities-report
[57] https://www.gov.uk/government/publications/airport-expansion-dft-review-of-the-airports-commissions-final-report *Review of the Airports Commission Final Report*, p19

3. The Government's preferred scheme: Heathrow Northwest Runway

Overview

3.1 While the previous chapter of the Airports NPS sets out the Government's underlying policy and evidence on the need to expand airport capacity in the South East of England, this chapter sets out why the Government has stated its preference for the Heathrow Northwest Runway scheme.

3.2 As set out in the previous chapter, the Airports Commission undertook a detailed shortlisting process, which resulted in three shortlisted schemes being considered by the Government for additional airport capacity:

- Gatwick Second Runway scheme;
- Heathrow Northwest Runway scheme (which the Airports Commission recommended and is the Government's preferred scheme);
- Heathrow Extended Northern Runway scheme.

3.3 The Government accepted the Airports Commission's three shortlisted schemes on 14 December 2015, agreeing with the Airports Commission's conclusion that one new runway in the South East of England by 2030 would be required to meet the need for additional capacity.

3.4 Following the publication of the Airports Commission's Final Report, the Government undertook further work on:

- Air quality;
- Noise;
- Carbon emissions; and
- Impacts on local communities.

3.5 The Government has carried out additional sensitivities, which show the worst case scenarios on noise, carbon and the economy, within the Appraisal of Sustainability.

3.6 The work on air quality, which demonstrated that expansion (with mitigation) is capable of taking place within legal limits, is outlined in the Government's air quality re-analysis[58] and the Appraisal of Sustainability. Both documents contain a worst case scenario.

3.7 The Government agrees with the Airports Commission's assessment that a new runway is deliverable within the UK's climate change obligations.[59]

[58] https://www.gov.uk/government/publications/airport-expansion-further-updated-air-quality-re-analysis
[59] https://www.gov.uk/government/publications/airport-expansion-dft-review-of-the-airports-commissions-final-report *Review of the Airports Commission Final Report*, p19

3.8 Following engagement with all three shortlisted scheme promoters, the Government has recommended a package of community supporting measures.

3.9 The Government also carried out additional work in relation to surface access, and further economic analysis. This work has allowed the Government to consider carefully the effectiveness of each of the three schemes to meet the need for additional capacity.

3.10 The detailed results of this work can be found in a number of reports published by the Government on 25 October 2016:

- A formal review by the Department for Transport of the Airports Commission's Final Report;[60]
- An air quality re-analysis to test the Airports Commission's work against the Government's air quality plan;[61]
- A further review of the Airports Commission's analytical approach, providing greater assurance in those areas where needed;[62]
- A comparison of the originally shortlisted schemes' compensation packages against other expansion projects around the world;[63]
- An assurance report by Highways England on the schemes' road surface access proposals;[64] and
- A non-binding statement of principles between Heathrow Airport and the Secretary of State for Transport on the Heathrow Northwest Runway scheme.[65]

3.11 On 25 October 2016, the Government announced that its preferred scheme to meet the need for new airport capacity in the South East of England was a Northwest Runway at Heathrow Airport.[66] It also confirmed that this would be included in a draft Airports NPS, which would be subject to consultation in accordance with the procedures laid down in the Planning Act 2008.

3.12 The draft Airports NPS and supporting Appraisal of Sustainability were published on 2 February 2017 and a 16 week public consultation was launched. On publishing the draft Airports NPS, the Government made a commitment to continue updating its evidence base on airport capacity, including revised passenger demand forecasts and the impact of the publication of the final Air Quality Plan (the UK plan for tackling roadside nitrogen dioxide concentrations). On 24 October 2017, the Government published and conducted an 8 week public consultation on a revised draft Airports NPS and other documents which were published alongside it. The revisions were made on the basis of changes to the evidence base and as a result of initial consideration of the responses to the February consultation and other broader government policy changes. Having considered the responses to both the February and October consultations, and the report published by the Transport Committee on 23 March 2018, the Government has made some further changes, principally to provide greater clarity and reflect updates to wider Government policies. The Government believes that the Heathrow Northwest Runway scheme, of all the three shortlisted schemes, is the most effective and most appropriate way of meeting the

[60] https://www.gov.uk/government/publications/airport-expansion-dft-review-of-the-airports-commissions-final-report
[61] https://www.gov.uk/government/publications/airport-expansion-further-analysis-of-air-quality-data
[62] https://www.gov.uk/government/publications/airport-expansion-further-review-and-sensitivities-report
[63] https://www.gov.uk/government/publications/airport-expansion-global-comparison-of-airport-mitigation-measures
[64] https://www.gov.uk/government/publications/airport-expansion-highways-england-assurance-report
[65] https://www.gov.uk/government/publications/heathrow-airport-limited-statement-of-principles
[66] https://www.gov.uk/government/speeches/airport-capacity

needs case set out in chapter 2. As such, the Government has also concluded that the other shortlisted schemes do not represent true alternatives to the preferred scheme.

3.13 The remainder of this chapter is broken down into two distinct sections. The first section focuses on why the Government prefers the Heathrow Northwest Runway Scheme to the Gatwick Second Runway scheme in terms of delivering additional airport capacity by 2030. The second section focuses on why the Government prefers the Heathrow Northwest Runway scheme to the Heathrow Extended Northern Runway scheme.

3.14 Increasing airport capacity in the South East of England and maintaining the UK's hub status can be expected to result in both positive and negative impacts, as would be the case for any major infrastructure project. Important positive impacts are expected to include better international connectivity and providing benefits to passengers and the UK economy as a whole (for example for the freight industry). The negative impacts are expected to include environmental impacts, for example on air quality and affected local communities.

3.15 In its considerations on a preferred scheme, the Government has fully taken into account the work of the Airports Commission, information provided by a variety of stakeholders, and the results of the Government's further work outlined in paragraphs 3.4-3.10 above. As set out below, the Government has considered the positive and negative effects from each of the three shortlisted schemes, and reached its conclusion by weighing these expected effects, along with considering how positive effects can be enhanced and negative effects mitigated.

Heathrow Northwest Runway and Gatwick Second Runway

3.16 In identifying the preferred scheme, a wide range of factors has been taken into account, including:

- International connectivity and strategic benefits;
- Passenger and wider economic benefits;
- Domestic connectivity and regional impacts;
- Surface access links;
- Views of airlines, regional airports and the business community;
- Financeability;
- Deliverability; and
- Local environmental impacts.

3.17 While the Government acknowledges the differences between the three shortlisted schemes, carbon impacts (unlike the factors above) have not been considered as a differentiating factor between schemes due to the Airports Commission's overarching assessment that all three are deliverable within the UK's climate change obligations.

International connectivity and strategic benefits, including freight

3.18 Heathrow Airport is best placed to address this need by providing the biggest boost to the UK's international connectivity. Heathrow Airport is one of the world's major hub airports, serving around 180 destinations worldwide with at least a weekly service,

including a diverse network of onward flights across the UK and Europe.[67] Building on this base, expansion at Heathrow Airport will mean it will continue to attract a growing number of transfer passengers, providing the added demand to make more routes viable. In particular, this is expected to lead to more long haul flights and connections to fast-growing economies, helping to secure the UK's status as a global aviation hub, and enabling it to play a crucial role in the global economy.

3.19 By contrast, expansion at Gatwick Airport would not enhance, and would consequently threaten, the UK's global aviation hub status. Gatwick Airport would largely remain a point to point airport, attracting very few transfer passengers. Heathrow Airport would continue to be constrained, outcompeted by competitor hubs which lure away transfer passengers, further weakening the range and frequency of viable routes. At the UK level, there would be significantly fewer long haul flights in comparison to the preferred scheme, with long haul destinations served less frequently. Expansion at Heathrow Airport is the better option to ensure the number of services on existing routes increases and allows airlines to offer more frequent new routes to vital emerging markets.

3.20 This was demonstrated by the forecasts produced by the Airports Commission, and continues to be found in the department's 2017 forecasts.[68] Compared to no expansion, the Government estimate that a Northwest Runway at Heathrow Airport by 2040 would result in 113,000 additional flights a year across the UK as a whole (including 43,000 long haul), and 28 million additional passengers a year. By way of comparison, the Heathrow Extended Northern Runway would add 85,000 more flights and 22 million additional passengers.[69] [70]

3.21 Compared to no expansion, the Second Runway scheme at Gatwick would add 15,000 flights and 10 million passengers by 2040, across the UK as a whole, increasing to 77,000 and 23 million respectively in 2050. The Government project that 8,000 of these additional flights would be long haul in 2040, rising to 17,000 in 2050.[71] Gatwick Airport has recently been successful in securing a number of long haul routes to the USA and Canada from low cost carriers, a new market segment.

3.22 As set out above, the ease with which businesses can move staff around the globe is an important facilitator of trade and for businesses locating and remaining in the UK. The broader range and greater frequency of long haul flights at Heathrow Airport best meets this need. It would deliver benefits for UK passengers (both business and leisure) by allowing them to travel to more destinations flexibly. These benefits include the additional frequency of flights, for example connecting the UK to long haul destinations daily instead of weekly, or several times a day instead of daily. Businesses from across the UK currently take advantage of Heathrow Airport's international connections, and will continue to benefit from these following expansion. In particular, the additional capacity delivered at Heathrow Airport will support growth

[67] CAA, 2016

[68] An important uncertainty to the central estimates concerns the forecasts of future aviation demand and allocation across UK airports. The Airports Commission reflected this uncertainty using five demand scenarios, as well as two carbon policy regimes. The Department for Transport has further considered uncertainty through the use of low, central and high demand scenarios. Further uncertainty arises from the choice of individual modelling assumptions. More information on the Airports Commission's scenarios and sensitivity analysis, can be found in the *Further Review and Sensitivities Report*. More information on the department's 2017 scenarios and sensitivity analysis can be found in the Updated Appraisal Report

[69] *Updated Appraisal Report,* p14 and 17.This number includes all point to point and transfer passengers at UK airports, and refers to terminal passengers who are counted each time they land or take off at a UK airport. Further disaggregation is provided in the Updated Appraisal Report

[70] Due to the expected use of larger planes with higher load factors, the department's 2017 forecasts find smaller increases in ATMs are needed to deliver similar increases in passenger numbers. This is particularly evident for Gatwick, where load factors have increased notably over the past few years. Further information is provided in the Updated Appraisal Report

[71] *Updated Appraisal Report,* p 14 and 17

in important sectors of the UK economy, including tourism, financial services, and the creative industries.

3.23 The aviation sector can also boost the wider economy by providing more opportunities for trade through air freight. The time-sensitive air freight industry, and those industries that use air freight, benefit from greater quantity and frequency of services, especially long haul. By providing more space for cargo, lowering costs, and by the greater frequency of services, this should in turn provide a boost to trade and GDP benefits.[72]

3.24 As set out above, expansion at Heathrow Airport delivers the biggest boost in long haul flights, and the greatest benefit therefore to air freight. This is further facilitated by the existing and proposed airport development of freight facilities as part of the Northwest Runway scheme. Heathrow Airport currently has a substantial freight handling operation, around 20 times larger by tonnage[73] than that at Gatwick Airport, and accounting for 34% of the UK's non-European Union trade by value – around 170 times more than Gatwick Airport.[74] Expansion at Heathrow Airport will further strengthen the connections of firms from across the UK to international markets.

Passenger and wider economic benefits

3.25 Without expansion, passengers and other users of airports are likely to suffer from higher fares and more delays. High demand for air travel at airports with limited or no scope for increased capacity could weaken competition, allowing airlines to charge higher fares. As airports fill up and operate at full capacity, there is little resilience to deal with any disruption, leading to delays.

3.26 Expansion via the Heathrow Northwest Runway scheme is best placed to address this need. Heathrow Airport is currently the busiest two runway airport in the world, already operating at full capacity, with substantial pent up demand from passengers and airlines. Expansion at Heathrow Airport would increase the availability of services, and increase competition between airlines. This would lower fares that passengers can expect to face relative to no expansion, leading to significant benefits to business and leisure passengers and the wider economy. Crucially, the extent of the pent up demand at Heathrow Airport means that these benefits will be experienced more rapidly once the new capacity is operational, with both Heathrow schemes providing more passenger benefits by 2050 than the Gatwick Second Runway scheme, and with total benefits (not including wider trade benefits) of up to £74 billion over 60 years for the Northwest Runway scheme.[75] [76] These benefits are expected to be realised by passengers across the UK as they make use of the additional services provided by the expanded airport. Cumulative benefits delivered by a Northwest Runway scheme remain highest throughout most of the appraisal period, until the mid-2070s, although total benefits are slightly lower than would be delivered by Gatwick expansion over the full 60 year assessment.[77]

3.27 The Government also recognises the role airports can play in supporting wider economic growth in the local community. Expansion at Heathrow Airport is expected to result in larger benefits to the wider economy than expansion at Gatwick Airport. These additional benefits come from workers moving to more productive jobs around the expanded airport as well as the productivity benefits from firms who will enjoy lower aviation transport costs. Heathrow Airport already has a more developed cluster

[72] *Updated Appraisal Report*, p16
[73] https://www.caa.co.uk/Data-and-analysis/UK-aviation-market/Airports/Datasets/UK-airport-data/Airport-data-2016/
[74] HMRC, 2016, https://www.uktradeinfo.com/Statistics/BuildYourOwnTables/Pages/Home.aspx
[75] For clarity of presentation, only the central demand scenario estimate is presented here. This value is the same for the department's carbon-traded and carbon-capped scenarios – see the Updated Appraisal Report for further details
[76] This includes passenger benefits to UK residents, non-UK residents and international-to-international interliners
[77] *Updated Appraisal Report*, p45

of businesses in its surrounding area, which should enable an even larger economic boost from expansion in the local economy.[78]

3.28 Expansion via the Heathrow Northwest Runway scheme should deliver additional jobs at the airport, through its supply chain and in the local community. The Heathrow Northwest Runway scheme is expected to generate up to 114,000 additional jobs in the local area by 2030,[79] with Heathrow Airport also pledging to provide 5,000 additional apprenticeships by this time. The number of local jobs created at an expanded Heathrow Airport is predicted to be much greater than at Gatwick Airport (up to 21,000 by 2030 and 60,000 by 2050),[80] and the jobs would also be created more quickly. The numbers are higher at Heathrow Airport because the additional capacity is forecast to be used more quickly following expansion and, importantly, because the types of services offered at an expanded Heathrow Airport are likely to be more complex, particularly with the greater number of full service airlines operating there.

3.29 Expansion brings a wide set of non-monetised benefits such as local job creation, trade, and freight benefits, which indicate a stronger case for a Heathrow scheme than for the Gatwick Second Runway scheme.[81]

Domestic connectivity

3.30 The Government recognises the importance that the nations and regions of the UK attach to domestic connectivity, particularly connections into Heathrow Airport. Airports across the UK provide a vital contribution to the economic wellbeing of the whole of the UK. Without expansion, there is a risk that, as airlines react to limited capacity, they could prioritise routes away from domestic connections. The Government therefore sees expansion at Heathrow Airport as an opportunity to not only protect and strengthen the frequency of existing domestic routes, but to secure new domestic routes to the benefit of passengers and businesses across the UK.

3.31 Passengers from across the UK are likely to benefit from the improved international connectivity provided by expansion. In 2040, 5.9 million additional passengers from outside of London and the South East are forecast to make one way international journeys[82] from Heathrow Airport. Under a Gatwick Second Runway scheme, 3.8 million additional passengers from outside London and the South East would be forecast to make one way international journeys from Gatwick Airport in 2040. By way of comparison, under a Heathrow Extended Northern Runway scheme, 4.6 million additional passengers from outside London and the South East would be forecast to make one way international journeys from Heathrow Airport in 2040. While expansion will also see some displacement of passengers from regional airports to the London system, overall regional airports are expected to continue displaying strong growth in passenger numbers by 2050.[83]

3.32 An expanded Heathrow Airport should therefore mean that more passengers from across the UK are likely to benefit from lower fares and access to important international markets from the airport.

3.33 The Government expects to see expansion at Heathrow Airport driving an increase in the number of UK airports with connections specifically into the airport. Heathrow

[78] *Updated Appraisal Report*, p27
[79] *Updated Appraisal Report*, p29
[80] *Ibid*.
[81] *Updated Appraisal Report*, p42
[82] Defined as any passenger who travels to (or from) an international destination from a region outside of London and the South East, and uses the expanded airport as part of this journey. A one-way journey is counted as either an outbound or an inbound journey. Return passengers are therefore counted twice.
[83] *Updated Appraisal Report*, p20

Airport and Gatwick Airport set out plans on domestic connectivity which they say they could deliver by 2030:

- at least 14 domestic routes for Heathrow Airport, compared to the eight routes currently in operation; and
- at least 12 domestic routes for Gatwick Airport, compared to the six currently offered.[84]

The following table provides examples of potential domestic routes:[85]

Heathrow Airport under expansion in 2030[86]	Gatwick Airport under expansion in 2030
8 domestic routes operating today (Aberdeen, Belfast City, Edinburgh, Glasgow, Inverness, Leeds Bradford, Manchester, Newcastle) **plus** Belfast International, Durham Tees Valley, Humberside, Liverpool, Newquay, Prestwick **Total: 14**	**6 domestic routes operating today** (Aberdeen, Belfast International, Edinburgh, Glasgow, Inverness, Newquay) **plus** Belfast City, Derry-Londonderry, Dundee, Leeds Bradford, Manchester, Newcastle **Total: 12**

Government expectation on domestic connectivity

3.34 The Government recognises that air routes are in the first instance a commercial decision for airlines and are not in the gift of an airport operator. But the Government is determined that new routes will be secured, and will hold Heathrow Airport to account on this. The Government requires Heathrow Airport to demonstrate it has worked constructively with its airline customers to protect and strengthen existing domestic routes, and to develop new domestic connections, including to regions currently unserved.

Surface access links

3.35 To realise the benefits of expansion, passengers and users must have good access to the airport. On this basis Heathrow Airport has the advantage, because of its more accessible location and more varied surface access links.

3.36 Heathrow Airport already has good surface transport links to the rest of the UK. It enjoys road links via the M25, M4, M40 and M3, and rail links via the London Underground Piccadilly Line, Heathrow Connect, and Heathrow Express. In the future, it will connect to Crossrail, and link to HS2 at Old Oak Common. Plans are being developed for improved rail access: the proposed Western Rail Access could link the airport to the Great Western Main Line, and Southern Rail Access could join routes to the South Western Railway network and London Waterloo Station. This varied choice of road and rail connections makes Heathrow Airport accessible to both passengers

[84] The DfT 2017 aviation forecasts do not take account of the ability of airport levers to strengthen specific routes. Domestic routes proposed by promoters are therefore not included in the updated forecasts
[85] Table excludes UK Crown Dependencies
[86] Taken from promoter plans for domestic connections at Heathrow Airport and Gatwick Airport, compared to existing domestic connections at both airports. The Government would expect Heathrow Airport's plan to be broadly equivalent for the Extended Northern Runway proposal if it was taken forward

and freight operators in much of the UK, and provides significant resilience to any disruption.

3.37 Access to Gatwick relies on the M23 and the Brighton Main Line, which means it serves London well but makes it less convenient for onward travel to the rest of the UK. It is also less resilient than Heathrow Airport. Heathrow Airport has advantages over Gatwick Airport with its greater integration into the national transport network, benefitting both passengers and freight operators. It also currently has significantly larger freight operations than Gatwick Airport, around 20 times larger in terms of total tonnage[87] and around 170 times larger in terms of value.[88]

3.38 The airport scheme promoters have pledged to meet the cost of surface access schemes required to enable a runway to open. For Gatwick Airport, this covers the full cost of the works (including the M23 and A23) needed to support expansion. The two Heathrow schemes would pay for the full cost of M25, A4 and A3044 works, as well as other local road works. They would make a contribution towards the cost of the proposed Western Rail Access and Southern Rail Access schemes. Improvements which are already underway, such as Thameslink and Crossrail, will be completed, and the Government has not assumed any change to these schemes' existing funding.

3.39 The majority of the surface access costs where a split of beneficiaries is expected (for example, where multiple businesses and the public at large benefit from a new road junction or rail scheme) are likely to be borne by Government, where the schemes provide greater benefits for non-airport users. The airport contribution would be subject to a negotiation, and review by regulators.

3.40 Because of the early stages of development, there is some variability of surface access costs, which are subject to more detailed development and, for example, choices over precise routes. The additional public expenditure effects of the options would likely be as follows:

- For both Heathrow proposals, there is no Government road spend directly linked to expansion; the promoter would pay for changes to the M25, A4 and A3044 and any local roads. The Western and Southern Rail schemes are at different levels of development and the cost estimates will change as these schemes are developed. The Government would expect the costs of the schemes to be partly offset by airport contributions, which would be negotiated when the schemes reach an appropriate level of development.
- For the Gatwick proposal, there would be no additional public expenditure solely because of expansion, as all road enhancement costs for airport expansion would be met by the scheme promoter. The Government has assumed that any improvements to the Brighton Main Line that may be required would take place regardless of expansion and would be publicly funded.

Views and support of airlines, regional airports and the business community

3.41 The benefits of expansion will be delivered only if airlines and the industry choose to use the new capacity, and pay for it via airport charges. There is much greater airline support for expansion via the Heathrow Northwest Runway scheme than the other two schemes, subject to various concerns being met, for example on costs.

3.42 The majority of regional airports who have stated a public preference support expanding Heathrow Airport, on the basis of its current status as the UK's hub (though

[87] https://www.caa.co.uk/Data-and-analysis/UK-aviation-market/Airports/Datasets/UK-airport-data/Airport-data-2016/
[88] https://www.uktradeinfo.com/Statistics/BuildYourOwnTables/Pages/Home.aspx

Birmingham Airport has supported expansion at Gatwick Airport). This support is driven by airports' considerations on connectivity and other commercial issues.

3.43 Expansion is critical for business confidence in the UK. The Heathrow Northwest Runway scheme has strong support from the wider business community across the whole of the UK, including from the Confederation of British Industry,[89] the British Chambers of Commerce,[90] the Federation of Small Businesses,[91] the manufacturers' organisation EEF,[92] and regional business groups across the UK. 61% of the directors asked by the Institute of Directors stated that their preference was for expansion at Heathrow Airport, compared to 39% who favoured expansion at Gatwick Airport.[93]

Financeability

3.44 While the Gatwick Second Runway scheme would be significantly cheaper than the two schemes at Heathrow, with the Heathrow Northwest Runway the most expensive of the three shortlisted schemes, all three are private sector schemes which the Government believes could be financeable without Government support.[94]

3.45 The level of debt and equity required for the Gatwick Second Runway scheme would be significantly lower than for the Heathrow schemes, but the Airports Commission noted that the Gatwick Second Runway scheme would have comparatively higher demand risk, which is harder for Government to mitigate compared to the Heathrow schemes.[95] Both Heathrow schemes build on a strong track record of proven demand that has proven resistant to economic downturns. Independent financial advisers have undertaken further work for the Government, and agree that all three schemes are financeable without Government support.

Deliverability and safety

3.46 The three shortlisted schemes involve different levels of delivery risk. Gatwick Airport said its Second Runway scheme is capable of being delivered by 2025, while Heathrow Airport said its Northwest Runway scheme is capable of being delivered by 2026. The Gatwick Second Runway scheme would be much simpler to build. The process for delivering powers for the Heathrow schemes will be more complex because the schemes themselves are more complex. The delivery dates for both Heathrow schemes are therefore likely to be more risky than that for the scheme at Gatwick.

3.47 The Airports Commission worked with the Civil Aviation Authority and NATS Holdings to review the operational and airspace implications of all three shortlisted schemes, including conducting fast-time simulation modelling of the proposed airspace routes. This work concluded that, while safely managing the expected increase in air traffic for any scheme will be challenging, it should nevertheless be achievable given modernisation of airspace in the South East of England and taking advantage of new technologies – changes which will be necessary with or without expansion.

3.48 The Airports Commission also asked the Health and Safety Laboratory (HSL) to review the scale of increase in crash risk associated with each of the schemes. This review considered two risks: the background risk, which accounts for aircraft cruising in UK airspace, and an airfield crash rate, relating to aircraft taking off and landing at a

[89] http://mediacentre.heathrow.com/pressrelease/details/81/Expansion-News-23/4789
[90] http://www.britishchambers.org.uk/press-office/press-releases/bcc-while-britain-dithers-on-aviation,-others-do.html
[91] https://www.fsb.org.uk/media-centre/press-releases/heathrow-s-third-runway-sends-clear-signal-britain-is-open-for-business
[92] https://www.eef.org.uk/about-eef/media-news-and-insights/media-releases/2016/oct/eef-comment-on-heathrow-expansion
[93] https://www.iod.com/news-campaigns/news/articles/Business-leaders-welcome-Airports-Commission-recommendations
[94] The Airports Commission estimated capital costs at £9 billion for the Gatwick Second Runway scheme, £14.4 billion for the Heathrow Extended Northern Runway Scheme, and £17.6 billion for the Heathrow Northwest Runway scheme, not including surface access costs
[95] *Airports Commission: Final Report*, p270

specific airfield.[96] This review concluded that "the changes to the background crash risk are minimal regardless of whether or not expansion takes place at the airports."[97] In addition the increase in airfield crash risks for both airports was proportionate to the additional number of flights anticipated, meaning that the "scenario for Heathrow with the highest crash rates represents an increase of 60% in the crash rate compared to 2013. At Gatwick Airport, the crash rate is more than doubled in the scenario with the highest rates."[98] As noted by HSL, "there is a high level of uncertainty in the calculated crash rates" due to the limited number of previous incidents to assess. Of the over 36 million aircraft movements examined by HSL that are of relevance to either Heathrow or Gatwick's airfield crash risk, only three resulted in accidents.[99] The Civil Aviation Authority conducted a preliminary safety assessment of the schemes and concluded that the schemes were feasible in principle from a safety perspective.[100]

Local environmental, health and community impacts

3.49 Decisions on airport capacity must rightly balance local, environmental and social considerations against the national and local benefits stemming from expansion. As set out above, in terms of economic and strategic benefits, expansion via the Heathrow Northwest Runway scheme best meets the need for additional capacity in the South East of England. However, set against these positive impacts, airport expansion can also have negative impacts. For example, all three schemes will have significant impacts on the environment and local communities.

3.50 The Appraisal of Sustainability presents an assessment of the likely environmental, social and economic impacts of all three schemes. The Health Impact Analysis also presents an assessment of the health impacts. The following discussion of assessments of the three schemes considers the impacts of expansion without the benefits of the mitigation package put forward by scheme promoters or required by the Government under this NPS. The *Updated Appraisal Report* monetises, where possible, the air quality, noise and carbon impacts affecting people from each of the three schemes. These monetised values are small relative to the size of the monetised economic benefits of each scheme over the 60-year appraisal period. The Appraisal of Sustainability shows that, while all three schemes are expected to lead to a reduction in air quality and increased noise (without consideration of potential mitigations of the three schemes), the Gatwick Second Runway scheme would have a lower level of adverse effects relating to noise and air quality than either scheme at Heathrow. All three schemes will have an impact on the natural environment, including biodiversity, water and landscape. Negative effects upon quality of life, health and amenity were assessed, when unmitigated, to be of a greater magnitude for the two Heathrow expansion schemes and of a lower magnitude for the Gatwick Second Runway scheme. This is primarily because Gatwick Airport is in a more rural location, with fewer people impacted by the airport. The Appraisal of Sustainability also outlines measures to mitigate these local impacts to ensure that legal obligations will be met.

[96] *Operational Efficiency: Ground Risk Analysis*, Health and Safety Laboratory, p3 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/437269/operational-efficiency-ground-risk-analysis.pdf
[97] *Operational Efficiency: Ground Risk Analysis*, Health and Safety Laboratory, pvi https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/437269/operational-efficiency-ground-risk-analysis.pdf
[98] *Operational Efficiency: Ground Risk Analysis*, Health and Safety Laboratory, p15 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/437269/operational-efficiency-ground-risk-analysis.pdf
[99] *Operational Efficiency: Ground Risk Analysis,* Health and Safety Laboratory, p9 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/437269/operational-efficiency-ground-risk-analysis.pdf
[100] *Airports Commission: Final report*, p243

As set out below, the Government believes this demonstrates how the commitment to ensure that local impacts of expansion will be mitigated satisfactorily can be met.

3.51 Heathrow Airport has committed to ensuring its landside airport-related traffic is no greater than today. The airport will be expected to achieve a public transport mode share of at least 50% by 2030, and at least 55% by 2040, for passengers.

3.52 The Government agrees with the evidence set out by the Airports Commission that expansion at Heathrow Airport is consistent with the UK's climate change obligations.[101]

3.53 The Appraisal of Sustainability identifies that, in addition to changes due to local noise and air quality impacts, communities may be affected by airport expansion through loss of, and/or additional demand for housing, community facilities or services, including recreational facilities. In addition, there will be effects on parks, open spaces and the historic environment, which will affect the quality of life of local communities which benefit from access to these facilities and features. These effects will be of a higher magnitude for the two Heathrow expansion schemes and a lower magnitude for Gatwick Second Runway. Overall, each of the three schemes is expected to have negative impacts on local communities, with more severe impacts expected from the Heathrow schemes. Impacts of all three schemes will not be felt equally across social groups. Equality impacts are set out in chapter four.

3.54 The Heathrow Northwest Runway scheme will be accompanied by a package of measures to mitigate the impact of airport expansion on the environment and affected communities.[102] The Government agrees with the Airports Commission's conclusion that "to make expansion possible…a comprehensive package of accompanying measures [should be recommended to] make the airport's expansion more acceptable to its local community, and to Londoners generally".[103] This is expected to include a highly valued scheduled night flight ban of six and a half hours between 11pm and 7am (with the exact start and finish times to be determined following consultation), and the offer of a predictable, though reduced, period of respite for local communities.

3.55 To mitigate environmental and social impacts, Heathrow Airport and Gatwick Airport both announced compensation packages (covering residential property acquisition, noise insulation, and other community measures like funding for schools), of more than £1 billion at Heathrow Airport and more than £200 million at Gatwick Airport (over 15-20 years from 2020). Heathrow Airport's package reflects the much greater number of people affected in the local area.

Heathrow Northwest Runway and Heathrow Extended Northern Runway

3.56 The Heathrow Extended Northern runway scheme has two advantages over the Heathrow Northwest Runway scheme: lower capital costs (£14.4 billion for the Extended Northern Runway scheme compared to £17.6 billion for the Northwest Runway scheme), and significantly fewer houses being demolished (242 rather than 783), as well as avoiding impacts on a number of commercial properties.

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[101] https://www.gov.uk/government/publications/airport-expansion-dft-review-of-the-airports-commissions-final-report *Review of the Airports Commission Final Report*, p19

[102] By way of comparison, the Government engaged Ernst & Young to prepare a report on the approaches taken by other international airports in addressing the local impacts of the airport - https://www.gov.uk/government/publications/airport-expansion-global-comparison-of-airport-mitigation-measures

[103] *Airports Commission: Final Report*, p4

3.57 However, the Government made a preference for the Heathrow Northwest Runway based on a number of factors:

- Resilience;
- Respite from noise for local communities; and
- Deliverability.

3.58 The Heathrow Northwest Runway scheme would provide respite by altering the pattern of arrivals and departures across the runways over the course of the day to give communities breaks from noise. However, respite would decrease from one half to one third of the day. The Heathrow Extended Northern Runway scheme has much less potential for respite. It would use both runways for arrivals and departures for most of the day, although it may be able to 'switch off' one runway for a short time during non-peak periods with a corresponding reduction in capacity.[104]

3.59 The Heathrow Northwest Runway scheme should provide greater resilience than the Heathrow Extended Northern Runway scheme because of the way the three separate runways could operate more flexibly when needed to reduce delays, and the less congested airfield. It delivers greater capacity (estimated on a like for like basis by the Airports Commission at 740,000 flights departing and arriving per annum compared to the Extended Northern Runway scheme at 700,000),[105] accordingly higher economic benefits, and a broader route network. It also provides greater space for commercial development, which could be used to enhance onsite freight capacity.

3.60 The Airports Commission assessed the Heathrow Extended Northern Runway scheme to be deliverable.[106] However, the Extended Northern Runway scheme has no direct global precedent. As such, there is greater uncertainty as to what measures may be required to ensure that the airport can operate safely, and what the impact of those measures may be, including the restriction on runway capacity.

Carbon emissions

3.61 Although not a differentiating factor between the three shortlisted schemes, the Government has considered the issue of carbon emissions, given the Government's commitment to tackle climate change, and its legal obligations under the Climate Change Act 2008.

3.62 The Airports Commission identified carbon impacts from expansion in four areas: a net increase in air travel; airside ground movements and airport operations; changes in travel patterns as a result of the scheme's surface access arrangements; and construction of new infrastructure. Emissions from air travel, specifically international flights, are by far the largest of these impacts.[107]

3.63 To address uncertainties over the future policy treatment of international aviation emissions,[108] the Airports Commission used two carbon policy scenarios in its analysis.

3.64 The first was a 'carbon capped' scenario, in which emissions from the UK aviation sector are limited to the Committee on Climate Change's planning assumption for the

[104] *Airports Commission: Final Report*, pp180-184
[105] *Airports Commission: Final Report*, p29
[106] *Airports Commission: Final Report*, p236
[107] Intra-UK flights account for approximately 6% of the total emissions from all flights departing UK airports. These emissions are included in the UK's carbon budgets
[108] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/186683/aviation-and-climate-change-paper.pdf *Airports Commission: discussion paper 03: aviation and climate change*, pp12-16

sector of 37.5 million tonnes of carbon dioxide in 2050. The second was a 'carbon traded' scenario, in which emissions are traded as part of a global carbon market, allowing reductions to be made where they are most efficient across the global economy.

3.65 The Airports Commission then assessed whether the needs case could be met under each of these scenarios, that is whether expansion would still deliver the necessary improvements and provide benefits to passengers and the wider economy. The Government has updated this analysis to take account of the latest passenger demand forecasts.

3.66 This further analysis reinforces the conclusion that any one of the three shortlisted schemes could be delivered within the UK's climate change obligations, as well as showing that a mix of policy measures and technologies could be employed to meet the Committee of Climate Change's planning assumption.[109]

3.67 Of the three shortlisted schemes, the Heathrow Northwest Runway scheme produces the highest carbon emissions in absolute terms. However, this is in part due to the greater additional connectivity provided by the scheme, and, in relation to the increase in emissions caused by expansion under any of the schemes, the differences between the schemes are small. Both of the carbon policy scenarios incorporated measures to ensure that the increased emissions from any of the shortlisted schemes were not additional overall either at the global level (in the carbon traded case) or at the UK level (in the carbon capped case).

3.68 The further analysis also shows that, in both carbon policy scenarios, the Heathrow Northwest Runway scheme would deliver significant benefits to passengers and the wider economy (such as lower fares, improved frequency and higher productivity), and would do so more quickly than the Gatwick Second Runway scheme. Both Heathrow schemes provide more passenger benefits by 2050 than the Gatwick Second Runway scheme.

3.69 The Government has considered this further analysis, and concludes both that expansion via a Northwest Runway at Heathrow Airport (as its preferred scheme) can be delivered within the UK's carbon obligations, and that the scheme is the right choice on economic and strategic grounds regardless of the future regime to deal with emissions from international aviation.[110]

Strategic environmental assessment

3.70 Strategic environmental assessments are required by the law. A strategic environmental assessment is set out in full in the Appraisal of Sustainability.[111] It demonstrates that airport expansion will attract additional air traffic, which impacts upon quality of life and wellbeing, in particular through noise, air quality, housing, community facilities, and access to nature and cultural heritage. Negative impacts upon quality of life were of a greater scale within the two Heathrow schemes and of lower magnitude for the Gatwick Second Runway scheme. However, when assessing against the objective of maximising economic benefits and improving competitiveness and employment, the Heathrow Northwest Runway scheme generates the most benefits, as well as producing the highest direct benefits to passengers.

[109] *Updated Appraisal Report,* p36
[110] *Updated Appraisal Report*, p35 and p42
[111] https://www.gov.uk/government/publications/appraisal-of-sustainability-for-the-revised-draft-airports-national-policy-statement

Conclusion

3.71 This section summarises the factors the Government considered when evaluating each of the three schemes shortlisted by the Airports Commission against the needs case presented in chapter 2. As part of this, the Government identified where schemes could have negative impacts, for example on the local environment. It considered the predicted beneficial effects of the three schemes, particularly in relation to the needs case and economic considerations. It also assessed how the schemes could conform to wider Government strategic objectives and meet legal obligations, for example on air quality. Bringing these considerations together, the Government's decision on a preferred scheme balances this range of factors, enabling it to determine which scheme, overall, is the most effective and appropriate means of meeting the needs case and maintaining the UK's hub status in particular.

3.72 The Appraisal of Sustainability provides an assessment of the schemes against a number of the factors considered in this chapter. It concludes that the Heathrow Northwest Runway scheme is best placed to maximise the monetised economic benefits that the provision of additional airport capacity could deliver in the short term, although this scheme is likely to do so with the greatest negative impact on local communities. However, the Appraisal of Sustainability also identifies measures which can help to mitigate these impacts, for example by reducing noise, ensuring that the development is in accordance with legal obligations on air quality, showing how future carbon targets could be met, and assessing future demand scenarios.

3.73 Building on this assessment, the Government has identified a number of attributes in the manner of strategic effects, which it believes only the preferred scheme is likely to deliver to meet the overall needs case for increased capacity in the South East of England and to maintain the UK's hub status. The Government has afforded particular weight to these:

- Expansion via the Heathrow Northwest Runway scheme would provide the biggest boost to connectivity, particularly in terms of long haul flights. This is important to a range of high value sectors across the economy in the UK which depend on air travel, as well as for air freight. It will enable more passengers to fly where they need to, when they need to.
- Expansion via the Heathrow Northwest Runway scheme would provide benefits to passengers and to the wider economy sooner than the other schemes. This is regardless of the technical challenges to its delivery. It would also provide the greatest boost to local jobs.
- Heathrow Airport is better connected to the rest of the UK by road and rail. Heathrow Airport already has good road links via the M25, M4, M40 and M3, and rail links via the London Underground Piccadilly Line, Heathrow Connect and Heathrow Express. In the future, it will be connected to Crossrail, and linked to HS2 at Old Oak Common. The number of such links provides resilience.
- The Heathrow Northwest Runway scheme delivers the greatest support for freight. The plans for the scheme include a doubling of freight capacity at the airport. Heathrow Airport already handles more freight by value than all other UK airports combined, and twice as much as the UK's two largest container ports.

3.74 The needs case has shown the importance of developing more capacity more quickly, and in a form which passengers and businesses want to use. The Heathrow Northwest Runway scheme is best placed to deliver this capacity, delivering the greatest benefits soonest as well as providing the biggest boost to the UK's international connectivity,

doing so in the 2020s at a point when without the scheme 4 out of 5 London airports would be full, with all the problems to passengers this could entail. Taken together, benefits to passengers and the wider economy are substantial, even having regard to the proportionally greater environmental disbenefits estimated for the Heathrow Northwest Runway. Even though the preferred scheme's environmental disbenefits are larger than those of the Gatwick Second Runway scheme, when all benefits and disbenefits are considered together,[112] overall the Heathrow Northwest Runway scheme is considered to deliver the greatest net benefits to the UK.

3.75 A number of mitigation measures will need to be applied to reduce the impacts of the Heathrow Northwest Runway scheme felt by the local community and the environment. Airport expansion is also expected to be accompanied by an extensive and appropriate compensation package for affected parties. With these safeguards in place, the Government considers that the Heathrow Northwest Runway scheme delivers the greatest strategic and economic benefits, and is therefore the most effective and appropriate way of meeting the needs case.

[112] *Updated Appraisal Report*, p44

4. Assessment principles

General principles of assessment

4.1 The statutory framework for deciding applications for development consent is contained in the Planning Act 2008. This chapter of the Airports NPS sets out general policies in accordance with which applications relating to a Northwest Runway at Heathrow Airport are to be decided. This chapter is specific to assessments necessary for the Heathrow Northwest Runway scheme, but is not exhaustive as to the assessments that may be applicable to that scheme.

4.2 The Airports NPS covering the Heathrow Northwest Runway scheme establishes the needs case for that proposed development, provided it adheres to the detailed policies and protections set out in the Airports NPS, and the legal constraints contained within the Planning Act 2008. The statutory framework for deciding nationally significant infrastructure project applications where there is a relevant designated NPS is set out in section 104 of the Planning Act 2008.[113]

4.3 The Airports NPS applies to schemes at Heathrow Airport (in the area shown, for this purpose, illustratively, within the scheme boundary map at Annex A) that include a runway of at least 3,500m in length and that are capable of delivering additional capacity of at least 260,000 air transport movements per annum, and associated infrastructure and surface access facilities. In particular, it also applies to the reconfiguration of and provision of new terminal capacity to be located between the two existing runways at Heathrow Airport. The Secretary of State's policy in relation to other airport infrastructure in the South East of England is set out at paragraph 1.41 above.

4.4 In considering any proposed development, and in particular when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State will take into account:

- Its potential benefits, including the facilitation of economic development (including job creation) and environmental improvement, and any long term or wider benefits; and
- Its potential adverse impacts (including any longer term and cumulative adverse impacts) as well as any measures to avoid, reduce or compensate for any adverse impacts.

4.5 In this context, environmental, safety, social and economic benefits and adverse impacts should be considered at national, regional and local levels. These may be identified in the Airports NPS, or elsewhere. The Secretary of State will also have regard to the manner in which such benefits are secured, and the level of confidence in their delivery.

[113] Planning Act 2008, section 104 – decisions in cases where an NPS has effect

4.6 The National Networks NPS sets out the Government's policies to deliver development of nationally significant infrastructure projects on the national road and rail networks and strategic rail freight interchanges. It provides planning guidance for promoters of nationally significant infrastructure projects on the road and rail networks, and the basis for the examination by the Examining Authority and decisions by the Secretary of State.

4.7 Where the applicant's proposals in relation to surface access meet the thresholds to qualify as nationally significant infrastructure projects under the Planning Act 2008, or is associated development under section 115 of the Planning Act 2008, the Secretary of State will consider those aspects by reference to both the National Networks NPS and the Airports NPS, as appropriate. To the extent that discrete aspects of the surface access proposals do not qualify as nationally significant and cannot be included in a development consent application as associated development (for example), the applicant will be expected to pursue or secure necessary consent(s) through the most appropriate alternative consenting regime. This might include, for example, the Town and Country Planning Act 1990, the Highways Act 1980, or the Transport and Works Act 1992, promoted by a third party if need be.

4.8 The Secretary of State will consider any relevant nationally significant road and rail elements of the applicant's proposals in accordance with the National Networks NPS and with the Airports NPS. If there is conflict between the Airports NPS and other NPSs, the conflict should be resolved in favour of the NPS that has been most recently designated. The Airports NPS and the National Networks NPS may also be a material consideration in decision making on applications for road and rail schemes associated with or related to the preferred scheme that fall under the Town and Country Planning Act 1990, the Transport and Works Act 1992, or other legislation relating to planning. Whether, and to what extent, the Airports NPS and the National Networks NPS are a material consideration will be judged on a case by case basis by the relevant decision makers.

4.9 The Examining Authority should only recommend, and the Secretary of State will only impose, requirements in relation to a development consent, that are necessary, relevant to planning, relevant to the development to be consented, enforceable, precise, and reasonable in all other respects.[114] The need for requirements in respect of the phasing of the scheme is likely to be an important consideration, so that effects of construction and operational phases are properly mitigated, as well as any changes in the operations of the airport that may occur in line with the phasing of physical works and commencement of operations. Guidance on the use of planning conditions or any successor to it should be taken into account where requirements are proposed.

4.10 Obligations under section 106 of the Town and Country Planning Act 1990 should only be sought where they are necessary to make the development acceptable in planning terms, (including where necessary to ensure compliance with the Airports NPS), directly related to the proposed development, and fairly and reasonably related in scale and kind to the development.[115]

Scheme variation

4.11 While the Government has decided that a Northwest Runway at Heathrow Airport is its preferred scheme to deliver additional airport capacity (an illustrative masterplan is at

[114] National Planning Policy Framework, March 2012, paragraph 206, or any successor document
[115] Town and Country Planning Act 1990, section 106; Regulation 122(2) Community Infrastructure Levy Regulations 2010; National Planning Policy Framework, March 2012, paragraph 204

Annex B of the Airports NPS), this does not limit variations resulting in the final scheme for which development consent is sought. To benefit from the full support of policy within the Airports NPS, any application(s) will have to fall within the boundaries and parameters set out in the Airports NPS. However, the form of a development for which an application is made is a matter for the applicant. The Airports NPS does not prejudice the viability or merits of any particular application, detailed scheme or applicant. It governs the location, limits and nature of such schemes. It will be for an Examining Authority, and ultimately the Secretary of State, to determine whether any future application is compliant with the Airports NPS, meets the need for additional capacity, and is of benefit to the UK, whilst minimising any harm caused.

Environmental Impact Assessment

4.12 All proposals for projects that are subject to the European Union's Environmental Impact Assessment Directive,[116] and are likely to have significant effects on the environment, must be accompanied by an environmental statement, describing the aspects of the environment likely to be significantly affected by the project.[117] The Directive specifically requires an Environmental Impact Assessment to identify, describe and assess effects on human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them. Schedule 4 to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017[118] sets out the information that should be included in the environmental statement. This includes a description of the likely significant effects of the proposed project on the environment, covering the direct effects and any indirect, secondary, cumulative, short-, medium- and long-term, permanent and temporary, positive and negative effects of the project, and also the measures envisaged for avoiding or mitigating significant adverse effects.

4.13 When examining a proposal to which the Airports NPS applies, the Examining Authority should ensure that likely significant effects at all stages of the project have been adequately assessed. The effects of any changes in operations, including the number of air traffic movements, during the construction and operational phases must be properly assessed and appropriate mitigation secured for any significant effects. Any requests for environmental information not included in the original environmental statement should be proportionate and focus only on likely significant effects. In the Airports NPS, the terms 'effects', 'impacts' or 'benefits' should accordingly be understood to mean likely significant effects, impacts or benefits.

4.14 When considering significant cumulative effects, any environmental statement should provide information on how the effects of an applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been granted, as well as those already in existence if they are not part of the baseline).[119]

4.15 The Examining Authority should consider how significant cumulative effects, and the interrelationship between effects, might as a whole affect the environment, even

[116] Directive 2014/52/EU of the European Parliament and of the Council amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The amendments to Directive 2011/92/EU made by Directive 2014/52/EU have been transposed into domestic legislation. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 have, subject to transitional arrangements, with amendments, consolidated the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 and various amending regulations

[117] http://www.legislation.gov.uk/uksi/2017/572/contents/made

[118] Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (S.I. 2017/572)

[119] The applicant should refer to the Planning Inspectorate's advice on assessing cumulative effects https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf

though they may be acceptable when considered on an individual basis or with mitigation measures in place.

4.16 In some instances it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case.

4.17 Effort should be made to refine the detail of the proposed development. However, where details are still to be finalised, such as in respect of the phasing of the development and operational changes at the airport, the applicant is advised to set out in the environmental statement the relevant design parameters used for the assessment. The environmental statement should explain, with reference to the parameters, what the maximum extent of the proposed development may be (for example in terms of site area) or the extent of change in respect of operational impacts, and assess the potential adverse effects which the project could have, to ensure that the impacts of the project as it may be constructed have been properly assessed.

4.18 Should the Secretary of State decide to grant development consent for an application where details are still to be finalised, this will need to be reflected in appropriate development consent requirements in the development consent order. It may be the case that development consent is granted for a proposal and, at a later stage, the applicant wishes (for technical or commercial reasons) to construct it in such a way that it is outside the terms of what has been consented, for example because its extent will be greater than has been provided for in terms of the consent. In this situation, it will be necessary for the applicant to apply for a change to be made to the development consent provided under the Planning Act 2008.

Habitats Regulations Assessment

4.19 Prior to granting development consent, the Secretary of State as competent authority must comply with the duties under the Conservation of Habitats and Species Regulations 2017. Under these regulations, if the competent authority considers that the proposed development is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and is not connected with or necessary to the management of that site, it must make an Appropriate Assessment of the implications for the site in view of the site's conservation objectives.[120] [121] The applicant should also refer to the Airports NPS sections on biodiversity, land use, and air quality. The competent authority must consult Natural England to ensure that impacts on European sites are adequately considered.

4.20 The applicant is required to provide sufficient information with their applications for development consent to enable the Secretary of State to carry out an Appropriate Assessment if required. This information should include details of any measures that are proposed to minimise or avoid any likely significant effects on a European site. The information provided may also assist the Secretary of State in concluding that an Appropriate Assessment is not required because significant effects on European sites

[120] This includes candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas, and is defined in Regulation 8 of the Conservation of Habitats and Species Regulations 2017

[121] Directive 2011/92/EU was amended in 2014 by Directive 2014/52/EU. As amended, Article 2(3) of the Directive provides that, where an obligation to assess environmental effects arises simultaneously from the EIA Directive and the Habitats Directive (Directive 92/43/EU) and/or the Wild Birds Directive (Directive 2009/147/EC), Member States "shall, where appropriate, ensure that coordinated and/or joint procedures" are provided for

are sufficiently unlikely that they can be excluded. If it is concluded there is likely to be a significant effect, or such effects cannot be ruled out (alone or in combination), an Appropriate Assessment is required.

4.21 If an Appropriate Assessment for a proposed airport development concludes that it is not possible to rule out an adverse effect on the integrity of a European site, the Habitats Directive permits a derogation, subject to the proposal meeting three tests. These tests are (a) that there are no less damaging alternative solutions, (b) that there are imperative reasons of overriding public interest for the proposal going ahead, and (c) that adequate and timely compensation measures will be put in place to ensure the overall coherence of the network of protected sites is maintained. At detailed design stage, and in so far as it may be necessary, the matters set out in the Airports NPS will be relevant to determining whether there are alternative solutions and imperative reasons of overriding public interest, provided that the design remains consistent with the objectives of the Airports NPS.

4.22 Where a development may negatively affect any priority natural habitat type or priority species,[122] any imperative reasons of overriding public interest case would need to be established solely on one or more of the grounds relating to human health, public safety or beneficial consequences of primary importance to the environment. The competent authority may only rely on other (i.e. social or economic) imperative reasons of overriding public interest if it has first obtained an opinion from the European Commission.

Equalities

4.23 The Airports Commission's stated objective on equalities was "to reduce or avoid disproportionate impacts on any social group".[123] At consultation stage, the Airports Commission carried out a high level Equality Impact Assessment.

4.24 The Appraisal of Sustainability to the Airports NPS sets out an assessment of equalities impacts, informed by the work of the Airports Commission. The Airports Commission was clear that its assessment was based upon current scheme design, and that a more detailed Equality Impact Assessment would likely be necessary as design, supporting measures and operational plans were developed.

4.25 The Airports Commission's assessment identified different types of equalities impacts for each of its shortlisted schemes, but no substantial difference in the overall extent of equalities impacts. The Airports Commission's assessment, and the assessment carried out for the Appraisal of Sustainability that informs the Airports NPS, both concluded that negative equalities impacts could be well mitigated through good design and operation, and supporting measures and plans.

4.26 The Department for Transport has reviewed the Airports Commission's work, informed by the Equality Assessment carried out as part of the Appraisal of Sustainability. The Government is satisfied that the scope of the Airports Commission's work was appropriate at this stage of scheme development, that the Airports Commission's approach was consistent with the Equality Act 2010, and that its conclusion is consistent with the evidence produced.

4.27 For any application to be considered compliant with the Airports NPS, it must be accompanied by a project level Equality Impact Assessment examining the potential impact of that project on groups of people with protected characteristics. In order to

[122] As listed in Annex I and II of the Habitats Directive
[123] *Airports Commission: Appraisal Framework*, p98

benefit from the support of the Airports NPS, the results of that project level Equality Impact Assessment must be within the legal limits and parameters of acceptability outlined in the Appraisal of Sustainability that informs the Airports NPS.

Assessing alternatives

4.28 The applicant should comply with all legal obligations and policy set out in the Airports NPS on the assessment of alternatives. In particular:

- The Environmental Impact Assessment Directive requires projects with significant environmental effects to include a description of the reasonable alternatives studied by the applicant which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the significant effects of the project on the environmental effects;
- There may also be other specific legal obligations requiring the consideration of alternatives, for example, under the Habitats and Water Framework Directives; and
- There may be policies in the Airports NPS requiring consideration of alternatives, for example the flood risk sequential test.

Criteria for 'good design' for airports infrastructure

4.29 The applicant should include design as an integral consideration from the outset of a proposal.

4.30 Visual appearance should be an important factor in considering the scheme design, as well as functionality, fitness for purpose, sustainability and cost. Applying 'good design' to airports projects should therefore produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction, and matched by an appearance that demonstrates good aesthetics as far as possible.

4.31 A good design should meet the principal objectives of the scheme by eliminating or substantially mitigating the adverse impacts of the development, for example by improving operational conditions. It should also mitigate any existing adverse impacts wherever possible, for example in relation to safety or the environment. A good design will also be one that sustains the improvements to operational efficiency for as many years as is practicable, taking into account capital cost, economics and environmental impacts.

4.32 Scheme design will be an important and relevant consideration in decision making. The Secretary of State will need to be satisfied that projects are sustainable and as aesthetically sensitive, durable, adaptable and resilient as they can reasonably be, having regard to regulatory and other constraints and including accounting for natural hazards such as flooding. The Secretary of State will also need to be satisfied that extant security, customs and immigration measures are maintained or reprovided.

4.33 The scheme should take into account, as far as possible, both functionality, including fitness for purpose and sustainability, and aesthetics, including the scheme's contribution to the quality of the area in which it would be located. The applicant will want to consider the role of technology in delivering new airports projects. Professional, independent advice on the design aspects of a proposal should be undertaken to ensure good design principles are embedded into infrastructure proposals.

4.34 There may be opportunities for the applicant to demonstrate good design in terms of siting and design measures relative to existing landscape and historical character and function, landscape permeability, landform, and vegetation.

4.35 The applicant should be able to demonstrate in its application how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, the applicant should set out the reasons why the favoured choice has been selected. The Examining Authority and Secretary of State will take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security standards which the design has to satisfy.

Costs

4.36 The relationship between cost and affordability for a scheme is governed by the regulated funding of the airport and funding from other sources, and the need to comply with the Government's guidance on compulsory acquisition of land under the Planning Act 2008.[124] This guidance is relevant to any scheme that will require the compulsory acquisition of land, which is expected in relation to any scheme to which this NPS applies which would include any application for development consent for a Northwest Runway at Heathrow Airport. That guidance sets out what a promoter must demonstrate if it is to be granted powers of compulsory acquisition - including in relation to impediments to a scheme and financial resources.

4.37 Heathrow Airport is subject to economic regulation by the Civil Aviation Authority (CAA) under the Civil Aviation Act 2012. As part of the CAA's discharge of its duty under the Civil Aviation Act 2012 to further the interests of users of air transport services (passengers and cargo owners), the CAA has granted an economic licence to the operator of Heathrow Airport to levy airport charges. This licence sets a maximum yield per passenger that can be recovered by the operator of Heathrow Airport through airport charges (the "maximum yield"). This maximum yield is set by the CAA having conducted a process that scrutinises, among other things, the business plan submitted by the licence holder and developed through constructive engagement with the airlines, as well as other submissions from airlines and stakeholders. This process of scrutiny of costs will include benchmarking exercises from industry professionals and assessments by an Independent Fund Surveyor as well as by the CAA. Expansion will also be subject to specific gateway reviews by airlines and stakeholders. The final business plan will include details of the future capital expenditure that the licensee proposes to incur.

4.38 For the development of new capacity at Heathrow, the CAA will set the maximum yield having regard to the matters required by the Civil Aviation Act 2012. The CAA will consider, among other things:

- the need to secure that the licence holder is able to finance its provision of airport operation services; and
- the economy and efficiency of the proposals set out in any business plan (including such capital expenditure proposals as are contained in it),

as part of its process of setting the maximum yield per passenger in the period covered by the price control.

[124] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/236454/Planning_Act_2008_-_Guidance_related_to_procedures_for_the_compulsory_acquisition_of_land.pdf

4.39 The applicant should demonstrate in its application for development consent that its scheme is cost-efficient and sustainable, and seeks to minimise costs to airlines, passengers and freight owners over its lifetime.

4.40 Detailed scrutiny of any business plan put forward by the licence holder will fall under the CAA's regulatory process under the Civil Aviation Act 2012, and the detailed matters considered under that process are not expected to be scrutinised in the same way during the examination and determination of an application for development consent. The CAA is a statutory consultee for all proposed applications relating to airports or which are likely to affect an airport or its current or future operation. The applicant is expected to provide the CAA with the information it needs to enable it to assist the Examining Authority in considering whether any impediments to the applicant's development proposals, insofar as they relate to the CAA's economic regulatory and other functions, are capable of being properly managed.

Climate change adaptation

4.41 The Planning Act 2008 requires the Secretary of State to have regard to the desirability of mitigating, and adapting to, climate change in designating an NPS.[125]

4.42 This section sets out how the Airports NPS puts Government policy on climate change adaptation into practice, and in particular how the applicant and the Secretary of State will take into account the effects of climate change when developing and considering airports infrastructure applications. Climate change mitigation is essential to minimise the most dangerous impacts of climate change, as previous global greenhouse gas emissions will already mean some degree of continued climate change for at least the next 30 years. Climate change is likely to mean that the UK will experience on average hotter, drier summers and warmer, wetter winters. There is potentially an increased risk of flooding, drought, heatwaves, intense rainfall events and other extreme events such as storms and wildfires, as well as rising sea levels.

4.43 Adaptation is therefore necessary to deal with the potential impacts of these changes that are already happening. 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.

4.44 The Government has published a set of UK Climate Projections, and every five years prepares a statutory UK Climate Change Risk Assessment and National Adaptation Programme.[126] In addition, the Climate Change Act 2008 adaptation reporting power has been used by Government to invite reporting authorities (a defined list of public bodies and statutory undertakers, including airports) to consider the impact on them of current and predicted climate change, and to report on progress implementing adaptation actions.[127] Successive strategies for adaptation reporting will be laid alongside five yearly updates to the National Adaptation Programme.

4.45 New airports infrastructure will typically be a long-term investment which will need to remain operational over many decades, in the face of a changing climate. Consequently, the applicant must consider the impacts of climate change when planning design, build and operation. Any accompanying environmental statement

[125] Planning Act 2008, section 10(3)(a)
[126] Climate Change Act 2008, section 58
[127] Climate Change Act 2008, section 62

should set out how the proposal will take account of the projected impacts of climate change.

4.46 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. This should cover the estimated lifetime of the new infrastructure. Should a new set of UK Climate Projections become available after the preparation of any environmental statement, the Examining Authority should consider whether it needs to request additional information from the applicant.

4.47 Where transport infrastructure has safety-critical elements, and the design life of the asset is 60 years or greater, the applicant should apply the latest available UK Climate Projections, considering at least a scenario that reflects a high level of greenhouse gas emissions at the 10%, 50% and 90% probability levels, to assess the impacts of climate change over the lifetime of the development.

4.48 The applicant should demonstrate that there are no critical features of infrastructure design which may be seriously affected by more radical changes to the climate beyond those projected in the latest set of UK Climate Projections. Any potential critical features should be assessed, taking account of the latest credible scientific evidence on, for example, sea level rise, and on the basis that necessary action can be taken to ensure the operation of the infrastructure over its estimated lifetime through potential further mitigation or adaptation.

4.49 Any adaptation measures should be based on the latest set of UK Climate Projections,[128] the most recent UK Climate Change Risk Assessment,[129] consultation with statutory consultation bodies, and any other appropriate climate projection data. Any adaptation measures must themselves also be assessed as part of any Environmental Impact Assessment and included in the environmental statement, which should set out how and where such measures are proposed to be secured.

4.50 If any proposed adaptation measures themselves give rise to consequential impacts, the Secretary of State will consider the impact in relation to the application as a whole and the assessment principles set out in the Airports NPS.

4.51 Adaptation measures can be required to be implemented at the time of construction where necessary and appropriate to do so.

4.52 Where adaptation measures are necessary to deal with the impact of climate change, and that measure would have an adverse effect on other aspects of the project or the surrounding environment, the Secretary of State may consider requiring the applicant to ensure that the adaptation measure could be implemented should the need arise, rather than at the outset of the development.

Pollution control and other environmental protection regimes

4.53 Issues relating to discharges or emissions from a proposed project which affect air quality, water quality, land quality or the marine environment, or which include noise, may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes. Relevant permissions will need to be obtained for any activities within the development that are regulated under those regimes before the activities can be operated.

[128] http://ukclimateprojections.metoffice.gov.uk/
[129] https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report

4.54 In deciding an application, the Secretary of State should focus on whether the development is an acceptable use of the land, and on the impacts of that use, rather than the control of processes, emissions or discharges themselves. The Secretary of State should assess the potential impacts of processes, emissions or discharges to inform decision making, but should work on the assumption that, in terms of the control and enforcement, the relevant pollution control regime will be properly applied and enforced. Decisions under the Planning Act 2008 should complement but not duplicate those taken under the relevant pollution control regime.

4.55 These considerations apply in an analogous way to other environmental regulatory regimes, including those on land drainage, flood defence, and biodiversity.

4.56 When an applicant applies for an environmental permit, the relevant regulator (in this case the Environment Agency) requires that processes are in place that are sufficient for the grant of the permit and to ensure compliance with conditions attached to any permit. In examining the impacts of the project, the Examining Authority may wish to seek the views of the regulator on the scope of the permit or consent and any management plans (such as any produced for noise) that would be included in an environmental permit application.

4.57 The applicant should begin pre-application discussions with the Environment Agency as early as possible. It is expected, however, that an applicant will have first considered what the Environment Agency is likely to require as a starting point for discussion. Some consents require a significant amount of preparation: as an example, the Environment Agency strongly recommends the applicant should start work towards submitting the permit application at least six months prior to the submission of a development consent order application, where it wishes to parallel track the applications. This will help ensure that applications take account of all relevant environmental considerations and that the relevant regulators are able to provide timely advice and assurance to the Examining Authority and the Secretary of State.

4.58 The Secretary of State will be satisfied that development consent can be granted taking full account of environmental impacts. This will require close cooperation with the Environment Agency, the local planning authority and pollution control authority, and other relevant bodies, such as Natural England, Drainage Boards, and water and sewerage undertakers, to ensure that, in the case of potentially polluting developments:

- The relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework; and
- The effects of existing sources of pollution in and around the project are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits.

4.59 The Secretary of State should not refuse consent on the basis of regulated impacts unless there is good reason to believe that any relevant necessary operational pollution control permits or licences or other consents will not subsequently be granted.

Common law nuisance and statutory nuisance

4.60 Section 158 of the Planning Act 2008 provides a defence of statutory authority in civil or criminal proceedings for nuisance. Such a defence is also available in respect of anything else authorised by an order granting development consent. The defence does not extinguish the local authority's duties under Part III of the Environmental Protection Act 1990 to inspect its area and take reasonable steps to investigate complaints of statutory nuisance and to serve an abatement notice where satisfied of its existence, likely occurrence or recurrence.

4.61 During the examination of an application for development consent for infrastructure covered under the Airports NPS, possible sources of nuisance under section 79(1) of the Environmental Protection Act 1990 and under sections 76 and 77 of the Civil Aviation Act 1982 should be considered by the Examining Authority. The Examining Authority should also consider how those sources of nuisance might be mitigated or limited so they can recommend appropriate requirements that the Secretary of State might include in any subsequent order granting development consent.

4.62 The defence of statutory authority is subject to any contrary provision made by the Secretary of State in any particular case by an order granting development consent.[130]

Security and safety considerations

4.63 National security considerations apply across all national infrastructure sectors. The Department for Transport acts as the sector sponsor department for the aviation sector, and in this capacity has lead responsibility for security matters and for directing the security approach to be taken, working with the Civil Aviation Authority. The Department for Transport works closely with Government agencies, including the Centre for the Protection of National Infrastructure, to reduce the vulnerability of the aviation sector to terrorism and other national security threats.

4.64 Government policy is to ensure that, where possible, proportionate protective security measures are designed into new infrastructure projects at an early stage in the project development. The nature of the aviation sector as a target for terrorism means that security considerations will likely apply in the case of the infrastructure project for which development consent may be sought under the Airports NPS.

4.65 Where national security implications have been identified, the applicant should consult with relevant security experts from the Centre for the Protection of National Infrastructure and the Department for Transport to ensure that physical, procedural and personnel security measures have been adequately considered in the design process, and that adequate consideration has been given to the management of security risks. If the Department for Transport, taking advice from the Civil Aviation Authority, Centre for the Protection of National Infrastructure and others it considers appropriate, forms the opinion that it is satisfied that current and potential future security needs are adequately addressed in the project and that relevant guidance on these matters has been appropriately taken into account in the application, it will provide confirmation of this to the Secretary of State, and the Examining Authority should not need to give any further consideration to the details of the security measures during the examination.

[130] Planning Act 2008, section 158(3)

4.66 The applicant should only include such security-related information in the application as is necessary to enable the Examining Authority to examine the development consent issues and make a properly informed recommendation on the application.

4.67 In exceptional cases where examination of an application would involve public disclosure of information about defence or national security which would not be in the national interest, the Secretary of State can intervene and may appoint an examiner to consider evidence in closed session.

4.68 Air transport is one of the safest forms of travel, and the UK is a world leader in aviation safety. Maintaining and improving that record, while ensuring that regulation is proportionate and cost-effective, remains of primary importance to the UK. Since 2003, rules and standards for aviation safety in Europe have increasingly been set by the European Aviation Safety Agency. The UK will continue to work closely with the European Aviation Safety Agency to ensure that a high and uniform level of civil aviation safety is maintained across Europe. The preferred scheme at Heathrow must comply with the UK's civil aviation safety regime, regulated by the Civil Aviation Authority.

4.69 There remains a considerable threat to aviation security from terrorism. The UK meets this threat with a multi-layered aviation security regime built on intelligence, effective risk management and robust, proportionate measures, brought together under the National Aviation Security Programme. The regulations governing aviation security in the UK have their basis in UK and European law, and are enforced by the Civil Aviation Authority on behalf of the Secretary of State. The design and operation of the Heathrow Northwest Runway scheme, to which the Airports NPS relates, must comply with aviation security regulations and guidance in the same way as existing airports. There may also be other security considerations linked to any application for development consent under the Airports NPS.

Health

4.70 The construction and use of airports infrastructure has the potential to affect people's health, wellbeing and quality of life. Infrastructure can have direct impacts on health because of traffic, noise, vibration, air quality and emissions, light pollution, community severance, dust, odour, polluting water, hazardous waste and pests.

4.71 New or enhanced airports infrastructure may also have indirect health impacts, for example if they affect access to key public services, local transport, opportunities for cycling and walking, or the use of open space for recreation and physical activity. It should also be noted, however, that the increased employment stemming from airport expansion may have indirect positive health impacts.

4.72 As described elsewhere in the Airports NPS, where the proposed project has likely significant environmental impacts that would have an effect on human beings, any environmental statement should identify and set out the assessment of any likely significant health impacts.

4.73 The applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. These impacts may affect people simultaneously, so the applicant, the Examining Authority and the Secretary of State (in determining an application for development consent) should consider the cumulative impact on health.

Accessibility

4.74 The Government is committed to creating a more accessible and inclusive transport network that provides a range of opportunities and choices for all people to connect with jobs, services and leisure opportunities. This commitment extends to all the users of new airports infrastructure, and to the associated surface access facilities.

4.75 In 2008, the Department for Transport published *Access to Air Travel for Disabled Persons and Persons with Reduced Mobility – Code of Practice*,[131] which sets out the legal framework and gives advice and information. Since then, the Equality Act 2010 has updated and extended the legal framework for accessibility.[132]

4.76 In accordance with legal and best practice in relation to accessibility:

- The Government requires the applicant to include clear details of how plans will improve access on and around the airport by designing and delivering schemes (both new construction and upgrade or refurbishment) that address the accessibility needs of all those who use, or are affected by, surface access infrastructure, including those with physical and/or mental impairments as well as older users. Every opportunity to deliver improvements in accessibility on and to the existing national road network should also be taken;
- The Government will continue to work to ensure that all bus and train fleets comply with legal access standards by 2020, and to improve rail station access for those with impairments in accordance with legislation and best practice; and
- The car will continue to play an important role, providing disabled people with independence where other forms of transport are not accessible or available. Easy access and car parking provision at the airports is essential to this goal and must meet standards set down in guidance (such as the Department for Transport's *Inclusive Mobility*).[133]

[131] http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/transportforyou/access/aviationshipping/accesstoairtravelfordisabled.pdf
[132] http://www.legislation.gov.uk/ukpga/2010/15/contents
[133] https://www.gov.uk/government/publications/inclusive-mobility

5. Assessment of impacts

Introduction

5.1 This chapter focuses on the potential impacts of the Heathrow Northwest Runway scheme, the assessments that any applicant will need to carry out, and the specific planning requirements that they will need to meet, in order to gain development consent.

5.2 In its Final Report, the Airports Commission recommended that "to make expansion possible…a comprehensive package of accompanying measures [should be recommended to] make the airport's expansion more acceptable to its local community, and to Londoners generally".[134]

5.3 When the Government stated in December 2015 that it agreed with the Airports Commission that one additional runway was required in the South East of England by 2030, it also emphasised the importance of securing the best possible deal for communities affected by the preferred scheme to increase airport capacity. The Government undertook further work, including through engagement with all three shortlisted scheme promoters, during 2016 to develop a package of location-specific measures to mitigate the impacts of increased capacity, and to enhance beneficial effects.

5.4 The Government announced on 25 October 2016 that its preferred scheme to deliver additional airport capacity in the South East of England was a Northwest Runway at Heathrow Airport. Alongside this, it set out a number of supporting measures that any application for development consent will be required to demonstrate and secure in order to mitigate the impacts of expansion on the environment and affected communities.

Surface access

Introduction

5.5 The Government's objective for surface access is to ensure that access to the airport by road, rail and public transport is high quality, efficient and reliable for passengers, freight operators and airport workers who use transport on a daily basis. The Government also wishes to see the number of journeys made to airports by sustainable modes of transport maximised as much as possible. This should be delivered in a way that minimises congestion and environmental impacts, for example on air quality.

5.6 A Northwest Runway at Heathrow Airport will have a range of impacts on local and national transport networks serving the airport, during both the construction and operational phases. Passengers, freight operators and airport workers share the

[134] *Airports Commission: Final Report*, p4

routes to and from the airport with other road and rail users, including commuters, leisure travellers and business users. Without effective mitigation, expansion is likely to increase congestion on existing routes and have environmental impacts such as increased noise and emissions.

5.7 The Airports Commission identified three major rail improvements which would support a new Northwest Runway at Heathrow Airport. These were Crossrail, a Western Rail Link to Heathrow and Southern Rail Access to the airport. Notwithstanding the requirements for the applicant's assessment set out below, Government has supported, or is supporting, all three of these schemes subject to a satisfactory business case and the agreement of acceptable terms with the Heathrow aviation industry. Crossrail is in construction and full services are anticipated to commence in 2019. The Western Rail Link to Heathrow was one of the schemes named as being in the 'develop' phase in the Rail Network Enhancements Pipeline, published in March 2018 and, subject to obtaining planning consent, it is expected to commence operations before 2030. Any Southern Rail Access to Heathrow is at an earlier stage of development and, subject to an acceptable business case and obtaining planning consent, should commence operations as soon as reasonably practicable after a new runway has opened.

5.8 It is important that improvements are made to Heathrow Airport's transport links to be able to support the increased numbers of people and freight traffic which will need to access the expanded airport, should development consent be granted.

Applicant's assessment

5.9 The applicant must prepare an airport surface access strategy in conjunction with its Airport Transport Forum, in accordance with the guidance contained in the Aviation Policy Framework.[135] The airport surface access strategy must reflect the needs of the scheme contained in the application for development consent, including any phasing over its development, implementation and operational stages, reflecting the changing number of passengers, freight operators and airport workers attributable to the number of air traffic movements. The strategy should reference the role of surface transport in relation to air quality and carbon. The airport surface access strategy must contain specific targets for maximising the proportion of journeys made to the airport by public transport, cycling or walking. The strategy should also contain actions, policies and defined performance indicators for delivering against targets, and should include a mechanism whereby the Airport Transport Forum can oversee implementation of the strategy and monitor progress against targets alongside the implementation and operation of the preferred scheme.

5.10 The applicant should assess the implications of airport expansion on surface access network capacity using the WebTAG methodology stipulated in the Department for Transport guidance,[136] or any successor to such methodology. The applicant should consult Highways England, Network Rail and highway and transport authorities, as appropriate, on the assessment and proposed mitigation measures. The assessment should distinguish between the construction and operational project stages for the development comprised in the application.

5.11 The applicant should also consult with Highways England, Network Rail and relevant highway and transport authorities, and transport operators, to understand the target completion dates of any third party or external schemes included in existing rail, road or other transport investment plans. It will need to assess the effects of the preferred

[135] https://www.gov.uk/government/publications/aviation-policy-framework, paragraphs 4.20-4.21
[136] https://www.gov.uk/guidance/transport-analysis-guidance-webtag

scheme as influenced by such schemes and plans. Such consultation and assessment, both of third party schemes on which the preferred scheme depends, and others which interact with it, all of which may be subject to their own planning, funding and approval processes, must be understood in terms of implications of the timings for the applicant's own surface access proposals.

5.12 The applicant will need to demonstrate that Highways England, Network Rail and any relevant highway and transport authorities and transport providers have been consulted, and are content with the deliverability of any new transport schemes or other changes required to existing links to allow expansion within the timescales required for the preferred scheme as a whole, the requirements of the Airports NPS and other statutory requirements. This includes changes to the M25 to allow a new runway to cross the motorway, local road changes, and improvements including the diversion of the A4 and A3044, changes to the Colnbrook Freight branch railway and on-airport station works and safeguarding. On the strategic road network, it will be important to ensure that any changes to the M25 which the applicant proposes will be implemented consistently with the Secretary of State's statutory directions and guidance set out in Highways England's licence. This includes ensuring that sufficient provision is made to accommodate flexibility and future-proofing in planning the long-term development, improvement and operation of Highways England's network.

5.13 For schemes and related surface access proposals or other works impacting on the strategic road network, the applicant should have regard to DfT Circular 02/2013, *The Strategic Road Network and the delivery of sustainable development*[137] (or prevailing policy), and the National Networks NPS. This sets out the way in which the highway authority for the strategic road network will engage with communities and the development industry to deliver sustainable development and economic growth, whilst safeguarding the primary function and purpose of the network.

5.14 The surface access systems and proposed airport infrastructure may have the potential to result in severance in some locations. Where appropriate, the applicant should seek to deliver improvements or mitigation measures that reduce community severance and improve accessibility.

Mitigation

5.15 In its application, the applicant should set out the mitigation measures that it considers are required to minimise and mitigate the effect of expansion on existing surface access arrangements.

5.16 The applicant should demonstrate in its assessment that the proposed surface access strategy will support the additional transport demands generated by airport expansion. This should be appropriately secured.

5.17 Any application for development consent and accompanying airport surface access strategy must include details of how the applicant will increase the proportion of journeys made to the airport by public transport, cycling and walking to achieve a public transport mode share of at least 50% by 2030, and at least 55% by 2040 for passengers. The applicant should also include details of how, from a 2013 baseline level, it will achieve a 25% reduction of all staff car trips by 2030, and a reduction of 50% by 2040.[138]

5.18 The applicant should commit to annual public reporting on performance against these specific targets. The airport surface access strategy should consider measures and

[137] https://www.gov.uk/government/publications/strategic-road-network-and-the-delivery-of-sustainable-development
[138] These mode share targets are derived from *Heathrow Airport Ltd. Statement of Principles*, part 5, paragraph 1.6 https://www.gov.uk/government/publications/heathrow-airport-limited-statement-of-principles

incentives which could help to manage demand by car users travelling to and from the airport, as well as physical infrastructure interventions, having at all times due regard to the effect of its strategy on the surrounding area and transport networks. The strategy should also include an assessment of the feasibility of the measures proposed as well as the benefits and disbenefits related to those measures, including any implications for Highways England, Network Rail and affected relevant highway authorities and transport providers. These measures could be used to help achieve mode share targets and should be considered in conjunction with measures to mitigate air quality impacts as described in the Airports NPS.

5.19 The Government expects the applicant to secure the upgrading or enhancing of road, rail or other transport networks or services which are physically needed to be completed to enable the Northwest Runway to operate. This includes works to the M25, local road changes and improvements including the diversion of the A4 and A3044, and on-airport station works and safeguarding, as set out in more detail in paragraph 5.12.

5.20 Where a surface transport scheme is not solely required to deliver airport capacity and has a wider range of beneficiaries, the Government, along with relevant stakeholders, will consider the need for a public funding contribution alongside an appropriate contribution from the airport on a case by case basis. The Government recognises that there may be some works which may not be required at the time the additional runway opens, but will be needed as the additional capacity becomes fully utilised. The same principle applies that, where a transport scheme is not solely required to deliver airport capacity, the Government, along with relevant stakeholders, will consider the need for a public funding contribution alongside an appropriate contribution from the airport on a case by case basis.

Decision making

5.21 The applicant's proposals will give rise to impacts on the existing and surrounding transport infrastructure. The Secretary of State will consider whether the applicant has taken all reasonable steps to mitigate these impacts during both the development and construction phase and the operational phase. Where the proposed mitigation measures are insufficient to effectively offset or reduce the impact on the transport network, arising from expansion, of additional passengers, freight operators and airport workers, the Secretary of State will impose requirements on the applicant to accept requirements and / or obligations to fund infrastructure or implement other measures to mitigate the adverse impacts, including air quality.

5.22 Provided the applicant is willing to commit to transport planning obligations to satisfactorily mitigate transport impacts identified in the transport assessment (including environment and social impacts), with costs being considered in accordance with the Department for Transport's policy on the funding of surface access schemes, development consent should not be withheld on surface access grounds.

Air quality

Introduction

5.23 Increases in emissions of pollutants during the construction or operational phases of the scheme could result in the worsening of local air quality. Increased emissions can contribute to adverse impacts on human health and on the natural environment.

5.24 The European Union has established common, health-based and ecosystem based ambient concentration limit values for the main pollutants in the Ambient Air Quality Directive (2008/50/EC) ('the Air Quality Directive'),[139] which member states are required to meet by specified dates.

5.25 Where compliance by those dates has not been achieved, the member state is required to put in place an action plan showing how the period of exceedance in each non-compliant area will be kept as short as possible. In December 2015, the UK submitted its national air quality plan for nitrogen dioxide, including a zonal plan for Greater London and the South East, for the approval of the European Commission.

5.26 In November 2016 the High Court ordered the Government to produce a modified air quality plan that delivers compliance in the shortest possible time. The Government published a final, modified air quality plan on 26 July 2017. The European Commission were notified of this plan on 31 July 2017.[140]

5.27 Other relevant legislation includes the fourth daughter Air Quality Directive (2004/107/EC), which sets targets for levels in outdoor air of certain toxic heavy metals and polycyclic aromatic hydrocarbons, and the National Emission Ceilings Directive (2016/2284/EU),[141] which sets national emission limits for a range of atmospheric pollutants.

5.28 Air quality impacts are generated by all types of infrastructure development to varying degrees, and the geographical extent and distribution can cover a large area. At Heathrow Airport in 2015, aircraft movements were modelled to have contributed 17% on average to local NOx concentrations at nearby roadside locations. Road transport, by comparison, accounted for 64% of NOx concentrations in the same areas. Off-road transport and mobile machinery (a category which would include airside vehicles) contributed 5%[142].

5.29 The Airports Commission identified (and in some cases quantified the impact of) a number of measures that would help mitigate any negative impacts on air quality.[143] In addition, for the Heathrow Northwest Runway scheme, the Airports Commission recommended the following supporting measures:

- That Heathrow Airport should be held to performance targets to increase the percentage of employees and passengers accessing the airport by public transport; and
- That the introduction of a congestion or access charge for road vehicles should be considered.

5.30 The Airports Commission undertook extensive analysis on air quality and concluded that expansion could take place within legal obligations (including in a high demand growth scenario). The Department for Transport conducted a study of the implications of the Government's 2015 national air quality plan on the conclusions of the Airports Commission's air quality assessment.[144]

5.31 Since this work was completed in June 2016, updated international evidence on vehicle emission forecasts was published at the end of September 2016. The Department for Transport has conducted further analysis to assess the impact that this updated evidence base would have on estimated compliance with EU limit values of

[139] The Ambient Air Quality Directive (2008/50/EC) was brought into law in England through the Air Quality Standards Regulations 2010
[140] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/633270/air-quality-plan-detail.pdf
[141] This Directive succeeds an earlier National Emissions Ceilings Directive (2001/81/EC) and contains transitional provisions
[142] Based on 2015 data from the Pollution Climate Mapping Model for roads affected by Heathrow emissions
[143] https://www.gov.uk/government/consultations/airports-commission-air-quality-assessment
[144] https://www.gov.uk/government/publications/airport-expansion-further-analysis-of-air-quality-data

expansion options at Heathrow Airport and Gatwick Airport. This analysis has been updated to take account of the revised aviation demand forecasts and the Government's final air quality plan. The result of this analysis helped inform the Government's view that, with a suitable package of policy and mitigation measures, including the Government's modified air quality plan, the Heathrow Northwest Runway scheme would be capable of being delivered without impacting the UK's compliance with air quality limit values.

Applicant's assessment

5.32 The applicant should undertake an assessment of the project, to be included as part of the environmental statement, demonstrating to the Secretary of State that the construction and operation of the Northwest Runway will not affect the UK's ability to comply with legal obligations. Failure to demonstrate this will result in refusal of development consent.

5.33 The environmental statement should assess:

- Existing air quality levels for all relevant pollutants referred to in the Air Quality Standards Regulations 2010 and the National Emission Ceilings Regulations 2002 (as amended) or referred to in any successor regulations;
- Forecasts of levels for all relevant air quality pollutants at the time of opening, (a) assuming that the scheme is not built (the 'future baseline'), and (b) taking account of the impact of the scheme, including when at full capacity; and
- Any likely significant air quality effects of the scheme, their mitigation and any residual likely significant effects, distinguishing between those applicable to the construction and operation of the scheme including any interaction between construction and operational changes and taking account of the impact that the scheme is likely to cause on air quality arising from road and other surface access traffic.

5.34 Defra publishes future national projections of air quality based on evidence of future emissions. Projections may be updated as the evidence base changes. The applicant's assessment should, in so far as practicable, be based on the latest available projections.

Mitigation

5.35 The Secretary of State will need to be satisfied that the mitigation measures put forward by the applicant are acceptable, including at the construction stage. A management / project plan may help record and secure mitigation measures.

5.36 Mitigation measures may affect the project design, layout, construction and operation, and / or may comprise measures to improve air quality in pollution hotspots beyond the immediate locality of the scheme.

5.37 While the precise package of mitigations should be subject to consultation with local communities and relevant stakeholders to ensure the most effective measures are taken forward, an extensive range of mitigation measures is likely to be required.

5.38 In addition, Heathrow Airport should continue to strive to meet its public pledge to have landside airport-related traffic no greater than today. To achieve this, it should set out and regularly review its plans to meet the mode share targets set at paragraph 5.17 above. Heathrow Airport should also develop and keep under review plans to improve the impact of road freight serving the airport.

5.39 Other mitigation measures which may be put forward by the applicant could include, but are not limited to:

- Landing charges structured to reward airlines for operating cleaner flights (for example NOx emissions charging);
- Zero- or low-emission hybrid or electric vehicle use (ultra-low emission vehicles), charging and fuel facilities;
- Reduced or single engine taxiing (improved taxiing efficiency);
- Reducing emissions from aircraft at the gate (for example installation of fixed electrical ground power and preconditioned air to aircraft stands to reduce the use of auxiliary power unit);
- Modernised heating supplies in airport buildings;
- Changes to the layout of surface access arrangements;
- Traffic restrictions and / or traffic relocation around sensitive areas;
- An emissions-based access charge; and
- Physical means, including barriers to trap or better disperse emissions and speed control on roads.

5.40 Mitigation measures at the construction stage should also be provided and draw on best practice from other major construction schemes, including during the procurement of contractors. Specific measures could include but are not limited to:

- Development of a construction traffic management plan (which may include the possible use of rail and consolidation sites or waterways);
- The use of low emission construction plant / fleet, fitting of diesel particulate filters, and use of cleaner engines;
- The use of freight consolidation sites;
- Active workforce management / a worker transport scheme;
- Construction site connection to grid electricity to avoid use of mobile generation; and
- Selection of construction material to minimise distance of transport and increase recycling percentages of the material where appropriate.

5.41 The implementation of mitigation measures may require working with partners to support their delivery.

Decision making

5.42 The Secretary of State will consider air quality impacts over the wider area likely to be affected, as well as in the vicinity of the scheme. In order to grant development consent, the Secretary of State will need to be satisfied that, with mitigation, the scheme would be compliant with legal obligations that provide for the protection of human health and the environment.

5.43 Air quality considerations are likely to be particularly relevant where the proposed scheme:

- is within or adjacent to Air Quality Management Areas,[145] roads identified as being above limit values, or nature conservation sites (including Natura 2000 sites and Sites of Special Scientific Interest);
- would have effects sufficient to bring about the need for new Air Quality Management Areas or change the size of an existing Air Quality Management Area, or bring about changes to exceedances of the limit values, or have the potential to have an impact on nature conservation sites; and
- after taking into account mitigation, would lead to a significant air quality impact in relation to Environmental Impact Assessment and / or to a deterioration in air quality in a zone or agglomeration.

Noise

Introduction

5.44 The impact of noise from airport expansion is a key concern for communities affected, and the Government takes this issue very seriously. High exposure to noise is an annoyance, can disturb sleep, and can also affect people's health. Aircraft operations are by far the largest source of noise emissions from an airport, although noise will also be generated from ground operations and surface transport, and during the construction phase of a scheme.

5.45 Aircraft noise is not only determined by the number of aircraft overhead, but also by engine technologies and airframe design, the paths the aircraft take when approaching and departing from the airport, and the way in which the aircraft are flown.

5.46 Over recent decades, there have been reductions in aviation noise due to technological and operational improvements, and this trend is expected to continue.[146] New technology is already making aircraft quieter. Newer generation aircraft coming into service have a noise footprint typically 50% smaller on departure than the ones they are replacing, and at least 30% smaller on arrival. In addition, further opportunities for noise reductions are expected in the next decade as part of the UK airspace modernisation programme. One of the key benefits of this programme is expected to be "reduced noise from aircraft overflying communities, with less 'holding' at lower altitudes".[147] However, evidence has shown that people's sensitivity to noise has increased in recent years, and there has been growing evidence that exposure to high levels of aircraft noise can adversely affect people's health.[148] Expansion will lead to a rise in the number of flights in the local area compared to a no expansion scenario.

5.47 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 impacts of flights. There is no European or national legislation which sets legally binding limits on aviation noise emissions. Major airports are, however, under a legal obligation[149] to

[145] https://uk-air.defra.gov.uk/aqma/
[146] *The Sustainable Aviation Noise Roadmap, A Blueprint for Managing Noise from Aviation Sources to 2050*: http://www.sustainableaviation.co.uk/road-maps/
[147] UK Airspace Policy: A framework for balanced decisions on the design and use of airspace, p21, para 3.9, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/588186/uk-airspace-policy-a-framework-for-balanced-decisions-on-the-design-and-use-of-airspace-web-version.pdf
[148] *CAP 1164, Aircraft noise, sleep disturbance and health effects 2014*: http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=6275
CAP 1506, Survey of noise attitudes 2014: Aircraft http://www.gov.uk/government/publications/survey-of-attitudes-to-aviation-noise
[149] The EU Environmental Noise Directive 2002/49 which is implemented in England by the Environmental Noise (England) Regulations 2006 (S.I. 2006/2238 as amended)

develop strategic noise maps and produce Noise Action Plans based on those maps, on a five yearly basis. They are also required to review and, if necessary, revise action plans when a major development occurs affecting the existing noise situation. In addition, the Government already expects the noise-designated airports (Heathrow, Gatwick and Stansted) to produce noise exposure maps on an annual basis.

5.48 The International Civil Aviation Organisation introduced the concept of a 'Balanced Approach' to noise management (resolution A33/7). This is given legal effect in the UK through EU Regulation 598/2014.[150]

5.49 The Airports Commission undertook a thorough assessment of the noise impacts of the proposed development. The Airports Commission used a "noise scorecard" to assess the noise impacts of the scheme in 2030, 2040 and 2050.[151] The noise scorecard included both conventional metrics, which assess noise levels over a period of time (daytime, night time and 24-hour), and more innovative metrics that assess the number of times a location is overflown by aircraft whose noise impacts exceed a specified level.

5.50 The Airports Commission's assessment was based on 'indicative' flight path designs, which the Government considers to be a reasonable approach at this stage in the process. Precise flight path designs can only be defined at a later stage after detailed airspace design work has taken place. This work will need to consider the various options available to ensure a safe and efficient airspace which also mitigates the level of noise disturbance. Once the design work has been completed, the airspace proposal will be subject to extensive consultation as part of the separate airspace decision making process established by the Civil Aviation Authority.

5.51 The Airports Commission concluded that "expansion at Heathrow must be taken forward with a firm guarantee that the airport and its airlines will be held to the very highest standards of noise performance". In addition, the Airports Commission stated that "the airport should not be allowed to expand without appropriate conditions being put in place in respect of its noise impacts".[152]

Applicant's assessment

5.52 Pursuant to the terms of the Environmental Impact Assessment Regulations,[153] the applicant should undertake a noise assessment for any period of change in air traffic movements prior to opening, for the time of opening, and at the time the airport is forecast to reach full capacity, and (if applicable, being different to either of the other assessment periods) at a point when the airport's noise impact is forecast to be highest. This should form part of the environmental statement. The noise assessment should include the following:

- A description of the noise sources;
- An assessment of the likely significant effect of predicted changes in the noise environment on any noise sensitive premises (including schools and hospitals) and noise sensitive areas (including National Parks and Areas of Outstanding Natural Beauty);
- The characteristics of the existing noise environment, including noise from aircraft, using noise exposure maps, and from surface transport and ground operations

[150] Regulation (EU) No 598/2014 of the European Parliament and of the Council on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC
[151] *Airports Commission: Final Report*, p170-171
[152] *Airports Commission: Final Report*, p276
[153] Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (S.I. 2017/572)

associated with the project, the latter during both the construction and operational phases of the project;

- A prediction on how the noise environment will change with the proposed project; and
- Measures to be employed in mitigating the effects of noise.

These should take into account construction and operational noise (including from surface access arrangements) and aircraft noise. The applicant's assessment of aircraft noise should be undertaken in accordance with the developing indicative airspace design. This may involve the use of appropriate design parameters and scenarios based on indicative flightpaths.

5.53 Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. For the prediction, assessment and management of construction noise, reference should be made to any British Standards and other guidance which give examples of mitigation strategies. In assessing the likely significant impacts of aircraft noise, the applicant should have regard to the noise assessment principles, including noise metrics, set out in the national policy on airspace.

Mitigation

5.54 Noise management at airports where a noise problem has been identified is subject to the concept of a 'Balanced Approach', referred to above. EU Regulation 598/2014, which adopts the Balanced Approach,[154] also lays down a procedure for the adoption of noise-related operating restrictions, in particular a requirement for prior consultation.

5.55 The Government recognises that aircraft noise is a significant concern to communities affected and that, as a result of additional runway capacity, noise- related action will need to be taken. Such action should strike a fair balance between the negative impacts of noise and positive impacts of flights.

5.56 The Government also recognises that predictable periods of relief from aircraft noise (known as respite) are important for communities affected, and that noise at night is widely regarded as the least acceptable aspect of aviation noise for those communities, with the costs on communities of aircraft noise during the night (particularly the health costs associated with sleep disturbance) being higher.

5.57 While the package and detail of noise mitigation measures should be subject to consultation with local communities and other stakeholders to ensure the most appropriate and effective measures are taken forward, in the context of Government policy on sustainable development, the Government expects the applicant to make particular efforts to avoid significant adverse noise impacts and mitigate other adverse noise impacts as a result of the Northwest Runway scheme and Heathrow Airport as a whole.

5.58 The Secretary of State will consider whether the mitigation measures put forward by the applicant following consultation are acceptable. The noise mitigation measures should ensure the impact of aircraft noise is limited and, where possible, reduced compared to the 2013 baseline assessed by the Airports Commission.[155]

[154] For the purposes of EU Regulation 598/2014, an airport means an airport which has more than 50,000 civil aircraft movements per calendar year (a movement being a take-off or landing), on the basis of the average number of movements in the last three calendar years before the noise assessment

[155] With reference to the 2013 baseline for the 54 decibel LAeq, 16h noise contour assessed by the Airports Commission. LAeq,16h indicates the annual average noise levels for the 16-hour period between 0700 – 2300

5.59 The applicant should specifically seek to deliver the mitigation measures set out in paragraphs 5.60-5.62 below.

5.60 The applicant should put forward plans for a noise envelope. Such an envelope should be tailored to local priorities and include clear noise performance targets. As such, the design of the envelope should be defined in consultation with local communities and relevant stakeholders, and take account of any independent guidance such as from the Independent Commission on Civil Aviation Noise. The benefits of future technological improvements should be shared between the applicant and its local communities, hence helping to achieve a balance between growth and noise reduction. Suitable review periods should be set in consultation with the parties mentioned above to ensure the noise envelope's framework remains relevant.

5.61 The applicant should put forward plans for a runway alternation scheme that provides communities affected with predictable periods of respite (though the Government acknowledges that the duration of periods of respite that currently apply will be reduced). Predictability should be afforded to the extent that this is within the airport operator's control.[156] The details of any such scheme, including timings, duration and scheduling, should be defined in consultation with local communities and relevant stakeholders, and take account of any independent guidance such as from the Independent Commission on Civil Aviation Noise.

5.62 The Government also expects a ban on scheduled night flights for a period of six and a half hours, between the hours of 11pm and 7am, to be implemented.[157] The rules around its operation, including the exact timings of such a ban, should be defined in consultation with local communities and relevant stakeholders, in line with EU Regulation 598/2014. In addition, outside the hours of a ban, the Government expects the applicant to make particular efforts to incentivise the use of the quietest aircraft at night.

5.63 It is recognised that Heathrow Airport already supports a number of initiatives to mitigate aircraft noise, such as developing quieter operating procedures (like steeper descent approaches) and keeping landing gear up as long as possible. The applicant is expected to continue to do so, and to explore all opportunities to mitigate operational noise in line with best practice. The implementation of such measures may require working with partners to support their delivery.

5.64 Noise mitigation measures at the construction stage should also be provided. These should draw on best practice from other major construction schemes, with due regard given to any relevant British Standards and other guidance, and should be taken into account during the procurement of contractors.

5.65 Other measures to mitigate noise during the construction and operation of the development may include one or more of the following:

- Reducing noise at point of generation and containment of noise generated;
- Where possible, optimising the distance between source and noise-sensitive receptors, and incorporating good design to minimise noise transmission through screening by natural barriers or other buildings; and
- Restricting activities allowed on the site.

5.66 The Secretary of State will expect the applicant to put forward proposals as to how these measures may be secured and enforced, including the bodies who may enforce

[156] Examples of circumstances outside of an airport operator's control might be severe weather disruption and similar events
[157] 11pm to 7am is the standard night period used in noise measurement, and is used in World Health Organisation guidelines and the Environmental Noise Directive

the measures. These bodies might include the Secretary of State, local authorities (including those over a wider area), and / or the Civil Aviation Authority.

Decision making

5.67 The proposed development must be undertaken in accordance with statutory obligations for noise.[158] Due regard must have been given to national policy on aviation noise, and the relevant sections of the Noise Policy Statement for England,[159] the National Planning Policy Framework,[160] and the Government's associated planning guidance on noise.[161] However, the Airports NPS must be used as the primary policy on noise when considering the Heathrow Northwest Runway scheme, and has primacy over other wider noise policy sources.

5.68 Development consent should not be granted unless the Secretary of State is satisfied that the proposals will meet the following aims for the effective management and control of noise, within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life from noise;
- Mitigate and minimise adverse impacts on health and quality of life from noise; and
- Where possible, contribute to improvements to health and quality of life.

Carbon emissions

Introduction

5.69 The Planning Act 2008 requires that a national policy statement must give reasons for the policy set out in the statement and an explanation of how the policy set out in the statement takes account of Government policy relating to the mitigation of, and adaptation to, climate change.[162] The Government has a number of international and domestic obligations to limit carbon emissions. Emissions from both the construction and operational phases of the project will be relevant to meeting these obligations.

5.70 The Government's key objective on aviation emissions, as outlined in the Aviation Policy Framework, is to ensure that the aviation sector makes a significant and cost-effective contribution towards reducing global emissions.[163] This must be achieved while minimising the risk of putting UK businesses at a competitive international disadvantage. The development of the Heathrow Northwest Runway scheme being considered under the Airports NPS does not override this objective.

5.71 The UK's obligations on greenhouse gas emissions are set under the 2008 Climate Change Act. Under this framework, the UK has a 2050 target to reduce its greenhouse gas emissions by at least 80% on 1990 levels, and has a series of five year carbon budgets on the way to 2050.

Coverage of aviation emissions under the UK's Climate Change Act

5.72 Whilst UK domestic aviation emissions are included in the 2050 target, international aviation emissions are not currently formally included within the UK's 'net carbon account' for greenhouse gas emissions and are therefore not included in the 2050 target as defined by the Climate Change Act, nor within the first five carbon budgets. The Climate Change Act says that the Government must "take into account" the

[158] EU Regulation 598/2014; The Environmental Noise (England) Regulations 2006
[159] Noise policy statement for England, March 2010, https://www.gov.uk/government/publications/noise-policy-statement-for-england
[160] National Planning Policy Framework, March 2012, paragraph 123, or any successor document
[161] https://www.gov.uk/guidance/noise--2
[162] Planning Act 2008, section 5(8)
[163] *Aviation Policy Framework*, paragraph 12

"estimated amount of reportable emissions from international aviation for the budgetary period or periods in question" when setting carbon budgets. The Committee on Climate Change has interpreted the requirement to take these emissions into account as requiring the UK to aim to meet a 2050 target which includes these emissions, and has made its recommendations for the levels of the existing carbon budgets on this basis.

5.73 The Government has accepted the Committee on Climate Change's recommendations on the first five carbon budgets. The fifth carbon budget, for the period 2028-2032, was set in July 2016 in line with the Committee on Climate Change's advice. In effect, this means that carbon budgets for other sectors of the UK economy have been set at a level which the Committee on Climate Change considers is consistent with meeting the overall 2050 target when international aviation emissions are included.

Impacts

5.74 The carbon impact of the proposed development falls into four areas: increased emissions from air transport movements (both international and domestic) as a result of increased demand, emissions from airport buildings and ground operations, emissions from surface transport accessing the expanded airport, and emissions caused by construction. The first is by far the largest of these impacts.

5.75 The Airports Commission used two sets of carbon scenarios: one in which a cap is imposed on UK aviation emissions in line with the Committee on Climate Change's planning assumption of 37.5 million tonnes of CO_2 in 2050; and another in which an international trading mechanism allows carbon emissions from aviation to be offset by paying for emissions reductions in other sectors of the global economy. The analysis also assumed certain carbon-limiting developments largely outside the applicant's control. These include growth in numbers of more fuel-efficient aircraft, increasing use of biofuels, and other airline operational measures.

Applicant's assessment

5.76 Pursuant to the terms of the Environmental Impact Assessment Regulations,[164] the applicant should undertake an assessment of the project as part of the environmental statement, to include an assessment of any likely significant climate factors. The applicant should provide evidence of the carbon impact of the project (including embodied carbon), both from construction and operation, such that it can be assessed against the Government's carbon obligations, including but not limited to carbon budgets. The applicant should quantify the greenhouse gas impacts before and after mitigation to show the impacts of the proposed mitigation. This will require emissions to be split into traded sector and non-traded sector emissions, and for a distinction to be made between international and domestic aviation emissions.

5.77 As far as possible, the applicant's assessment should also seek to quantify impacts including:

- Emissions from surface access due to airport and construction staff;
- Emissions from surface access due to freight and retail operations and construction site traffic.
- Emissions from surface access due to airport passengers / visitors; and
- Emissions from airport operations including energy and fuel use.

[164] Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (S.I. 2017/572). Regulation 5(2)(c) refers to the significant effects of the proposed development on, among other factors, climate.

This should be undertaken in both a 'do minimum' and also in the 'do something' scenario for the opening, peak operation, and worst case scenarios.

Mitigation

5.78 The Secretary of State will need to be satisfied that the mitigation measures put forward by the applicant are acceptable, including at the construction stage. A management / project plan may help clarify and secure mitigation at this stage. The applicant is expected to take measures to limit the carbon impact of the project, which may include, but are not limited to:

- Zero or low-emission hybrid or electric vehicle use (ultra-low emission vehicles), charging and fuel facilities;
- Reduced engine taxiing (improved taxiing efficiency);
- Reducing emissions from aircraft at the gate;
- Reduced emissions from airport buildings (for example from lower carbon heating);
- Changes to the layout of surface access arrangements; and
- Encouraging increased use of public transport by staff and passengers.

5.79 Aircraft are expected to become cleaner as technology and standards improve and fleets evolve. It is recognised that the applicant already supports a number of initiatives to reduce the carbon emissions from flights, such as reduced-engine taxiing and ground-towing, and airspace and navigational reform.

5.80 Mitigation measures at the construction stage should also be provided and draw on best practice from other major construction schemes, including during the procurement of contractors. Specific measures could include but are not limited to:

- Development of a construction traffic management plan (which may include the possible use of rail and consolidation sites);
- Transport of materials to site by alternative modes to road (for example by rail or water);
- Increased efficiency in use of construction plant;
- Use of energy efficient site accommodation;
- Reduction of waste, and the transport of waste;
- Construction site connection to grid electricity to avoid use of mobile generation;
- Selection of construction material to utilise low carbon options; and
- Selection of construction material to minimise distance of transport.

5.81 The implementation of mitigation measures may require working with partners to support their delivery.

Decision making

5.82 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.

5.83 Evidence of appropriate mitigation measures (incorporating engineering plans on configuration and layout, and use of materials) in both design and construction should be presented as part of any application for development consent. The Secretary of

State will consider the effectiveness of such mitigation measures in order to ensure that, in relation to design and construction, the carbon footprint is not unnecessarily high. The Secretary of State's view of the adequacy of the mitigation measures relating to design, construction and operational phases will be a material factor in the decision making process.

Biodiversity and ecological conservation

Introduction

5.84 Biodiversity is the variety of plant and animal life in the world or in a particular habitat, and encompasses all species of plants and animals and the complex ecosystems of which they are a part. Government policy for the natural environment, including on biodiversity, is set out in the *Natural Environment White Paper*.[165] The biodiversity section in the *Natural Environment White Paper* sets out a vision of moving progressively from new biodiversity loss to net gain, by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. It is also a requirement of the Water Framework Directive to protect and enhance biodiversity associated with the water environment. Geological conservation relates to the sites that are designated for their geology and / or geomorphological importance.[166]

5.85 The Government's biodiversity strategy is set out in *Biodiversity 2020: A Strategy for England's wildlife and ecosystem services*.[167] Its aim is to halt overall biodiversity loss, support healthy, well-functioning ecosystems, and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people. The contribution that the planning system should make to enhancing the local and natural environment, including establishing coherent ecological networks, is set out in the National Planning Policy Framework, to which the applicant should also refer.[168]

5.86 The National Planning Policy Framework states that pursuing sustainable development involves seeking positive improvements in the quality of the built, natural and historic environment, as well as in people's quality of life. This includes moving from a net loss of biodiversity to achieving net gains for nature.[169]

5.87 The wide range of legislative provisions at the international and national level that can impact on planning decisions affecting biodiversity and ecological conservation is set out in the Planning Practice Guidance on biodiversity and ecosystems.[170] This includes a description of the potential impacts on internationally, nationally and locally protected sites which may arise through development, and should therefore be considered through further assessment.

5.88 Airport development may require the netting of open watercourses to manage the risk of bird strike, which may have a detrimental impact on water environment and biodiversity.

Applicant's assessment

5.89 The applicant should ensure that the environmental statement submitted with its application for development consent clearly sets out any likely significant effects on

[165] https://www.gov.uk/government/publications/the-natural-choice-securing-the-value-of-nature
[166] A list of designated sites is included in the Geological Conservation Review held by the Joint Nature Conservation Committee
[167] https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services
[168] National Planning Policy Framework, March 2012, paragraph 109, or any successor document
[169] National Planning Policy Framework, March 2012, paragraph 9, or any successor document
[170] http://planningguidance.communities.gov.uk/blog/guidance/natural-environment/biodiversity-ecosystems-and-green-infrastructure/

internationally, nationally and locally designated sites of ecological or geological importance, protected species, and habitats and other species identified as being of principal importance for the conservation of biodiversity.

5.90 The Environmental Impact Assessment should reflect the principles of *Biodiversity 2020* and identify how the effects on the natural environment will be influenced by climate change, and how ecological networks and their physical and biological process will be maintained.

5.91 The applicant should show how the project has taken advantage of and maximised opportunities to conserve biodiversity and geological conservation interests.

Mitigation

5.92 The Secretary of State will consider what requirements should be attached to any consent and / or in any planning obligations entered into in order to ensure that mitigation measures are delivered and monitored for their effectiveness.

5.93 The Secretary of State will take account of any mitigation measures agreed between the applicant and Natural England, and whether Natural England has granted or refused, or intends to grant or refuse, any relevant licences, including protected species mitigation licences.

5.94 The applicant's proposal should address the mitigation hierarchy (which supports efforts to conserve and enhance biodiversity), which is set out in the National Planning Policy Framework.[171]

5.95 Compensation ratios relating to the effects of the preferred scheme should be considered in more detail during the design. The application of 2:1 compensation ratio is considered to represent the minimum requirement. However, there are other mechanisms for establishing compensation ratios, such as Defra's biodiversity offsetting metric. Equally, it is important to note that habitat ratios form only one part of potential compensation which should be considered, and the location and quality of any compensation land is of key importance. In this regard, habitat creation, where required, should be focused on areas where the most ecological and ecosystems services benefits can be realised.

Decision making

5.96 As a general principle, and subject to the specific policies set out below and the Infrastructure Planning (Decisions) Regulations 2010,[172] development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives. The applicant may also wish to make use of biodiversity offsetting in devising compensation proposals to counteract any impacts on biodiversity which cannot be avoided or mitigated.[173] Where significant harm cannot be avoided or mitigated, as a last resort appropriate compensation measures should be sought. The development consent order, or any associated planning obligations, will need to make provision for the long term management of such measures.

5.97 In taking decisions, the Secretary of State will ensure that appropriate weight is attached to designated sites of international, national and local importance, protected

[171] National Planning Policy Framework, March 2012, paragraph 118, or any successor document
[172] http://www.legislation.gov.uk/uksi/2010/305/regulation/7/made
[173] https://www.gov.uk/government/collections/biodiversity-offsetting Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for residual adverse biodiversity impacts arising from a development after mitigating measures have been taken. The goal of biodiversity offsets is to achieve no net loss and, preferably, a net gain of biodiversity

species, habitats and other species of principal importance for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment.

International sites

5.98 The most important sites for biodiversity are those identified through international conventions and European Directives. The Habitats Regulations provide statutory protection for European sites and require an assessment of impacts upon such sites.[174] The Government considers that the following wildlife sites should have the same protection as European sites:

- Potential Special Protection Areas and possible Special Areas of Conservation;
- Listed or proposed Ramsar sites;[175] and
- Sites identified or required as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

5.99 At this stage, it is not possible to rule out adverse effects of the Heathrow Northwest Runway scheme, given that more detailed project design information, and detailed proposals for mitigation, are not presently available. However, the applicant will need to demonstrate that Article 6(3) or 6(4) of the Habitats Directive are complied with in order to satisfy the competent authority that development consent can be granted on that basis.

Sites of Special Scientific Interest

5.100 Many Sites of Special Scientific Interest are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of Sites of Special Scientific Interest that are not covered by an international designation, will be given a high degree of protection. All National Nature Reserves are notified as Sites of Special Scientific Interest.

5.101 Where a proposed development on land within or outside a Site of Special Scientific Interest is likely to have an adverse effect on the site (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect on the site's notified special interest features is likely, an exception should be made only where the benefits of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest. The Secretary of State will ensure that the applicant's proposals to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest, are acceptable. Where necessary, requirements and / or planning obligations should be used to ensure these proposals are delivered.

Regional and local sites

5.102 Sites of regional and local biodiversity interest (which include Local Nature Reserves, Local Wildlife Sites and Nature Improvement Areas) have a fundamental role to play in meeting overall national biodiversity targets, contributing to the quality of life and the wellbeing of the community, and supporting research and education. The Secretary of State will give due consideration to such regional or local designations. However,

[174] This includes candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas, and is defined in Regulation 8 of the Conservation of Habitats and Species Regulations 2010

[175] Potential Special Protection Areas, possible Special Areas of Conservation and proposed Ramsar sites are sites on which Government has initiated public consultation on the scientific case for designation as a Special Protection Area, candidate Special Area of Conservation or Ramsar site

given the need for new infrastructure, these designations should not be used in themselves to refuse development consent, although adequate compensation should always be considered, and ecological corridors and their physical processes should be maintained as a priority to mitigate widespread impacts.

Irreplaceable habitats including ancient woodland and veteran trees

5.103 Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost, it cannot be recreated. The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss. Aged or veteran trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided.[176] Where such trees would be affected by development proposals, the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons for this.

Biodiversity within and around developments

5.104 The proposed development comprised in the preferred scheme should provide many opportunities for building in beneficial biodiversity as part of good design. When considering proposals, the Secretary of State will consider whether the applicant has maximised such opportunities in and around developments, and particularly to establishing and enhancing green infrastructure. The Secretary of State may use requirements or planning obligations where appropriate in order to ensure that such beneficial features are delivered.

Protection of other habitats and species

5.105 In addition to the habitats and species that are subject to statutory protection or international, regional or local designation, other habitats and species have been identified as being of principal importance for the conservation of biodiversity in England and Wales and therefore requiring conservation action. The Secretary of State will ensure that the applicant has taken measures to ensure that these other habitats and species are protected from the adverse effects of development. Where appropriate, requirements or planning obligations may be used in order to deliver this protection. The Secretary of State will refuse consent where harm to these other habitats, or species and their habitats, would result, unless the benefits of the development (including need) clearly outweigh that harm. In such cases, compensation will generally be expected to be included in the design proposals.

Land use including open space, green infrastructure and Green Belt

Introduction

5.106 Access to high quality open spaces and the countryside[177] and opportunities for sport and recreation can be a means of providing necessary mitigation and / or compensation requirements. Green infrastructure can enable developments to provide positive environmental and economic benefits.

[176] This does not prevent the loss of such trees where the decision maker is satisfied that their loss is unavoidable

[177] All open space of public value, including not just land but also areas of water (such as rivers, canals, lakes and reservoirs) which offer important opportunities for sport and recreation and can act as a visual amenity

5.107 Green Belts, defined in a development plan,[178] are situated around certain cities and built up areas, including London. The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open. The essential characteristics of Green Belts are their openness and their permanence. Further information on the purposes and protection of Green Belt is set out in the National Planning Policy Framework.[179]

5.108 Best and most versatile agricultural land is land which is most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non-food uses such as biomass, fibres and pharmaceuticals. The National Planning Policy Framework sets out how local planning authorities should take into account the economic and other benefits of best and most versatile agricultural land.[180] Planning practice guidance for the natural environment provides additional guidance on best and most versatile agricultural land and soil issues.

5.109 Development of land will affect soil resources, including physical loss of and damage to soil resources, through land contamination and structural damage. Indirect impacts may also arise from changes in the local water regime, organic matter content, soil biodiversity and soil process.

5.110 Construction and operation of airport facilities is a potential source of contaminative substances (for example, through de-icing or leaks and spills of fuel). Where pre-existing land contamination is being considered through development, the objective is to ensure that the site is suitable for its intended use. Risks would require consideration in accordance with the contaminated land statutory guidance as a minimum.[181]

Applicant's assessment

5.111 The applicant should identify existing and proposed land uses[182] near the project, including any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing. The applicant should also assess any effects of precluding a new development or use proposed in the development plan. The assessment should be proportionate to the scale of the preferred scheme and its likely impacts on such receptors.

5.112 Existing open space, sports and recreational buildings and land should not be developed unless the land is no longer needed or the loss would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location. If the applicant is considering proposals which would involve developing such land, it should have regard to any local authority's assessment of need for such types of land and buildings.

5.113 During any pre-application discussions with the applicant, the local planning authority should identify any concerns it has about the impacts of the application on land use, having regard to the development plan and relevant applications and including, where relevant, whether it agrees with any independent assessment that the land is no longer needed. These are also matters that local authorities may wish to include in their Local Impact Report which can be submitted after an application for development consent has been accepted.

[178] Or else so designated under the Green Belt (London and Home Counties) Act 1938
[179] National Planning Policy Framework, March 2012, paragraphs 79-92, or any successor document
[180] National Planning Policy Framework, March 2012, paragraph 112, or any successor document
[181] https://www.gov.uk/government/publications/contaminated-land-statutory-guidance
[182] For example, where a planning application has been submitted

5.114 The general policies controlling development in the countryside apply with equal force in Green Belts but there is, in addition, a general presumption against inappropriate development within them. Such development should not be approved except in very special circumstances which are already the subject of Government guidance.[183] The applicant should therefore determine whether the proposal, or any part of it, is within an established Green Belt and, if so, whether its proposal may be considered inappropriate development within the meaning of Green Belt policy. Metropolitan Open Land and land designated a Local Green Space in a local or neighbourhood plan are subject to the same policies of protection as Green Belt, and inappropriate development should not be approved except in very special circumstances.

5.115 The applicant should take into account the economic and other benefits of best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, the applicant should seek to use areas of poorer quality land in preference to that of a higher quality. The applicant should also identify any effects, and seek to minimise impacts, on soil quality, taking into account any mitigation measures proposed.

5.116 For developments where land may be affected by contamination, or existing mitigation is in place in respect of historic contamination, the applicant should have regard to the statutory regime contained in Part IIA of the Environmental Protection Act 1990 and relevant Government guidance relating to or dealing with contaminated land.[184]

5.117 The applicant should safeguard any mineral resources on the proposed site for the preferred scheme as far as possible.

Mitigation

5.118 The applicant can minimise the direct effects of a project on the existing use of the proposed site, or proposed uses near the site, by the application of good design principles, including the layout of the project and the protection of soils during construction.[185]

5.119 Where green infrastructure is affected, the applicant should aim to ensure the functionality and connectivity of the green infrastructure network is maintained and any necessary works are undertaken, where possible, to mitigate any adverse impact and, where appropriate, to improve that network and other areas of open space, including appropriate access to National Trails and other public rights of way.

5.120 The Secretary of State must also consider whether mitigation of any adverse effects on green infrastructure or open space is adequately provided for by means of requirements, planning obligations, or any other means, for example to provide exchange land and provide for appropriate management and maintenance agreements. Any exchange land should be at least as good in terms of size, usefulness, attractiveness, quality and accessibility. Alternatively, where sections 131 and 132 of the Planning Act 2008 apply,[186] any replacement land provided under those sections will need to conform to the requirements of those sections.

5.121 Where the preferred scheme has an impact on a mineral safeguarding area, the Secretary of State must ensure that the applicant has put forward appropriate mitigation measures to safeguard mineral resources.

[183] https://www.gov.uk/guidance/housing-and-economic-land-availability-assessment#paragraph_044
[184] https://www.gov.uk/government/collections/land-contamination-technical-guidance
[185] https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites
[186] http://www.legislation.gov.uk/ukpga/2008/29/section/131 and http://www.legislation.gov.uk/ukpga/2008/29/section/132

5.122 Where a project has a sterilising effect on land use, there may be scope for this to be mitigated through, for example, using the land for nature conservation or wildlife corridors.

5.123 Public rights of way, National Trails and other rights of access to land are important recreational facilities for walkers, cyclists and equestrians. The applicant is expected to take appropriate mitigation measures to address adverse effects on National Trails, other public rights of way and open access land and, where appropriate, to consider what opportunities there may be to improve access. In considering revisions to an existing right of way, consideration needs to be given to the use, character, attractiveness and convenience of the right of way. The Secretary of State should consider whether the mitigation measures put forward by an applicant are acceptable and whether requirements or other provisions in respect of these measures might be attached to any grant of development consent.

Decision making

5.124 The Secretary of State should not grant consent for development on existing open space, sports and recreational buildings and land, including playing fields, unless an assessment has been undertaken either by the local authority or independently, which has shown the open space or the buildings and land to be no longer needed, or the Secretary of State determines that the benefits of the project (including need) outweigh the potential loss of such facilities, taking into account any positive proposals made by the applicant to provide new, improved or compensatory land or facilities.

5.125 Where networks of green infrastructure have been identified in development plans, they should normally be protected from development and, where, possible, strengthened by or integrated within it. The Secretary of State will also have regard to the effect of the development upon and resulting from existing land contamination, as well as the mitigation proposed.

5.126 The Secretary of State will take into account the economic and other benefits of the best and most versatile agricultural land, and ensure the applicant has put forward appropriate mitigation measures to minimise impacts on soils or soil resources.

5.127 When located in the Green Belt, projects may comprise inappropriate development. Inappropriate development is by definition harmful to the Green Belt and there is a presumption against it except in very special circumstances. The Secretary of State will need to assess whether there are very special circumstances to justify inappropriate development. Very special circumstances will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations. In view of the presumption against inappropriate development, the Secretary of State will attach substantial weight to the harm to the Green Belt, when considering any application for such development. In exchange for, or so as to ensure the reprovision of, lost Green Belt land,[187] the Secretary of State may require the provision of other land by the applicant, to be declared as Green Belt under the Green Belt (London and the Home Counties) Act 1938. The provision of such land should be in accordance with the National Planning Policy Framework or any successor document, and take into account relevant development plan policies.

[187] The term “Green Belt land” refers to land designated as Green Belt land under a local development plan and/or land declared as Green Belt under the 1938 Act.

Home Office assets

Introduction

5.128 There are two Immigration Removal Centres (IRCs) to the north-west of Heathrow Airport, run as one facility, within the land shown inside the red line on the scheme boundary map (at Annex A). Detention at immigration removal centres plays a vital role as part of the infrastructure which allows the Government to maintain effective immigration control and secure the UK's borders. The IRCs are Harmondsworth IRC and the Colnbrook IRC.

5.129 Continuous service provision of the IRCs at Heathrow is necessary. This consideration extends to the need to provide appropriate road access to the IRCs.

Assessment

5.130 The applicant should show how it has considered the impacts of the project upon the existing IRCs. This should include the process in identifying alternative means of addressing the impact of the project on the IRCs, including the means by which they will be reprovided.

5.131 The applicant should discuss the provision to be made in substitution for the existing IRCs with the Home Office and any local authority whose area is likely to be affected by a replacement facility.

5.132 The applicant's assessment should also set out how a replacement IRC would function in relation to neighbouring land uses, as well as how it can best be accommodated without adversely affecting such uses. These are also matters which local authorities may wish to address in their local impact report, which can be submitted after an application for development consent has been submitted.

Decision making

5.133 The Secretary of State considers that replacement facilities in substitution for the affected IRCs should be provided prior to any works which may significantly interfere with the service and facilities provided by the existing IRCs. The Secretary of State will consider whether the applicant has taken all reasonable steps to mitigate impacts of the project on the existing IRCs. Where necessary, the Secretary of State will impose requirements or obligations upon the applicant to deliver suitable replacement facilities.

5.134 Provided that the applicant is willing to commit to appropriate provision of such facilities on a continuous service basis and with constant road access, and to mitigate the effect of the project on the existing and replacement IRCs, development consent should not be withheld on the grounds of its effects on the existing IRCs.

Resource and waste management

Introduction

5.135 Government policy on hazardous and non-hazardous waste is intended to protect human health and the environment by producing less waste and by using it as a resource wherever possible. Where this is not possible, waste management regulation ensures that waste is disposed of in a way that is least damaging to the environment and to human health.

5.136 Sustainable waste management is implemented through the waste hierarchy:

- Waste prevention;
- Preparing for reuse;
- Recycling;
- Other recovery, including energy recovery; and
- Disposal.

5.137 The targets for preparation for re-use and recycling of municipal waste (50%), and for construction and demolition waste (70%) set out by the Waste Framework Directive (2008/98/EC)[188] should be considered 'minimum acceptable practice' for the construction and operation of any new airport infrastructure. Exceeding these targets if possible by aiming for exemplar performance in resource efficiency and waste management is recommended, to align with the principles of the EU Action Plan for the Circular Economy.[189]

5.138 Large airport infrastructure projects may generate hazardous and non-hazardous waste during construction and operation. The Environment Agency's environmental permitting regime incorporates operational waste management controls for certain activities. When the applicant applies to the Environment Agency for an environmental permit, the Environment Agency will require the application to demonstrate that processes are in place to meet all relevant conditions.

5.139 In addition, the Heathrow Northwest Runway scheme would involve the removal of the Lakeside energy from waste plant.

5.140 Waste generated and sent to landfill during construction and operation will be an ongoing management issue, and will continue to have adverse effects on the environment into and beyond the operational phase. The principal adverse effects of sending waste to landfill include:

- Permanent loss of materials from potential use higher up the waste management hierarchy;
- Reduction of local and regional landfill capacity;
- Visual, noise, health and other nuisance impacts on local communities;
- Environmental degradation and pollution;
- Greenhouse gas emissions; and
- Environmental implications of transporting waste to landfill sites.

Applicant's assessment

5.141 The applicant should set out the arrangements that are proposed for managing any waste produced in the application for development consent. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental, social and economic outcome when considered over the whole lifetime of the project.

5.142 The effects of removing the Lakeside energy from waste plant upon capacity for treatment of waste will require assessment.

[188] http://ec.europa.eu/environment/waste/framework/
[189] http://ec.europa.eu/environment/circular-economy/index_en.htm

Mitigation

5.143 The applicant should set out a comprehensive suite of mitigations to eliminate or significantly reduce the risk of adverse impacts associated with resource and waste management.

5.144 The Government recognises the role of the Lakeside Energy from Waste plant in local waste management plans. The applicant should make reasonable endeavours to ensure that sufficient provision is made to address the reduction in waste treatment capacity caused by the loss of the Lakeside Energy from Waste plant.

Decision making

5.145 The Secretary of State will consider the extent to which the applicant has proposed an effective process that will be followed to ensure effective management of hazardous and non-hazardous waste arising from all stages of the lifetime of the development. The Secretary of State should be satisfied that the process set out provides assurance that:

- Waste produced will be properly managed, both onsite and offsite;
- The waste from the proposed development can be dealt with appropriately by the waste infrastructure which is, or is likely to be, available. Such waste arising should not have an adverse effect on the capacity of existing waste management facilities to deal with other waste arising in the area; and
- Adequate steps have been taken to ensure that all waste arising from the site is subject to the principles of the waste hierarchy[190] and are dealt with at the highest possible level within the hierarchy.

5.146 Where necessary, the Secretary of State will require the applicant to develop a resource management plan to ensure that appropriate measures for sustainable resource and waste management are secured.

Flood risk

Introduction

5.147 Climate change over future decades is likely to result in milder, wetter winters and hotter, drier summers in the UK, while sea levels will continue to rise. Within the lifetime of the proposed development, these factors will lead to increased flood risk in areas susceptible to flooding, and to an increased risk of flooding in some areas not currently thought of as being at risk. In addition to increasing flood risk, longer term climate change will result in changes to weather-related disruption, most often caused by wind, rain, snow and ice. The applicant, the Examining Authority and the Secretary of State in taking decisions should take account of the policy on climate change adaptation as set out in the National Planning Policy Framework[191] and other supporting guidance.[192]

5.148 The National Planning Policy Framework sets out that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk.[193] But where development is necessary, it should be made safe without

[190] Article 4 of the revised EU Waste Framework Directive (Directive 2008/98/EC) sets out the 'waste hierarchy' with five steps for dealing with waste, ranked according to environmental impact
[191] National Planning Policy Framework, March 2012, paragraph 99, or any successor document
[192] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances and https://www.gov.uk/government/publications/adapting-to-climate-change-for-risk-management-authorities
[193] National Planning Policy Framework, March 2012, paragraphs 100-104, or any successor document

increasing flood risk elsewhere. Supporting guidance[194] explains that essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk is permissible in areas of high flood risk, subject to the Exception Test. In addition, as set out in the National Planning Policy Framework, new development should be planned to avoid increased vulnerability to the range of impacts arising from climate change.[195]

5.149 Loss of flood plain storage may increase the overall flood risk for the catchment. The extent of any impact will depend on the ability of the development to manage storage of water on or off-site.

5.150 There is the potential for airport expansion to result in increased risk from climate change effects, particularly to increased surface water runoff rate and pressure on potable water supply. There may also be effects on groundwater.

5.151 Where the Airports NPS mentions the UK Climate Change Risk Assessment, the reader should refer to the most recent version of the document.

Applicant's assessment

5.152 Applications for projects in the following locations should be accompanied by a flood risk assessment:

- Flood Zones 2 and 3 (medium and high probability of river and sea flooding);
- Flood Zone 1 (low probability of river and sea flooding) for projects of 1 hectare or greater, or projects which may be subject to other sources of flooding (local watercourses, surface water, groundwater or reservoirs), or where the Environment Agency has notified the local planning authority that there are critical drainage problems.

5.153 The applicant should identify and assess the risks of all forms of flooding to and from the preferred scheme, and demonstrate how these flood risks will be managed, taking climate change into account.[196]

5.154 In preparing a flood risk assessment the applicant should:

- Consider the risk of all forms of flooding arising from the development comprised in the preferred scheme, in addition to the risk of flooding to the project, and demonstrate how these risks will be managed and, where relevant, mitigated, so that the development remains safe throughout its lifetime;[197]
- Take into account the impacts of climate change, clearly stating the development lifetime over which the assessment has been made;
- Consider the need for safe access and exit arrangements;
- Include the assessment of residual risk after risk reduction measures have been taken into account, and demonstrate that this is acceptable for the development;
- Consider if there is a need to remain operational during a worst case flood event over the preferred scheme's lifetime; and
- Provide evidence for the Secretary of State to apply the Sequential Test and Exception Test,[198] as appropriate.

[194] http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/
[195] National Planning Policy Framework, March 2012, paragraph 99, or any successor document
[196] https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications
[197] Updated flood maps are available on the Environment Agency's website
[198] National Planning Policy Framework, March 2012, paragraphs 100-104, or any successor document

5.155 Where the preferred scheme may be affected by, or may add to, flood risk, the applicant is advised to seek early pre-application discussions with the Environment Agency, and, where relevant, other flood risk management bodies such as lead local flood authorities, Internal Drainage Boards, sewerage undertakers, highways authorities and reservoir owners and operators. These discussions can be used to identify the likelihood and possible extent and nature of the flood risk, help scope the flood risk assessment, and identify the information that may be required by the Secretary of State to reach a decision on the application. If the Environment Agency has concerns about proposals on flood risk grounds, the applicant is encouraged to discuss these concerns at a sufficiently early stage with the Environment Agency and explore ways in which the proposal might be amended, or additional information provided, which would satisfy the Environment Agency's concerns, before the application for development consent is submitted.

5.156 For local flood risk (surface water, groundwater and ordinary watercourse flooding), local flood risk management strategies and surface water management plans provide useful sources of information for consideration in a flood risk assessment. Surface water flood issues need to be understood to allow them to be taken into account, for example by clearly identifying and managing flow routes.

5.157 When assessing the potential impacts of climate change on airports which can be wider than flooding impacts, such as implications from heat and water availability and the potential adaptation strategies for them, the applicant should take into account the latest UK Climate Change Risk Assessment, the latest set of UK Climate Projections, and other relevant sources of climate change evidence.

Mitigation

5.158 The applicant should ensure that the preferred scheme design takes into account flood risk, and should put forward measures to mitigate the impact of flooding.

5.159 Mitigation measures will need to be developed as part of the applicant's application for development consent to ensure that it is safe from flooding, and will not increase flood risk elsewhere for the proposed development's lifetime, taking into account climate change.

5.160 To satisfactorily manage flood risk and the impact of the natural water cycle on people, property and ecosystems, good design and infrastructure may need to be secured using requirements or planning obligations. This may include the use of sustainable drainage systems but could also include vegetation to help to slow runoff, hold back peak flows, and make landscapes more able to absorb the impact of severe weather events.

5.161 In the Airports NPS, the term sustainable drainage systems is used and taken to cover the whole range of sustainable approaches to surface water drainage management including:

- Source control measures including rainwater recycling and drainage;
- Infiltration devices to allow water to soak into the ground, that can include individual soakaways and communal facilities;
- Filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns;
- Filter drains and porous pavements to allow rainwater and runoff to infiltrate into permeable material below ground and provide storage if needed;

- Basins and ponds to hold excess water after rain and allow controlled discharge that avoids flooding; and
- Flood routes to carry and direct excess water through developments to minimise the impact of severe rainfall flooding.

5.162 Site layout and surface water drainage systems should be able to cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without adverse impacts.

5.163 The surface water drainage arrangements for any project should be such that the volumes and peak flow rates of surface water leaving the site are no greater than the rates prior to the proposed project, taking into account climate change, unless specific off-site arrangements are made and result in the same net effect.

5.164 It may be necessary to provide surface water storage and infiltration to limit and reduce both the peak rate of discharge from the site and the total volume discharged from the main application site. There may be circumstances where it is appropriate for infiltration attenuation storage to be provided outside the project site, if necessary through the use of a planning obligation or a development consent order requirement.

5.165 The sequential approach should be applied to the layout and design of the project. Vulnerable uses should be located on parts of the site at lower probability and residual risk of flooding. The applicant should seek opportunities where appropriate to use open space for multiple purposes such as amenity, wildlife habitat, and flood storage uses. Opportunities can be taken to lower flood risk by improving flow routes, flood storage capacity and using sustainable drainage systems.

Decision making

5.166 Where flood risk is a factor in determining an application for development consent, the Secretary of State will need to be satisfied that, where relevant:

- The application is supported by an appropriate flood risk assessment; and
- The Sequential Test[199] has been applied as part of site selection and, if required, the Exception Test.[200]

5.167 When determining an application, the Secretary of State will need to be satisfied that flood risk will not be increased elsewhere, and will only consider development appropriate in areas at risk of flooding where, informed by a flood risk assessment, following the Sequential Test and, if required, the Exception Test, it can be demonstrated that:

- Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and
- Over its lifetime, development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning, and that priority is given to the use of sustainable drainage systems.

5.168 The applicant should take into account the potential impacts of climate change using the latest UK Climate Change Risk Assessment, the latest set of UK Climate Projections, and other relevant sources of climate change evidence. The applicant should also ensure any environment statement that is prepared identifies appropriate mitigation or adaptation measures. This should cover the estimated lifetime of the new

[199] National Planning Policy Framework, March 2012, paragraph 101, or any successor document
[200] National Planning Policy Framework, March 2012, paragraph 102, or any successor document

infrastructure. Should a new set of UK Climate Projections become available after the preparation of an environmental statement, the Examining Authority or the Secretary of State will consider whether they need to request additional information from the applicant as part of the development consent application.

5.169 When determining an application, the Secretary of State will need to be satisfied that the potential effects of climate change on the development have been considered as part of the design.

5.170 For construction work which has drainage implications, approval for the preferred scheme's overall approach to drainage systems will form part of any development consent issued by the Secretary of State.[201] The Secretary of State will therefore need to be satisfied that the proposed drainage system complies with any technical standards issued by the Government[202] or to any National Standards[203] issued under Schedule 3 to the Flood and Water Management Act 2010.[204] In addition, the development consent order, or any associated planning obligations, will need to make provision for the adoption and maintenance of any sustainable drainage systems, including any necessary access rights to property. The Secretary of State will need to be satisfied that the most appropriate body would be given the responsibility for maintaining any sustainable drainage systems, taking into account the nature and security of the infrastructure on the proposed site. The responsible body could include, for example, the applicant, the landowner, the relevant local authority, or another body such as the Internal Drainage Board.

5.171 If the Environment Agency continues to have concerns, and therefore objects to the grant of development consent on the grounds of flood risk, the Secretary of State can grant consent, but would need to be satisfied that all reasonable steps have been taken by the applicant and the Environment Agency to attempt to resolve the concerns. Similarly, if the lead local flood authority objects to the development consent on the grounds of surface or other local sources of flooding, the Secretary of State can grant consent, but would need to be satisfied that all reasonable steps have been taken by the applicant and the lead local flood authority to attempt to resolve the concerns.

Water quality and resources

Introduction

5.172 Airport infrastructure projects can have adverse effects on the water environment, including groundwater, inland surface water and transitional waters.[205] During construction and operation, it can lead to increased demand for water, involve discharges to water, and cause adverse ecological effects resulting from physical modifications to the water environment. There may also be an increased risk of spills and leaks of pollutants to the water environment. These effects could lead to adverse impacts on health or on protected and other species and habitats, and could, in

[201] Drainage implications as defined in Paragraph 7(2) of Schedule 3 to the Flood and Water Management Act 2010 http://www.legislation.gov.uk/ukpga/2010/29/schedule/3/crossheading/requirement-for-approval
[202] https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards
[203] The National Standards set out requirements for the design, construction, operation and maintenance of sustainable drainage systems, and may include guidance to which the Secretary of State will have regard
[204] http://www.legislation.gov.uk/ukpga/2010/29/contents
[205] As defined in the Water Framework Directive (2000/60/EC), transitional waters are bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters by which are substantially influenced by freshwater flows

particular, result in surface waters, groundwaters or protected areas[206] failing to meet environmental objectives established under the Water Framework Directive.[207]

5.173 The Government's planning policies make clear that the planning system should contribute to and enhance the natural and local environment by, among other things, preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, water pollution. The Government has issued guidance on water supply, wastewater and water quality considerations in the planning system.[208] Where applicable, an application for development consent has to contain a plan with accompanying information identifying water bodies in a river basin management plan.[209]

5.174 Development may result in an increased potential for impacts on the water environment, especially the quality of the surface and groundwater through the discharge of waters contaminated with de-icer along with hydrocarbons and other pollutants.

Applicant's assessment

5.175 The applicant should make sufficiently early contact with the relevant regulators, including the Environment Agency, for abstraction licensing and environmental permitting, and with the water supply company likely to supply the water. Where the proposed development is subject to an Environmental Impact Assessment and the development is likely to have significant adverse effects on the water environment, the applicant should ascertain the existing status of, and carry out an assessment of, the impacts of the proposed project on water quality, water resources and physical characteristics as part of the environmental statement.

5.176 Any environmental statement should describe:

- The existing quality of water affected by the proposed project;
- Existing water resources affected by the proposed project and the impacts of the proposed project on water resources;
- Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project, and any impact of physical modifications to these characteristics;
- Any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones around potable groundwater abstractions; and
- Any cumulative effects.

5.177 The applicant should assess the effects on the surrounding water and wastewater treatment network in cooperation with the relevant water and sewerage undertaker(s). It should also address any future water infrastructure needed for the preferred scheme, including for supplies and sewerage treatment, and the effects on the surrounding water and wastewater treatment network. This assessment would be based on the additional wastewater flows which would need to be treated at sewage treatment works and should be developed through liaison with the relevant water and sewerage undertaker(s).

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[206] Protected areas are areas which have been designated as requiring special protection under specific community legislation for the protection of their surface water and groundwater or for the conservation of habitats and species directly depending on water
[207] Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy
[208] http://planningguidance.communities.gov.uk/blog/guidance/water-supply-wastewater-and-water-quality/
[209] http://www.legislation.gov.uk/uksi/2009/2264/made

Mitigation

5.178 The impact on local water resources can be minimised through planning and design for the efficient use of water, including water recycling.

5.179 The Secretary of State will need to consider whether the mitigation measures put forward by the applicant which are needed for operation and construction (and which may be over and above any which may form part of the development consent application) are acceptable.

5.180 The project should adhere to any national standards for sustainable drainage systems, which introduce a hierarchical approach to drainage design that promotes the most sustainable approach but recognises the feasibility and use of conventional drainage systems as part of a sustainable solution for any given site given its constraints.

5.181 The risk of impacts on the water environment can be reduced through careful design to adhere to good pollution practice.

Decision making

5.182 Activities that discharge to the water environment are subject to pollution control, and the considerations set out at paragraphs 4.53-4.59 above covering the interface between planning and environmental permitting therefore apply. These considerations will also apply in an analogous way to the abstraction licensing regime regulating activities that take water from the environment, and to the control regimes relating to works to, and structures in, on, or under, a controlled water.

5.183 The Secretary of State will generally need to give more weight to impacts on the water environment where a project would have adverse effects on the achievement of the environmental objectives established under the Water Framework Directive.

5.184 The Secretary of State will need to be satisfied that a proposal has had regard to the Thames river basin management plan and the Water Framework Directive and its daughter Directives on priority substances and groundwater. In terms of Water Framework Directive compliance, the overall aim of development should be to prevent deterioration in status of water bodies, to support the achievement of the objectives in the Thames river basin management plan and not to jeopardise the future achievement of good status for any affected water bodies. If the development is considered likely to cause deterioration of water body status or to prevent the achievement of good groundwater status or of good ecological status or potential, compliance with Article 4.7 of the Water Framework Directive must be demonstrated. Any use of Article 4.7 must be reported in the Thames river basin management plan.

5.185 The Secretary of State will need to consider the interactions of the preferred scheme with other plans, such as statutory water resources management plans.

5.186 The Secretary of State will need to consider proposals put forward by the applicant to mitigate adverse effects on the water environment, taking into account the likely impact of climate change on water availability, and whether appropriate requirements should be attached to any development consent and / or planning obligations. If the Environment Agency continues to have concerns, and objects to the grant of development consent on the grounds of impacts on water quality / resources, the Secretary of State can grant consent, but will need to be satisfied that all reasonable steps have been taken by the applicant and the Environment Agency to try to resolve the concerns.

Historic environment

Introduction

5.187 The construction and operation of airports and associated infrastructure has the potential to result in adverse impacts on the historic environment above and below ground. This could be as a result of the scale, form and function of the development, and the wider impacts it can create in terms of associated infrastructure to connect the airport to existing transport networks, changes in aircraft movement on the ground and in the surrounding airspace, additional noise and light levels, and the need for security and space to ensure the airport's operation.

5.188 The historic environment includes 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.

5.189 Those elements of the historic environment that hold value to this and future generations because of their historic, archaeological, architectural or artistic interest are called 'heritage assets'. Heritage assets may be buildings, monuments, sites, places, areas or landscapes, or any combination of these. The sum of the heritage interests that a heritage asset holds is referred to as its significance. Significance derives not only from a heritage asset's physical presence, but also from its setting.[210]

5.190 Some heritage assets have a level of significance that justifies official designation. Categories of designated heritage assets are:

- World Heritage Sites;
- Scheduled Monuments;
- Listed Buildings;
- Protected Wreck Sites;
- Protected Military Remains;
- Registered Parks and Gardens;
- Registered Battlefields; and
- Conservation Areas.[211]

5.191 Non-designated heritage assets of archaeological interest that are demonstrably equivalent to Scheduled Monuments should be considered subject to the policies for designated heritage assets.[212] The absence of designation for such heritage assets does not indicate lower significance.

5.192 The Secretary of State will also consider the impacts on other non-designated heritage assets on the basis of clear evidence that the assets have a significance that merits consideration in that decision, even though those assets are of lesser value than designated heritage assets. The non-designated heritage assets would be identified

[210] Setting of a heritage asset is the surroundings in which it is experienced. Its extent is not fixed, and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance, or may be neutral

[211] The issuing of licences to undertake works on protected wreck sites in English waters is the responsibility of the Secretary of State for Culture, Media and Sport and does not form part of development consent orders. The issuing of licences for protected military remains is the responsibility of the Secretary of State for Defence

[212] There will be archaeological interest in a heritage asset if it holds, or may potentially hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and the people and cultures that made them

either through the development plan process by local authorities, including through 'local listing', or through the nationally significant infrastructure project examination and decision making process.

Applicant's assessment

5.193 As part of the environmental statement, the applicant should provide a description of the significance of the heritage assets affected by the proposed development, and the contribution of their setting to that significance. The level of detail should be proportionate to the asset's importance, and no more than is sufficient to understand the potential impact of the proposal on the significance of the asset. Consideration will also need to be given to the possible impacts, including cumulative, on the wider historic environment. At a minimum, the relevant Historic Environment Record[213] should be consulted and the heritage assets assessed using appropriate expertise. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, the applicant should include an appropriate desk-based assessment and, where necessary, a field evaluation. The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage asset affected can be adequately understood from the application and supporting documents.

5.194 Detailed studies will be required on those heritage assets affected by noise, light and indirect impacts based on the guidance provided in *The Setting of Heritage Assets*[214] and the *Aviation Noise Metric*.[215] Where proposed development will affect the setting of a heritage asset, accurate representative visualisations may be necessary to assess the impact.

5.195 The applicant is encouraged, where opportunities exist, to prepare proposals which can make a positive contribution to the historic environment, and to consider how their scheme takes account of the significance of heritage assets affected. This can include, where possible:

- Enhancing, through a range of measures such as sensitive design, the significance of heritage assets or setting affected;
- Considering measures that address those heritage assets that are at risk, or which may become at risk, as a result of the scheme; and
- Considering how visual or noise impacts can affect heritage assets, and whether there may be opportunities to enhance access to or interpretation, understanding and appreciation of the heritage assets affected by the scheme.

Careful consideration in preparing the scheme will be required on whether the impacts on the historic environment will be direct or indirect, temporary or permanent.

Decision making

5.196 In determining applications, the Secretary of State will seek to identify and assess the particular significance of any heritage asset that may be affected by the proposed development (including by development affecting the setting of a heritage asset), taking account of the available evidence and any necessary expertise from:

[213] Historic Environment Records are information services maintained and updated by (or on behalf of) local authorities and National Park Authorities with a view to providing access to comprehensive and dynamic resources relating to the historic environment of an area for public benefit and use. Details of Historic Environment Records in England are available from the Heritage Gateway website. Historic England should also be consulted where relevant

[214] https://www.historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/

[215] https://www.historicengland.org.uk/images-books/publications/aviation-noise-metric/

- Relevant information provided with the application and, where applicable, relevant information submitted during examination of the application;
- Any designation records included on the National Heritage List for England;
- Historic landscape character records;
- The relevant Historic Environment Record(s) and similar sources of information;
- Representations made by interested parties during the examination; and
- Expert advice, where appropriate and when the need to understand the significance of the heritage asset demands it.

5.197 The Secretary of State must also comply with the regime relating to Listed Buildings, Conservation Areas and Scheduled Monuments set out in The Infrastructure Planning (Decisions) Regulations 2010.[216]

5.198 In considering the impact of a proposed development on any heritage assets, the Secretary of State will take into account the particular nature of the significance of the heritage asset and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between their conservation and any aspect of the proposal.

5.199 The Secretary of State will take into account: the desirability of sustaining and, where appropriate, enhancing the significance of heritage assets; the contribution of their settings; and the positive contribution their conservation can make to supporting sustainable communities – including to their quality of life, their economic vitality, and to the public's enjoyment of these assets. The Secretary of State will also take into account the desirability of new development making a positive contribution to the character and local distinctiveness of the historic environment. The consideration of design should include scale, height, massing, alignment, materials, use and landscaping (for example screen planting).

5.200 When considering the impact of a proposed development on the significance of a designated heritage asset, the Secretary of State will give great weight to the asset's conservation. The more important the asset, the greater the weight should be. The Secretary of State will take into account the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation, the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality, and the desirability of new development making a positive contribution to local character and distinctiveness.

5.201 Once lost, heritage assets cannot be replaced, and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Given that heritage assets are irreplaceable, any harm or loss should require clear and convincing justification.

5.202 Substantial harm to or loss of a Grade II Listed Building or a Grade II Registered Park or Garden should be exceptional. Substantial harm to or loss of designated sites of the highest significance, including World Heritage Sites, Scheduled Monuments, Grade I and II* Listed Buildings, Protected Wreck Sites, Registered Battlefields, and Grade I and II* Registered Parks and Gardens should be wholly exceptional.

5.203 Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of development, recognising that the greater the

[216] http://www.legislation.gov.uk/uksi/2010/305/regulation/3/made

harm to the significance of the heritage asset, the greater the justification that will be needed for any loss.

5.204 Where the proposed development will lead to substantial harm to or the total loss of significance of a designated heritage asset, the Secretary of State will refuse consent unless it can be demonstrated that the substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm, or alternatively that all of the following apply:

- The nature of the heritage asset prevents all reasonable uses of the site;
- No viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation;
- Conservation by grant funding or some form of charitable or public ownership is demonstrably not possible; and
- The harm or loss is outweighed by the benefit of bringing the site back into use.

5.205 Where the proposed development will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, including securing its optimum viable use.

5.206 Not all elements of a World Heritage Site or conservation area will necessarily contribute to its significance. The Secretary of State will treat the loss of a building (or other element) that makes a positive contribution to the significance of a World Heritage Site or conservation area's significance either as substantial harm or less than substantial harm, as appropriate, taking into account the relative significance of the elements affected and their contribution to the significance of the World Heritage Site or conservation area as a whole.

5.207 Where the loss of significance of any heritage asset is justified on the merits of the new development, the Secretary of State will consider imposing a requirement on the consent, or require the applicant to enter into an obligation, that will prevent the loss occurring until it is reasonably certain that the relevant part of the development is to proceed.

5.208 The applicant should look for opportunities for new development within Conservation Areas and World Heritage Sites, and within the setting of heritage assets, to enhance and better reveal their significance. Proposals that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset should be treated favourably.[217]

Recording

5.209 A documentary record of our past is not as valuable as retaining the heritage asset, and therefore the ability to record evidence of the asset should not be a factor in deciding whether consent should be given.

5.210 Where the loss of the whole or part of a heritage asset's significance is justified, the Secretary of State will require the applicant to record and advance understanding of the significance of the heritage asset before it is lost (wholly or in part). The extent of the requirement should be proportionate to the nature and level of the asset's significance. The applicant should be required to publish this evidence and to deposit copies of the reports with the relevant Historic Environmental Record. They should

[217] Further good practice advice on decision making in the historic environment can be found at: https://www.historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/

also be required to deposit the archive generated in a local museum or other public repository willing to receive it.

5.211 Where appropriate, the Secretary of State will impose requirements to the development consent order to ensure that the work is undertaken in a timely manner, in accordance with a written scheme of investigation that complies with the policy in the Airports NPS and has been agreed in writing with the relevant local authority, and that the completion of the exercise is properly secured.

5.212 Where there is a high probability that a development site may include as yet undiscovered heritage assets with archaeological interest, the Secretary of State will consider requirements to ensure appropriate procedures are in place for the identification and treatment of such assets discovered during construction.

Landscape and visual impacts

Introduction

5.213 For airport development, landscape and visual effects also include tranquillity effects, which would affect people's enjoyment of the natural environment and recreational facilities. In this context, references to landscape should be taken as covering local landscape, waterscape and townscape character and quality, where appropriate.

Applicant's assessment

5.214 Where the development is subject to an Environmental Impact Assessment, the applicant should undertake an assessment of any likely significant landscape and visual impacts and describe them in the environmental statement. The landscape and visual assessment should reference any landscape character assessment and associated studies as a means of assessing landscape impacts relevant to the preferred scheme. In addition, the applicant's assessment should take account of any relevant policies based on these assessments in local development documents.

5.215 The applicant's assessment should include any significant effects during construction of the preferred scheme and / or the significant effects of the completed development and its operation on landscape components and landscape character, including historic characterisation. This should include assessment of any landscape and visual impacts as a result of the development, for example surface access proposals or aviation activity.

5.216 The assessment should include the visibility and conspicuousness of the preferred scheme during construction and the presence and operation of the preferred scheme and potential impacts on views and visual amenity. This should include any noise and light pollution effects, including on local amenity, tranquillity and nature conservation.

Mitigation

5.217 Adverse landscape and visual effects may be minimised through appropriate design (including choice of materials), and landscaping schemes. Materials and designs for the Heathrow Northwest Runway scheme should be given careful consideration.

Decision making

Landscape impact

5.218 Landscape effects depend on the nature of the existing landscape likely to be changed and nature of the effect likely to occur. Both these factors need to be considered in judging the impact of the preferred scheme on the landscape. The preferred scheme

needs to be designed carefully, taking account of the potential impact on the landscape. Having regard to siting, operational and other relevant constraints, the development should aim to avoid or minimise harm to the landscape, providing reasonable mitigation where possible and appropriate.

Development proposed within nationally designated areas

5.219 Great weight should be given to conserving landscape and scenic beauty in nationally designated areas. National Parks, the Broads and Areas of Outstanding Natural Beauty have the highest status of protection in relation to landscape and scenic beauty. Each of these designated areas has specific statutory purposes which help ensure their continued protection and which the Secretary of State has a statutory duty to have regard to in decisions.

5.220 The Secretary of State should refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that it is in the public interest. Consideration of such applications should include an assessment of:

- The need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy;
- The cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way; and
- Any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.

5.221 Where consent is given in these areas, the Secretary of State should be satisfied that the applicant has ensured that the preferred scheme will be carried out to high environmental standards and, where possible, includes measures to enhance other aspects of the environment. Where necessary, the Secretary of State should consider the imposition of appropriate requirements to ensure these standards are delivered.

Developments outside nationally designated areas which might affect them

5.222 The duty to have regard to the purposes of nationally designated areas also applies when considering applications for projects outside the boundaries of these areas which may have impacts within them. The development should aim to avoid compromising the purposes of designation, and such projects should be designed sensitively given the various siting, operational, and other relevant constraints.

Developments in other areas

5.223 Outside nationally designated areas, there are local landscapes and townscapes that are highly valued locally and may be protected by local designation. Where a local development document in England has policies based on landscape character assessment, these should be given particular consideration. However, local landscape designations should not be used in themselves as reasons to refuse consent, as this may unduly restrict acceptable development.

5.224 In taking decisions, the Secretary of State will consider whether the preferred scheme has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to avoid adverse effects on landscape or to minimise harm to the landscape, including by reasonable mitigation.

Visual impact

5.225 The Secretary of State will judge whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the development.

Land instability

Introduction

5.226 The effects of land instability may result in landslides, subsidence or ground heave. Failing to deal with this issue could cause harm to human health, local property and associated infrastructure, and the wider environment. They occur in different circumstances for different reasons and vary in their predictability and in their effect on development.

Applicant's assessment

5.227 Where necessary, land stability should be considered in respect of new development, as set out in the National Planning Policy Framework and supporting planning guidance.[218] Specifically, proposals should be appropriate for the location, including preventing unacceptable risks from land instability. If land stability could be an issue, the applicant should seek appropriate technical and environmental expert advice to assess the likely consequences of proposed developments on sites where subsidence, landslides and ground compression is known or suspected. Applicants should liaise with the Coal Authority if necessary.

5.228 A preliminary assessment of ground instability should be carried out at the earliest possible stage before a detailed application for development consent is prepared. The applicant should ensure that any necessary investigations are undertaken to confirm that their sites are and will remain stable, or can be made so as part of the development. The site needs to be assessed in the context of surrounding areas where subsidence, landslides and land compression could threaten the development during its anticipated life or damage neighbouring land or property. This could be in the form of a land stability or slope stability risk assessment report.

Mitigation

5.229 The applicant has a range of mechanisms available to mitigate and minimise risks of land instability. These include:

- Establishing the principle and layout of new development, for example avoiding mine entries and other hazards;
- Ensuring proper design of structures to cope with any movement expected and other hazards such as mine and / or ground gases; or
- Requiring ground improvement techniques, usually involving the removal of poor material and its replacement with suitable inert and stable material. For development on land previously affected by mining activity, this may mean prior extraction of any remaining mineral resource.

Dust, odour, artificial light, smoke and steam

5.230 The construction and operation of airports infrastructure has the potential to create a range of emissions such as dust, odour, artificial light, smoke and steam. All have the potential to have a detrimental impact on amenity or cause a common law nuisance or statutory nuisance under Part III, Environmental Protection Act 1990.[219] These may also be covered by pollution control or other environmental consenting regimes.

[218] https://www.gov.uk/guidance/land-stability
[219] http://www.legislation.gov.uk/ukpga/1990/43/part/III

5.231 Because of the potential effects of these emissions and in view of the availability of the defence of statutory authority against nuisance claims described previously, it is important that the potential for these impacts is considered by the applicant in its application, by the Examining Authority in examining applications, and by the Secretary of State in taking decisions on development consent.

5.232 For nationally significant infrastructure projects of the type covered by the Airports NPS, some impact on amenity for local communities is likely to be unavoidable. Impacts should be kept to a minimum and should be at a level that is acceptable.

Applicant's assessment

5.233 Where the development is subject to an Environmental Impact Assessment, the applicant should assess any likely significant effects on amenity from emissions of dust, odour, artificial light, smoke and steam, and describe these in the environmental statement.

5.234 In particular, the assessment provided by the applicant should describe:

- The type and quantity of emissions;
- Aspects of the development which may give rise to emissions during construction, operation and decommissioning;
- Premises or locations that may be affected by the emissions;
- Effects of the emission on identified premises or locations; and
- Measures to be employed in preventing or mitigating the emissions.

5.235 The applicant is advised to consult the relevant local planning authority and, where appropriate, the Environment Agency, about the scope and methodology of the assessment.

Mitigation

5.236 The Secretary of State should ensure the applicant has provided sufficient information to show that any necessary mitigation will be put into place. In particular, the Secretary of State should consider whether to require the applicant to abide by a scheme of management and mitigation concerning emissions of dust, odour, artificial light, smoke and steam from the development to reduce any loss to amenity which might arise during the construction and operation of the development. A construction management plan may help clarify and secure mitigation.

Decision making

5.237 The Secretary of State should be satisfied that all reasonable steps have been taken, and will be taken, to minimise any detrimental impact on amenity from emissions of dust, odour, artificial light, smoke and steam. This includes the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

5.238 If development consent is granted for a project, the Secretary of State should consider whether there is a justification for all of the authorised project (including any associated development) being covered by a defence of statutory authority against nuisance claims. If the Secretary of State cannot conclude that this is justified, then the defence should be disapplied, in whole or in part, through a provision in the development consent order.

Community compensation

Introduction

5.239 The Secretary of State recognises that, in addition to providing economic growth and employment opportunities, airport expansion will also have negative impacts upon local communities. This will include impacts through land take requiring the compulsory acquisition of houses that fall within the new boundary of the airport, exposure to air quality impacts, and aircraft noise, that is both an annoyance and can have an adverse impact on health and cognitive development.

5.240 The Secretary of State expects the applicant to provide an appropriate community compensation package, relevant to planning. This will include financial compensation to residents who will see their homes compulsorily acquired, as well as ongoing financial compensation to the local community. In addition to controlling and reducing aircraft noise impacts, the applicant will be required to commit appropriate resources to mitigate the impacts of aircraft through noise insulation programmes for both private homes and public buildings such as schools.

5.241 A number of statutory protections are provided in these areas, and the applicant must fulfil its statutory duties in a timely and efficient manner.

5.242 Under planning law, residential and agricultural owners in the area within the red line on the map shown in Annex A will be able to make a claim for statutory blight upon the designation of the Airports NPS.

5.243 In addition, compensation can be sought in respect of loss of value of a property arising from the development during construction (under the Compulsory Purchase Act 1965)[220] and for loss of value arising from the operation of an expanded airport (under Part 1 of the Land Compensation Act 1973)[221] after one year of operation.

5.244 People are entitled to know what steps will be taken to help protect them against aircraft noise and, where appropriate, to help them to move house.

5.245 In addition to statutory requirements, Heathrow Airport has publicly committed to a community compensation package comprising a number of more generous offers:

- To pay 125% of market value, plus taxes and reasonable moving costs, for all owner occupied homes within the compulsory acquisition zone;[222]
- To pay 125% of market value, plus taxes and reasonable moving costs, for all owner occupied homes within an additional voluntary purchase / acquisition zone incorporating the area known as the Heathrow Villages;[223]
- Following a third party assessment, to provide full acoustic insulation for residential property within the full single mode easterly and westerly 60dB LAeq (16hr)[224] noise contour of an expanded airport;
- Following a third party assessment, to provide a contribution of up to £3,000 for acoustic insulation for residential properties within the full single mode easterly and

[220] http://www.legislation.gov.uk/ukpga/1965/56/contents
[221] http://www.legislation.gov.uk/ukpga/1973/26/contents
[222] http://your.heathrow.com/newpropertycompensation/
[223] http://your.heathrow.com/newpropertycompensation/
[224] Leq is the measure used to describe the average sound level experienced over a period of time (usually sixteen hours for day and eight hours for night) resulting in a single dec bel value. Leq is expressed as LAeq when it refers to the A-weighted scale

westerly 57dB LAeq (16hr) or the full 55dB Lden[225] noise contours of an expanded airport, whichever is the bigger; and

- To deliver a programme of noise insulation and ventilation for schools and community buildings within the 60dB LAeq (16hr) contour.[226]

5.246 In addition to the statutory requirements and the public commitments made by Heathrow Airport, the Government also supports the Airports Commission's recommendation for an additional component of ongoing community compensation proportionate to environmental impacts.

5.247 The Airports Commission suggested this should take the form of a national noise levy paid for by passengers. The Government does not consider a national levy appropriate, but supports the development of a community compensation fund at an expanded Heathrow Airport. The Government expects that the size of the community compensation fund will be proportionate to the environmental harm caused by expansion of the airport. The Government notes that, in its consideration of a noise levy, the Airports Commission considered that a sum of £50 million per annum could be an appropriate amount at an expanded Heathrow Airport, and that, over a 15 year period, a community compensation fund could therefore distribute £750 million to local communities.

5.248 Expansion at Heathrow Airport is likely to increase the amount of locally collected business rates in the area. The Government will consider how authorities can benefit from this through a business rate retention scheme and the opportunities for authorities to work together to share the benefits. Heathrow Airport is currently the highest single site business rates payer in the UK.[227]

Applicant's assessment

5.249 The Government expects to see arrangements being made for the community compensation schemes which Heathrow Airport has publicly stated would be provided, and for a community compensation fund.

5.250 The applicant should seek to minimise impacts on local people, to consult on the details of its works, and to put them in place quickly. The Government also looks to the applicant to consult on the detail of a community compensation fund.

Decision making

5.251 The Secretary of State will consider whether and to what extent the applicant has sought to minimise impacts on local people, has consulted on the details of its works, and has put mitigations in place, at least to the level committed to in Heathrow Airport's public commitments. This includes whether the applicant has set out appropriate eligibility criteria, how delivery will be ensured, and whether the applicant has made reasonable efforts to put the works in place quickly.

5.252 The Secretary of State will also consider whether the applicant has consulted on the details of a community compensation fund, including source of revenue, size and duration of fund, eligibility, and how delivery will be ensured.

5.253 The Secretary of State will expect the applicant to demonstrate how these provisions are secured, and how they will be operated. The applicant will also need to show how these measures will be administered to ensure that they are relevant to planning when in operation. The mechanisms for enforcing these provisions should also be

[225] Lden is the 24 hour LAeq calculated for an annual period, but with a five decibel weighting for evening and a ten decibel weighting for night to reflect people's greater sensitivity to noise within these periods
[226] http://your.heathrow.com/newpropertycompensation/
[227] http://www.cvsuk.com/news-resources/news/draft-list-release

demonstrated, along with the appropriateness of any identified enforcing body, which may include the Secretary of State.

Community engagement

Introduction

5.254 The Government recognises that the planning, construction, and subsequent operation of a Northwest Runway will bring both significant impacts and opportunities to communities living around Heathrow Airport. Communities will wish to participate fully in the development and delivery of expansion, and the Government expects them to be able to do so.

5.255 There will be many opportunities for communities to engage as expansion is taken forward. The Government is required to consult on and publicise the Airports NPS, and the applicant is subject to pre-application consultation duties. Additional consultations on issues such as airspace change, overseen by the Civil Aviation Authority, will take place outside of the planning process. Ongoing engagement will also be required as the applicant takes forward its compensation package.

5.256 The Government wishes to maximise local stakeholder engagement with the expansion process, and it wishes to encourage any applicant and local stakeholders to strengthen the way in which the airport and local stakeholders work together to make engagement effective. Local stakeholders, including those representing communities around Heathrow Airport, have the experience and expertise to identify solutions tailored to their specific circumstances. A number of engagement forums already exist at Heathrow Airport. These have developed over time in response to emerging needs and are consistent with the Government's view that, in principle, it encourages collaborative local solutions.

5.257 A community engagement board will be developed at Heathrow Airport to help to ensure that local communities are able to contribute effectively to the delivery of expansion, including to consultations and evidence gathering during the planning process.

Applicant's assessment

5.258 The applicant must engage constructively with the community engagement board throughout the planning process, with its membership (including an independent chair), and with any programme(s) of work the community engagement board agrees to take forward.

Decision making

5.259 The Secretary of State will consider whether the applicant has engaged constructively with this community engagement board throughout the planning process.

Skills

Introduction

5.260 The Government is committed to helping people into jobs and improving the skills of the UK workforce, with a target of three million new apprenticeships being created in the current Parliament.[228] Continuing to create jobs and new training opportunities will

[228] https://www.gov.uk/government/news/government-kick-starts-plans-to-reach-3-million-apprenticeships

help to consolidate the national economic recovery, put the UK on the path to full employment and raise the nation's productivity. Apprenticeships have an essential role to play within this work, helping individuals to develop key skills which will benefit both them and employers.

5.261 To help deliver the Government's wider skills agenda, the Department for Transport published *Transport Skills Strategy: building sustainable skills* in January 2016, setting out its skills strategy for transport, including aviation, and an additional 30,000 apprenticeships by 2020 across the road and rail sectors.[229] The Strategic Transport Apprenticeship Taskforce has been created to deliver this work.[230]

5.262 The Government notes that Heathrow Airport already makes a significant contribution to local employment and already has a number of skills and employment initiatives designed to support the business needs of the airport. The Heathrow Academy, established in 2004, supports recruitment and retention of local residents across the retail, construction, aviation and logistics sectors, and includes apprenticeships as a part of the package.[231]

5.263 The Government notes that, with expansion, Heathrow Airport has publicly committed to ensuring 10,000 apprenticeships before 2030, thereby doubling the number currently available at the airport and in its supply chain and airport-related businesses.[232]

5.264 The Heathrow Northwest Runway scheme represents an opportunity to grow the number of jobs and apprenticeships supported by the applicant and its supply chain and airport-related businesses, particularly in neighbouring communities.

Applicant's assessment

5.265 Heathrow Airport should put in place arrangements for the delivery of the 5,000 new apprenticeships which it has publicly stated would be created. Heathrow Airport should set out the timetable for delivering the apprenticeships, provide information on the areas and skills to be covered by these apprenticeships, the breakdown between opportunities to be created within the core airport and those being offered by companies within its supply chain and other airport-related businesses, and the qualification level and standards which they will need to achieve. Heathrow Airport should also set out how it will publicly report progress against the target.

5.266 The Government expects the applicant to maximise the employment and skills opportunities for local residents, including apprenticeships.

5.267 Heathrow Airport will also need to show how these measures will be administered to ensure that they are relevant to planning when in operation. The mechanisms for enforcing these provisions should also be demonstrated, along with the appropriateness of any identified enforcing body, which may include the Secretary of State.

Decision making

5.268 The Secretary of State will consider whether Heathrow Airport has set out a credible plan to implement its commitment to deliver a total of 10,000 apprenticeships at an expanded airport.

[229] https://www.gov.uk/government/publications/transport-infrastructure-skills-strategy-building-sustainable-skills
[230] https://www.gov.uk/government/news/strategic-transport-apprenticeship-taskforce-to-boost-apprenticeships
[231] http://www.heathrow.com/company/heathrow-jobs/heathrow-academy
[232] https://www.heathrowexpansion.com/uk-growth-opportunities/job-opportunities/

5.269 The Secretary of State will consider how these provisions are secured, and how they will be operated.

Ruling out a fourth runway

Introduction

5.270 As part of its work, the Airports Commission considered the possibility that, in addition to the increased capacity provided by a Northwest Runway at Heathrow Airport, the airport might wish in the future to develop a fourth runway. The Airports Commission found no sound case for such a development.

5.271 First, the Airports Commission concluded that the airspace around the airport would be increasingly difficult to manage if a fourth runway was built. It noted that the airport could safely support 800,000 air transport movements per year at a four runway site, only 60,000 more than under the (three runway) Heathrow Northwest Runway scheme, but that the airspace impacts would lead to reduced numbers of air transport movements at the other airports in the London area.

5.272 Second, the Airports Commission concluded that it would be increasingly challenging to physically accommodate a fourth runway at the Heathrow Airport site. Taken together, these conclusions mean that building a fourth runway at Heathrow Airport would result in significant costs while providing less overall additional benefit.

5.273 Finally, the Airports Commission noted that there would be no guarantee that the potential demand for a further runway would be backed by a strong economic or environmental case. Any project to deliver a fourth runway at Heathrow Airport would be costly and extremely difficult to deliver given all of these considerations.

5.274 The Airports Commission also noted the importance of a clear signal from Government on limiting expansion to reassure local communities that Heathrow Airport will not expand any further.

Decision making

5.275 The Government agrees with the Airports Commission's recommendation and the analysis that underpins it, and therefore does not see a need for a fourth runway at Heathrow Airport. An application in the vicinity of Heathrow Airport for a fourth runway would not be supported in policy terms, and should be seen as being in conflict with the Airports NPS.

Annex A: Heathrow Northwest Runway scheme boundary map

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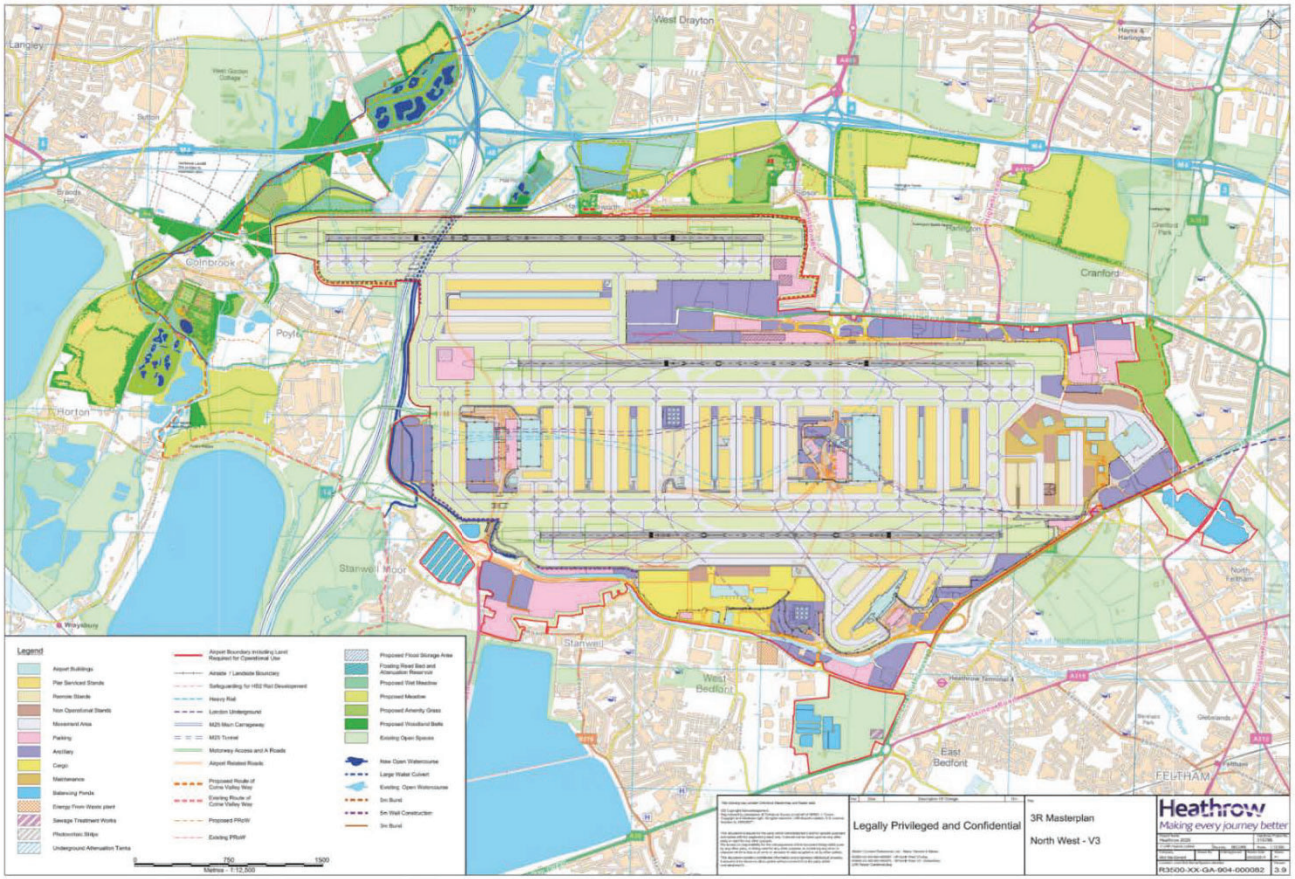
Annex B: Illustrative Heathrow Northwest Runway scheme masterplan



NB: This map is for illustrative purposes and is a masterplan of the Heathrow Northwest Runway scheme as submitted by Heathrow Airport to the Airports Commission. It should not be considered as a detailed site plan; the full detail and design of the scheme will be considered as part of Heathrow Airport's development consent application.

TR020002 – SMAa representation to the Secretary of State for Transport

Response to Jennifer Dawes - Annex 1 - Report by Louise Congdon of York Aviation [LC]

Re-determination of the Application by RiverOak Strategic Partners Limited ("the Applicant") for an Order granting Development Consent for the reopening and development of Manston Airport in Kent.

Save Manston Airport association (SMAa) has over 3,700 members who are in full support of the Development Consent Order to reopen Manston Airport, many wanting jobs for themselves, their family or other Kentish people. Thus, we wish to make further representations to assist in the re-determination of the DCO.

1.0 Introduction

It seems surprising that Harrison Grant decided on behalf of Jennifer Dawes, to employ Louise Congdon (LC) to make representations on their behalf rather than a qualified expert on forecasting[1]. It will be interesting to see if Harrison Grant decide to retain the services of Paul Stinchcombe QC who cross-examined LC during the Stansted Public Inquiry and established that she was not qualified to act as an expert witness in aviation forecasting.

The representation produced by LC for Harrison Grant is mostly a regurgitation of, and attempts to justify, the comments made in previous submissions to the Examination by her. As such, most of this representation is irrelevant and does not address the 4 Matters raised by the Secretary of State (SoS).

The report by LC does not even address Matter 3 on the Sixth Carbon Budget, which is odd. It is worth noting that the JR case, on behalf of Jenny Dawes, was accepted as being covered by the Aarhus Convention as it involved environmental information and decision making by a public body. If the report from LC, on behalf of Harrison Grant, was paid for out of money donated for or from costs awarded from the Judicial Review (JR), we assume that Harrison Grant will be employing someone else to comment on this significant environmental issue.

2.0 Summary of Previous York Aviation Reports

All of section 2, nearly 7 pages, is a precis of representations "*submitted to the Examination at Deadline 3*"[2].

Since LC is aware that all previously submitted evidence will be considered by the DfT and LC does not produce any new evidence, this section is irrelevant.

This point is perfectly illustrated by the fact that LC is still questioning the inclusion of the Northern Grass in the DCO and refers to Associated Development. Since the applicant owns the land and did so before the Examination ended one must question why LC is still raising this point?

3.0 Changes to Policy

3.1 ANPS

LC states that *"The Heathrow Northwest Runway scheme delivers the greatest support for freight. The plans for the scheme include a doubling of freight capacity at the airport." and "Hence, the reinstatement of the ANPS is a material change in Government Policy since the decision was taken to confirm the Manston DCO in July 2020. This weakens the case, in so far as it existed, that there is any need for the development of Manston to meet any shortfall in freight capacity in the South East of England"[3].*

[1] SMAa [Matter 4]
[2] [LC] – page 3
[3] [LC] – page 11

As outlined in detail in SMAa [Matter 2] section 1.2, the expansion to Heathrow is not likely to happen for a considerable time and even when it does, with "*its emphasis on passengers and belly freight at Heathrow, it is not going to be sufficient to meet the predicted need. A reopened Manston, with its state-of-the-art facilities and available capacity, will provide resilience to the supply network in the UK that LHR cannot, for at least several decades. The predicted delay to Heathrow increases the quantitative need for Manston Airport*"**.**

It is worth noting that in the Bristol Airport Public Inquiry (July 2021), James Brass, also from York Aviation, stated in written evidence that "the model assumes that a third runway (R3) is delivered at Heathrow in 2033"[4]. This was confirmed during cross-examination.

During the Manston Examination, the applicant indicated that R3 would not be open until later than the 2026 date proposed[5] but the Examiners wrongly believed the 2026 date was realistic[6]. This must call into question the conclusions the Examiners reached based on this wrong assumption.

When asked whether the opening of R3 at Heathrow would reduce demand at Bristol James Brass from York Aviation said, "*I wouldn't see it reducing demand at Bristol*".

3.2 Making Best Use (MBU)

LC quote "*"We therefore consider that any proposals should be judged by the relevant planning authority, taking careful account of all relevant considerations, particularly economic and environmental impacts and proposed mitigations."*

In this case it is the Secretary of State that will be "*taking careful account all relevant considerations"*. The recent Stansted Airport Public Inquiry decision makes clear that Making Best Use of existing runways (MBU) should be accepted as government policy:

"*The in-principal support for making best use of existing runways provided by MBU is a recent expression of policy by the Government. It is given in full knowledge of UK commitments to combat climate change, having been published long after the Climate Change Act 2008 (CCA) and after the international Paris Agreement. It thoroughly tests the potential implications of the policy in climate change terms, specifically carbon emissions. To ensure that Government policy is compatible with the UK's climate change commitments the Department for Transport (DfT) aviation model was used to look at the impact of allowing all MBU airports to make best use of their existing runway capacity. This methodology appears to represent a robust approach to the modelling*"[7].

In SMAa [Matter 1] section 2 we outline in detail the socio-economic benefits of the development.

In SMAa [Matter 3] sections 2 and 3 we outline in detail the environmental impacts of the scheme and that

"*The development, even without mitigation, represents a tiny proportion of the overall UK GHG emissions and a tiny proportion of the total passenger and cargo ATMs in the UK. With mitigation measures implemented, through the Carbon Minimisation Action Plan, the Proposed Development's effect on the global climate is not significant. With aeroplane operators obliged to offset all CO_2 emissions caused by International Flights, the granting of the DCO for Manston is not at odds with the recommendations by the CCC in the sixth carbon budget.*

With Government action to push forward airspace change, aircraft innovation and a commitment to SAF there is no reason why the Secretary of State should not grant the DCO for Manston Airport".

[4] YAL Bristol Airport Expansion – page 8
[5] Examining Authority Recommendation Report – 5.6.13
[6] Examining Authority Recommendation Report – 5.6.15
[7] Stansted Airport Public Inquiry decision – page 4 section 18

3.3 Climate Change

LC states "*We do not address this change in detail in this Report*" but does state "*there tends to be a lag in upgrading the freighter fleet to the newest technology. This would suggest that development of an airport specifically aimed at attracting more dedicated freighter operations is more likely to use a higher share of the UK's Carbon Budget*"[8].

LC is either misunderstanding or misrepresenting the situation here. In our submission on [Matter 2] section 2.1 we outlined why there is always going to be a need for dedicated freighters. Boeing state:

"In addition to the long-term trend of dedicated freighters carrying more than 50% of global air cargo traffic despite growing widebody passenger fleets, the COVID-19 pandemic has highlighted the importance of main-deck freighters in our global air transportation system"[9].

As outlined in SMAa [Matter 3] section 2.1, CORSIA, now being law in the UK, imposes obligations:

"*Aeroplane operators will be set a "CORSIA Eligible Emission Unit" quota by the ICAO Council and these must be cancelled by the buying and selling of Eligible Emission Units on the Carbon Market*"[10].

Whether dedicated freighters land and take off from Manston or another airport in the UK, **aeroplane operators** will still be obliged to offset all CO_2 emissions caused by International Flights.

Finally, DHL has ordered 12 all-electric freighter aircraft with the first delivery scheduled in 2024[11].

Therefore, the points raised by LC in this section are irrelevant to the granting of the DCO for Manston.

3.4 Thanet District Council Local Plan 2020

LC refers to Policy SP07 – Manston Airport:

"Manston Airport as identified on the Policies Map is safeguarded for airport related uses. Whether or not the DCO is confirmed, the future use and development of Manston Airport and/or policies affected by the outcome of the DCO process will be determined through the early review of the Plan."

And that "*The LP makes clear that this, and other related policies, will be subject to review when the outcome of the DCO is known".*

This is merely in line with TDC Policy SP03 - Local Plan Review

"*Within six months of the adoption of the Local Plan, the Council shall undertake and complete a review of the Plan with information published as part of an updated Local Development Scheme setting out a timetable for the completion of the review and any update as may be required*".

Point 3.4 raised by LC about reviewing the Policy is pointless. The airport is safeguarded for airport related uses and the applicant owns the airport land.

3.5 Employment

LC state "*We note that the claimant rate in Kent is actually below the national average"*[12].

[8] [LC] – page 12
[9] Boeing Executive Summary
[10] CORSIA – FAQs – page 20 section 2.14
[11] DHL all-electric freighter aircraft
[12] [LC] - page 13

This is, at best, misleading. It seems to imply that there isn't a problem with unemployment throughout Kent.

This is definitely not the case, and it is unforgivable that LC has not included data about Thanet which has[13]:

- the highest unemployment rate in Kent.[14]
- the highest 18-24 unemployment rate in the South East[15].
- many areas with very high levels of deprivation[16].

Following on from that:

- There is an established link between deprivation and life expectancy with a difference of over 9 years for males and over 7 years for females[17].
- In the Thanet District only 0.1% of enterprises (5 out of 4,050) employ more than 250 people.[18]
- By year two, direct jobs projected by the applicant (856)[19] will exceed the 250-job threshold making it one of the major employers in the area.
- The Manston development will reduce local unemployment.
- The Manston development will reduce local deprivation.
- The Manston development will improve local life expectancy and local healthy life expectancy.

The statement by LC "*To the extent that there is ongoing unemployment in Kent, the Airport would, at best, make only a small contribution to overcoming the issue*" is blatantly untrue.

3.6 Thames Freeport

LC states that the "*Thames Freeport will be of no benefit to Manston Airport or positive influence on its alleged need case as it is not included within the boundary of the Thames Freeport and tariffs would still be applicable to goods using the Airport*"[20].

However, in the same section when explaining Freeports she states, "*This allows firms to import goods, use the same goods in manufacturing, and export finished products without facing the standard tariffs or customs checks".* In other words, goods could be imported via Manston, enter the freeport, use those goods in manufacturing, and then the goods could leave the freeport to areas within the Southeast or be flown from Manston to other countries.

Therefore, the statement by LC that the "*Thames Freeport will be of no benefit to Manston Airport" is not true.*

3.7 The London Resort

In connection with the London Resort LC states "*Realistically, this would dwarf the potential job generation impact of an air freight hub at Manston Airport and could make local recruitment more difficult*"[21].

It is hard to imagine that there is direct correlation between the two. As stated earlier, Thanet has a very high unemployment rate, particularly in the 18-24 age group and, as indicated in our representation on [Matter 1]

[13] SMAa [Matter 1]
[14] District Unemployment Level Kent 2021
[15] District Unemployment Kent Level 2021
[16] Indices of Deprivation headline figures 2020
[17] The Kings Fund
[18] UK-business-counts-statistics 2020
[19] [APP-085] – Volume IV page 28
[20] [LC] - page 14
[21] [LC] - page 15

section 2.5, the applicant has a commitment to employ local people. **This is, at best, an extremely weak argument put forward by LC and is not a significant consideration.**

3.8 Ebbsfleet Garden City

LC seems to be making the same extremely weak argument and so is not a significant consideration.

3.9 The Lower Thames Crossing

LC states "*The Lower Thames Crossing is a significant development that would ultimately provide Kent with easier access to Southend and Stansted airports*"[22].

Whilst this statement is undoubtably true it is equally true that the Lower Thames Crossing will give easier access for freight travelling from Manston to the Thames Freeport, Essex and beyond.

In addition, we outlined in detail in SMAa [Matter 2] section 1.1 why Stansted will not have the Cargo ATMs required to meet the need.

At present, according to the Southend Airport web site FAQs, Southend uses only Boeing 737 – 400F aircraft for its freight operations probably due to its relatively short runway (1,856m).

It is hard to see that the opening of the Lower Thames Crossing will make any material difference to the decision of granting the DCO.

4.0 Updating the qualified need case

4.1 The baseline

Sections 4.1 to 4.8[23] cover information from periods before July 2019 and so are irrelevant. Although it is nice to see someone using a "Waterfall Chart" (sometimes called a bridge), the SoS asked whether "*the quantitative need for the Development has been affected by any changes **since 9 July 2019***" (our emphasis) **so none of the comments by LC address the questions asked.**

4.2 The effects of Covid

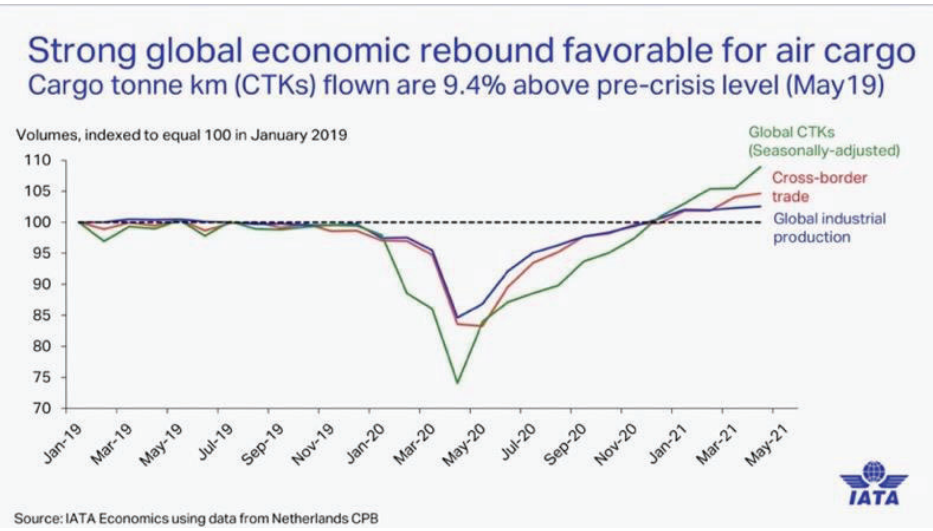
LC states *"Figure 4.2 presents the overall freight tonnage flown to or from UK airports on a monthly basis from January 2019 through to May 2021"[24].*

[22] [LC] - page 15
[23] [LC] - page 18
[24] [LC] - page 20

Unfortunately, LC seems to have used the wrong data for May 2021. The cumulative total should be 192,369 (bellyhold 40,394 + freighter 142,975)[25] and not the approximately 160,000 shown by LC. **This lack of accuracy is very worrying and does call into question her attention to detail.**

LC states that "*overall projections for the operation of dedicated freighter aircraft globally have not changed, despite any short-term factors arising from the pandemic. In 2018, Boeing forecast a worldwide freighter fleet of 3,260 aircraft by 2037 and now projects the same number by 2039*"[26].

It should be noted that Boeing released its 2020-2039 report[27] in October 2020 when the full extent of the upturn in air freight demand was not clear[28]:



The graph clearly shows that after a big drop in early 2020, not only has it recovered to pre-covid levels in around the time of the Boeing forecast but by May 2021 was 9.4% above the levels in January 2019. N.B. In their latest data IATA have indicated that the June 2021 CTKs are 9.9% above June 2019 levels.[29]

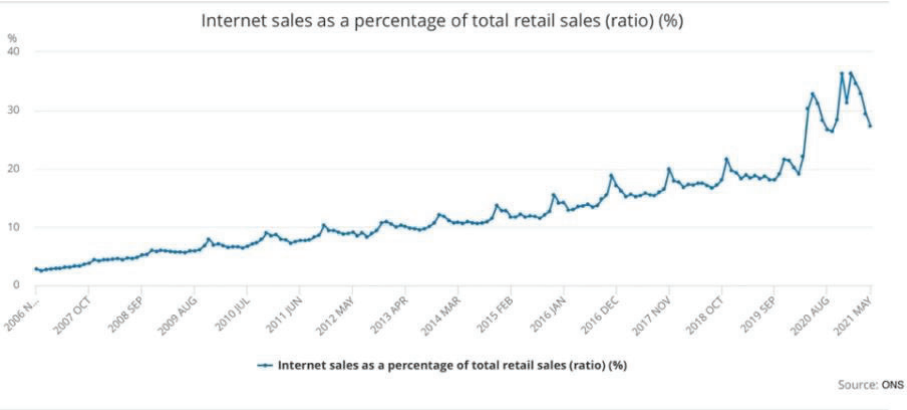
This suggests that were Boeing to have written their report in May 2021, the figure quoted of 3,260 freighter aircraft may well have been higher.

However, even if we take the figure of 3,260 freighters, what LC failed to explain was that this figure represents a 60% increase in the freighter fleet:

"The combination of 4.0% annual average RTK growth, in addition to the proven need for dedicated freighter capacity to support our global transportation system, results in the need for a 60% larger fleet during the next two decades"[30].

One of the biggest drivers of this upturn has been the huge growth in e-commerce. It is true that e-commerce has been growing for many years and according to ONS data total e-commerce sales in the UK have risen from £375 billion in 2009 to £669 billion in 2019[31]. There was then a rapid rise in e-commerce because of the pandemic and, although there have been fluctuations as normal retail reopens, internet sales as a percentage of total retail sales are still way above pre-pandemic levels:

[25] CAA airport data May 2021
[26] [LC] - page 21
[27] Boeing Executive Summary
[28] IATA air freight monthly analysis May 2021
[29] IATA air freight monthly analysis June 2021
[30] Boeing WACF – page 10
[31] ONS e-commerce data - table 1



Internet sales as a percentage of total retail sales have risen from 19.1% in February 2020 to 27.3% in May 2021 (the last data available). At the peak of the graph shown above it was at 36.3% in both November 2020 and January 2021[32].

According to Boeing "*However, it is clear that e-commerce is revolutionizing customer expectations and air cargo logistics. In the next four years, the market size is forecast to increase over US$3 trillion, to US$6.5 trillion in 2023"*[33].

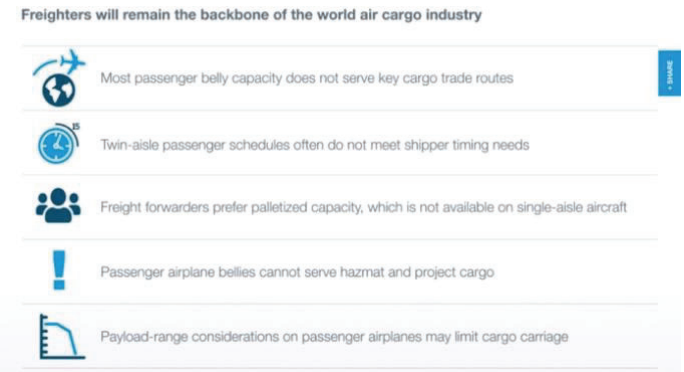
It seems astonishing that LC decided not to include the effect the pandemic has had on e-commerce and internet sales because of the implications it has for air cargo and dedicated freighter use. To have totally ignored it in this section must seriously call into question her judgement and the conclusion she reached that "*Prima facie, there is no change in the need for additional airport capacity going forward for dedicated freighter operations as a consequence of the Covid-19 pandemic than there was in our original assessments in 2017 and 2019*".

4.3 Changes related to the UK's withdrawal from the European Union

LC states "*Ultimately, there is no compelling evidence to suggest that the UK's withdrawal from the European Union contributes to an alleged need for the development and re-opening of Manston Airport".*

This is a somewhat surprising conclusion because, as LC has indicated, the UK have already agreed several trade deals that will increase the need for air cargo. LC seems to be suggesting that "*this will tend to reinforce the importance of bellyhold capacity as the principal means of carriage as it enables a wider network of points to be served directly rather than trying to consolidate cargo onto a small number of dedicated freight routes".*

This is, at best, misleading, as all the evidence indicates that bellyhold is not the "*principle means of carriage*". The split is approximately 50/50 and bellyhold has limitations[34]:

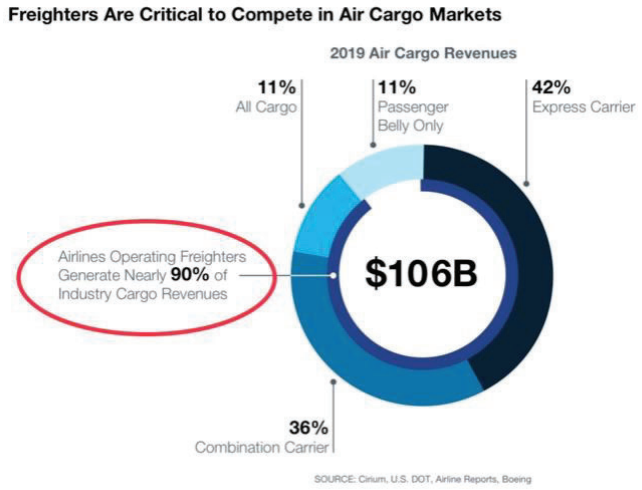


[32] ONS – Internet sales as a percentage of total retail sales
[33] Boeing WACF – page 17
[34] Boeing WACF – overview

New trade deals will increase the need for both bellyhold and dedicated freighters and the latter will increase the quantitative need for Manston. To suggest otherwise goes against all the evidence.

Whilst on the subject, LC has asserted that bellyhold freight is more economic than freight carried on dedicated freighters[35]. She claims to have provided proof in her 2019 report in paras. 4.7 to 4.15. However, having looked at that document, there is no credible factual evidence to back up her claims and it is just a mixture of anecdotal evidence and supposition on her part.

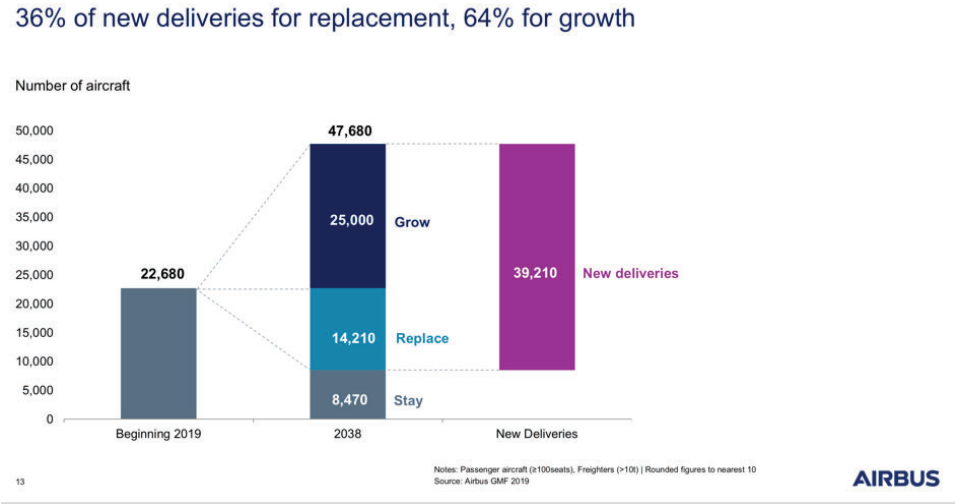
What is fact is that Airlines operating freighters generate nearly 90% of Industry cargo revenues[36]:



4.6 Changes in airline fleets

LC states "*Some large operators of freighter aircraft have placed new factory orders for additional aircraft but at least some of these new orders will be one-for-one replacements of existing aircraft within freighter fleets, which in principle would not contribute to growth within the market".*

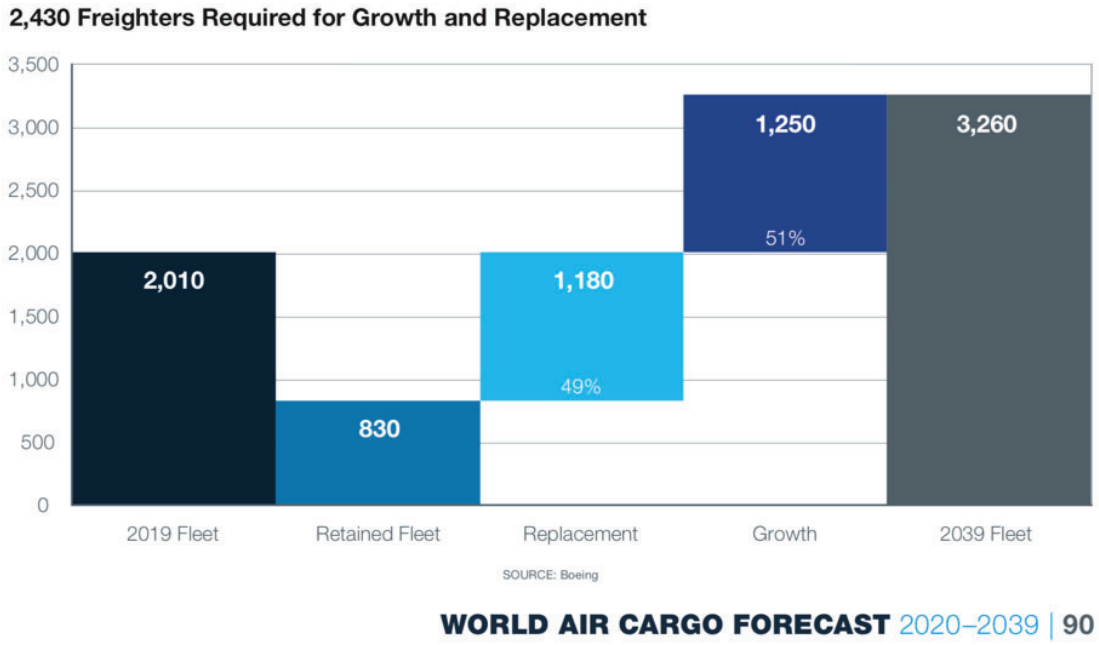
This statement is at odds with the evidence:



The graphic above is from the 2019 forecast[37] which is their latest release and shows growth for passenger and freighter aircraft.

[35] [LC] – page 8 section 2.11
[36] Boeing WACF – page 19
[37] Airbus 2019 forecast – page 13

Boeing have a more up to date and therefore more relevant graphic:



This graphic shows that 51% of freighters will be for growth. LC has, once again, misrepresented the evidence.

LC has failed to mention a recent trend away from wide-body aircraft:

"A trend among airlines of phasing out four-engine widebody aircraft in favour of smaller, more fuel-efficient two-engine aircraft, including even narrow bodies, has accelerated"[38].

This trend is explained because *"a narrow-body airplane can make money in good times and lose money in bad times, but the swing in either direction is not so great. A wide-body can make more money in good times, of course because they can carry more people. But they also can lose a lot more in weaker times, because of their high monthly ownership costs, fuel, and labour requirements"*[39].

Orders for the new Airbus A321XLR are strong with 20 companies and 450 ordered so far[40]. "*The A321XLR is a single-aisle, narrow-body aircraft with a typical two-class capacity of 180-200. But it pushes the range to the highest of any narrowbody – up of 8,700 kilometers (4,700 NM)*"and "*should enter service in 2023*"[41].

According to Airbus figures, the A321XLR will have "*20% lower fuel burn per seat, 5,000 tonnes less CO2 per year, and a noise footprint that is 50% lower for passengers and airports*"[42].

For aeroplane operators, the increased range, increased fuel economy and a smaller Carbon footprint will make such planes an attractive proposition.

If this trend for a reduction in wide-body aircraft does materialise then it has huge ramifications for belly hold cargo. The narrow-bodied planes clearly have less belly hold capacity and once passenger baggage has been accommodated there is not going to be much room for air cargo. For example, the A321XLR could

[38] Forbes – fewer wide-body aircraft
[39] Forbes – fewer wide-body aircraft
[40] Travel Daily – switch to narrow bodied
[41] Simple Flying - A321XLR
[42] Airbus A321XLR

accommodate 3 tonnes of additional cargo compared with 13.5 tonnes in a B747-400ER[43]. This potential reduction in bellyhold capacity strengthens the case for reopening Manston for dedicated freighters.

4.7.0 Changes in capacity at other airports

4.7.1 Heathrow

As has already been stated, this has already been covered by us in detail in SMAa [Matter 2] section 1.2, and previously in this representation under section 3.1. Heathrow expansion is unlikely to happen for a considerable length of time and certainly later than the date assumed by the Examining Authority.

4.7.2 Stansted

LC states that "the current position remains as at July 2019 in that Stansted has substantial headroom to grow its freighter activity".

We addressed this point in detail in SMAa [Matter 2] section 1.1 and concluded:

"The evidence demonstrates that for the maximum Cargo ATMs availability is shrinking and must continue to fall because of the clear intention of MAG to increase passenger numbers. Depending on three scenarios the % reduction in the maximum Cargo ATMs available (currently 20,500) range from a Minimum 22% reduction (to 16,000) to a maximum of 71% reduction (to 6,000)[44].

In summary, because of the appeal decision to grant the planning application, Stansted will not have sufficient Cargo ATMs in the very near future to meet the cargo need as it increases its passenger ATMs closer and closer to the total ATMs available at Stansted. In our view this change increases the quantitative need for Manston Airport".

4.7.3 Gatwick and Luton

Both airports have a long way to go before their plans for expansion are realised and even when they do, as acknowledged by LC, the plans involve passenger growth and not dedicated freighters so are irrelevant.

4.7.4 Southampton

Although planning permission has been granted as LC states "**an extended runway will allow the Airport to rebuild its reduced passenger network since the closure of Flybe. This may offer some limited opportunities for short haul freight**". **It seems unlikely that such expansion materially alters the quantitative need for the Manston development, and one wonders why LC bothered to mention it?**

4.7.5 East Midlands

LC states "that Manston, located where it is, would be highly unlikely to offer any competition to East Midlands".

However, this should not be seen as an either East Midlands or Manston Airport situation. Instead, it should be seen as a vital opportunity to build significant resilience to the air freight market by having both airports available for dedicated freighters, one serving the Midlands / North and the other the South of England.

As has been stated earlier, e-commerce is a huge market and will continue to grow and would certainly support the use of both East Midlands and Manston Airports.

[43] [RSP Annex 3] – para 28

[44] Reduction in air cargo ATMS at Stansted

From our representation SMAa [Matter 2] section 2.1 "*One of the major drivers of this increase in e-commerce is Amazon and it is significant to note that Amazon are in the process of building a "Mega Shed" in Dartford. This will be one of their largest warehouses in Europe and its four floors will encompass 2.3 million square feet.*

Amazon have decided to make this huge investment in the South East rather than in the Midlands which is very telling. As has already been stated, neither Stansted nor Heathrow will have sufficient capacity to meet the need for e-commerce dedicated freighters in the next 5 to 10 years. In contrast, Manston Airport will have the necessary capacity and the location of this facility is much closer to Manston than East Midlands by road (58.5 miles as compared with 141.2 miles)[45]. Since the warehouse is adjacent to the Thames, it opens up the possibility of using greener methods of transporting goods from Manston, via Ramsgate Port, to Dartford.

Consumers increasingly expect rapid / next day delivery of their e-commerce items. The extra delay from landing their goods at East Midlands and then having to truck them down to Kent and the South East adds a significant extra delay compared to landing e-commerce items at Manston".

4.8 Quantifying the Need for Manston Airport

Sections 4.65 to 4.68 involve LC making forecasts for future growth.

As has already been stated, LC is not qualified to act as an expert in aviation forecasting. Instead, we believe the SoS should rely on expert predictions for the future growth of air cargo as produced by Boeing, Airbus and IATA

5.0 Conclusion

LC has produced a lengthy representation covering some 43 pages, but she has said virtually nothing new. The report contains several errors and/or serious omissions.

- LC has failed to acknowledge the positive implications for the development of the long delay in the Heathrow expansion.
- LC has underplayed the significance of the MBU for the development.
- LC misunderstood or misrepresented the situation in section 3.14.
- The points raised by LC in section 3.14 of her report were irrelevant to the granting of the DCO for Manston.
- The point raised by LC in section 3.15 about reviewing the Policy is pointless. The airport is safeguarded for airport related uses and the applicant owns the airport land.
- The statement by LC "*To the extent that there is ongoing unemployment in Kent, the Airport would, at best, make only a small contribution to overcoming the issue*" is blatantly untrue.
- The statement by LC that the "*Thames Freeport will be of no benefit to Manston Airport"* is not true.
- The comments by LC about The London Resort and Ebbsfleet City are pointless.
- LC refers to the Lower Thames Crossing, but it is hard to see that the opening of the Lower Thames Crossing will make any material difference to the decision of granting the DCO.
- LC used incorrect data in representing the freight situation in May 2021.
- LC tried to imply that predictions for future freighter numbers have remained static whereas they equate to a 60% growth.
- It seems astonishing that LC decided not to include the effect the pandemic has had on e-commerce and internet sales because of the implications it has for air cargo and dedicated freighter use.
- LC's statement that "*Prima facie, there is no change in the need for additional airport capacity going forward for dedicated freighter operations as a consequence of the Covid-19 pandemic"* is not correct.
- New trade deals will increase the need for both bellyhold and dedicated freighters and the latter will increase the quantitative need for Manston. For LC to suggest otherwise goes against all the evidence.
- Contrary to what LC stated, evidence shows 51% of new freighters will be for growth and not replacements.

[45] AA route finder

- LC has failed to mention a recent trend away from wide-body aircraft towards narrow-body planes which, if it continues, strengthens the quantitative need for the development.
- LC has failed to make the case that other airports in the Southeast will have sufficient Cargo ATMs to meet the cargo needs.
- LC has failed to grasp that dedicated freighter aircraft will make up at least 50% of global air cargo traffic.
- LC has failed to grasp that carrying freight as bellyhold has limitations.
- LC continues to make aviation forecasts when it has been established that, although she is qualified to be an expert in socio-economic factors, she is not qualified as an expert witness for aviation forecasts.

For all the reasons outlined above, we urge the Secretary of State to consider the arguments that we have put forward and conclude that the representation by LC for Grant Harrison does not stop the granting of the DCO for Manston.

<u>From the SMAa Committee on behalf of the 3,700 members</u>

Dr Beau Webber (Chairman)

Climate Change Committee

The Sixth Carbon Budget

Aviation

This document contains a summary of content for the aviation sector from the CCC's Sixth Carbon Budget Advice, Methodology and Policy reports.

Introduction

The Committee is advising that the UK set its Sixth Carbon Budget (i.e. the legal limit for UK net emissions of greenhouse gases over the years 2033-37) to require a reduction in UK emissions of 78% by 2035 relative to 1990, a 63% reduction from 2019. This will be a world-leading commitment, placing the UK decisively on the path to Net Zero by 2050 at the latest, with a trajectory that is consistent with the Paris Agreement.

Our advice on the Sixth Carbon Budget, including emissions pathways, details on our analytical approach, and policy recommendations for the aviation sector is presented across three CCC reports, an accompanying dataset, and supporting evidence.

- **An Advice report**: *The Sixth Carbon Budget – The UK's path to Net Zero*, setting out our recommendations on the Sixth Carbon Budget (2033-37) and the UK's Nationally Determined Contribution (NDC) under the Paris Agreement. This report also presents the overall emissions pathways for the UK and the Devolved Administrations and for each sector of emissions, as well as analysis of the costs, benefits and wider impacts of our recommended pathway, and considerations relating to climate science and international progress towards the Paris Agreement. Section 7 of Chapter 3 of that report contains an overview of the emissions pathways for the aviation sector.
- **A Methodology Report:** *The Sixth Carbon Budget – Methodology Report*, setting out the approach and assumptions used to inform our advice. Chapter 8 of that report contains a detailed overview of how we conducted our analysis for the aviation sector.
- **A Policy Report:** *Policies for the Sixth Carbon Budget and Net zero*, setting out the changes to policy that could drive the changes necessary particularly over the 2020s. Chapter 8 of that report contains our policy recommendations for the aviation sector.
- **A dataset** for the Sixth Carbon Budget scenarios, which sets out more details and data on the pathways than can be included in this report.
- **Supporting evidence** including our public Call for Evidence, 10 new research projects, three expert advisory groups, and deep dives into the roles of local authorities and businesses.

All outputs are published on our website (www.theccc.org.uk).

For ease, the relevant sections from the three reports for each sector (covering pathways, method and policy advice) are collated into self-standing documents for each sector. A full dataset including key charts is also available alongside this document. This is the self-standing document for the aviation sector. It is set out in three sections:

1) The approach to the Sixth Carbon Budget analysis for the aviation sector
2) Emissions pathways for the aviation sector
3) Policy recommendations for the aviation sector

Chapter 1

The approach to the Sixth Carbon Budget analysis for the aviation sector

The following sections are taken directly from Chapter 8 of the CCC's Methodology Report for the Sixth Carbon Budget.[1]

Introduction and key messages

This chapter sets out the method for the aviation sector's Sixth Carbon Budget pathways.

The scenario results of our costed pathways are set out in the accompanying *Advice report*. Policy implications are set out in the accompanying *Policy report*.

For ease, these sections covering pathways, method and policy advice for the aviation sector are collated in *The Sixth Carbon Budget – Aviation*. A full dataset including key charts is also available alongside this document.

The key messages from this chapter are:

- **Background**. Aviation emissions accounted for 7% of UK GHG emissions in 2018 and were 88% above 1990 levels. Emissions have been relatively flat from 2008-2018, with increasing international travel being offset by some improvements in efficiencies and by falling military and domestic aviation emissions. 2020 has likely seen a drop in GHG emissions of over 60% from 2019, due to the impact of COVID-19, with a return to pre-pandemic passenger levels not expected until 2024.[2]
- **Options for reducing emissions**. Mitigation options considered include demand management, improvements in aircraft efficiency (including use of hybrid electric aircraft), and use of sustainable aviation fuels (biofuels, biowaste to jet and synthetic jet fuels) to displace fossil jet fuel.
- **Analytical approach**. Our starting point for this analysis has been the 2019 *Net Zero* report, and the underlying DfT demand, efficiency and emissions modelling.
  - We have adapted and updated this analysis to fit to a new set of demand scenarios (consistent with those considered by the Climate Assembly), before introducing significantly higher shares of sustainable aviation fuels than previously considered.
  - This includes new evidence on the costs and emissions savings of sustainable aviation fuels, fitting with our Fuel Supply analysis, and the added capital costs of efficiency improvements.
- **Uncertainty**. We have used the scenario framework to test the impacts of uncertainties, to inform our balanced Net Zero Pathway. The key areas of uncertainty we test relate to sustainable aviation fuel supplies and costs of synthetic jet fuel, the mix of SAF options, the profile for expansion in passenger demand over time (with mid-term or no net expansion of airports), and whether there will be long-term structural change in the sector due to COVID-19. Out of all the CCC's sectors, Aviation has been most impacted by COVID-19, and continues to face the highest uncertainties about the future size of the sector.

We set out our analysis in the following sections:

1. Sector emissions
2. Options for reducing emissions
3. Approach to analysis for the Sixth Carbon Budget

1. Sector emissions

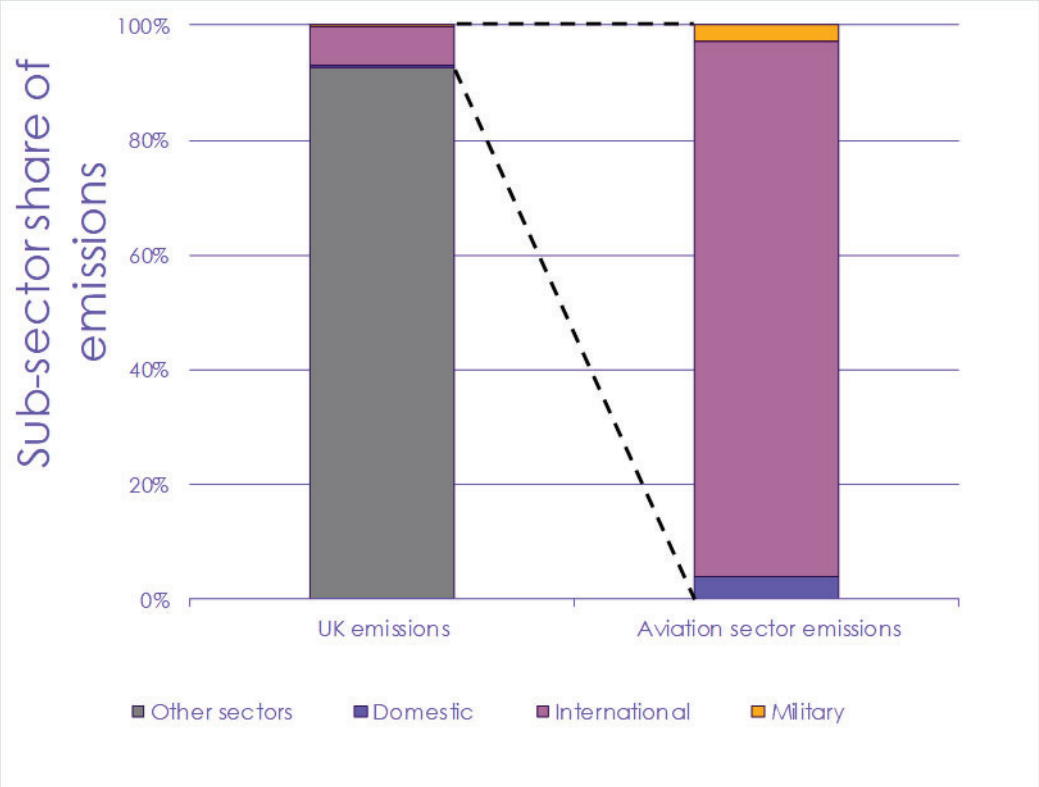
This section outlines the recent trends in aviation emissions and their sources. For more detail, see our 2020 Progress Report to Parliament.[3]

a) Breakdown of current emissions

Based on the most recent official UK emissions data, total UK aviation emissions increased by 0.8% from 2017 levels to 39.3 $MtCO_2e$/year in 2018. Within this, emissions from international flights increased by 1.1% to 36.7 $MtCO_2e$/year, emissions from domestic flights fell by 5.9% to 1.5 $MtCO_2e$/year, and emissions from military aviation fell 0.6% to 1.1 $MtCO_2e$/year. Aviation therefore comprised 7% of UK GHG emissions in 2018, and within this international aviation dominates at 93% of UK aviation emissions (Figure M8.1).

To be consistent with other sectors and the Climate Change Act framework, these GHG emissions do not include non-CO_2 impacts of aviation, which are discussed in Chapter 8, section 4 of the main *Advice Report*.

Figure M8.1 Breakdown of aviation sector emissions (2018)



Source: BEIS (2020) *Final UK greenhouse gas emissions national statistics 2018*.
Notes: Total UK emissions in 2018 were 539 $MtCO_2e$/yr (AR5 basis peatland revisions and IAS included). UK aviation sector emissions in 2018 were 39 3 MtCO2e/yr.

We have also estimated UK aviation emissions for 2019 at 39.6 $MtCO_2e$/year, a 0.9% increase on 2018 levels. This combines 11% falls in domestic and military emissions with a 1.7% increase in international aviation emissions.

However, given the COVID-19 pandemic and its impact on the aviation sector, and the need to reflect this in our analysis in the near-term, we have also estimated a fall in 2020 GHG emissions of over 60% from 2019 levels (and then a recovery to 2024), as detailed below in section 3(e). The emissions estimates from 2019 onwards will revised once official BEIS final GHG emissions data is published.

b) Emissions trends and drivers

The breakdown of aviation emissions since 1990 is shown in Figure M8.2. Overall, emissions from domestic and international aviation in 2018 were 124% above 1990 levels, and military aviation emissions have fallen 71% from 1990 levels.

Figure M8.2 Breakdown of aviation sector emissions (1990-2019)

Source: BEIS (2020) *Final UK greenhouse gas emissions national statistics 2018* BEIS (2020) *Provisional UK greenhouse gas emissions national statistics 2019* BEIS (2020) *Energy Trends* CCC estimates for 2019.

Aviation emissions rose strongly throughout the 1990s and early-to-mid 2000s, due to increasing passenger demand, with only minor falls seen around 1990 and 2000 due to economic down-turns.

Emissions fell significantly during 2007-2010 due to the financial crisis, then stayed relatively flat in the early 2010s, but have been rising again in recent years.

UK aviation emissions in 2018 were therefore the same as in 2008, as falls in domestic and military aviation emissions have been balanced by a rise in UK international aviation emissions. Over the same 2008-2018 period, the total number of UK terminal passengers rose by 24% to reach 292 million in 2018, with a further 2% increase seen in 2019.

The increase in emissions has been more modest than growth in passengers due to increased plane loadings, decreases in average flight distance (due to faster growth in flights to the EU than other international destinations) and some improvements in fleet efficiency.

2. Options for reducing emissions

Several different emissions reduction options have been explored within the Aviation sector. These include:

- **Demand management**. A reduction in the annual number of passengers versus a counterfactual with unlimited passenger demand growth. Demand management policies could take several forms, either reducing passenger demand for flying through carbon pricing, a frequent flyer levy, fuel duty, VAT or reforms to Air Passenger Duty, and/or restricting the availability of flights through management of airport capacity. Our analysis only assumes a demand profile is achieved, and does not model the policies required to achieve these profiles.
- **Aircraft fleet-efficiency improvements**, achieved via a combination of airspace modernisation, operational optimisation, aircraft passenger loadings, aircraft design and new engine efficiency improvements, as well as introduction of hybrid electric aircraft (significant falls in jet use, but adding some use of electricity via on-board batteries and motors). Our analysis uses fleet fuel tCO_2/passenger values from DfT modelling, and does not model individual improvements from the list above.
- **Sustainable aviation fuels (SAF)**. These are "drop-in" replacements for fossil jet fuel, meeting international fuel specifications (and currently allowed to be blended at up to 50% by volume), and have nil accounting CO_2 emissions on combustion. SAF production routes considered include:
  - Biomass to Fischer-Tropsch (FT) biojet, with or without CCS;
  - Biogenic waste fats/oils to Hydroprocessed Esters and Fatty Acids (HEFA) biojet;
  - Biogenic fraction of waste* to Fischer-Tropsch (FT) biojet, with or without CCS; and
  - Synthetic jet fuel produced via Direct Air Capture (DAC) of CO_2 and low-carbon H_2.

  Our analysis uses these four SAF options to displace fossil jet fuel, and each SAF option has its own deployment and cost profile, based on the availability of the feedstocks, efficiencies, input energy, capital and operating costs. Each route is discussed in more detail in the Fuel Supply chapter.

* Note that the non-biogenic fraction of waste converted to FT jet will still have fossil accounting CO_2 emissions on combustion in aviation and so is included within fossil jet fuel figures not as SAF.

a) Summary of scenario choices

As a reminder from Chapter 3, section 7 of the *Advice Report*, the measures discussed in section 2 above are combined into the different scenarios as set out in Table M8.1.

Table M8.1
Aviation scenario composition

	Passenger demand growth by 2050 from 2018 levels	Average efficiency improvement 2018-2050 (%/year)	Use of biomass FT jet (TWh, % of liquid fuel demand in 2050)	Use of HEFA biojet (TWh, % of liquid fuel demand in 2050)	Use of bio-waste FT jet (TWh, % of liquid fuel demand in 2050)	Use of synthetic jet (TWh, % of liquid fuel demand in 2050)	Use of fossil jet (TWh, % of liquid fuel demand in 2050)
Balanced Net Zero Pathway	**+25%, with no net expansion**	**+1.4%**	**14 (11%)**	**8 (6%)**	**-**	**10 (8%)**	**94 (75%)**
Headwinds	+25%, with expansion	+1.4%	14 (11%)	11 (9%)	-	-	101 (80%)
Widespread Engagement	-15%, no expansion	+1.6%	14 (16%)	4 (4%)	5 (5%)	-	61 (74%)
Widespread Innovation	+50%, with expansion	+2.1%	23 (19%)	9 (7%)	-	30 (25%)	58 (49%)
Tailwinds	-15%, no expansion	+2.1%	23 (33%)	12 (18%)	-	30 (44%)	4 (5%)
Baseline	+64%, with expansion	+0.7%	-	-	-	-	205 (100%)

Our baseline is taken direct from DfT modelling, with high demand growth (64% growth in passenger number by 2050, from 2018 levels), low efficiency improvement (0.7%/year), no hybrid electric aircraft and no SAF deployment.

The exploratory scenarios use different mixes of the options set out in section 2 to reduce emissions below baseline emissions:

- **Headwinds** follows the approach in Net Zero 2019, with 25% passenger growth by 2050, 1.4%/year efficiency improvement (in-line with historical averages), and 14 TWh/year of biomass to FT jet. We have also added 11 TWh/year of HEFA biojet, as surface transport shifts to EVs, leaving waste fats/oils resources available to be converted into HEFA biojet instead of biodiesel.
- **Widespread Engagement** assumes a reduction in aviation demand of 15% from 2018 levels, based on the lowest of the Climate Assembly scenarios. This reflects a scenario in which people are willing to embrace greater changes to behaviour. Efficiencies are marginally higher than in Headwinds. Biomass to FT jet remains at the same level, whereas significantly lower livestock numbers and a phasing out of biofuel imports leads to lower HEFA biojet use. However, in this scenario, residual wastes are assumed to be increasingly diverted from energy-from-waste plants, with 70% of the UK's residual waste converted into 5 TWh/year of biojet (plus a similar fossil fraction) by 2050, thereby contributing an additional 5% of aviation fuel demand from waste biojet.

- **Widespread Innovation** assumes demand growth of 50% from 2018 levels, based on the highest demand amongst the preferred Climate Assembly scenarios. Efficiencies are much higher, based on the DfT scenario selected. More biomass is assumed to be diverted to FT biojet, along with HEFA biojet making up ~25% of supply, and the other 25% of the fuel mix is assumed to be made up of synthetic jet fuel. We did not increase the blending of synthetic jet fuel above 25% due to the high costs of synthetic jet fuel, and the high penetration of biomass to hydrogen in the Widespread Innovation scenario (where it would be more efficient to make biojet direct from the biomass, rather than via a hydrogen intermediary). However, the overall choices fit with the overall scenario design philosophy of maximal technical change.

- **Tailwinds** combines the most stretching of the scenarios above – a reduction in demand, high efficiency, and the maximal resource allocations for the biojet and synthetic jet fuel from the other scenarios. Waste to jet has not been included, as the remaining energy-from-waste (EfW) plants in our analysis all retrofit CCS before 2050, ensuring 95% capture of the fossil & biogenic carbon. However, putting the residual waste instead into new jet production plants with CCS would likely lead to a very similar outcome in terms of GHG emissions.*

Our scenario for the Balanced Net Zero Pathway takes elements from each of the above pathways:

- **Demand growth**: Our demand growth by 2050 matches Headwinds at 25%, although the passenger growth profile is more gradual due to an assumption of no net capacity expansion at UK airports in this scenario. This arises as a function of 2050 passenger numbers (365 million passengers) being within current UK airport capacities (at least 370 million passengers), and the need to ensure the UK achieves Net Zero by 2050 with aviation still one of the largest emitting sectors. We therefore do not assume a surge in emissions occurs in the early 2030s, as happens with the airport expansion modelled in the Headwinds and Widespread Innovation scenarios. Airport expansion could still occur under the Balanced Pathway, but would require capacity restrictions elsewhere in the UK (i.e. effectively a reallocation of airport capacity).

Box M8.1
Climate Assembly scenarios

The Climate Assembly debated five aviation scenarios, with changes in demand from 2018 to 2050 of -15%, +20%, +25%, +50% and +65%. Growth of 65% growth was highly unpopular - a majority wanted to see a 25-50% growth in flights, with the higher end of the range acceptable if technology was developed to mitigate the additional emissions. However, the weighted average of scenario Borda votes was +24% growth, and the report also noted that a majority voted for +25% growth or less. This gives added confidence that the required demand management to keep the Balanced Net Zero Pathway to only 25% growth by 2050 would be acceptable to the UK general public.

Source: Climate Assembly UK (2020) CCC analysis.

* This assumes that jet production is maximised and that other co-products (e.g. diesel LPG) also still displace fossil fuels (increasingly difficult to 2050 as other sector counterfactuals decarbonise) and that EfW plants with CCS are displacing grid electricity with zero emissions by 2050 (rather than displacing fossil gas with CCS plants).

- **Efficiency**: The Balanced Net Zero Pathway takes the same efficiency assumptions as in the Headwinds scenario, in line with historical average improvement.
- **SAF**: Use of SAF matches Headwinds and Widespread Engagement for biomass to FT jet, and similar assumptions are taken on HEFA biojet (with slight differences due to waste fats/oils availability). Our Balanced Net Zero Pathway also assumes some synthetic jet fuels might be available in 2040s, at one third of the level deployed in the Widespread Innovation scenario, due to the higher costs of hydrogen and Direct Air Capture in the Balanced Net Zero Pathway compared to the Widespread Innovation scenario. Similar to the Tailwinds scenario, we have not allocated residual waste to jet fuel in this scenario.

The resulting GHG emissions in the Balanced Pathway grow during 2021-2023 with the return in passenger numbers post-COVID, before flat demand, efficiency measures and the start of SAF deployment lead to falls in emissions to the early 2030s. The more back-ended passenger growth in the Balanced Pathway (compared to Headwinds) has passenger numbers starting to grow from the mid-2030s, meaning that emissions continue to decline to 2040, as this later passenger growth is able to be accommodated by further improvements in efficiency and the continued uptake of SAF (compared to emissions increasing in Headwinds in the early 2030s with earlier passenger growth). The Balanced Pathway therefore only sees growth in passenger numbers towards 2050 once SAF is commercially proven and contributing at scale (in this scenario, there is 8% SAF used in 2035, increasing at slightly above 1 percentage point a year). From 2040, DfT modelling then introduces a new generation of aircraft (including the start of hybrid electric aircraft) that lead to further falls in emissions, with continued SAF uptake and passenger numbers continuing to increase to 2050.

Aviation measures reduce sector emissions to 23 $MtCO_2e$/year by 2050 in the Balanced Pathway, and all scenarios have positive emissions. The aviation sector will therefore require significant amounts of GHG removals to be developed to offset an increasing proportion of the sector's (declining) gross emissions to 2050, and aviation is therefore likely to be a key driving force behind the long-term deployment of engineered removals.

b) Sector classifications

Note that with our current sector classifications, some emissions reduction options have been counted outside of the CCC's Aviation sector, even if these emissions reductions are achieved via aviation policy and could count towards a separate Net Zero goal for the sector. For example:

- Sequestering biogenic CO_2 by installing CCS on UK biojet production facilities is counted within the CCC's engineered GHG removals sector, as a form of bioenergy with CCS (BECCS).
- Airlines paying for Direct Air Capture with CCS (DACCS) in the UK, in order to offset their remaining aviation gross emissions, is also counted within CCC's engineered GHG removals sector.
- Airlines paying for tree planting in the UK, in order to offset their remaining aviation gross emissions, is counted within CCC's Land Use, Land Use Change & Forestry (LULUCF) sinks sector.

These do not constitute recommendations on emissions accounting, merely what we have assumed for this analysis. These 'negative emissions' options are discussed in greater detail in the LULUCF and engineered GHG removals chapters.

This CCC sector classification also means that whilst some SAF fuels can be strongly carbon-negative on a lifecycle basis at the point of use (e.g. if there is upstream biogenic CCS involved in their production), our Aviation sector analysis only considers the direct accounting CO_2 emissions from the use of SAF in the sector, i.e. nil and not negative. If an alternative accounting methodology were followed, the negative emissions from upstream biogenic CCS could be counted within the Aviation sector emissions, but then these upstream negative emissions would have to be excluded from the GHG removals or LULUCF sinks sector to avoid double-counting. Overall, these discussions reflect emissions accounting classifications and do not affect aggregate UK emissions.

The residual aviation emissions in the Widespread Innovation scenario are used to calculate the Direct Air Capture with CCS requirement (14.5 $MtCO_2$/year) in both the Widespread Innovation scenario and the Tailwinds scenario. DACCS costs, energy inputs and deployment profiles are discussed in the GHG removals sector.

c) Analytical steps

The aviation analysis for the Sixth Carbon Budget advice consists of the following steps:

- **Coverage.**
  - Aviation is split into three sub-sectors: domestic, international and military.
  - Emissions cover CO_2, N_2O and CH_4.
  - Coverage is for UK, Scotland, Wales and Northern Ireland.
- **Abatement measures** are split into three types: demand, efficiency (including hybrids) and SAF.
  - Domestic and international passenger demand and fuel use trajectories to 2050 are sourced from DfT aviation modelling, thereby incorporating DfT efficiency assumptions.
  - Trajectory start points were adjusted for 2015-2019 actual NAEI[4] and CCA data[5], and estimated COVID-19 impacts in 2020-23 (discussed below), and trajectories then re-scaled to meet passenger growth targets for 2050 (discussed above).
  - The domestic share of DfT fuel use increases from 3.4% today to 3.9% by 2050. Military fuel use is derived separately from NAEI[4] and held fixed to 2050. Freight flights are included within DfT trajectories, so are implicitly assumed to scale with CCC passenger profiles.
  - SAF deployments from the CCC's Fuel Supply sector modelling are used to calculate residual fossil jet demands, with the same SAF % blend assumed to be used in each sub-sector (including in military aviation).
  - Direct accounting CO_2, CH_4 and N_2O emissions are calculated based on fuel use, then split into sub-sectors and DAs (discussed below).

  - Energy inflows to the sector (SAF = bioenergy, non-bio waste and hydrogen derived fuels, fossil jet and electricity from hybrid planes) are split into sub-sectors and DAs. It is assumed that 50% of the hybrid aircraft electricity use is in the domestic sub-sector.

- **Costs.**
  - Re-scaled DfT departing seat-km data is used to calculate operating cost savings from efficiency measures and increased annualised aircraft capital costs (which are de-annualised to in-year investments), based on ATA data which assumes a 20 year economic lifetime, 10% residual value and a 4.5% interest rate[6]. No cost data was available for the military aviation sub-sector. Marginal added costs of SAF above fossil jet are also calculated for all sub-sectors.
  - Costs are then split into sub-sectors and DAs to calculate £/tCO_2e abated by each measure, using CCC's 3.5% social discount rate.

Further assumptions used in the analysis include:

- In 2018, 99.91% of fuel used in the UK aviation sector was aviation turbine fuel (avtur or jet), and 0.09% of fuel used was aviation spirit (avgas). CCC have used the term "jet" or "jet fuel" to include all the fuel used in UK aviation. Our analysis uses the 2018 weighted average of avtur and avgas, with constant fuel density, calorific value and carbon content values from Defra.[7]
- NAEI factors are also applied to scale combustion CO_2 to combustion CH_4 (with separate factors for domestic, international and military sub-sectors), and a constant factor to scale combustion CO_2 to combustion N_2O (applied for all sub-sectors).[8] SAF fuels are assumed to continue to have the same combustion CH_4 and N_2O emissions per kWh as fossil jet (only their accounting CO_2 emissions are reduced).
- Jet fuel costs are not part of the BEIS/HMT Green Book Long-run variable costs of energy supply (LRVCs) dataset. However, based off IATA[9], financial market and refining datasets, the jet crack ($/bbl) above crude oil price is historically very similar to the diesel crack ($/bbl). The Green Book diesel LRVCs (p/litre) were therefore used and converted into p/kWh values for fossil jet fuel.

d) Devolved administrations

The 2018 share of emissions from the NAEI is used to apportion UK emissions to emissions at devolved administration (DA) level. Separate splits are used for domestic, international and military aviation:

- Domestic: 32.8% Scotland, 0.80% Wales, 13.1% NI, 53.2% England
- International: 4.3% Scotland, 0.29% Wales, 0.55% NI, 94.9% England
- Military: 7.4% Scotland, 3.4% Wales, 2.2% NI, 86.9% England

These DA splits are held fixed over time in all scenarios, except for in the Baseline, Headwinds and Widespread Innovation scenarios, where expansion in London airports from 2030 to 2033 is assumed (delayed from DfT modelling which assumes this happens from 2026):

- This expansion leads to domestic DA splits reaching 28.7% Scotland, 0.73% Wales, 10.9% NI, 59.7% England by 2033, before a linear return to 2018 DA splits is assumed by 2050.
- International DA splits reach 3.8% Scotland, 0.27% Wales, 0.48% NI, 95.4% England by 2033, before a linear return to 2018 DA splits is assumed by 2050.
- No change assumed in military aviation DA splits.

As show in Figure M8.3, Welsh aviation emissions to not rebound post-COVID as much as other DAs relative to the 2020 base year, due to the outsized influence of military aviation emissions in Wales, where fuel use has been assumed to be held flat from 2019. Scotland and NI have much smaller military sub-sectors relative to their combined domestic and international emissions, and so their emissions profile matches the UK profile with the COVID-19 recovery.

Figure M8.3 Comparison of emission pathways for the UK, Scotland, Wales, Northern Ireland

Source: CCC analysis.
Notes: Aviation sector GHG emissions for the Balanced Net Zero Pathway split into DAs and re-based from 2020 levels (which is at the bottom of the COVID-19 dip hence strong growth in the following years).

e) Uncertainties

Given aviation will be one of the largest-emitting sectors in 2050 (23 $MtCO_2e$/year in the Balanced Pathway), the following uncertainties could change UK emissions in 2050 by many $MtCO_2e$/year and impact Net Zero:

- **COVID-19**. Out of all the sectors, aviation has been most impacted by COVID-19, and continues to be severely impacted. There remain major uncertainties as to the size of the aviation industry that will emerge post-COVID, particularly as the pandemic continues to spread globally and many countries return to forms of stricter lockdowns in late 2020. CCC have estimated a drop in UK flights and emissions during 2020-2023 as shown in Table M8.2, with a return to previously projected to demand levels from 2024 in most scenarios.
  - Data for 2020 is based on CAA flight data to date, and OAG scheduling trackers showing UK flights in mid-October at ~30% of last year's levels. We have then assumed flat demand over winter 2020/21, before increases from 2021. Values chosen for 2021-23 are estimates, but align with IATA forecasts for a recovery by 2024, i.e. a return to the chosen pathways from 2024 onwards.
  - In the Widespread Engagement and Tailwinds scenarios we assume a structural shift in demand due to behaviour change (e.g. due to video-conferencing) and have estimated this potential impact via halving business travel (which previously comprised 20% of UK passengers) by 2024. These two pathways ultimately end up at a 15% fall in passenger numbers from 2018 levels by 2050, but most of the change in demand is assumed to happen over the next 4 years.
  - The pandemic may result in a near-term marginal improvement in fleet efficiency, due to earlier retirement of older aircraft (e.g. Boeing 747s), although lower passenger loadings could offset this on a tCO_2/passenger basis, and so has not been modelled. Lower demand could also decrease or delay purchases of newer, more efficient aircraft.

Table M8.2
Aviation COVID-19 impacts, as a % of expected pathway emissions

	2019	2020	2021	2022	2023	2024+	Notes
Headwinds	100%	39%	70%	85%	95%	100%	Recovers to expected pathway
Widespread Engagement	100%	39%	67%	76%	86%	90%	Half of business customers do not return
Widespread Innovation	100%	39%	70%	85%	95%	100%	Recovers to expected pathway
Balanced Net Zero Pathway	100%	39%	70%	85%	95%	100%	Recovers to expected pathway
Tailwinds	100%	39%	67%	76%	86%	90%	Half of business customers do not return
Baseline	100%	39%	70%	85%	95%	100%	Recovers to expected pathway

- **GDP/economic outlook.** We have not attempted to calculate a long-term reduction in aviation demand due to structural changes to the economy or long-term level of GDP due to COVID-19 (flights have historically correlated to GDP). We have also not considered any reductions in supply via e.g. failures of airports, airlines or engine manufacturers. Lower long-term fossil jet fuel prices and slowed aircraft sales and development cycles could lead to smaller efficiency gains than previously projected, although this has also not been modelled.

- **Efficiency** measures are expected to be cost saving in all scenarios, and under a range of fossil fuel costs and passenger demands. However, costs have not been modelled by DfT, and the DfT model is not an aircraft stock/sale model.

  We have therefore had to infer added investment costs in each year from representative ATA aircraft Class data, applied to DfT seat-km/year outputs, and de-annualising using annual changes. There are therefore some years with particularly large or small (or even very occasionally negative*) capital costs, due to the limitations of the datasets.

- **Future aircraft**.

  – The uptake of electric hybrid aircraft in the DfT modelling is relatively modest (around 9% of aircraft kilometres by 2050, consuming 6-7% of jet fuel). The DfT model assumes that full electric planes will not be commercialised by 2050, and it does not have a role for hydrogen turbine or hydrogen fuel cell planes by 2050 either. There could be break-throughs in these aircraft options, although the time taken to design, build, test, scale-up, certify and manufacture new aircraft propulsion systems (and the new aircraft bodies to accommodate them and their energy stores on-board) is significant – at least several decades.

  – Even if one of these options were commercialised in the 2040s, it would be challenging to immediately achieve a large % share of aircraft sales, and given the 20-30 year lifetimes of aircraft, this will not lead to a significant fleet penetration by 2050. These full electric or hydrogen options have energy storage limitations, and would be most suited for domestic or short-haul flights and/or smaller airplane classes, which make up a relatively small share of UK aviation emissions.

  – Combined, these range, aircraft class and development timings mean that 2050 penetrations of these options are likely to be limited, or they could occupy small niches by 2050 – although neither is likely to significantly improve the overall UK emissions profile. Long-haul flights dominate UK aviation emissions and are likely to stay using a hydrocarbon fuel until 2050 or beyond, hence the need for SAF.

* A negative capital cost is possible and would indicate a net sale of assets in the year. This only occurs where there is a particularly large divergence in demand from the Baseline scenario at which point the sector may down-size.

- **SAF** is expected to be an added marginal cost, and this marginal cost will depend heavily on the counterfactual fossil jet cost, the cost of feedstocks (especially for synthetic fuels using hydrogen and DAC CO_2), and the future improvement in processing plant costs (including the addition of CCS to FT routes which will significantly increase fuel GHG savings). Our scenarios explore different hydrogen and DAC costs, but hold costs of biomass, waste and waste fats/oils fixed over time (prices may well rise over time, but CCC analysis is only focused on resource costs). Processing costs are assumed to fall over time (as they are largely determined by global progress in SAF scale-up), and do not vary between scenarios. However, the earliest, high-risk projects, or smaller UK projects, or projects further from feedstocks or CO_2 sequestration sites, might be significantly more expensive than modelled. SAF costs are therefore have some level of uncertainty.

- **Impact of demand policies.** Although we have assessed how much efficiency and SAF costs would subtract/add to an indicative trans-Atlantic ticket price, our analysis is only taking the outputs of DfT modelling, and we do not have the ability to feed the specific decarbonisation costs back in to the demand framework to calculate the impact on passenger demand. This limitation also applies to demand management policies – DfT modelling internally assumes a rising carbon price, which reduces demand from an original counterfactual scenario, but CCC again only take the outputs after this internal carbon pricing is applied to demand. The particular policies that might be utilised to manage demand could have different impacts on ticket prices (e.g. carbon pricing, frequent flier levy, VAT, fuel duty, APD reform, airport capacity management). CCC analysis has focused on the outcomes (demand, fuel and emissions), rather than prescribing or modelling the policy method for achieving the demand levels required.

- **Measure interdependencies**. Theoretically, any combination of the mitigation measures discussed in section 2 would be possible, as they separately impact demand, fuel use and fuel accounting emissions. However, scenarios that rely on high amounts of technical change or new expensive fuels will likely either require a profitable sector to fund this RD&D, customers being willing to pay more, and/or more government intervention (regulation or support). Scenarios with negative growth, if repeated globally, are likely to result in a slower uptake of new, more efficient aircraft, and less investment in SAF due to depressed fossil fuel prices. Delivery of the Tailwinds scenario would therefore be particularly challenging – a reduction in demand from 2018 levels, with maximal efficiency and 95% SAF by 2050.

- **Non-CO_2 impacts.** These impacts are discussed in Chapter 8, section 4 of the Advice Report. There remain significant uncertainties in the science and mitigation options, and therefore uncertainties regarding the policy response and any interactions with sector GHG emissions (e.g. re-routing aircraft around super-saturated atmospheric zones to avoid cirrus cloud formation could increase GHG emissions).

Endnotes

[1] CCC (2020) *The Sixth Carbon Budget – Methodology Report*. Available at: www.theccc.org.uk

[2] IATA (2020) *Recovery Delayed as International Travel Remains Locked Down*

[3] CCC (2020) *2020 Progress Report to Parliament*

[4] National Atmospheric Emissions Inventory (2020) *UK Greenhouse Gas Inventory, 1990 to 2018: Annual Report for submission under the Framework Convention on Climate Change*

[5] Civil Aviation Authority (2020) Airport data 2019

[6] ATA & Ellondee (2018) *Understanding the potential and costs for reducing UK aviation emissions*

[7] Defra (2020) *Greenhouse gas reporting: conversion factors 2020*

[8] All the analysis is conducted on an IPCC AR5 basis with carbon feedbacks, using 34 tCO_2e/tCH_4 and 298 tCO_2e/tN_2O.

[9] IATA (2020) *Jet Fuel Price Monitor*

Chapter 2

Emissions pathways for the aviation sector

The following sections are taken directly from Section 7 of Chapter 3 of the CCC's Advice Report for the Sixth Carbon Budget]. [1]

Introduction and key messages

Aviation is one of the sectors in which we expect there to be significant remaining positive emissions by 2050, given the limited set of options for decarbonisation. Remaining residual emissions will need to be offset by greenhouse gas removals (see section 11) for the sector to reach Net Zero.

The evidence base on how to achieve GHG savings in aviation in the UK relies on internal modelling from DfT, Climate Assembly UK demand scenarios and internal CCC analysis of sustainable aviation fuel costs. Further details are provided in the Methodology Report.

We present the scenarios for aviation emissions in three parts:

a) The Balanced Net Zero Pathway for aviation

b) Alternative pathways for aviation emissions

c) Investment requirements and costs

a) The Balanced Net Zero Pathway for aviation

In the Balanced Net Zero Pathway, the aviation sector returns to close to pre-pandemic demand levels by 2024. Thereafter, emissions gradually decline over time (Figure A3.7.a) to reach 23 $MtCO_2e$/year by 2050, despite modest growth in demand.

This gradual reduction in emissions is due to demand management, improvements in efficiency and a modest but increasing share of sustainable aviation fuels:

The Balanced Pathway has 25% growth in demand by 2050 compared to 2018 levels but with no net expansion of UK airport capacity.

- **Demand management.** The Balanced Net Zero Pathway does allow for some limited growth in aviation demand over the period to 2050, but considerably less than a 'business as usual' baseline. We allow for a 25% in growth by 2050 compared to 2018 levels, whereas the baseline reflects unconstrained growth of around 65% over the same period. We assume that, unlike in the baseline, this occurs without any net increase in UK airport capacity, so that any expansion is balanced by reductions in capacity elsewhere in the UK.
- **Efficiency improvements.** The fuel efficiency per passenger of aviation is assumed to improve at 1.4% per annum, compared to 0.7% per annum in the baseline. This includes 9% of total aircraft distance in 2050 being flown by hybrid electric aircraft.

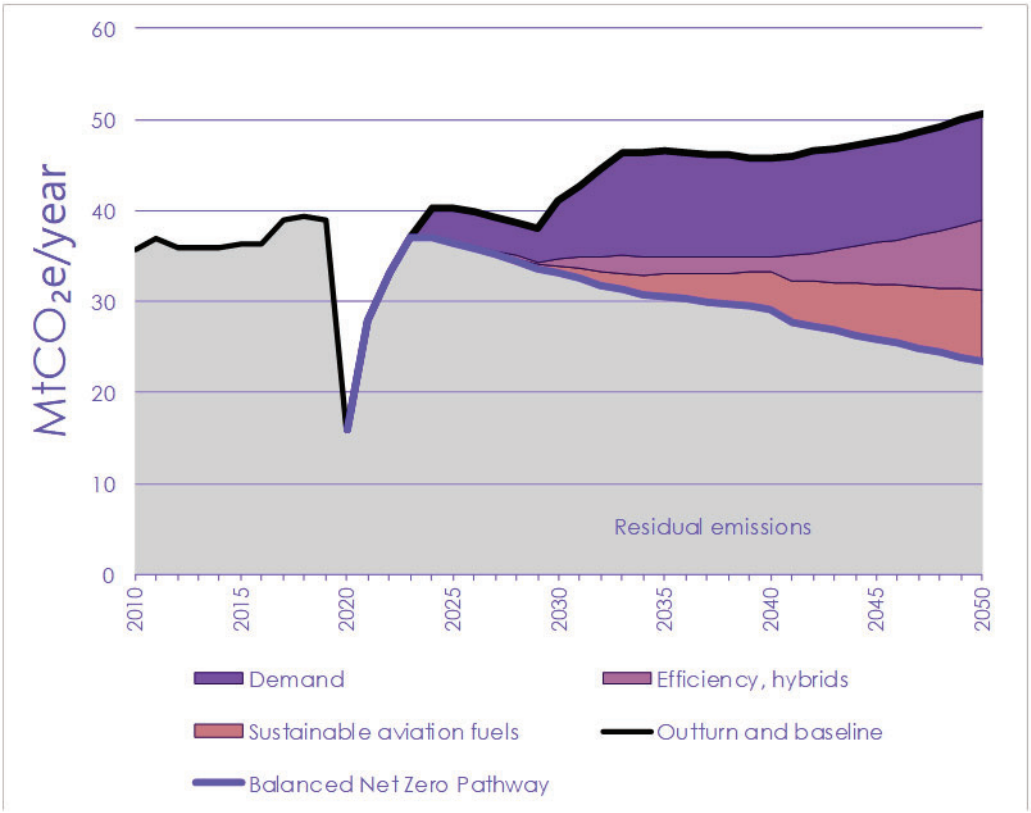
A quarter of jet fuel by 2050 is made from sustainable low-carbon sources.

- **Sustainable aviation fuels (SAF)** contribute 25% of liquid fuel consumed in 2050, with just over two-thirds of this coming from biofuels[1] and the remainder from carbon-neutral synthetic jet fuel (produced via direct air capture of CO_2 combined with low-carbon hydrogen, with 75% of this synthetic jet fuel assumed to be made in the UK and the rest imported).

[1] Biofuels are assumed to be produced with CCS on the production plant – overall carbon-negative but assumed to have zero direct CO_2 emissions in aviation. Removals are accounted for in section 11.

Demand management plays a critical role in ensuring GHG emissions continue to decrease particularly while efficiency benefits and SAF take time to scale up.

Figure A3.7.a Sources of abatement in the Balanced Net Zero Pathway for the aviation sector



Source: BEIS (2020) *Provisional UK greenhouse gas emissions national statistics 2019* CCC analysis.

b) Alternative pathways for aviation emissions

Each of our exploratory scenarios for aviation sees emissions fall from 2018 to 2050 by more than 35% (Figure A3.7.b), though with different contributions from efficiency improvements, sustainable fuels and constraints on demand (Table A3.7):

- **Headwinds** assumes the same 25% growth in demand from 2018 to 2050 as in the Balanced Pathway, although with higher demand in the 2030s due to a net increase in airport capacity. Improvements in efficiency are as in the Balanced Pathway, while biofuels comprise 20% of the fuel mix by 2050. Emissions are 25 $MtCO_2e$ in 2050, 36% below 2018 levels.

Widespread Engagement assumes lower demand in 2050 than in 2018 due mainly to reduced business travel.

- **Widespread Engagement** has lower demand, with an overall reduction of 15% on 2018 levels and therefore around half the 2050 demand as in the baseline. This is in line with the Climate Assembly UK's 'flying less' scenario. It includes a substantial reduction in business aviation due to widespread near-term adoption of videoconferencing. Efficiency improvements are slightly faster than those in the Balanced Pathway at 1.6% per annum, while the share of biofuels in 2050 is slightly lower at 20%, with a further 5% contribution from the biogenic fraction of waste-based fuels.[2] Emissions in 2050 are 15 $MtCO_2e$, 62% below 2018 levels.

Widespread Innovation assumes much higher demand growth is possible due to rapid technology development.

- **Widespread Innovation** has a greater contribution from technological performance, both in terms of improved efficiency (2.1% per annum) and the contribution of sustainable aviation fuels. By 2050, around a quarter of fuel use is biofuel, with a further quarter carbon-neutral synthetic jet fuel. These technical improvements lead to a lower carbon-intensity and lower cost of aviation, although demand in this scenario is considerably higher, reaching 50% above 2018 levels by 2050 (in line with the Climate Assembly UK's 'technological change' scenario). Emissions in 2050 are 15 $MtCO_2e$, 63% below 2018 levels.

- In **Tailwinds**, the reductions in demand under Widespread Engagement are combined with the technology improvements in Widespread Innovation. Demand in 2050 is 15% below 2018 levels and efficiency improves at 2.1% per annum. Very similar volumes of sustainable fuels are used as in Widespread Innovation, but when applied to the lower fuel consumption in Tailwinds these comprise a higher combined share of 95% of fuel use. Emissions in 2050 are 1 $MtCO_2e$, 97% below 2018 levels.

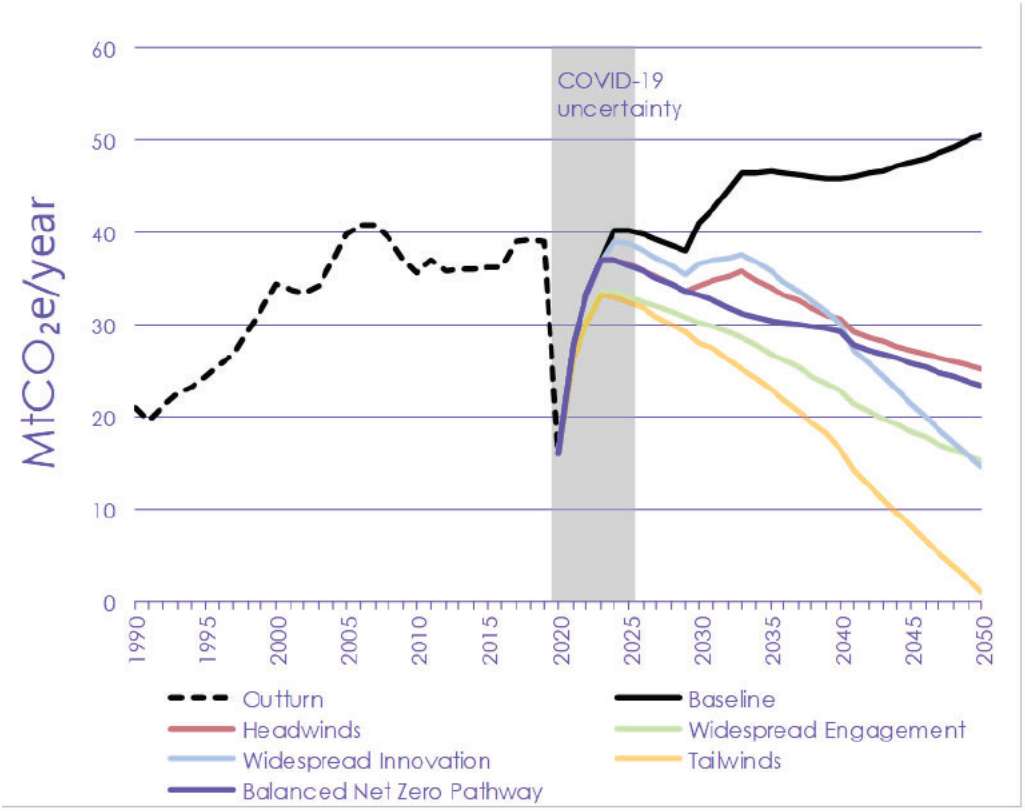
In each case, for the aviation sector to reach Net Zero by 2050, the remaining emissions will need to be offset with greenhouse gas removals (see section 11).

In addition to the GHG emissions presented here, aviation also has non-CO_2 warming impacts due to contrails, NO_x emissions and other factors. While outside of the emissions accounting framework used by UK carbon budgets (see Chapter 10), we estimate the additional warming from these non-CO_2 effects in section 4 of Chapter 8.

[2] Waste-based fuels save less CO_2 than biofuels due to approximately half of the waste carbon content being of fossil origin. Only the biogenic fraction of wastes save CO_2 compared to fossil jet fuel.

COVID-19 has had a dramatic impact and all scenarios remain under 2019 emissions levels. Tailwinds is able to almost completely decarbonise by 2050.

Figure A3.7.b Emissions pathways for the aviation sector



Source: BEIS (2020) *Provisional UK greenhouse gas emissions national statistics 2019* CCC analysis.
Notes: Only direct CO_2 CH_4 and N_2O combustion emissions in aviation are shown. 'Non-CO_2 impacts' are excluded.

Table A3.7
Summary of key differences in the aviation scenarios

	Balanced Pathway	Headwinds	Widespread Engagement	Widespread Innovation	Tailwinds
Demand growth to 2050 (vs. 2018)	**+25%**	+25%	-15%	+50%	-15%
Efficiency improvements (%/year)	**1.4%**	1.4%	1.6%	2.1%	2.1%
Biofuel share in 2050	**17%**	20%	20%	26%	51%
Bio-waste fuel share in 2050	**-**	-	5%	-	-
Synthetic jet fuel share in 2050	**8%**	-	-	25%	44%

c) Investment requirements and costs

In our 2019 *Net Zero* report, we identified aviation as one of the sectors with cost-effective GHG savings, given that efficiency gains could offset the added costs of sustainable aviation fuels. Our updated Sixth Carbon Budget pathways estimate the full costs and savings involved:

- In the Balanced Net Zero Pathway we estimate total added investment costs above our baseline of around £390 million/year in 2035 and £570 million/year in 2050, for efficiency improvements and hybridisation (Figure A3.7.c).

The capital costs of improved aircraft efficiency are more than offset by fuel savings. Sustainable aviation fuels add significant costs.

- However, these added investment costs are offset by operational cost savings of around £1,230 million/year in 2035 and £2,750 million/year in 2050. There are also added operational costs of using sustainable aviation fuels, given their additional cost above fossil jet fuel, of £470 million/year in 2035, and £1,520 million/year in 2050 (Figure A3.7.d). We have not assigned any costs or savings to reductions in demand in our scenarios.

International aviation dominates UK aviation emissions and investment.

Figure A3.7.c Breakdown of aviation sector additional investment

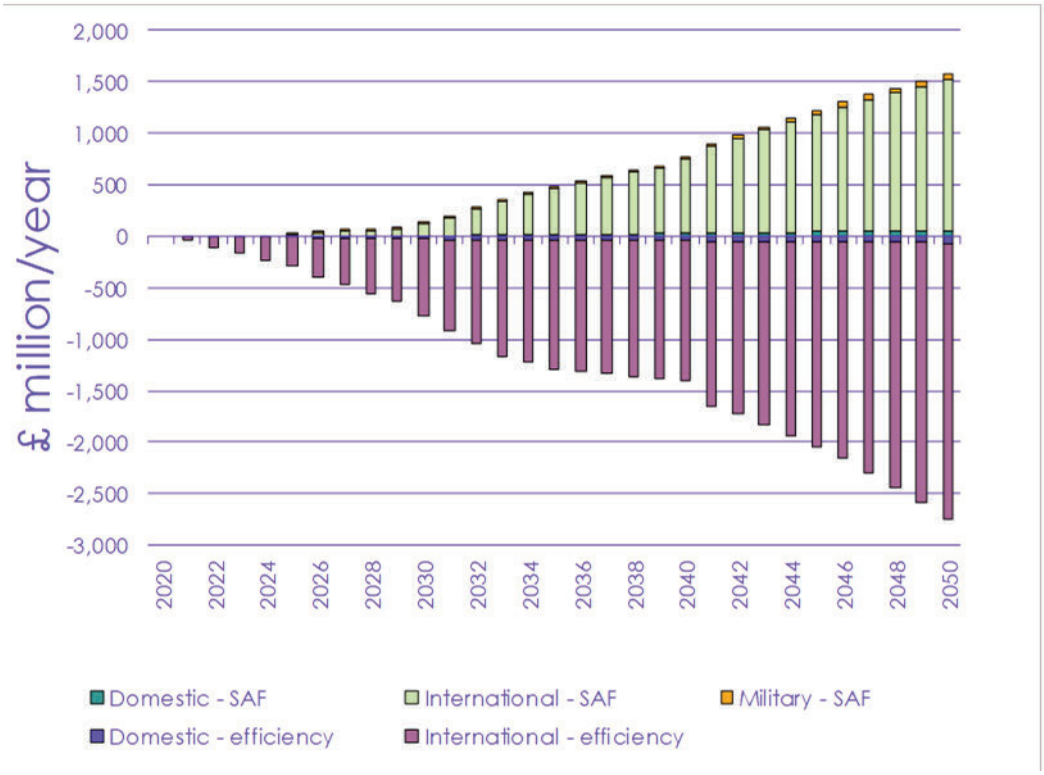
Source: CCC analysis.
Notes: Additional investment in Balanced Net Zero Pathway compared to the baseline due to higher costs of more efficient aircraft. No costs or savings have been assumed for reductions in demand vs. the baseline trajectory. No military aviation cost data available.

- Reducing GHG emissions from UK domestic and international aviation is therefore expected to cost between -£90 and -£40/tCO_2e abated in 2035, and between -£30 and +£20/tCO_2e abated by 2050.* There are increases over time due to higher aircraft costs, and the higher share of GHG savings from biofuels and more expensive synthetic jet fuel. In earlier years, efficiency gains significantly outweigh added fuel costs.

Paying for a fully zero-carbon flight via the use of GHG removal offsets will be affordable by 2050.

- As an example of costs for passengers, sustainable aviation fuels priced with marginal GHG removals might add £35 to a return ticket from London to New York in 2050 in the Balanced Pathway, minus £21 of fuel savings from improved efficiency.[3] If full decarbonisation were paid for using GHG removals to offset residual emissions, this may add a further £41, giving a net added cost of £56.
- The cost of GHG savings in military aviation is based only on the use of biofuels and synthetic jet, and falls to around £110/tCO_2e abated in 2035, staying at around this level to 2050 in the Balanced Pathway.

Figure A3.7.d Breakdown of aviation sector additional costs



Source: CCC analysis.
Notes: Additional operational costs in Balanced Net Zero Pathway compared to the baseline due to higher costs of sustainable aviation fuels and costs savings from improved efficiency. No costs or savings have been assumed for reductions in demand vs. the baseline trajectory. No military aviation cost data for efficiency savings available.

* International aviation is typically at the lower end of this cost range and domestic aviation at the upper end. Efficiency costs are -£280 to -£135/tCO_2e and SAF costs are £110/tCO_2e on average.

[3] Based on ICAO (2020) Carbon Emissions Calculator current value of 671 $kgCO_2$ per passenger economy return. In 2050 243 $kgCO_2$ is saved via efficiency 108 $kgCO_2$ directly via sustainable aviation fuels with 89 $kgCO_2$ saved upstream from biogenic CO_2 sequestration leaving a further 230 $kgCO_2$ to be offset via other GHG removals. £180/tCO_2 is assumed for residual offsetting and marginal SAF costs (based on Direct Air Capture with CCS).

Endnote

[1] CCC (2020) *The Sixth Carbon Budget – Methodology Report*. Available at: www.theccc.org.uk

Chapter 3

Policy recommendations for the aviation sector

The following sections are taken directly from Chapter 8 of the CCC's Policy Report for the Sixth Carbon Budget.[1] Chapter 8 covers aviation & shipping policy recommendations together – we have excluded shipping-only content here.

Table P8.1
Summary of policy recommendations in aviation and shipping

Aviation	• Formally include International Aviation emissions within UK climate targets when setting the Sixth Carbon Budget. • Work with ICAO to set a long-term goal for aviation consistent with the Paris Agreement, strengthen the CORSIA scheme and align CORSIA to this long-term goal. • Commit to a Net Zero goal for UK aviation as part of the forthcoming Aviation Decarbonisation Strategy, with UK international aviation reaching Net Zero emissions by 2050 at the latest, and domestic aviation potentially earlier. Plan for residual emissions, after efficiency, low-carbon fuels and demand-side measures, to be offset by verifiable greenhouse gas removals, on a sector net emissions trajectory to Net Zero. • There should be no net expansion of UK airport capacity unless the sector is on track to sufficiently outperform its net emissions trajectory and can accommodate the additional demand. • Monitor non-CO_2 effects of aviation, set a minimum goal of no further warming after 2050, research mitigation options, and consider how best to tackle non-CO_2 effects alongside UK climate targets without increasing CO_2 emissions. • Longer-term, support for sustainable aviation fuel (SAF) should transition to a more bespoke policy, such as a blending mandate. However, near-term construction of commercial SAF facilities in the UK still needs to be supported. • Continue innovation and demonstration support for SAF technologies, aircraft efficiency measures, hybrid, full electric and hydrogen aircraft development and airspace modernisation.

Progress in decarbonising aviation and shipping has been slow over the past decade, and changes in emissions have primarily been driven by changes in demands along with some improvements in efficiency. Policy to date has been mainly driven by international fora (negotiations at ICAO and the IMO), although neither organisation has both established ambitious 2050 global goals and a set of policies to meet these goals.

The main policy challenges in aviation and shipping are the international nature of these sectors requiring fuel infrastructure coordination, long asset lifetimes and economic competitiveness concerns.

Aviation policy in the UK has previously focused on aerospace developments, although several announcements have been made in 2020, with an Aviation Decarbonisation Strategy now due in 2021. Funding is still mainly directed at innovation and demonstration activities, rather than long-term market deployment support for sustainable aviation fuels and GHG removals.

Our recommendations are based on an assessment of existing policies and announcements, a review of evidence (including the views of the Climate Assembly) and updating our existing findings set out in our 2020 *Progress Report* and 2019 *International aviation & shipping letter*.[2]

This chapter covers:

1. The respective roles for international and domestic policy
2. Existing UK policy, gaps, and planned publications
3. Key policy changes needed

Inclusion of IAS emissions in UK climate targets does not imply taking a unilateral policy approach for them.

Even with their emissions formally included in UK carbon budgets and the Net Zero target, the primary policy approach to reducing emissions from international aviation and shipping (IAS) should be at the international level. These sectors are global in nature and there are some risks that a unilateral UK approach to reducing these emissions could lead to carbon leakage (under certain policy choices) or competitiveness concerns.

The UK has played a key role in progress by both the International Civil Aviation Organisation (ICAO) and International Maritime Organisation (IMO). In the context of international negotiations at the ICAO and the IMO, inclusion of IAS emissions in the Net Zero target should not be interpreted as a rejection of multi-lateral approaches or as prejudicing discussions on burden sharing.

International approaches are unlikely to overcome all barriers to decarbonising the IAS sectors.

However, international approaches are unlikely to overcome all barriers to decarbonising the IAS sectors. Supplementary domestic policies should also be pursued where these can help overcome UK-specific market barriers, and where these do not lead to adverse impacts on competitiveness and/or carbon leakage.

a) International approaches

At the international level, global policies consistent with the ambition in the Paris Agreement are required to provide a level playing field for airlines and shipping operators, and to guard against the risk of competitive distortions. The international trade bodies for both aviation and shipping have begun to develop their approaches but further progress is required:

- **Aviation.** The ICAO's current carbon policy to 2035, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), aims to ensure that most emissions increases above a baseline year are balanced by offsets.
  - In light of COVID-19, ICAO agreed a baseline year change to 2019 (instead of averaging over 2019-2020). This will reduce offset requirements in the initial years of the scheme as the sector recovers. CORSIA's list of eligible emissions reduction measures has also been finalised.
  - A new long-term goal for global international aviation emissions is now required that is consistent with the Paris Agreement. CORSIA then needs to be extended and aligned with this goal, and rules need to be put in place to ensure that CORSIA offsets deliver genuine emission reductions, transitioning to sustainable, well-governed greenhouse gas removals (see Chapter 11).

ICAO needs to set a long-term goal aligned with the Paris Agreement and strengthen CORSIA.

b) Supplementary domestic policies

Domestic policy can focus on supporting low-carbon fuels managing demand domestic fleet decarbonisation and developing GHG removals.

Supplementary domestic policies that have limited competitiveness or carbon leakage risks should be pursued in parallel to international approaches to decarbonisation. These include support for developing alternative fuels and associated infrastructure, managing demand, decarbonising domestic fleets, and kick-starting a UK market for greenhouse gas removals (see Chapter 11). These domestic policy recommendations are discussed in section 3 below.

By taking these domestic and international policy approaches in parallel to including IAS formally within carbon budgets and the Net Zero target, the UK will be contributing fully to the global effort to tackle aviation and shipping emissions.

a) Aviation

Aerospace development has been a focus in UK policy although the RTFO is yet to bring forward renewable jet fuel.

Existing UK policy in Aviation has been focused on match-funding for aircraft technology development (e.g. the £300million Future of Flight Challenge), and traded certificate price support for aviation biofuels and synthetic jet fuels under the Renewable Transport Fuel Obligation (RTFO)'s 'development fuels' sub-mandate. Recent announcements include:

- The Jet Zero Council has also been established as a forum with the ambition for developing zero-emissions commercial flight.
- £15 million has been invested into FlyZero, with the Aerospace Technology Institute looking at design challenges and the market opportunity for zero-emissions aircraft concepts from 2030.
- £15 million will be invested in a new grant-funding competition for SAF production.
- A SAF clearing house will be set up to enable UK to certify new fuels.
- A planned consultation on a SAF blending mandate has been announced, for a potential start in 2025.
- An aviation Net Zero Consultation and following Strategy were planned for 2020. Plans are to now consult on a combined Aviation Decarbonisation Strategy in 2021.

Government announcements and support to date focuses on innovation and demonstration but long-term deployment policy needs developed.

However, there remain significant gaps within the policy framework for aviation. Government support at present is focused on innovation funding and demonstration activities, but without clear long-term policy mechanisms driving SAF uptake or valuing negative emissions in the UK:

- The RTFO development fuels sub-mandate is unlikely to drive significant development of jet fuels, as it can be met with cheaper fuels.
- There is currently no price signal for GHG removals in the UK.
- There is a lack of larger-scale deployment support and policy frameworks specifically for sustainable aviation fuel and GHG removals.

UK aviation industry has committed to reaching Net Zero by 2050.

Although the UK aviation industry has committed to a Net Zero goal for 2050 (via the Sustainable Aviation coalition),[3] this is not yet a policy goal for Government. Higher-level strategic gaps include the lack of formal inclusion of international emissions in UK carbon budgets and the Net Zero target, and the need for a sector emissions trajectory to inform demand management and airport capacity policies. Further research is also needed on non-CO_2 effects and potential mitigation options.

a) Aviation

International aviation emissions to be included in Carbon Budgets.

The Government should include international aviation emissions within the Sixth Carbon Budget, subsequent carbon budgets and the 2050 Net Zero target.

Government should commit to a 2050 Net Zero goal for UK aviation with use of verifiable GHG removals.

The forthcoming Aviation Decarbonisation Strategy should commit to a 2050 Net Zero goal for UK aviation, with use of verifiable GHG removals (but with limits), and set out demand management policies to ensure a trajectory to 2050 is achieved and that non-CO_2 effects are addressed.

i) Aviation emissions on the way to Net Zero

The Government should commit to UK international aviation reaching net zero GHG emissions by 2050 at the latest, and UK domestic and military aviation potentially earlier.

An emissions trajectory to 2050 will set expectations for use of GHG removals over time.

This will necessarily entail having a plan for how verifiable greenhouse gas removals will offset residual emissions over time (i.e. after contributions from efficiency improvements, low-carbon fuels and demand-side measures). DfT should set a net emissions trajectory for aviation (net of a constrained level of GHG removals), or as a minimum, interim targets on the way to 2050.

- Following the Balanced Net Zero Pathway, the remaining 23 $MtCO_2e$/year of gross aviation emissions in 2050 would require 40% of total UK engineered greenhouse gas removals to be assigned to the aviation sector to achieve Net Zero within aviation.
- With the ramp-up in GHG removals in the UK over time, Figure P8.1 gives an indicative net aviation emissions trajectory that could be followed if 40% of UK GHG removals were assigned to aviation in all years.
- Interim targets for aviation emissions net of greenhouse gas removals could therefore be 31 $MtCO_2e$/year in 2030, 21 $MtCO_2e$/year in 2035 and 14 $MtCO_2e$/year in 2040.

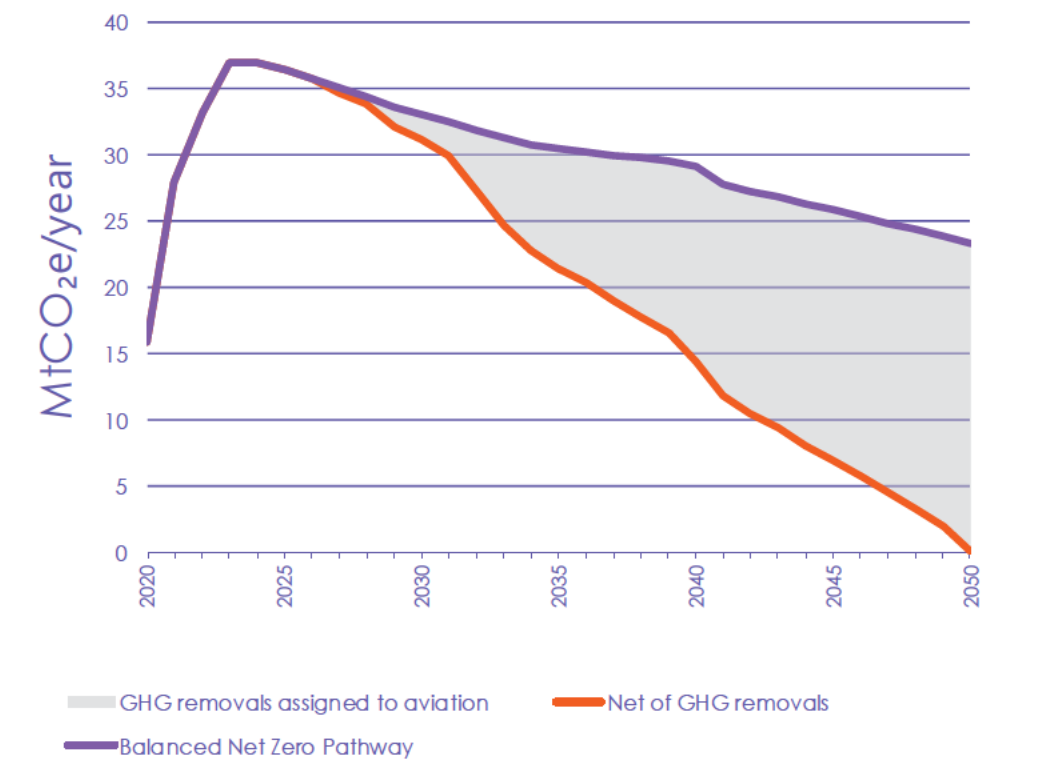
Inclusion of IAS in Carbon Budgets does not diminish the value of a sector target and trajectory.

- Setting an aviation sector net emissions target and trajectory is not obviated by IAS inclusion with carbon budgets. This is more important in aviation than other emitting sectors, given that without policy action aviation emissions could rise significantly (as would non-CO_2 effects) and that, even with appropriate action, residual positive GHG emissions are very likely to remain by 2050 (and need compensating for with greenhouse gas removals). The UK aviation industry has also already committed to a 2050 Net Zero target.

This plan should dovetail with the wider overall strategy for Net Zero, which should set out how this can be achieved with manageable volumes of sustainable greenhouse gas removals.

From the Balanced Net Zero Pathway aviation emissions net of GHG removals fall relatively smoothly from the mid-2020s to 2050 Net Zero.

Figure P8.1 Indicative UK aviation emissions trajectory to achieve Net Zero with GHG removals



Source: CCC analysis.
Note: Net of GHG removals trajectory assumes that 40% of UK engineered GHG removals are assigned to/bought by the aviation sector. COVID-19 recovery assumed from 2020 to 2024.

ii) Demand management

Demand management policy is required as demand growth will need significantly constrained from baseline assumptions and there are non-CO_2 risks.

Demand management policy should be implemented, as given expected developments in efficiency and SAF deployment, demand growth will need to be lower than baseline assumptions, and likely constrained to 25% growth by 2050 from 2018 levels for the sector to contribute to UK Net Zero.

If efficiency or SAF do not develop as expected, further demand management will be required. Conversely, if efficiency and SAF develop quicker, it may be possible for demand growth to rise above 25%, provided that additional non-CO_2 effects are acceptable or can be mitigated.

Demand management needs to act as a back-stop to keep emissions on track to the sector trajectory to Net Zero.

A demand management framework will therefore need to be developed and in place by the mid-2020s to annually assess and, if required, act as a backstop to control sector GHG emissions and non-CO_2 effects.

- There are a number of demand management policies that could be considered, as we outlined in our 2019 *IAS letter*.[2] However, the Climate Assembly has provided valuable evidence that demand management policies will have to be fair and be seen as fair, with a clear preference for any taxes to increase as people fly more and fly further (Box P8.1).

- As part of providing wider information regarding transport choices, Government should also consider the feasibility and benefits of providing flight CO_2 labelling to prospective aviation passengers, building on the work of the Civil Aviation Authority (CAA).

The Government should assess its airport capacity strategy in the context of Net Zero and any lasting impacts on demand from COVID-19. Investments will need to be demonstrated to make economic sense in a Net Zero world and the transition towards it.

- Unless faster than expected progress is made on aircraft technology and SAF deployment, such that the sector is outperforming its trajectory to Net Zero, current planned additional airport capacity would require capacity restrictions placed on other airports.

No net expansion of UK airport capacity unless the sector is on track to sufficiently outperform its trajectory.

- Going forwards, there should be no net expansion of UK airport capacity unless the sector is assessed as being on track to sufficiently outperform a net emissions trajectory that is compatible with achieving Net Zero alongside the rest of the economy, and is able to accommodate the additional demand and still stay on track.

The Climate Assembly stated a clear preference for demand taxes to increase as people fly more and fly further.

Box P8.1
Climate Assembly aviation demand findings

Box 8.1 from the *Methodology Report*, Chapter 8, highlights the Climate Assembly's preferences regarding demand growth. The Assembly recommended 25-50% demand growth by 2050 from 2018, depending on how quickly technology progressed. A weighted average of the scenario votes was a 24% growth.

80% of assembly members 'strongly agreed' or 'agreed' that taxes that increase as people fly more often and as they fly further should be part of how the UK gets to Net Zero. Assembly members saw this as fairer than alternative policy options, such as a carbon tax that would impact all flights.

There were also strong calls for making alternatives to flying cheaper and better, and for the UK to influence the rest of the world in implementing global decarbonisation policies.

Source: Climate Assembly UK (2020).

iii) Wider supporting policies

Alongside the Aviation Decarbonisation Strategy, UK policy should also:

Support is needed for the UK's first commercial SAF plants.

- Set out a policy package for supporting the near-term deployment of commercial sustainable aviation fuel (SAF) facilities in the UK (with carbon capture and storage (CCS) where applicable). This may involve capital or loan guarantee support. In the mid-term, SAF support should transition to a more bespoke policy than the RTFO.
  - The existing RTFO will not be suitable for delivering mass commercial roll-out of SAF, due to decreasing liquid road fuel use. It may also make more sense for long-term SAF deployment to be paid for by the aviation sector rather than road fuel users.

A SAF blending mandate could provide more certainty to SAF plant investors.

  - Government has indicated willingness to consider introducing a SAF blending mandate from 2025,[4] which could ultimately provide more certainty to SAF plant investors than the RTFO. A SAF mandate is likely to be more effective than Contracts for Difference (as the technology maturity of many routes are not high enough and there are variable feedstock costs), inclusion in an Emissions Trading Scheme (likely insufficient and volatile pricing signal) or carbon taxation (would have to be high to incentivise initial SAF deployment, and not perceived as fair by the Climate Assembly).

Many other European countries already have SAF blending mandates so carbon leakage risks are decreasing.

  - Whether the mandate's added SAF costs then fall to the aviation sector or general taxation will depend on the policy design and any concerns regarding UK operator competitiveness or carbon leakage. Several other European countries already have SAF blending mandates and are introducing ambitious blending trajectories, which suggests the risk of leakage is decreasing (e.g. France is targeting 5% by 2030 & 50% by 2050; Finland & Sweden 30% by 2030; Germany 2% by 2030; with an EU-wide proposal for 1-2% by 2030).[4]
  - Ongoing uncertainty until 2025 about a new UK SAF mandate, and withdrawal of SAF from the RTFO, may risk delaying first commercial SAF projects in the UK reaching financial close for several years. Consideration could be given to either RTFO grandfathering, starting the SAF mandate earlier or running it in parallel to the RTFO.
- Continue innovation and demonstration support for newer SAF technologies, ensuring fuels can meet international standards. The newly announced £15m competition focused only on SAF is welcome, although is smaller than previous competitions.
- Continue RD&D support for aircraft efficiency measures, hybrid, full electric & hydrogen aircraft development and airspace modernisation. Continue to use existing delivery bodies, such as ATI, the Future of Flight Challenge, NATS, and guided by the Jet Zero Council.

Strict sustainability standards will need to be enforced any double-counting of removals avoided and SAF plants should be built with CCS.

- Continue to enforce strict sustainability standards, and work to consistently account for fuels produced with biogenic CO_2 capture without allowing double-counting of any GHG removals.

[4] From our analysis potential UK SAF blending levels could be 1.5-3.5% by 2030, 4-9% by 2035 and 11-17% by 2040 although the top end of these figures could almost be doubled in a Tailwinds scenario due to faster technology deployment and higher biofuel imports.

  - SAF facilities should have to install CCS, or be built CCS ready, in order to maximise GHG savings from any concentrated CO_2 streams or dilute flue gases.* The 2022 Bioenergy Strategy should set a date after which all new build plants must use CCS, and a date after which existing plants should retrofit CCS.

  - An accounting choice needs to be made as to whether the consumer of a fuel made with CCS gets to account for the GHG removals (i.e. fuels can be carbon negative, further reducing end-use sector direct emissions),[5] or whether the producer of the fuel gets to account for the GHG removals (and the fuel is carbon neutral).

  - Any GHG removals accounted for within a fuel carbon intensity factor or by a producer cannot also be claimed by another actor or sector.

  - A clear GHG savings methodology needs to be established for wastes.

- Monitor non-CO_2 effects of aviation, continue to work to reduce scientific uncertainties, and fund research into mitigation options such as SAF benefits and engine design improvements.

  - Once mitigation options are better characterised, consider policy responses as to how best to tackle them alongside UK climate targets without increasing CO_2 emissions.

There should be no additional non-CO_2 warming after 2050.

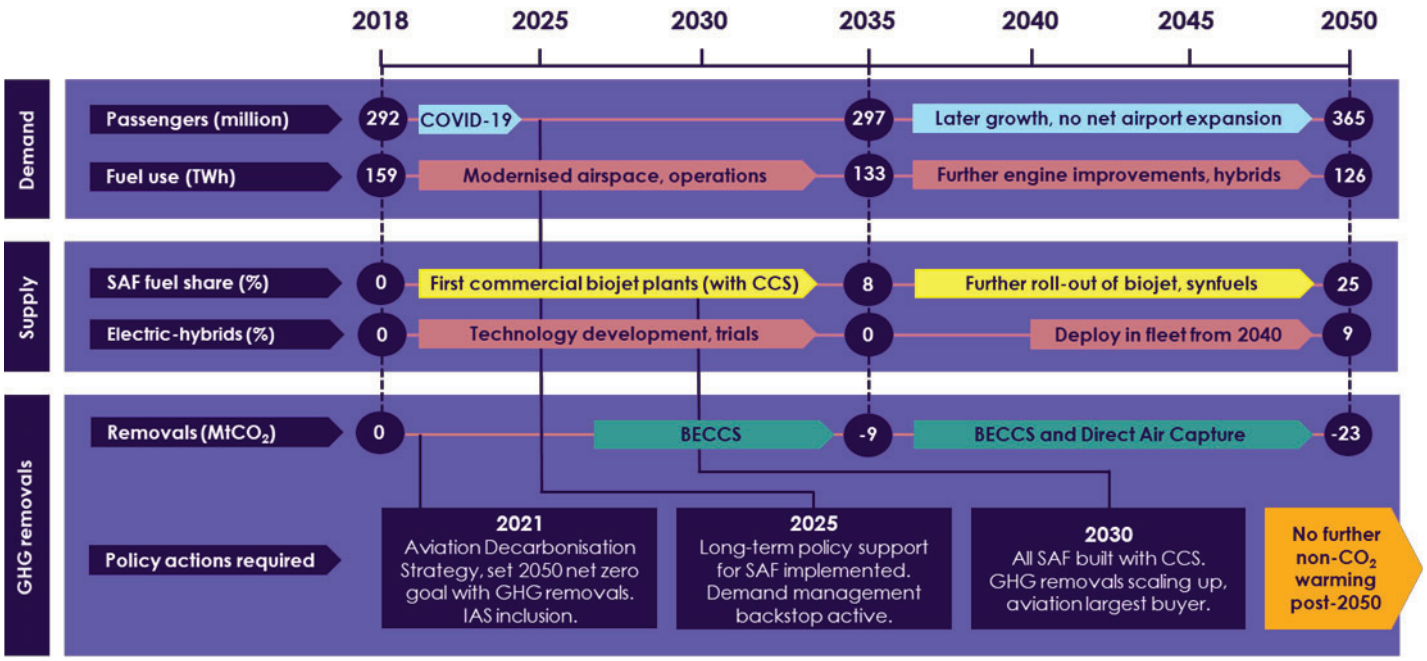
  - As a minimum goal, there should be no additional non-CO_2 warming from aviation after 2050. If mitigation options develop quickly, or new risks are identified, DfT could consider an earlier date, or setting a maximum level of allowable non-CO_2 warming from a base year.

Alongside efforts at ICAO, the Aviation Decarbonisation Strategy and the package of domestic policies, plus parallel progress on a mechanism for deploying GHG removals in the UK (see Chapter 11), should put UK aviation emissions on track to contribute fully to meeting the Sixth Carbon Budget and the Net Zero target. A summary of the required steps in aviation is given in Figure P8.2.

* Some SAF conversion plants do not produce CO_2 and hence these CCS provisions may not apply to them. For example synthetic jet fuel routes use CO_2 as a feedstock and waste fats/oils to biojet will produce little CO_2. However these plants may still have dilute flue gas streams from which CO_2 should still be captured.

[5] UK biofuels policy currently uses GHG emissions thresholds (gCO2e/MJ of fuel) as one set of eligibility criteria for support. Setting a negative GHG emissions threshold may lead to perverse outcomes where only less efficient plants meet the threshold. Any negative threshold would have to be accompanied by a minimum efficiency and would preclude carbon-neutral fuels. It is likely more appropriate to maintain low positive GHG emissions thresholds for eligibility purposes but allow additional benefits to flow to conversion plants capturing biogenic CO_2 (this may be achieved already by the design of wider GHG removals policies).

Figure P8.2 Timeline of key outcomes and policy requirements under the Balanced Pathway (2020-50)



Source: CCC analysis.
Note: SAF = Sustainable Aviation Fuel. BECCS = Bioenergy with carbon capture and storage

Endnotes

[1] CCC (2020) *Policies for the Sixth Carbon Budget and Net Zero*. Available at: www.theccc.org.uk
[2] CCC (2019) *Net-zero and the approach to international aviation and shipping emissions*
[3] Sustainable Aviation (2020) *UK aviation commits to net zero carbon emissions by 2050*
[4] Argus (2020) *Europe makes legislative push for aviation transition*

Climate Change Committee

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HM Government

Beyond the horizon
The future of UK aviation

Making best use of existing runways

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1. Making best use of existing runways

1.1 The government's 2013 Aviation Policy Framework provided policy support for airports outside the South East of England to make best use of their existing airport capacity. Airports within the South East were to be considered by the newly established Airports Commission.

1.2 The Airports Commission's Final Report recognised the need for an additional runway in the South East by 2030 but also noted that there would be a need for other airports to make more intensive use of their existing infrastructure.

1.3 The government has since set out its preferred option for a new Northwest runway at Heathrow by 2030 through drafts of the Airports National Policy Statement (NPS), but has not yet responded on the recommendation for other airports to make more intensive utilisation of their existing infrastructure.

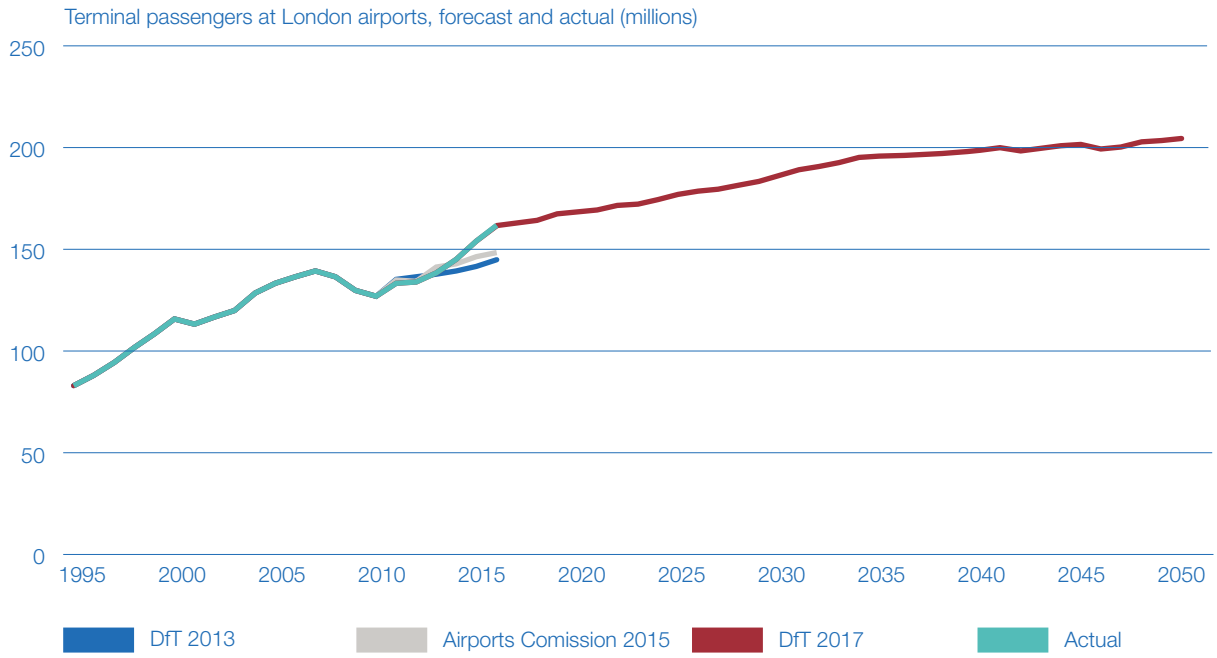
1.4 On 24th October 2017 the Department for Transport (DfT) released its latest aviation forecasts. These are the first DfT forecasts since 2013[1]. The updated forecasts reflect the accelerated growth experienced in recent years and that demand was 9% higher in London[2] in 2016 than the Airports Commission forecast[3]. This has put pressure on existing infrastructure, despite significant financial investments by airports over the past decade, and highlights that government has a clear issue to address.

1.5 The Aviation Strategy call for evidence set out that government agrees with the Airports Commission's recommendation and was minded to be supportive of all airports who wish to make best use of their existing runways, including those in the South East, subject to environmental issues being addressed. The position is different for Heathrow, where the government's proposed policy on expansion is set out in the proposed Airports NPS.

1 Additional aviation forecasts were published by the Airports Commission in 2015 to support their recommendations for an additional runway in the south east.

2 Heathrow, Gatwick, Stansted, Luton and London City

3 The difference is explained largely be the fact that oil prices were lower than expected



Call for evidence response summary

1.6 The Aviation Strategy call for evidence document asked specifically for views on the government's proposal to support airports throughout the UK making best use of their existing runways, subject to environmental issues being addressed.

1.7 We received 346 consultation responses. Excluding those who either did not respond or responded on a different topic, 60% were in favour, 17% against and 23% supportive provided certain issues were addressed.

1.8 The main issues raised included the need for environmental issues such as noise, air quality, and carbon to be fully addressed as part of any airport proposal; the need for improved surface access and airspace modernisation to handle the increased road / rail and air traffic; and clarification on the planning process through which airport expansion decisions will be made.

Role of local planning

1.9 Most of the concerns raised can be addressed through our existing policies as set out in the 2013 Aviation Policy Framework, or through more recent policy updates such as the new UK Airspace Policy or National Air Quality Plan. For the majority of environmental concerns, the government expects these to be taken into account as part of existing local planning application processes. It is right that decisions on the elements which impact local individuals such as noise and air quality should be considered through the appropriate planning process and CAA airspace change process.

1.10 Further, local authorities have a duty to consult before granting any permission, approval, or consent. This ensures that local stakeholders are given appropriate opportunity to input into potential changes which affect their local environment and have their say on airport applications.

Role of national policy

1.11 There are, however, some important environmental elements which should be considered at a national level. The government recognises that airports making the best use of their existing runways could lead to increased air traffic which could increase carbon emissions.

1.12 We shall be using the Aviation Strategy to progress our wider policy towards tackling aviation carbon. However, to ensure that our policy is compatible with the UK's climate change commitments we have used the DfT aviation model[4] to look at the impact of allowing all airports to make best use of their existing runway capacity[5]. We have tested this scenario against our published no expansion scenario and the Heathrow Airport North West Runway scheme (LHR NWR) option, under the central demand case.

1.13 The forecasts are performed using the DfT UK aviation model which has been extensively quality assured and peer reviewed and is considered fit for purpose and robust for producing forecasts of this nature. Tables 1-3 show the expected figures in passenger numbers, air traffic movements, and carbon at a national level for 2016, 2030, 2040, and 2050.

	Baseline	Baseline + best use	LHR NWR base	LHR NWR + best use
2016	266.6	266.6	266.6	266.6
2030	313.4	314.8	342.5	341.9
2040	359.8	365.9	387.4	388.8
2050	409.5	421.3	435.3	444.2

Table 1: Terminal Passengers at UK airports, million passengers per annum

	Baseline	Baseline + best use	LHR NWR base	LHR NWR + best use
2016	2,119	2,119	2,119	2,119
2030	2,330	2,358	2,459	2,460
2040	2,584	2,602	2,697	2,700
2050	2,901	2,958	3,013	3,043

Table 2: Air Transport Movements (ATMs) at UK airports, 000s

	Baseline	Baseline best use	LHR NWR base	LHR NWR best use
2016	37.3	37.3	37.3	37.3
2030	38.6	38.8	43.5	43.4
2040	38.1	38.7	42.3	42.4
2050	37.0	37.9	39.9	40.8

Table 3: CO_2 from flights departing UK airports, million tonnes

4 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/674749/uk-aviation-forecasts-2017.pdf

5 Modelled the impact of airports increasing their planning cap whenever they have become 95% full.

Implications for the UK's carbon commitments

1.14 As explained in Chapter 6 of the Aviation Strategy Next Steps document[6], we have made significant steps in developing international measures for addressing aviation carbon dioxide (CO_2) emissions, including reaching agreement at the International Civil Aviation Organisation (ICAO) in October 2016 on a global offsetting scheme for international aviation, known as the Carbon Offsetting and Reduction Scheme for International Aviation, or CORSIA. However, there remains uncertainty over future climate change policy and international arrangements to reduce CO2 and other greenhouse gases. The Airports Commission devised two scenarios which continue to be appropriate to reflect this uncertainty: carbon traded and carbon capped[7]. In this assessment the DfT has followed the same approach.

Carbon traded scenario

1.15 Under the carbon-traded scenario, UK aviation emissions could continue to grow provided that compensatory reductions are made elsewhere in the global economy. This could be facilitated by a carbon trading mechanism in which aviation emissions could be traded with other sectors. In this case, provided a global trading scheme is place, higher UK aviation activity would have no impact on global emissions as any increase in emissions would be offset elsewhere and therefore there is nothing to indicate that this policy would prevent the UK meeting its carbon obligations.

Carbon capped scenario

1.16 The carbon-capped scenario was developed to explore the case for expansion even in a future where aviation emissions were limited to the Committee on Climate Change's (CCC) planning assumption of 37.5Mt of CO_2 in 2050. Under DfT's carbon-capped scenario the cap is met using a combination of carbon pricing and specific measures. For the central demand case we determined that the most appropriate specific measures to use, based on cost effectiveness and practicality of implementation, were more efficient aircraft ground movements (using single engine taxiing) and higher uptake of renewable fuels[8].

6 https://www.gov.uk/government/consultations/a-new-aviation-strategy-for-the-uk-call-for-evidence

7 For background to the Carbon Policy scenarios used by DfT both in this document and in its airport expansion analysis see pages 9 and 33-38 of: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/653879/updated-appraisal-report-airport-capacity-in-the-south-east.pdf

8 These would be implemented alongside the carbon price.

1.17 The more efficient ground movement policy involves government action to incentivise the use of single-engine taxiing at UK airports. It is assumed that the policy would lead to a 95% take-up rate by 2030 and beyond and it is estimated that this measure would reduce fuel consumption by around 1% per flight on average[9].

1.18 The renewable fuels policy involves government regulations to mandate specific renewable fuel percentages in aviation fuel supply. Any measures deployed would be designed to ensure that the renewable feedstock is sustainable and delivers substantial lifecycle CO_2 savings, such as municipal waste, which on this basis could deliver savings of over 70%. Such a scheme would be consistent with the future aims of the Renewable Transport Fuel Obligation to include aviation and focus on advanced fuels, as set out in the government's response to its recent consultation[10]. The levels of carbon reduction delivered by the policy measures are presented in Table 4.

	No expansion base	No expansion + best use	LHR NWR base	LHR NWR + best use
Carbon reduction required, $MtCO_2$	-0.5	0.4	2.4	3.3
Abatement from single engine taxiing, $MtCO_2$*	0	0.3	0.3	0.3
Renewable fuel uptake required	0	0**	12%	16%

*Figure does not vary due to rounding
**Zero due to rounding

Table 4: Policies to meet CCC cap (37.5 $MtCO_2$), levels in 2050

1.19 The level of renewable fuels required is higher under the making best use sensitivity but these are still at the conservative end of the range of forecast future biofuel supply[11].

1.20 There is significant uncertainty over the likely future cost of these measures and their impact on carbon so this policy mix is presented to illustrate the type of abatement action that could be taken. It should not be interpreted as a statement of future carbon policy which will be considered through the development of the Aviation Strategy. Other measures are likely to be available and may turn out to be more cost effective or have greater abatement potential.

1.21 On balance, therefore, it is likely that these or other measures would be available to meet the planning assumption under this policy.

9 Ricardo Energy & Environment, 2017. *Carbon Abatement in UK Aviation* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/653776/carbon-abatement-in-uk-aviation.pdf

10 DfT, 2017. *Renewable transport fuel obligations order: government response.* https://www.gov.uk/government/publications/renewable-transport-fuel-obligations-order-government-response

11 See Increased use of biofuels chapter in Carbon Abatement in UK Aviation Report prepared by Ricardo Energy & Environment for discussion https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/653776/carbon-abatement-in-uk-aviation.pdf

Local environmental impacts

1.22 The government recognises the impact on communities living near airports and understands their concerns over local environmental issues, particularly noise, air quality and surface access. As airports look to make the best use of their existing runways, it is important that communities surrounding those airports share in the economic benefits of this, and that adverse impacts such as noise are mitigated where possible.

1.23 For the majority of local environmental concerns, the government expects these to be taken into account as part of existing local planning application processes.

1.24 As part their planning applications airports will need to demonstrate how they will mitigate local environmental issues, which can then be presented to, and considered by, communities as part of the planning consultation process. This ensures that local stakeholders are given appropriate opportunity to input into potential changes which affect their environment and have their say on airport applications.

Policy statement

1.25 As a result of the consultation and further analysis to ensure future carbon emissions can be managed, government believes there is a case for airports making best of their existing runways across the whole of the UK. The position is different for Heathrow Airport where the government's policy on increasing capacity is set out in the proposed Airports NPS.

1.26 Airports that wish to increase either the passenger or air traffic movement caps to allow them to make best use of their existing runways will need to submit applications to the relevant planning authority. We expect that applications to increase existing planning caps by fewer than 10 million passengers per annum (mppa) can be taken forward through local planning authorities under the Town and Country Planning Act 1990. As part of any planning application airports will need to demonstrate how they will mitigate against local environmental issues, taking account of relevant national policies, including any new environmental policies emerging from the Aviation Strategy. This policy statement does not prejudge the decision of those authorities who will be required to give proper consideration to such applications. It instead leaves it up to local, rather than national government, to consider each case on its merits.

1.27 Applications to increase caps by 10mppa or more or deemed nationally significant would be considered as Nationally Significant Infrastructure Projects (NSIPs) under the Planning Act 2008 and as such would be considered on a case by case basis by the Secretary of State.

1.28 Given the likely increase in ATMs that could be achieved through making best use of existing runways is relatively small (2% increase in ATMs "without Heathrow expansion" scenario; 1% "with Heathrow"), we do not expect that the policy will have significant implications for our overall airspace capacity. However it is important to note that any flightpath changes required as a result of a development at an airport will need to follow the CAA's airspace change process. This includes full assessment of the likely environmental impacts, consideration of options to mitigate these impacts, and the need to consult with stakeholders who may be affected. Approval for the proposed airspace change will only be granted once the CAA has been satisfied that all aspects, including safety, have been addressed. In addition, government has committed to establish an Independent Commission on Civil Aviation Noise (ICCAN) to help ensure that the noise impacts of airspace changes are properly considered and give communities a greater stake in noise management.

1.29 **Therefore the government is supportive of airports beyond Heathrow making best use of their existing runways. However, we recognise that the development of airports can have negative as well as positive local impacts, including on noise levels. We therefore consider that any proposals should be judged by the relevant planning authority, taking careful account of all relevant considerations, particularly economic and environmental impacts and proposed mitigations. This policy statement does not prejudge the decision of those authorities who will be required to give proper consideration to such applications. It instead leaves it up to local, rather than national government, to consider each case on its merits.**

Air Transport Movements 2019
Comparison with Previous Year (a)

Table 6

	<----------2019---------->			<----------2018---------->			<---------- Percentage Change ---------->		
	Total	Passenger Aircraft	Cargo Aircraft	Total	Passenger Aircraft	Cargo Aircraft	Total	Passenger Aircraft	Cargo Aircraft
London Area Airports									
GATWICK	282,896	282,848	48	283,186	283,186	-	-	-	..
HEATHROW	479,811	477,083	2,728	480,339	477,367	2,972	-	-	-8
LONDON CITY	80,931	80,931	-	78,037	78,037	-	4	4	..
LUTON	112,745	110,628	2,117	106,666	105,081	1,585	6	5	34
SOUTHEND	19,162	19,162	-	17,088	17,088	-	12	12	..
STANSTED	183,147	172,939	10,208	185,077	175,599	9,478	-1	-2	8
Total London Area Airports	1,158,692	1,143,591	15,101	1,150,393	1,136,358	14,035	1	1	8
Other UK Airports									
ABERDEEN	78,209	76,549	1,660	81,552	79,943	1,609	-4	-4	3
BARRA	1,366	1,365	1	1,390	1,389	1	-2	-2	-
BELFAST CITY (GEORGE BEST)	34,625	34,625	-	35,845	35,845	-	-3	-3	..
BELFAST INTERNATIONAL	47,230	42,984	4,246	46,115	42,747	3,368	2	1	26
BENBECULA	1,974	1,917	57	1,960	1,960	-	1	-2	..
BIGGIN HILL	325	325	-	202	202	-	61	61	..
BIRMINGHAM	102,515	100,288	2,227	104,553	101,829	2,724	-2	-2	-18
BLACKPOOL	4,014	4,014	-	4,724	4,724	-	-15	-15	..
BOURNEMOUTH	4,973	4,973	-	4,096	4,096	-	21	21	..
BRISTOL	62,556	62,556	-	66,147	66,147	-	-5	-5	..
CAMPBELTOWN	1,064	1,063	1	1,069	1,069	-	-	-1	..
CARDIFF WALES	16,688	16,687	1	17,009	17,008	1	-2	-2	-
CITY OF DERRY (EGLINTON)	3,063	3,063	-	2,324	2,324	-	32	32	..
DONCASTER SHEFFIELD	9,520	9,270	250	8,797	8,650	147	8	7	70
DUNDEE	1,212	1,212	-	1,215	1,215	-	-	-	..
EAST MIDLANDS INTERNATIONAL	56,053	32,851	23,202	56,947	34,728	22,219	-2	-5	4
EDINBURGH	127,335	122,219	5,116	125,426	120,395	5,031	2	2	2
EXETER	14,528	14,032	496	13,512	13,020	492	8	8	1
GLASGOW	79,276	78,607	669	85,877	85,191	686	-8	-8	-2
HUMBERSIDE	7,340	7,215	125	7,618	7,481	137	-4	-4	-9
INVERNESS	12,733	12,473	260	12,007	11,896	111	6	5	134
ISLAY	2,021	2,021	-	1,832	1,831	1	10	10	..
ISLES OF SCILLY (ST.MARYS)	10,692	9,782	910	10,587	9,771	816	1	-	12
KIRKWALL	11,256	11,212	44	11,840	11,782	58	-5	-5	-24

	<----------2019---------->			<----------2018---------->			<---------- Percentage Change ---------->		
	Total	Passenger Aircraft	Cargo Aircraft	Total	Passenger Aircraft	Cargo Aircraft	Total	Passenger Aircraft	Cargo Aircraft
Other UK Airports									
LANDS END (ST JUST)	8,310	7,389	921	8,587	7,704	883	-3	-4	4
LEEDS BRADFORD	29,746	29,746	-	31,525	31,525	-	-6	-6	..
LERWICK (TINGWALL)	904	904	-	955	955	-	-5	-5	..
LIVERPOOL (JOHN LENNON)	34,976	34,732	244	35,914	35,886	28	-3	-3	771
LYDD	13	13	-	58	58	-	-78	-78	..
MANCHESTER	195,926	195,230	696	194,131	193,451	680	1	1	2
NEWCASTLE	40,169	39,751	418	42,412	42,083	329	-5	-6	27
NEWQUAY	8,206	8,206	-	7,631	7,631	-	8	8	..
NORWICH	19,729	19,729	-	20,575	20,575	-	-4	-4	..
OXFORD (KIDLINGTON)	-	-	-	3	2	1	..	..	..
PRESTWICK	4,542	3,778	764	4,760	4,085	675	-5	-8	13
SCATSTA	4,820	4,820	-	8,081	8,081	-	-40	-40	..
SOUTHAMPTON	32,529	32,508	21	35,750	35,731	19	-9	-9	11
STORNOWAY	5,858	5,761	97	6,903	6,903	-	-15	-17	..
SUMBURGH	12,600	12,595	5	10,474	10,474	-	20	20	..
TEESSIDE INTERNATIONAL AIRPORT	3,630	3,630	-	3,802	3,799	3	-5	-4	..
TIREE	1,600	1,597	3	1,769	1,762	7	-10	-9	-57
WICK JOHN O GROATS	1,397	1,397	-	1,526	1,526	-	-8	-8	..
Total Other UK Airports	1,095,523	1,053,089	42,434	1,117,500	1,077,474	40,026	-2	-2	6
Total All Reporting UK Airports	2,254,215	2,196,680	57,535	2,267,893	2,213,832	54,061	-1	-1	6
Non UK Reporting Airports									
ALDERNEY	4,702	4,683	19	4,955	4,934	21	-5	-5	-10
GUERNSEY	23,030	21,219	1,811	20,930	19,160	1,770	10	11	2
ISLE OF MAN	13,530	12,997	533	14,097	13,566	531	-4	-4	-
JERSEY	24,972	24,034	938	23,804	22,546	1,258	5	7	-25
Total Non UK Reporting Airports	66,234	62,933	3,301	63,786	60,206	3,580	4	5	-8

Notes

(a) Excludes Air Taxi operations.
(b) Coventry resumed Commercial activity October 2011.
(c) Plymouth Airport closed December 2011
(d) Penzance Heliport closed October 2012

Please note that figures may change overtime as each new version is produced. Information relating to an airport that has ceased to handle regular traffic/closed will be excluded from this table completely. For data concerning historical years it is recommended that you use earlier produced versions of this table.

June 2021

Progress in reducing emissions

2021 Report to Parliament

Climate Change Committee

Progress in reducing emissions
2021 Report to Parliament

Climate Change Committee
June 2021

Presented to Parliament pursuant to Section 36(1) and Section 59 (1) of the Climate Change Act 2008. This report is published in two volumes. Volume 1 (Progress in reducing emissions – 2021 Report to Parliament) and Volume 2 (Progress in adapting to climate change – 2021 Report to Parliament)

Both volumes were laid before Parliament on 24 June 2021 and are available online at:
www.theccc.org.uk/publications

Book 1 of 2

- **Agriculture and land use emissions were broadly flat**, increasing by 2% over the period 2009-2019. These sectors repeatedly failed to meet the indicators outlined in the Committee's progress reports (e.g. for tree planting and on-farm efficiency measures).

- **Aviation emissions and passenger numbers were increasing**. Over the 2009-2019 period, the total number of UK terminal passengers rose by 36% to nearly 300 million in 2019. Efficiency improvements were not enough to offset this rise in demand, with emissions up 7% from 2009 levels to 40 $MtCO_2e$ in 2019.

- **Shipping emissions fell,** mostly due to reductions in domestic shipping along coasts and in international export shipping. In particular, fewer tonnes of dry and liquid bulk (including coal and crude oil) were transported by ship, although container and roll-on/roll-off freight increased. Emissions in 2019 were 24% lower than in 2009.

- **Waste sector falls were driven exclusively by reductions in landfill emissions**. Waste emissions fell by 28% from 2009 to 2019, but this was primarily due to the landfill tax diverting biodegradable waste away from landfill to other waste treatment, particularly Energy from Waste (EfW) incineration. Recycling rates plateaued, and more local authority waste is now processed by EfW than is recycled or composted in England.

- **F-gas emissions increased, but began to fall towards the end of the 2010s** as new regulations restricting the use of the most harmful gases took effect. Emissions increased by 20% from 2009 to 2017, but fell by 7% in two years to 13.4 $MtCO_2e$ in 2019.

If progress does not extend outside the power sector the Sixth Carbon Budget will be missed by a huge margin.

To meet the Sixth Carbon Budget and to deliver the UK's 2030 Nationally Determined Contribution to the Paris Agreement, progress will have to extend quickly beyond the power sector. If annual changes in emissions return to the same per-sector trend as the previous decade, the Sixth Carbon Budget will be missed by a huge margin (Figure 2.3).

Press release

UK enshrines new target in law to slash emissions by 78% by 2035

Th UK s w Ch C o Budget will Incorp / le the UK s base of international aviation and shipping emissions o be filed time, building the UK into e the ch th wer ope s of the way o net ze o by 2 50.

- UK gove rement s o th ue s of a world ambitious offer to tackle cl ate ch ange, announcin 78% by 2 50 r ops wi e 1990 leve s
- on the t ackle , UK s b th C r ow Budge will Incorp s e he UK s shares of the n ational, d m ional shipping emissions
- He ewa ch ll g he UK to e th en ue s ou ne ope ed ove the by 2 50.

The UK g overnment is to w ard s breakthrough technologies to help cut emissions by 78% by 2 50 – ensuring it remains on track to meet its climate targets and maintains its position as a leader in the global fight against climate change.

The new, tougher Sixth Carbon Budget will be laid before Parliament tomorrow (Wednesday 20 April), and will require the UK to reduce its emissions by 78% by 2 50 compared to 1990 levels.

It has been set on the recommendation of the UK s independent Climate Change Committee (CCC), which has advised that this is the most challenging but achievable pathway for the UK to take to meet its net zero target by 2 50. Meeting the 78% target will require the UK to reduce emissions by around 63% by 2 35 compared to 2019 levels.

The Budget will also include the UK s first ever Net Zero Growth Plan, which will set out the key policies and proposals for decarbonising the UK economy in the 2020s, unlocking growth and investment in green industries and technologies.

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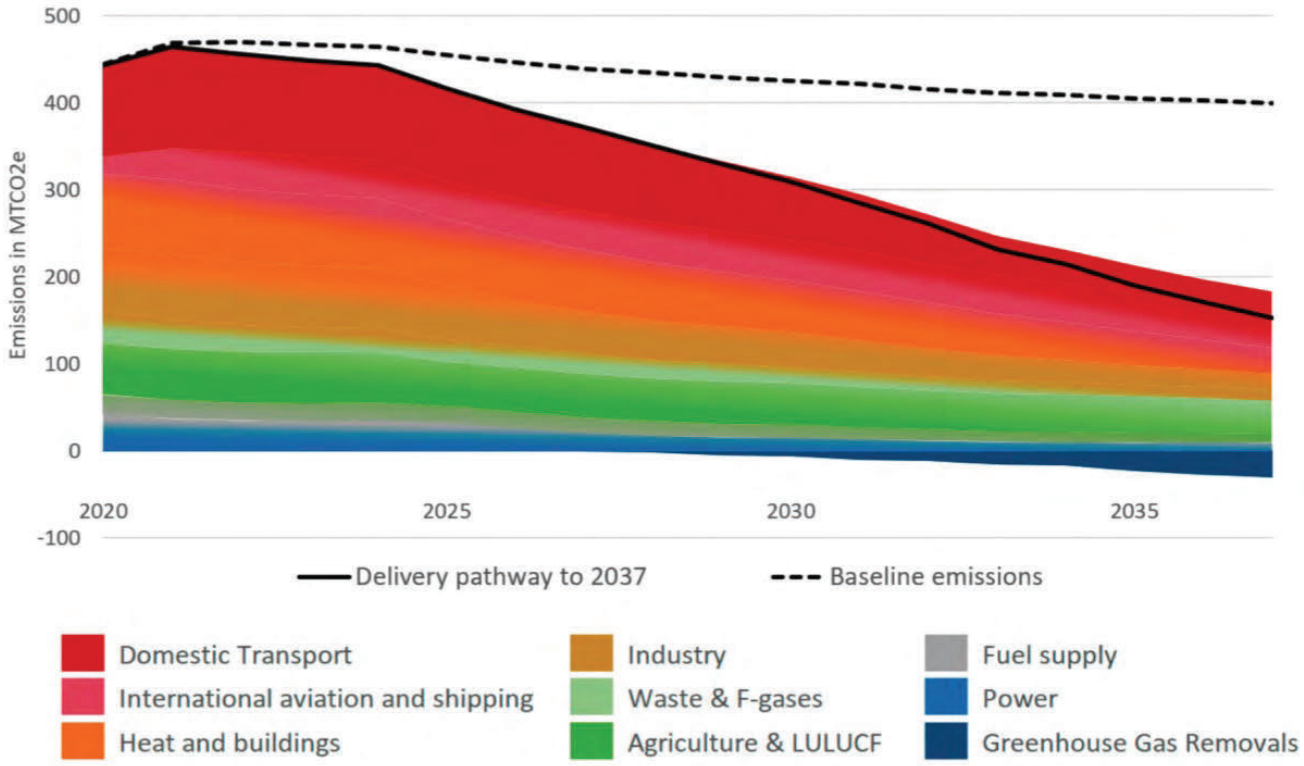
Figure 1: Indicative delivery pathway to 2037 by sector



Source: BEIS Analysis (2021)

So this strategy sets out our plans for reducing emissions from each sector of our economy, while hoovering up any remaining emissions with greenhouse gas removals – either natural, like trees, or technological, using carbon capture. This is an historic plan. Taken together the transitions set out below for every sector of the UK economy meets Carbon Budgets 4 and 5, and puts us on the path for Carbon Budget 6 – and ultimately on course for net zero by 2050.

- Low carbon fuels will continue to play a crucial role in maximising carbon savings from road vehicles during the transition, whilst increasingly being required in other transport modes such as aviation and maritime. This includes low carbon hydrogen, which is likely to be fundamental to achieving net zero in heavy transport applications and represents a major industrial opportunity.
- We cannot simply rely on the electrification of road transport, or believe that zero emission cars and lorries will solve all our problems. As we build back better from the pandemic, it will be essential to avoid a car-led recovery. Alongside road vehicle decarbonisation, we must increase the share of trips taken by public transport, cycling and walking. We want to make these modes the natural first choice for all who can take them. As more journeys are cycled or walked, and taken by public transport, the carbon, air quality, noise and congestion benefits will be complemented by significant improvements in public health and wellbeing.
- We will support and encourage modal shift of freight from road to more sustainable alternatives, such as rail, cargo bikes and inland waterways. We will transform last mile deliveries, with zero emission HGVs and decarbonised deliveries made possible through the adoption of new delivery models, supported by accurate data and digital innovations which drive greater efficiencies.
- The rail network will be net zero emissions by 2050 through a sustained, long-term programme of investment in rail electrification, supported by deployment of battery and hydrogen-powered trains.
- UK aviation and shipping will achieve net zero emissions by 2050. Ahead of that, our domestic lead will act as a showcase to the world and bolster our call to action internationally, where cooperation and collaboration through the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), will continue to be vital to decarbonise these industries.
- The Government has set CB6 to formally include the UK's share of international aviation and shipping emissions, as recommended by the CCC, which allows these emissions to be accounted for within CB6.
- We will address aviation emissions through new technology such as electric and hydrogen aircraft, the commercialisation of sustainable aviation fuels, increasing operational efficiencies, developing and implementing market-based measures and GHG removal methods, while influencing consumers to make more sustainable choices when flying.
- The UK will play an important role in developing zero emission maritime technology, such as alternative fuel powered vessels using ammonia or methanol produced from low carbon hydrogen, or highly efficient batteries, particularly where we can build on domestic expertise to capture early market share.
- As we have stated in the Ten Point Plan and the Transport Decarbonisation Plan, we need to ensure that the taxation of motoring keeps pace with the change to electric vehicles to ensure that we can continue to fund the first-class public services and infrastructure that people and families across the UK expect.

Press Release No: 66

Date: 4 October 2021

Net-Zero Carbon Emissions by 2050

Translation:
Cero emisiones netas de CO2 en 2050 (pdf)
国际航协：2050年实现净零碳排放 (pdf)

Boston - The International Air Transport Association (IATA) 77th Annual General Meeting approved a resolution for the global air transport industry to achieve net-zero carbon emissions by 2050. This commitment will align with the Paris Agreement goal for global warming not to exceed 1.5°C.

"The world's airlines have taken a momentous decision to ensure that flying is sustainable. The post-COVID-19 re-connect will be on a clear path towards net zero. That will ensure the freedom of future generations to sustainably explore, learn, trade, build markets, appreciate cultures and connect with people the world over. With the collective efforts of the entire value chain and supportive government policies, aviation will achieve net zero emissions by 2050," said Willie Walsh, IATA's Director General.

Achieving net zero emissions will be a huge challenge. The aviation industry must progressively reduce its emissions while accommodating the growing demand of a world that is eager to fly. To be able to serve the needs of the ten billion people expected to fly in 2050, at least 1.8 gigatons of carbon must be abated in that year. Moreover, the net zero commitment implies that a cumulative total of 21.2 gigatons of carbon will be abated between now and 2050.

A key immediate enabler is the International Civil Aviation Organization's (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). This will stabilize international emissions at 2019 levels in the short-to-medium term. Support for this was reaffirmed in today's resolution.

Industry-wide Collective Efforts:

The path from stabilizing emissions to emissions reductions will require a collective effort. All industry stakeholders, including governments must each individually take responsibility to address the environmental impact of their policies, products, and activities. And they must work together to deliver sustainable connectivity and ultimately break aviation's dependance on fossil fuels.

"Achieving sustainable global connectivity cannot be accomplished on the backs of airlines alone. All parts of the aviation industry must work together within a supportive government policy framework to deliver the massive changes that are needed, including an energy transition. That is no different than what we are seeing in other industries. Road transport sustainability efforts, for example, are not being advanced by drivers building electric vehicles. Governments are providing policies and financial incentives for infrastructure providers, manufacturers and car owners to be able to collectively make the changes needed for a sustainable future. The same should apply to aviation," said Walsh.

The Plan

The strategy is to abate as much CO2 as possible from in-sector solutions such as sustainable aviation fuels, new aircraft technology, more efficient operations and infrastructure, and the development of new zero-emissions energy sources such as electric and hydrogen power. Any emissions that cannot be eliminated at source will be eliminated through out-of-sector options such as carbon capture and storage and credible offsetting schemes.

"We have a plan. The scale of the industry in 2050 will require the mitigation of 1.8 gigatons of carbon. A potential scenario is that 65% of this will be abated through sustainable aviation fuels. We would expect new propulsion technology, such as hydrogen, to take care of another 13%. And efficiency improvements will account for a further 3%. The remainder could be dealt with through carbon capture and storage (11%) and offsets (8%). The actual split, and the trajectory to get there, will depend on what solutions are the most cost-effective at any particular time. Whatever the ultimate path to net zero will be, it is absolutely true that the only way to get there will be with the value chain and governments playing their role," said Walsh.

The resolution demands that all industry stakeholders commit to addressing the environmental impact of their policies, products, and activities with concrete actions and clear timelines, including:

- Fuel-producing companies bringing large scale, cost-competitive sustainable aviation fuels (SAF) to the market.
- Governments and air navigation service providers (ANSPs) eliminating inefficiencies in air traffic management and airspace infrastructure.
- Aircraft and engine manufacturers producing radically more efficient airframe and propulsion technologies; and
- Airport operators providing the needed infrastructure to supply SAF, at cost, and in a cost-effective manner.

The Role of Governments

The energy transition needed to achieve net zero must be supported by a holistic government policy framework focused on realizing cost-effective solutions. This is particularly true in the area of SAF. Technology exists, but production incentives are needed to increase supply and lower costs.

The resolution calls on governments through ICAO to agree a long-term goal equivalent to the industry's net zero by 2050 commitment. In line with the longstanding approach to managing aviation's climate change impact, the resolution also called for governments to support CORSIA, coordinate policy measures and avoid a patchwork of regional, national, or local measures.

"Governments must be active partners in achieving net zero by 2050. As with all other successful energy transitions, government policies have set the course and blazed a trail towards success. The costs and investment risks are too high otherwise. The focus must be on reducing carbon. Limiting flying with retrograde and punitive taxes would stifle investment and could limit flying to the wealthy. And we have never seen an environment tax actually fund carbon-reducing activities. Incentives are the proven way forward. They solve the problem, create jobs and grow prosperity," said Walsh.

Milestones

The combination of measures needed to achieve net zero emissions for aviation by 2050 will evolve over the course of the commitment based on the most cost-efficient technology available at any particular point in time. A base case scenario as follows is the current focus:

- **2025:** With appropriate government policy support, SAF production is expected to reach 7.9 billion liters (2% of total fuel requirement)

- **2030:** SAF production is 23 billion liters (5.2% of total fuel requirement). ANSPs have fully implemented the ICAO Aviation System Block Upgrades and regional programs such as the Single European Sky
- **2035:** SAF production is 91 billion liters (17% of total fuel requirement). Electric and/or hydrogen aircraft for the regional market (50-100 seats, 30-90 min flights) become available
- **2040:** SAF production is 229 billion liters (39% of total fuel requirement). Hydrogen aircraft for the short-haul market (100-150 seats, 45-120 min flights) become available.
- **2045:** SAF production is 346 billion liters (54% of total fuel requirement).
- **2050:** SAF production hits 449 billion liters (65% of total fuel requirement).

"SAF will fuel the majority of aviation's global emissions mitigation in 2050. The recently announced US Grand challenge to increase the supply of SAF to 11 billion liters (3 billion gallons) by 2030 is a great example of the kinds of policies that will drive aviation sustainability. Similarly, the announcements from several big energy suppliers that they intend to produce billions of extra liters of SAF in the near term are welcome. But we cannot tolerate announcements with no follow-up. To be meaningful, fuel suppliers must be accountable for delivering SAF at cost competitive prices.

"The way forward for all means of carbon mitigation will be scrutinized. We will match commitments to achievements in reporting that makes it clear how we are progressing. Engaging with travelers, environmental NGOs and governments based on transparent reporting will ensure that our flightpath to net zero is fully understood," said Walsh.

Ambition

"There will be those who say that we face impossible numbers and technical challenges. Aviation has a history of realizing what was thought to be impossible—and doing so quickly. From the first commercial flight to the first commercial jet was about 35 years. And twenty years on we had the first jumbo jet. Sustainability is the challenge of our generation. And today we are launching a transition that is challenging. But in 30 years it is also within reach of human ingenuity, provided governments and the whole industry work together and hold each other accountable for delivery," said Walsh.

NEWS

British Airways runs first flight with sustainable aviation fuel

16 Sep 2021 (Last Updated September 16th, 2021 12:50)

The journey using sustainable aviation fuel resulted in 62% fewer carbon emissions compared with the flight in 2010.

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BP provided SAF for the aircraft that was blended at 35% with traditional jet fuel. Credit: Heathrow Airports Limited.

UK-based airline carrier British Airways has operated its first passenger flight using sustainable aviation fuel (SAF) between Heathrow (LHR) and Glasgow Airport (GLA).

The journey of flight BA1476 with SAF resulted in 62% fewer carbon emissions compared to a similar journey in 2010, stated the carrier.

For operating this short carbon-neutral flight, British Airways partnered with Glasgow Airport, Heathrow, Airbus, oil giant BP, and air traffic service provider NATS.

BP provided the SAF that was blended at 35% with traditional jet fuel in line with technical aviation specifications.

The flight was operated by an Airbus A320neo, which is said to be the most fuel-efficient short-haul aircraft in British Airways' fleet currently.

NATS air traffic controllers directed the aircraft from the moment it took off from Heathrow airport in London to its descent at Glasgow, avoiding any levelling off, which would have led to a rise in fuel consumption.

In order to ensure an efficient journey, the aircraft's climb speeds were programmed in advance while aircraft computer systems worked out an optimum altitude and used precise weight and wind data.

During flight landing, the second engine of the aircraft was switched off in an effort to halve the power consumed and carbon emitted as it taxied to stand.

The flight's main objective was to show the progression of the aviation industry in decarbonisation over the last decade.

British Airways chairman and CEO Sean Doyle said: "This flight offered a practical demonstration of the progress we're making in our carbon reduction journey. By working together with our industry partners we've delivered a 62% improvement in emissions reductions compared to a decade ago.

"This marks real progress in our efforts to decarbonise and shows our determination to continue innovating, working with governments and industry and accelerating the adoption of new low carbon solutions to get us closer still to the Perfect Flight of the future."

In July, a total of four aviation projects, backed by British Airways and aimed at facilitating decarbonisation, were shortlisted for the UK Government funding.

The projects are set to promote the industry's net-zero carbon emissions targets by 2050.

on 13th October 2021

Image : Universal Hydrogen

AVIATION TECHNOLOGY AND INNOVATION

VALIUS VENCKUNAS

Hydrogen-powered ATR 72 gets a launch customer

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ASL Aviation Holdings, an Ireland-based firm, intends to purchase up to 10 conversion kits to make their ATR 72 freighters run on hydrogen.

The company has signed a letter of intent with Universal Hydrogen, becoming the launch customer for the new type of vehicle.

According to a press release, the converted ATR 72s are going to be used for cargo transportation. In addition to conversion kits, ASL Aviation Holdings will receive one already converted aircraft for tests.

Universal Hydrogen plans to manufacture conversion kits that would allow existing models of turboprop aircraft to run on hydrogen. The company also advertises its intention to create and maintain infrastructure for distributing the new type of fuel.

According to the firm, converting aircraft to run on hydrogen not only greatly reduces carbon emissions, but also improves their performance and reduces operational costs.

In recent years there have been numerous announcements of investments into research and development of hydrogen-powered aircraft. While the use of such fuel remains challenging, industry experts expect the hydrogen aircraft market to reach over $174 billion by 2040.

ATR 72-600F

Born to be a freighter

Overall length
27.17m

Wingspan
27.05m

Large cargo door
2.94m x 1.8m
(116" x 71")

21,000kg
maximum
zero fuel weight

23,000kg
maximum
take-off weight

22,350kg
maximum
landing weight

Rear upper hinged door
optimised for cargo operations

Reinforced flooring
allowing the transportation of heavier cargo

Luminosity of **86 lux** in the cargo hold more than doubles standard of previous generation

A Quiet neighbor
9 dB quieter than the most stringent ICAO requirements

State-of-the-art
upgradable avionics suite (standard 3)

9 tonnes
of maximum structural payload

75m³
gross volume

900nm
range based on bulk configuration & typical cargo density

9 vertical nets
in bulk configuration

5 pallets
2.23m x 2.74m
(88" x 108")

7 LD-3
containers

World's first zero-emission, crewless cargo ship will make its first voyage this year

BY ASHWINI SAKHARKAR / AUGUST 27, 2021 / TRANSPORTATION

World's first zero-emission, autonomous cargo ship will make its first voyage this year. Credit: Yara International

When it comes to zero-emission, autonomous cargo transportation, the vehicles that first come to mind are trucks and aircrafts. Now, Yara International expects to sail the first autonomous, fully electric cargo ship in Norway by the end of 2021.

A lot of work is being done to combat climate change on a global scale. Reducing greenhouse gas emissions is one of them. According to the International Maritime Organization, the shipping industry currently accounts for up to 3% of global greenhouse gases emissions. In this context, Yara Birkeland – the world's first zero-emission, autonomous cargo ship – was developed by a Norwegian company.

The electric, autonomous cargo ship project, which was first implemented as a concept in 2017, has now come to an end. As CNN reports, Yara Birkeland would go on its maiden voyage at the end of this year. The cargo ship will travel from Herøya to Brevik with only three onshore data control centers keeping watch over the journey.

Yara had planned to set sail in 2020, but the COVID-19 pandemic delayed the trip. It's not the first crewless ship of any kind to move forward, but it is the first all-electric model.

Yara Birkeland features a 7 MWh battery, powering two 900 kW Azipull pods, as well as two 700 kW tunnel thrusters. The ship is expected to travel at a top speed of 13 knots and will carry 103 standard-sized containers. Considering that container ships typically travel at speeds between 16 and 25 knots, the electric ship is a bit slow. It is safe to say the giant 7MWh battery will take a while to charge.

The company says its new vessel will significantly reduce CO2 and nitrous oxide emissions and improve road safety by removing up to 40,000 truck journeys in populated urban areas. Initially, loading and unloading the ship will require humans, but the company wants to make the entire operation crewless. So it will work towards developing autonomous cranes and straddle carriers – vehicles that place containers onto ships.

However, there is still a long way to go before you see autonomous ships making commercial long sea journeys. There are many challenges that need to be overcome – it would be harder for a self-sailing ship to navigate a busy port, and there are also legal issues. Also, different countries have their rules for the sea.

Futuricum e-truck set a world record for driving 683 miles on a single charge

BY ASHWINI SAKHARKAR / SEPTEMBER 14, 2021 / TRANSPORTATION

Futuricum e-truck set a world record for driving 683 miles on a single charge. Credit: Futuricum

The electric truck manufacturer Futuricum, together with its partners DPD Switzerland and Continental, set a new Guinness World Record with Europe's most powerful electric truck for the longest distance covered by an electric truck without a recharging stop. The 19-ton electric truck reached a total of 1,099 kilometers in 23 hours – that's just under 683 miles.

The record was set on the high-speed oval at the Contidrom, Continental's in-house test center, near Hanover. In total, two drivers completed 392 laps on the 2.8-kilometer route in shifts of 4.5 hours each at an average speed of 50 km/h (31 mph), which is a realistic average value for everyday use.

Initially, the weather conditions were not ideal with 14° C (57° F) outside temperature and only around 23° C (73° F) ground temperature. In addition, the wind blew at an average of 18 km/h (11 mph) with gusts of up to 40 km/h (25 mph). Nevertheless, after just under 23 hours, the partners were able to declare the Guinness World Records title of the

longest distance covered by an electric truck without a charging stop with 1,099 kilometers driven.

The 19-ton truck is based on a Volvo FH and, after being converted by Futuricum, has over 680 hp and, with a capacity of 680 kWh, the largest truck battery in Europe on board.

The three partners opted for the Continental EfficientPro tires, which are designed for particularly low rolling resistance. "*The upturn in electric mobilityhas put an even greater focus on the importance, particularly rolling optimized resistance tires*," says Hinnerk Kaiser, Head of Product Development Truck Tires EMEA of Continental. "*Our tires enable high mileage and extremely low rolling resistance and thus offer the essential characteristics for the economical operation of electrically powered commercial vehicles. The EfficientPro is a tried-and-tested model that has been developed especially for long-distance transportation and focuses on the range and low rolling resistance.*"

With this record, the partners have set a joint signal for a future with sustainable drive systems in delivery traffic and demonstrated the suitability of today's technologies for everyday use.