

# Environmental Impacts of Gatwick & Heathrow

A comparison between the Gatwick & Heathrow (northwest) options for a new runway





# QUALITY MANAGEMENT

---

Prepared by:	David Cowan, Julia Tindale, Dan Smyth
Authorised by:	David Cowan
Date:	17 June 2016
Project Number/Document Reference:	OXF8027/COMPARISONS REPORT
Document Title	Environmental Impacts of Gatwick and Heathrow A comparison between the Gatwick and Heathrow (Northwest) options for a new runway
Office Details	RPS 20 Western Avenue Milton Park Abingdon Oxon OX14 4SH  Tel: 01235 821888 Email: <a href="mailto:rpsox@rpsgroup.com">rpsox@rpsgroup.com</a>

COPYRIGHT © RPS



# CONTENTS

---

<b>GLOSSARY</b> .....	<b>III</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>IV</b>
<b>1 INTRODUCTION</b> .....	<b>1</b>
<b>2 METHODOLOGY</b> .....	<b>2</b>
<b>3 ENVIRONMENTAL APPRAISAL</b> .....	<b>4</b>
Community (including population and material assets).....	4
Human Health.....	5
Biodiversity and Nature Conservation .....	6
Land (including soils and material assets) .....	8
Water .....	9
Air Quality .....	10
Noise .....	12
Cultural Heritage.....	15
Landscape (including Green Belt) .....	16
<b>4 CONCLUSIONS</b> .....	<b>18</b>



# GLOSSARY

---

AC	The Airports Commission
BCSA	Business Case and Sustainability Appraisal
dB	Decibels
dBA	A-weighted decibels
DCO	Development Consent Order
DEFRA	Department for Environment, Food & Rural Affairs
DfT	Department for Transport
EIA	Environmental Impact Assessment
ENR	Extended Northern Runway (applicable to the Heathrow Extended Northern Runway scheme)
EU	European Union
Ha	Hectare
HAL	Heathrow Airport Limited, the promoter of the Heathrow Airport North West Runway option
Hr	Hour
HIA	Health Impact Assessment
Km	Kilometre
L <sub>Aeq</sub>	The noise measure used to describe the average sound level experienced over a period of time resulting in a single decibel value. L <sub>Aeq</sub> is most commonly used with the A-weighted scale, expressed as L <sub>Aeq</sub> . UK airports produce noise contours showing locations of equal noise exposure over 16 hours (L <sub>Aeq</sub> 16H) in effect presenting the average sound level experienced within certain areas around the airport between the hours of 07:00 and 23:00.
LAQM	Local Air Quality Management
Lden	LDEN is the 24-hr Leq calculated for an annual period, but with a 5 decibel weighting for evening and a 10 decibel weighting for night to reflect people's greater sensitivity to noise within these periods
Leq	Equivalent Continuous Level
NO <sub>2</sub>	Nitrogen Dioxide
NWR	Northwest Runway (applicable to the Heathrow North West Runway scheme)
PM <sub>10</sub>	Particulate Matter of less than 10 millionths of a metre (10 micrometres or 10 µm) in diameter
SINC	Sites of Important Nature Conservation
SMINC	Sites of Metropolitan Importance for Nature Conservation
SPA	A Special Protection Area (SPA) is an area of land, water or sea which has been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds found within the European Union
µg.m <sup>-3</sup>	Micrograms per cubic metre
UK	United Kingdom



## EXECUTIVE SUMMARY

---

This report by RPS compares the environmental impacts of the two main options for additional runway capacity in the south east namely the Heathrow Northwest Runway and the Gatwick Second Runway. It is based upon reports published by the Airports Commission and other published sources. It shows that the environmental impacts of the Heathrow Northwest Runway would be significantly greater than those of the Gatwick Second Runway with respect to:

- Communities and population
- Human Health
- Biodiversity and Nature Conservation
- Water resources, water quality and flood risk
- Air Quality
- Noise
- Cultural Heritage
- Landscape, Townscape and Green Belt.

The advantages of the Gatwick scheme over Heathrow are acknowledged in the Commission's assessment with respect to community; water resources, water quality and flood risk; air quality; and noise.

However, the environmental advantages of Gatwick were not properly recognised in the Commission's assessment with respect to:

- Human Health;
- Biodiversity and Nature Conservation;
- Landscape, Townscape and Green Belt;
- Heritage assets.

The Commission's approach to Health Impact Assessment overlooks accepted HIA methodology and best practice and its final report acknowledges that further work needs to be completed on this aspect of assessment.

The Commission's assessment over-estimates the amount of Ancient Woodland required for the Gatwick scheme and, as a consequence, places too much weight on that impact at Gatwick. It does not add adequate weight to the potential impact on the South West London Waterbodies SPA.

For biodiversity and nature conservation, the Commission's assessment does not recognise the advantages of the Gatwick scheme in terms of landscape or heritage impacts. Although these advantages are acknowledged in the assessments, little or no weight is attached to them by virtue of landscape and heritage

being subsumed within a much broader assessment objective of 'Place' which receives the same overall score of 'Adverse' in the Commission's assessment.

Virtually no weight is attached in the Commission's assessment to the loss of 431 hectares of Green Belt. This is despite the loss of Green Belt carrying great weight in respect of all other forms of infrastructure development that have been the subject of National Policy Statements.

Even with regard to air quality and noise, insufficient weight appears to be attached to the impacts of the Heathrow scheme. For air quality, the Commission does not give sufficient weight to the forecasts of continued breaches of air quality Limit Values in the Heathrow area. With respect to noise, the assessment score arrived at by the Commission after mitigation at Heathrow was the same as for Gatwick, despite the number of people newly affected by noise at Heathrow being approximately nine times greater than for the Gatwick scheme.

In summary, the Commission's assessment failed to give adequate weight to the environmental impacts of the Heathrow Northwest Runway with respect to six of the nine topics considered in this report. This is apparent in the assessment scores allocated to the two schemes in the respective sustainability assessments. It is also apparent in the overall economic assessment presented in Chapter 7 of the Commission's Final Report where no weight is given to any of the differences in environmental impacts between the schemes.

The extent to which the Commission has under-estimated the weight that should be attached to the environmental impacts of Heathrow is such that the Government should re-evaluate the deliverability of the Heathrow scheme. Based on the Commission's assessment the Government cannot be confident that Heathrow would not have adverse impacts that outweigh its benefits or impacts that are in breach of international obligations. In either of those circumstances, any Development Consent Order application would need to be refused, even if the principle of the Heathrow scheme was supported in a National Policy Statement.

#### *RPS's Overall Conclusions*

Any infrastructure project of the scale of a new runway at a major airport will inevitably have significant environmental impacts. The scale of those impacts and the extent to which they can be mitigated will be a key determinant of whether such a scheme is deliverable.

Gatwick has significant advantages in all of these aspects: the scale of impact; the extent of mitigation available; and consequently in terms of the deliverability of the much needed additional airport capacity in the form of a new runway.

# 1 INTRODUCTION

---

- 1.1 This report compares the environmental impacts of two of the long term options for new runways in the south east that were considered by the Airports Commission namely: the Heathrow Northwest Runway scheme and the Gatwick Second Runway. In December 2015 the Government announced that it accepted the Commission's conclusion that a new runway was required. However, further review of the schemes would be undertaken, particularly with regard to the environmental aspects of the schemes, before reaching a decision on runway location and preparing a National Policy Statement. As the Government approaches its decision on which option should be preferred, this report is intended to highlight some of the profound differences in environmental impacts between these two options.
- 1.2 RPS is one of the UK's leading multi-disciplinary consultancies advising on all aspects of the Built & Natural Environment. Since it was established in 1970 it has been at the forefront of environmental impact assessment for UK infrastructure projects. This has included work on Heathrow Terminal 5 and new runways at Heathrow, Stansted and Gatwick.
- 1.3 Since 2013 RPS has been advising Gatwick Airport Limited on the environmental appraisal of its proposed second runway project and this report draws upon the work that RPS has undertaken over this period.



## 2 METHODOLOGY

---

2.1 This report sets out the key environmental issues relating to the proposals for an additional runway at Gatwick and the proposed Heathrow Northwest Runway (NWR) scheme. This has been compiled with reference to the following documents:

- I. Gatwick Airport's Runway 2 Updated Scheme Design reports as submitted Airports Commission May 2014;
- II. Airport Commission's Business Case and Sustainability Assessment for Gatwick - November 2014;
- III. Jacobs Assessment Reports for Heathrow and Gatwick - November 2014;
- IV. Gatwick Airport Limited Response to Airports Commission Consultation - February 2015;
- V. The Airports Commission's Final Report and Business Case and Sustainability Assessment for the Heathrow Northwest Runway, July 2015.

Where any other documents are referred to, the references are given in the text.

2.2 As the Commission did not recommend the second Heathrow option, the Extended Northern Runway (ENR), that option is not considered in this report. This approach allows a more straightforward comparison between the favoured Heathrow Northwest Runway scheme and Gatwick.

2.3 The main environmental topics considered in this report are as set out in Annex IV of the Environmental Impact Assessment (EIA) Directive 2014/52/EU under which any proposals for new runway would need to be assessed. These are set out in Chapter 3 as follows:

- Community, including population and associated material assets
- Human Health
- Biodiversity and Nature Conservation
- Land, including soils and associated material assets
- Water Resources including flood risk
- Air Quality
- Noise
- Cultural Heritage including archaeological resources
- Landscape (including the Green Belt).

2.4 The assessment in relation to climate change and carbon is complex and is not dealt with in this report. That was examined at length by the Airports Commission albeit, as the Environmental Audit Committee has subsequently identified, there are significant gaps in the Commission's analysis.

- 2.5 Each section in Chapter 3 summarises the main impacts of both schemes. These are then compared in the light of the Commission's assessment together with RPS's conclusions under each heading.
- 2.6 RPS's overall conclusions are then set out in Chapter 4.
- 2.7 Where the appraisal terms used by the Airports Commission in its assessment are referred to in this report, these are underlined (e.g. Adverse, Neutral).

### 3 ENVIRONMENTAL APPRAISAL

#### Community (including population and material assets)

**Table 3.1: Community Effects**

Effect	Gatwick	Heathrow
Homes demolished (for Airport)	163 <sup>1</sup>	783 <sup>2</sup>
Potential home loss for road and rail schemes (AC estimate)	37 <sup>2</sup>	289 <sup>2</sup>
Total homes demolished (estimate)	200	1072
Estimate of other homes promoter might need to purchase under compensation schemes	Less than 106 <sup>3</sup>	Up to 3,750 <sup>3</sup>
Employment land lost	49ha <sup>3</sup>	49ha <sup>2</sup>
Recreation/public open space lost	4.9ha <sup>3</sup>	48ha <sup>2</sup> + up to 500ha in the Colne Valley Regional Park.

Sources: <sup>1</sup>Gatwick Airport R2 Updated Scheme Design for Airports Commission May 2014; <sup>2</sup>Airports Commission Business Case and Sustainability Appraisal; and <sup>3</sup>Gatwick Airport Limited Response to Airports Commission Consultation - February 2015.

- 3.1 As acknowledged by the Airports Commission, the housing loss associated with Heathrow ‘dwarfs’ that of Gatwick.
- 3.2 In addition to the impact on homes lost within the land required, the impact on home ownership within the areas of the wider property compensation scheme at Heathrow also dwarfs that at Gatwick. Under the scheme announced at Heathrow, thousands of homes within the 66 LAeq16hr contour (2030) could be purchased, which would include the remaining parts of Harmondsworth and the settlements of Sipson, Harlington, Cranford Cross, Heston, Brands Hill, Colnbrook and part of Datchet. Changes in home ownership on this scale are likely to have a profound adverse effect on community cohesion in those settlements. At Gatwick the number of properties affected by the equivalent noise level are a fraction of those at Heathrow. Many of these would be eligible for purchase under Gatwick’s equivalent Home Owners Support Scheme.
- 3.3 Community cohesion in the settlements affected by Gatwick would not be significantly affected. The effect of the Heathrow scheme on the communities most affected would be profound and the Commission acknowledged that no community cohesion would be maintained in the villages most directly affected.
- 3.4 Both Heathrow and Gatwick have put forward habitat and landscape mitigation schemes in the areas that would remain surrounding the expanded airports and have pledged investments in community facilities. These include improvements to public access and the relocation of some affected community facilities. The unmitigated impact of Heathrow, however, remains substantially greater

than Gatwick in terms of the effects on public open space and recreation and the scale of the impact at Heathrow on the Colne Valley Regional Park.

- 3.5 The Airports Commission’s final reports acknowledge the scale of the community effects of the Heathrow scheme which was appraised as ‘Highly Adverse’ and would remain ‘Adverse’ with mitigation. In contrast, the Commission accepted that the effect of the Gatwick scheme on the Community objective, although initially ‘Adverse’, would be mitigated to ‘Neutral’.
- 3.6 The impact of the Heathrow scheme on communities is, therefore, an order of magnitude greater than at Gatwick, as recognised in the Commission’s appraisal. Some property loss would still be required at Gatwick but that option allows impacts of the scale seen at Heathrow to be avoided.
- 3.7 Avoidance of impacts should be preferred over mitigation or compensation. The Commission acknowledged that the effects on communities at Gatwick could be mitigated. In contrast it is not possible to fully mitigate adverse impacts on communities at Heathrow.

## Human Health

**Table 3.2: Human Health Effects**

Effect	Gatwick	Heathrow
Estimated population adversely affected by air quality in 2030 (annual mean concentrations of NO <sub>2</sub> and PM <sub>10</sub> )	51,323 <sup>1</sup>	121,085 <sup>1</sup>
Additional population newly affected by noise in 2050 (carbon capped, 55 dBLden)	15,100 <sup>2</sup>	143,100 <sup>3</sup>
Estimated population affected by noise in 2050 (carbon capped, 55 dBLden)	24,600 <sup>4</sup>	726,600 <sup>3</sup>

<sup>1</sup>Data taken from Jacobs Module 6: Air Quality Local Assessment, May 2015: Tables 4.6 and 5.6. Note that the Gatwick study area was larger than the Heathrow study area and Figure F1 of the Jacobs report suggested that air quality modelling overpredicted the effects at Gatwick and underpredicted the effects at Heathrow.

<sup>2</sup>Data taken from Jacobs Module 5: Noise Local Assessment, November 2014: Table 3.24,

<sup>3</sup>Data taken from Jacobs Module 5: Noise Local Assessment, November 2014: p156.

<sup>4</sup>Data taken from Jacobs Module 5: Noise Local Assessment, November 2014: Table 3.8.

- 3.8 The Commission did not undertake a Health Impact Assessment (HIA) of any of the options. This is acknowledged in an Annex to the Business Case and Sustainability Appraisal (BCSA) which sets out the further work that would be required.
- 3.9 Work undertaken by Gatwick in relation to potential air quality impacts on population demonstrates that exceedances of the air quality standard have been predicted for each assessed scenario for a third runway at Heathrow and that there is a high risk of an exceedance of the limit value during both construction and operational phases.
- 3.10 In contrast air quality around Gatwick is currently well below the legal limits enshrined in EU and UK legislation and concentrations of Nitrogen Dioxide are expected to fall further. Against this background, the proposed Gatwick second runway scheme will have a very small impact on local air quality and the exposure of the local population to pollutants attributable to the scheme is therefore

also very small. There is little or no risk that the development, during its construction and operation, would cause air quality limit values to be breached.

- 3.11 Using the approach adopted by the Airports Commission (Green Book Central Estimate), the total air quality damage costs for Heathrow NWR are £958 million<sup>1</sup> over the 60 year appraisal period. This relates directly to the effects of emissions on human health, and is three times the damage costs of the Gatwick scheme (£321m).
- 3.12 In relation to air noise, for the carbon capped forecast the Commission's consultants estimated that by 2050 there would be 143,100 people newly affected in the 55 dBLden contour at Heathrow, compared to 15,100 newly affected at Gatwick i.e. approximately 11% of the impact of Heathrow.

## Biodiversity and Nature Conservation

**Table 3.3: Biodiversity and Nature Conservation Effects**

Effect	Gatwick	Heathrow
Potential for significant effects on European Sites	No	Yes – South West London Waterbodies SPA <sup>1</sup>
Locally designated sites <sup>2</sup> within footprint	22ha <sup>3</sup>	65ha <sup>1</sup>
Loss of priority habitats	Rivers - None Ancient Woodland 6.35ha <sup>3</sup> Deciduous woodland 39ha <sup>3</sup> Traditional Orchard None	Rivers c.12 <sup>1</sup> km Ancient Woodland - None Deciduous woodland 34ha <sup>1</sup> Traditional Orchard – 1.5ha <sup>1</sup>

Source: <sup>1</sup>Biodiversity Assessment, Jacobs, November 2014. <sup>2</sup>Eg Local Nature Reserves, Sites of Importance for Nature Conservation (SINC) or Sites of Metropolitan Importance for Nature Conservation (SMINC, at Heathrow). Usually identified by local authority-sponsored nature conservation bodies and included in Local Plan documents. <sup>3</sup>Gatwick Airport Limited Response to Airports Commission Consultation - February 2015.

- 3.13 Both schemes affect habitats and resources with value for nature conservation and biodiversity but the scale of impacts of the Heathrow option are greater than at Gatwick both in terms of the areas affected and their value.
- 3.14 Whilst neither scheme requires direct land take from statutory designated sites of international or national importance, Gatwick takes less land from other designated sites and performs better in this aspect of the appraisal for biodiversity than the Heathrow scheme.

---

<sup>1</sup> A Second Runway for Gatwick Response to Airports Commission Air Quality Consultation. Gatwick Airport Limited, May 2015.

- 3.15 The Commission's assessment also included ecosystems services. Although little weight was attached to this part of the assessment, the loss of ecosystem services for the Gatwick scheme was significantly less than either of the Heathrow proposals.
- 3.16 The Commission's assessment of the Gatwick scheme placed great weight on the loss of Ancient Woodland. Too much weight was placed on this impact because the Commission's assessment was based on the loss of Ancient Woodland being over 14 hectares. The area of Ancient Woodland required for the Gatwick scheme is only 6.35ha. This was pointed out to the Commission in Gatwick's response to the Commission's consultation but the Commission's appraisal was never corrected.
- 3.17 The Gatwick scheme has significant benefits for habitats associated with rivers. Gatwick will remove existing culverting of the River Mole and Crawters Brook, and will provide a new naturalised river valley of over 6km for these water courses with highly beneficial implications to biodiversity at a regional level of importance. In this and other respects, the proposals are compliant with the objectives of the EU Water Framework Directive. The Heathrow schemes will require the loss of up to 13km of watercourses and create about 3km of river culverts. Not only is this unprecedented in the UK since the advent of environmental impact assessment in its current form but it is entirely at odds with the principles of the EU Water Framework Directive.
- 3.18 The Gatwick scheme is not likely to have a significant adverse effect on any statutory designated site of international or national importance. As advised by the Government's statutory advisors, Natural England, the Heathrow scheme has the potential for significant effects on a European site, the South West London Waterbodies SPA, due to the birdstrike mitigation likely to be required. The Commission noted that it had yet to be shown that these impacts could be mitigated.
- 3.19 The Commission's conclusions were that the Heathrow scheme had an Adverse impact which could move towards Neutral with the compensation being put forward. The Commission's appraisal of the Gatwick scheme was Adverse but did not account of the mitigation and compensation being put forward.
- 3.20 In our opinion the impact of the Heathrow scheme should have been assessed by the Commission as Highly Adverse for biodiversity to be consistent with its appraisal of the Heathrow Extended Northern Runway. With the bird strike measures that would be required, both have similar potential impacts on the South West London Waterbodies SPA and the same issues were raised for both schemes by the Commission's consultants and Natural England.
- 3.21 With mitigation the Gatwick scheme is capable of being neutral or beneficial for biodiversity and has significantly less impact on designated sites and priority habitats.

## Land (including soils and material assets)

**Table 3.4: Land Effects**

Effect	Gatwick	Heathrow
Land Take for 'Airport'	624ha <sup>2</sup>	569ha
Total Land Take (including AC indicative surface access corridors)	702ha	906 ha
Agricultural Land	382ha	235ha
High Quality Grade 1 Agricultural Land	0ha	168ha
Mineral Reserves	0ha	32.5ha
Landfill Sites	<5ha	182ha

Source: I. Gatwick Airport R2 Updated Scheme Design for Airports Commission May 2014; III. Jacobs Reports November 2014; and IV. Gatwick Airport Limited Response to Airports Commission Consultation - February 2015

- 3.22 The Airports Commission concluded that a greater area of land would be required to build the Heathrow scheme including surface access compared to Gatwick. In addition, the land required for a second runway at Gatwick is already safeguarded for that purpose in planning policies.
- 3.23 Whilst the Gatwick scheme includes a higher proportion of agricultural land than Heathrow, the quality of the land at Heathrow is exceptional, with 168ha classified as the highest quality Grade 1 agricultural land, compared to the dominance of lower quality Grade 3 land at Gatwick.
- 3.24 The Heathrow scheme also contains significant areas of natural mineral reserves. No mineral resources would be affected by the second runway at Gatwick.
- 3.25 In addition, the construction of the Heathrow scheme would affect large volumes of historical landfill within 16 former landfill sites, together with future capacity in the 2 active landfill sites. In total approximately 182ha of landfill sites would be affected by the operational boundary of the scheme. Heathrow presents some unique challenges in respect of re-engineering such sites compared to the small pockets of potential contamination that are located within the area of the Gatwick second runway area.

---

<sup>2</sup> Includes land required for A23 and rivers diversion.

## Water

**Table 3.5: Effects on Water Resources and Flood Risk**

Effect	Gatwick	Heathrow
Length of proposed channel realignment	6.8km <sup>1</sup>	12km <sup>2</sup>
Length of proposed culvert	-2km (culvert removed) <sup>1</sup>	+3km <sup>2</sup>

Source: <sup>1</sup>Gatwick Airport R2 Updated Scheme Design for Airports Commission May 2014; <sup>2</sup> Airports Commission Business Case and Sustainability Appraisal, 2015

- 3.26 Both Heathrow and Gatwick require the diversion of watercourses and affect land which is at risk of flooding. Whereas the Gatwick scheme takes the opportunity to return watercourses within the existing airport that have been put into culverts and/or engineered channels to more naturalised open channels, the Heathrow scheme does the opposite by requiring culverting of significant lengths of watercourse that are currently of good quality and in open channels.
- 3.27 The Heathrow scheme requires the diversion of sections of the Colne Brook, the Duke of Northumberland's River and the River Colne and creation of a new channel (the 'River Colne Spur') which places the watercourses in culvert beneath the new runway, close to the proposed M25 tunnel. These developments would reduce total channel length significantly. This will affect water quality and could fundamentally alter sediment processes in the existing waterways, with concurrent ecological implications. These proposals could compromise the ability to meet water quality standards set out in the Water Framework Directive and may increase the risk of flooding.
- 3.28 Gatwick removes over 2km of engineered channel and culvert from the River Mole and the Crawters Brook. In total approximately 3km of the Mole and 2.4km of the Crawters Brook would be diverted into new open channels. Watercourse length would be increases by 489 m, in addition to improving the quality of 2.7 km of watercourse. These diversions will remove the risk of flooding from these rivers to Gatwick Airport and the reduction in flood risk can be extended to communities beyond the airport.
- 3.29 The Heathrow scheme will increase the demand for potable water resources in a region that is already under water stress. The Commission's assessment was that Gatwick has clear advantages in terms of water supply to any expansion of Heathrow.
- 3.30 The Commission's assessment was that both schemes had potential impacts that were Adverse. With respect to Heathrow, the Commission concluded that it was unlikely that these impacts could be fully mitigated. At Gatwick, however, the Commission accepted that with mitigation a Neutral impact was achievable.

## Air Quality

- 3.31 In 2015, Gatwick commissioned an independent assessment of air quality<sup>3</sup> assuming opening of a third runway at Heathrow in either 2025, as suggested by Heathrow, or 2029, to provide capacity before 2030. A series of scenarios were considered, making different assumptions about improvements in future background air quality concentrations as follows:
- HAL Growth Forecasts and DEFRA 2025 background concentrations
  - HAL Growth Forecasts and DEFRA 2017 background concentrations
  - Airports Commission Growth Forecasts and DEFRA 2025 background concentrations
  - Airports Commission Growth Forecasts and DEFRA 2017 background concentrations
  - Airports Commission Growth Forecasts and Highways England Methodology
  - HAL Growth Forecasts and DEFRA 2029 background concentrations
  - HAL Growth Forecasts and DEFRA 2021 background concentrations
  - HAL Growth Forecasts and DEFRA 2019 background concentrations
  - Airports Commission Growth Forecasts and DEFRA 2029 background concentrations
  - Airports Commission Growth Forecasts and DEFRA 2021 background concentrations
  - Airports Commission Growth Forecasts and DEFRA 2017 background concentrations
  - Airports Commission Growth Forecasts and Highways England Methodology.
- 3.32 Using Heathrow growth forecasts and Defra 2025 or Defra 2029 background concentrations no breaches of the limit value for nitrogen dioxide were predicted. In every other scenario considered in this analysis, breaches were predicted.
- 3.33 In its final report, the Airports Commission noted confirmed that the UK is not forecast to be compliant with the Directive in terms of NO<sub>2</sub> emissions in the Greater London agglomeration area by 2030, even without airport expansion. The Heathrow site is contained within this area and itself contains a number of locations at which emissions are expected to be in exceedance in 2030, most notably at points on the A4 Bath Road, immediately to the north of the current airport boundary, with further exceedances forecast on the A4 (junction of Fulham Palace Road to Earls Court Road) and A40 on the routes from the airport to Central London.
- 3.34 Work undertaken for the Airports Commission confirmed that both Heathrow schemes would exceed the Air Quality Directive limit values and delay compliance with the EU limit value for the Greater London agglomeration, without mitigation.

---

<sup>3</sup> Air Quality Assessment of Operation of Proposed Runway 3, Arup, 2015.

**Table 3.6: Predicted Breaches of Annual Mean NO<sub>2</sub> Concentrations in 2030**

Road Sector	Total NO <sub>2</sub> Concentration (µg.m <sup>-3</sup> )
Bath Road, A4 (junction A437 to west of Newbury Road)	48.7
A4 (junction of Fulham Palace Road to Earls Court Road)	38.0 – 45.4
A40 Western Avenue (junction A406 to east of A219)	37.2 – 44.5

Source: Jacobs Air Quality Local Assessment May 2015 Table 5.7.

- 3.35 In its final report, the Commission then applied a novel interpretation of compliance based on the view that if other parts of London experienced more significant breaches of air quality Limit Values than the areas around Heathrow, non-compliance at Heathrow would not be considered unlawful. This view has been rejected by other informed observers, including the Environmental Audit Committee.
- 3.36 In 2015 the UK Government was ordered by the Supreme Court to bring forward a new Air Quality Plan (“the Plan”) to meet legal obligations to achieve nitrogen dioxide limit values in the shortest possible time.
- 3.37 The Government consulted on a draft Plan in September 2015. Projected compliance dates in the draft Plan were much more optimistic than the most recent previous modelling in 2014. Concerns were expressed that the dates were too optimistic. However, the Government published its new Plan in December 2015 without revising the projections.
- 3.38 Following the publication of the Plan, Gatwick Airport Ltd commissioned a number of leading national and international air quality experts to consider various aspects of the Plan’s projections and proposals. Their work provides a substantial body of evidence which has been published by Gatwick<sup>4</sup> and has been widely circulated.
- 3.39 In addition, in April 2016 the DfT published the findings of its most recent diesel emissions testing programme<sup>5</sup>. The DfT report has very significant implications for the air quality projections in the Plan, confirming that the base case represents an optimistic view of the future.
- 3.40 Furthermore, a recent analysis by Air Quality Consultants Ltd<sup>6</sup> suggests that future projections of background annual mean NO<sub>2</sub> concentrations should be higher than the values provided by Defra for use in Local Air Quality Management (LAQM).
- 3.41 The combined evidence strongly suggests that compliance in London is unlikely to be achieved until beyond 2030 and the Air Quality Plan does not provide the sound platform upon which to base a decision to support expansion of Heathrow that the Commission had relied upon.

---

<sup>4</sup> Air quality projections in the London Air Quality Plan. April 2016. Gatwick Airport Ltd.

<sup>5</sup> Vehicle Emissions Testing Programme. Moving Britain Ahead Cm 9259. DfT, 2016

<sup>6</sup> Air Quality Consultants (2016) Emissions of Nitrogen Oxides from Modern Diesel Vehicles, available to download from <http://www.aqconsultants.co.uk/Resources/Download-Reports.aspx>.

- 3.42 The Air Quality Plan is now also subject to further legal challenge following a ruling favour of ClientEarth in the Supreme Court against the Secretary of State for the Environment in April 2015.
- 3.43 The Commission's final report and its supporting assessment<sup>7</sup> confirmed that the Gatwick scheme will comply with air quality Limit Values. The mitigation measures proposed by Gatwick will ensure that any increased concentrations of NO<sub>2</sub> are minimised and that the Gatwick scheme will meet the required standards with ample headroom. There is a sound policy basis for recommending expansion at Gatwick on this basis.

## Noise

- 3.44 Heathrow airport has the highest noise impact on people of any European Airport, indeed Heathrow's noise impact exceeds that of all the other main airports combined. By contrast, Gatwick has one of the lower noise impacts in Europe.

**Table 3.7: Comparison of Noise Impacts of Main European Airports (2012)**

<b>Airport</b>	<b>Population within the 55dB<sub>Lden</sub> contour</b>
<b>London Heathrow</b>	<b>725,000</b>
Frankfurt	239,00
Paris Charles de Gaulle	170,000
Paris Orly	110,000
Brussels	50,000
Amsterdam	44,000
Madrid	43,000
Rome	34,000
<b>London Gatwick</b>	<b>11,000</b>
Munich	8,000

*Source: Table 2.2 of the Airports Commission Discussion Paper 05: Aviation Noise (July 2013)*

- 3.45 Noise elicits widely differing individual responses, from the mild to the extreme. By definition, minimising the number of people affected by noise is bound to minimise such effects. It is immediately obvious from Table 3.7 that the number of people affected by noise due to Heathrow is in the hundreds of thousands, compared with tens of thousands at Gatwick. This is because of Heathrow's location, rather than the fact that the operation of each airport would be materially different. It shows the relative scale of socio-environmental effects and it is quite clear that the Gatwick option would help minimise the number of people adversely affected by noise. The option at

<sup>7</sup> Jacobs Air Quality Local Assessment, 2015

Gatwick would also allow the noise impact of Heathrow to progressively improve as new technology is implemented, without compromising that progress by lifting the cap on throughput by providing extra runway capacity at this location.

**Table 3.8: Noise Effects - comparison of impacts of an additional runway at Gatwick and Heathrow in 2050 (55 dB<sub>Lden</sub> Contour)**

<b>Measures relating to the number of people contained with noise contours in 2050 - Based on the 55 dB<sub>Lden</sub> Contour (assuming Heathrow's option to minimise the number of people 'newly affected')</b>			
<b>Measure</b>	<b>Effects at Gatwick with R2</b>	<b>Effects at Heathrow with R3*</b>	<b>Multiple LHR R3:LGW R2</b>
Additional number of people "newly affected"	18,200 <sup>8</sup>	157,900 <sup>9</sup>	x8.7
Net additional number of people affected ("do something" less "do minimum")	15,100 <sup>10</sup>	143,100 <sup>11</sup>	x9.5
Total number of people affected	24,600 <sup>12</sup>	726,600 <sup>13</sup>	x30

<sup>8</sup> Jacobs: November 2014 Noise: Local Assessment - Page 42

<sup>9</sup> Ibid. From the Heathrow NWR 'N' airspace scenario (to minimise the number of newly affected people) – November 2014 Noise: Local Assessment - Page 156

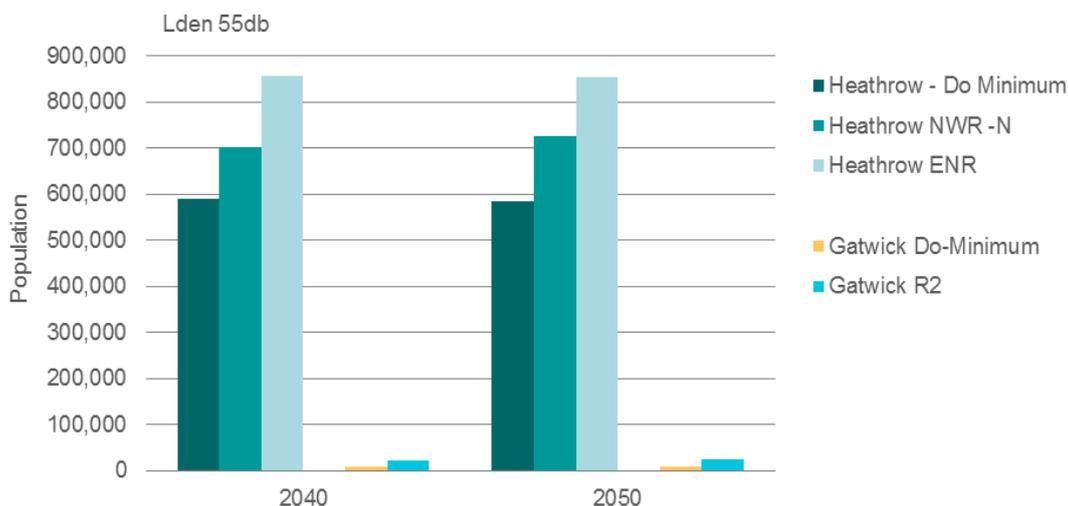
<sup>10</sup> Ibid. Tables 3.4 and 3.8

<sup>11</sup> Ibid. From the Heathrow NWR 'N' airspace scenario (to minimise the number of newly affected people) – Tables 4.4 and 4.49 (for Heathrow NWR)

<sup>12</sup> Ibid. Table 3.8

<sup>13</sup> Ibid. Table 4.49

**Figure 3.1: Population within the 55dB<sub>Lden</sub> contour for the Heathrow Northwest Runway scheme and Gatwick scheme (based on the Commission’s carbon capped forecasts for 2040 and 2050)**



3.46 Figure 3.1 illustrates that the noise impacts of Heathrow would be considerably more significant than those at Gatwick, affecting a far larger population that is already subject to significantly higher noise levels. It is clear that the Gatwick option would help minimise the number of people adversely affected by noise.

3.47 The current Heathrow proposal would also affect more people than the scheme that the Coalition Government rejected in 2010 (the total population within the 57dBA<sub>Leq</sub> contour in 2030 was 206,000 for the 2009 scheme compared with 261,200 for the current proposal, based on the Airports Commission carbon traded scenario).

3.48 The noise impacts on schools presents a similar picture, with 108 additional schools impacted by the third runway at Heathrow, compared with 14 at Gatwick, as shown in Table 3.9.

**Table 3.9: Number of Schools Impacted in 54dBA Leq contour in 2050**

Measure	Effects at Gatwick with R2	Effects at Heathrow with R3
Number of Additional Schools Affected	14	108

Source: Jacobs: November 2014 Noise: Local Assessment Tables 3.27 and 4.68.

3.49 In its Business Case and Sustainability Assessment (V), the Airports Commission concluded that the effects of noise from the Heathrow Airport Northwest Runway scheme would be Significantly Adverse. The Commission went on to suggest that potential future improvements to compensation schemes, air-space management, flight path design, angle of approach and technology incentives to further mitigate the noise impacts at Heathrow have the potential to bring the noise impact

assessment closer to Adverse, effectively a similar rating as Gatwick. Given that all of the suggested improvements at Heathrow would be equally possible without a third runway, there seems little doubt that the noise effects at Heathrow would be significant, particularly for those people newly exposed to noise, under new flight paths.

## Cultural Heritage

**Table 3.10: Cultural Heritage Effects**

Effect	Gatwick	Heathrow
<b>Within land take boundary</b>		
Grade 2* listed buildings	4	0
Grade 2 listed buildings	12	17
Scheduled Monuments	0	2
Conservation Areas	0	2
Total	16	21
<b>Within 2km of the land take boundary</b>		
Grade 1 listed buildings	0	2 (Harmondsworth Great Barn would be immediately outside the boundary)
Grade 2* listed buildings	0	11
Grade 2 listed buildings	5	44
Scheduled Monuments	2	1
Conservation Areas	2	5
Total	9	63

Source I. Gatwick Airport R2 Updated Scheme Design for Airports Commission May 2014 and IV. Gatwick Airport Limited Response to Airports Commission Consultation - February 2015

- 3.50 In relation to listed buildings there is little difference between the numbers affected within the land take for either Gatwick or Heathrow, although the latter would result in effects on 2 Scheduled Monuments and 2 Conservation Areas (one would be lost entirely at Longford).
- 3.51 With regard to designated heritage assets located outside the land take areas that could be adversely affected as a result of changes to their settings, the assessments undertaken by the Commission's consultants showed that there are substantially more designated heritage assets within 2km of the boundary of the Heathrow scheme than is the case at Gatwick (i.e. 63 compared to 9).
- 3.52 The Commission's consultants' report for Heathrow scheme does not specify the level of impact to two Scheduled Monuments within the land take area. The report identifies impacts of 'Very Large' significance (unmitigated) to the two Scheduled Monuments that lie outside the Gatwick land take

boundary. The effects on the Scheduled Monuments within the Heathrow scheme should therefore also be assessed as being of ‘Very Large’ significance.

- 3.53 Figures presented within the Commission’s consultants’ report on the impact on the tranquillity of heritage assets in 2030 are show in Table 3.11. This illustrates the significantly greater magnitude of effects on these assets associated with the Heathrow scheme.

**Table 3.11: Effects on tranquillity of heritage assets**

Effect	Gatwick	Heathrow
World Heritage Site	0	1
Grade 1 listed buildings	0	60+
Grade 2* listed buildings	24	140+
Grade 2 listed buildings	256	1700+
Scheduled Monuments	2	8-9
Conservation Areas	2	18-21
Registered Parks and Gardens	0	10-15

Source: III. Jacobs Reports November 2014

- 3.54 The Commission’s Final Report concludes that the overall impact on listed buildings and Conservation Areas is likely to be greatest for the Heathrow scheme.

## Landscape (including Green Belt)

**Table 3.12: Landscape Effects**

Effect	Gatwick	Heathrow
Land Take in Green Belt	9ha	431ha
Land Take in Regional Parks	0	501ha (includes Airports Commission figure for surface access)

Source: III. Jacobs Reports November 2014 and IV. Gatwick Airport Limited Response to Airports Commission Consultation - February 2015

- 3.55 The effects on landscape and townscape arising from the Gatwick scheme set out in the Commission’s Final Report were unchanged from its November 2014 Business Case and Sustainability Appraisal i.e. that the visibility of the scheme would be relatively constrained to the north and south by the high density of vegetation within the surrounding area, with the most significant impacts on views being from the east and west. Extensive mitigation proposals to address the visual impact of the new runway were noted by the Commission, including a comprehensive programme of landscaping to mitigate visual and noise impacts.
- 3.56 In relation to the Heathrow scheme, the Commission’s Final Report concluded that the landscape and townscape impacts would be dispersed, but the Hillingdon Lower Colne flood plain (which includes approximately 500ha in the Colne Valley Regional Park) would continue to be severely

impacted. The effects in this area are more significant as the runway would be on an elevated section across the flood plain. The Gatwick scheme would have more limited landscape impact.

- 3.57 Regarding loss of land within the Green Belt, the Commission's report acknowledges that only 9ha of Green Belt land would be affected at Gatwick, compared to more than 400ha for the Heathrow NWR. This significant difference is not reiterated in the conclusion to the landscape and townscape section.

## 4 CONCLUSIONS

---

4.1 This report by RPS compares the environmental impacts of the two main options for additional runway capacity in the south east namely the Heathrow Northwest Runway and the Gatwick Second Runway. It is based upon reports published by the Airports Commission and other published sources. It shows that the environmental impacts of the Heathrow Northwest Runway would be significantly greater than those of the Gatwick Second Runway with respect to:

- Communities and population
- Human Health
- Biodiversity and Nature Conservation
- Water resources, water quality and flood risk
- Air Quality
- Noise
- Cultural Heritage
- Landscape, Townscape and Green Belt.

### *Community Impacts*

4.2 The incontrovertible advantage of Gatwick over Heathrow in terms of community impacts is its avoidance of the large-scale impacts that are inevitable with the Heathrow scheme on dwellings and communities. At Gatwick, not only are the impacts on homes and communities minor by comparison, and capable of mitigation, but the land affected at Gatwick has been safeguarded for the development of a new runway in planning policies since 2003.

### *Biodiversity and Nature Conservation*

4.3 The Gatwick scheme takes less land from designated sites and priority habitats than Heathrow. It also remains to be demonstrated that the Heathrow scheme does not have significant effects on a European Site, the South West London Waterbodies SPA.

### *Human Health*

4.4 Gatwick has undertaken an assessment of the human health impacts for its second runway scheme which showed that, although it will have some identifiable health effects, these are likely to be relatively small when viewed in the context of background rates of diseases and health outcomes. The impacts at Gatwick are also likely to be considerably lower than would be the case of expanding Heathrow where the population adversely affected by air quality and noise is substantially greater.

#### *Water resources, water quality and flood risk*

- 4.5 The impact of Heathrow in terms of culverting existing good quality rivers is unprecedented in recent times and is likely to significantly affect the quality of watercourses in the area. Gatwick, by contrast, improves the quality and length of watercourses by returning sections of river that are currently in culverts and/or engineered channels to open, more naturalised channels. The Heathrow proposals could compromise the ability to meet water quality standards set out in the Water Framework Directive and may also increase the risk of flooding.

#### *Air Quality*

- 4.6 In most development scenarios it is evident that on-going breaches of air quality Limit Values in the Heathrow area will continue with the Heathrow proposal. The Commission agreed with its consultants' conclusion that the Gatwick scheme is not forecast to cause any exceedances of Limit Values.

#### *Noise*

- 4.7 The Gatwick scheme performs best due to the much smaller numbers impacted, many fewer people 'newly affected', and the smaller increment in noise over the baseline across the majority of metrics.

#### *Landscape, Townscape and Green Belt*

- 4.8 The landscape of the Lower Colne flood plain would be severely impacted by the Heathrow scheme which has an elevated section of new runway across the flood plain. The visibility of the Gatwick scheme would be relatively constrained to the north and south by the high density of vegetation within the surrounding area.

#### *Cultural Heritage*

- 4.9 Both the Heathrow and Gatwick schemes affect a similar number of listed buildings within the required land take. However, the Heathrow scheme has a greater overall impact on heritage assets as the land take also includes two Scheduled Monuments and two Conservation Areas. The Heathrow scheme also has a greater impact on heritage assets in the areas adjacent to the scheme.

#### *Land*

- 4.10 Both options require similar areas of land for the airport development although the Heathrow scheme requires significantly more high quality agricultural land and a high proportion of the land that is not of high agricultural quality is current or restored landfill which will be an added complication for the development of Heathrow. When the land required for surface access schemes is included, Heathrow is likely to require more land.

#### *Conclusions on the Commission's Assessment*

- 4.11 The advantages of the Gatwick scheme over Heathrow are acknowledged in the Commission's assessment with respect to:

- Community;
  - Water resources, water quality and flood risk;
  - Air Quality;
  - Noise.
- 4.12 The advantages of Gatwick were not properly recognised in the Commission’s assessment with respect to:
- Human Health;
  - Biodiversity and Nature Conservation;
  - Landscape, Townscape and Green Belt;
  - Heritage assets.
- 4.13 The Commission’s approach to Health Impact Assessment overlooks accepted HIA methodology and best practice and its final report acknowledges that further work needs to be completed on this aspect of assessment.
- 4.14 The Commission’s assessment over-estimates the amount of Ancient Woodland required for the Gatwick scheme and, as a consequence, places too much weight on that impact at Gatwick. It does not add adequate weight to the potential impact on the South West London Waterbodies SPA.
- 4.15 The Commission’s assessment does not recognise the advantages of the Gatwick scheme in terms of landscape or heritage impacts. Although these advantages are acknowledged in the assessments, little or no weight is attached to them by virtue of landscape and heritage being subsumed within a much broader assessment objective of ‘Place’ which receives the same overall score of Adverse in the Commission’s assessment.
- 4.16 Virtually no weight is attached in the Commission’s assessment to the loss of 431 hectares of Green Belt. This is despite the loss of Green Belt carrying great weight in respect of all other forms of infrastructure development that have been the subject of National Policy Statements.
- 4.17 Even with regard to air quality and noise, insufficient weight appears to be attached to the impacts of the Heathrow scheme. For air quality, the Commission does not give sufficient weight to the forecasts of continued breaches of air quality Limit Values in the Heathrow area. With respect to noise, the assessment score arrived at by the Commission after mitigation at Heathrow was the same as for Gatwick, despite the number of people newly affected by noise at Heathrow being approximately nine times greater than for the Gatwick scheme.
- 4.18 The Commission’s assessment failed to give adequate weight to the environmental impacts of the Heathrow Northwest Runway with respect to six of the nine topics considered in this report. This is apparent in the assessment scores allocated to the two schemes in the respective sustainability assessments. It is also apparent in the overall economic assessment presented in Chapter 7 of the Commission’s Final Report where no weight is given to any of the differences in environmental impacts between the schemes.

4.19 The extent to which the Commission has under-estimated the weight that should be attached to the environmental impacts of Heathrow is such that the Government should re-evaluate the deliverability of the Heathrow scheme. Based on the Commission's assessment the Government cannot be confident that Heathrow would not have adverse impacts that outweigh its benefits or impacts that are in breach of international obligations. In either of those circumstance, any Development Consent Order application would need to be refused, even if the principle of the Heathrow scheme was supported in a National Policy Statement.

*RPS's Overall Conclusions*

- 4.20 Any infrastructure project of the scale of a new runway at a major airport will inevitably have significant environmental impacts. The scale of those impacts and the extent to which they can be mitigated will be a key determinant of whether such a scheme is deliverable.
- 4.21 Gatwick has significant advantages in all of these aspects: the scale of impact; the extent of mitigation available; and consequently in terms of the deliverability of the much needed additional airport capacity in the form of a new runway.





For more information contact:

David Cowan  
Managing Director - Planning & Environment  
T: +44 (0)1235 821 888  
E: [cowand@rpsgroup.com](mailto:cowand@rpsgroup.com)