Airport Capacity Programme

Global Comparison of Airport Mitigation Measures

May 2016

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May 2016

Dear Sir/Madam

Global Comparison of Noise Compensation Measures

In accordance with our Statement of work of 19 January 2016, we have prepared our report in relation to your Airport Capacity Programme.

Purpose of our report and restrictions on its use

This report was prepared on your instructions solely for the purpose of Department for Transport (DfT) and should not be relied upon for any other purpose. Because others may seek to use it for different purposes, this report should not be quoted, referred to or shown to any other parties unless so required by court order or a regulatory authority, without our prior consent in writing. In carrying out our work and preparing our report, we have worked solely on the instructions of DfT and for DfT's purposes.

Our report may not have considered issues relevant to any third parties. Any use such third parties may choose to make of our report is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use. This report should not be provided to any third parties without our prior approval and without them recognising in writing that we assume no responsibility or liability whatsoever to them in respect of the contents of our deliverables.

Scope of our work

Our work in connection with this assignment is of a different nature to that of an audit. Our report to you is based on publicly available information and where possible inquiries of, and discussions with, airport management. We have not sought to verify the accuracy of the data or the information and explanations provided by management, or in the public domain.

If you would like to clarify any aspect of this review or discuss other related matters then please do not hesitate to contact us.

Yours faithfully

Partner

Contents

1. Executive Summary

1.1 Purpose of this Report

EY has been engaged by the Department for Transport (DfT) to undertake a review of strategies adopted by international airports to mitigate the impact of airports on residents.

1.2 Comparator airports considered

The following airports were considered as being particularly relevant in establishing a world class approach to noise mitigation and compensation

- Frankfurt am Main (Frankfurt, Germany)
- O'Hare International Airport (Chicago, USA)
- Paris Charles de Gaulle Airport (Paris, France)
- Amsterdam Airport Schiphol (Amsterdam, the Netherlands)
- Sydney Airport (Sydney, Australia)
- Suvarnabhumi Airport (Bangkok, Thailand)

1.3 Key Findings

International airports have consistently drawn from a menu of options to mitigate the impacts of the airport on local residents. Options are necessarily tailored to the specific circumstances of the airport and surrounding communities and are influenced by ownership structures, legal and political frameworks and the location of the airport in relation to private housing. The combination of compensation and mitigation volunteered by HAL and GAL, and the recommendations from the Airports Commission are consistent with the best practice identified through this study. This study has not identified any items from the menu of options used at airports within this study that has not been considered as a part of the package of mitigations proposed by the Airports Commission.

1.3.1 Approach to Noise Insulation

The scope of insulation works offered by both Heathrow Airport Limited (HAL) and Gatwick Airport Limited (GAL) to noise affected residents are comparable to offers made in other countries. The costs expected to be incurred per property for insulation works is in general terms lower than international comparators; however those comparators are themselves highly variable. This reflects the impact of local markets, and in particular the physical structures of properties and the additional works required to provide additional ventilation.

1.3.2 Approach to Financial Compensation

Each of the comparator airports has undertaken some residential property purchase so that residents could move away from the most noise affected areas. HAL and GAL have set out proposals to voluntarily purchase qualifying properties on the basis of the unimpaired market value plus, in the case of HAL, a 25% premium. This offer is substantially more generous that comparator airports where the most common valuation approaches were market value plus relevant costs.

1.3.3 Community Engagement Strategies

Each of the airports we have consulted highlighted the importance of effective community engagement. This is particularly important where works are expected to be carried out within residences where occupier goodwill is important to effective delivery of an expansion project. The Airport Commission's recommendation that an independent engagement body should be established is consistent with best practice across the world; however the precise nature of the body must be tailored to the particular circumstances of the UK.

1.3.4 Noise Reduction through Aircraft Operations

Each of the comparator airports had put in place a range of operating procedures that were designed to reduce the noise generated by aircraft on departure or approach. The recommendation of the Airport Commission that night time flights be suspended at HAL was only replicated at Frankfurt and in Sydney (with some exceptions) where flights are prohibited, except where safety is in question, from 11pm, into the early morning. On this basis, if a night time flight ban is imposed then this would be a world leading approach to mitigating aircraft noise. The recommendations of the Airports Commission for periods of respite and a noise envelope are consistent with the approaches taken at the airports within this study

2. Scope of the Review

2.1 Purpose of the Review

The Airport's Commission Final Report[1] published in July 2015 recommended that the compensation and mitigation package to be provided as part of expanding airport capacity at Heathrow airport should be 'world class'. The UK Government wanted to understand what a 'world class' compensation package was and whether the packages on offer by Heathrow Airport Limited (HAL) and Gatwick Airport Limited (GAL) could be considered as such. EY was engaged by the UK Department of Transport (DfT) to prepare a report on the approaches taken by other international airports in addressing the local impacts of the airport.

2.2 Approach

In partnership with the DfT, six international airports were selected for a case study. All of these airports were located in different countries, had undertaken expansion projects and had compensation and mitigation packages available to residents affected by the airport's operations. Research was undertaken on each of the airports to understand their expansion history, mitigation with respect to noise and types of compensation available.

The operators of the airports were then individually approached to participate in a survey regarding their airport. A uniform script was prepared and provided to each of the operators in advance and is available in the Appendix H. Communication, including a short telephone interview, was conducted with Schiphol, Frankfurt, Sydney and O'Hare airports to confirm our understanding of their compensation measures and provide additional insight. Operators were not requested to provide commercial in confidence or non-public information.

The results of the survey were then compiled into the individual summaries provided in this report. We also consulted various reports such as the Airports Commission Final Report and submissions provided by HAL and GAL to understand what was being offered in respect of compensation. We then noted the components of other airport's packages and compared this to what was being requested by the commission and on offer by Heathrow and Gatwick. Due to the limitations discussed below, direct comparisons were not always possible.

2.3 Selection of Comparator Airports

As discussed above, the six airports chosen were located in different countries, had undertaken expansion projects and made compensation available to residents affected by aircraft noise. To understand what is considered 'world class' we needed to understand what has been done to address aircraft noise not only within continental Europe, but also in other parts of the world. Three European and three international airports were selected:

- Frankfurt am Main (Frankfurt, Germany)
- O'Hare International Airport (Chicago, USA)
- Paris Charles de Gaulle Airport (Paris, France)
- Amsterdam Airport Schiphol (Amsterdam, the Netherlands)
- Sydney Airport (Sydney, Australia)
- Suvarnabhumi Airport (Bangkok, Thailand)

These airports are the largest airports in terms of passenger numbers in their countries and had to address community concerns on airport impacts in steady state operations and during

[1] Airports Commission: Final Report, Airports Commission, July 2015, https://www.gov.uk/government/organisations/airports-commission

periods of expansion. Some of the airports had recently undertaken expansion projects, e.g., Frankfurt or are faced with addressing these issues in the near future with new capacity projects planned, e.g., O'Hare. Other airports undertook expansion projects some years ago but still provide informative case studies into addressing noise impacts, e.g., Sydney. The purpose of the case studies is not to rank or assess the measures provided each airport; the purpose was to understand what has been offered around the world and therefore the components of what is required to be considered 'world class'.

2.4 Noise Measures Applied in this Review

The approach adopted by authorities to measure the impact of noise and consequently to identify the populations impacted by noise, vary between jurisdictions and over time. In this report the airports have applied the following measuring and reporting conventions.

Lden

This is now the standard measurement unit in the European Union. In particular the 55dBLden measure is the EU threshold above which populations are considered to be adversely impacted by noise. It is defined as:

A-weighted, Leq. noise level*:, Measured over the 24 hour period, with a 10 dB penalty added to the levels between 23.00 and 07.00 hours and a 5 dB penalty added to the levels between 19.00 and 23.00 hours to reflect people's extra sensitivity to noise during the night and the evening*[2]

Leq

Leq is the average decibel (dB) value measured over a defined time period. In the case of UK standards, the time period is 16 hours. The UK adopts 57dBLeq 16 as the threshold for the onset of significant community annoyance.

Ke

Ke was a measure of noise impact used in the Netherlands prior to their adoption of the Lden measure. It is calculated with reference to the noise of aircraft, the number of movements over time and the timing of take-off and landings. While not a direct correlation, 35Ke is broadly equivalent to 58Lden.

ANEF/I (Australian Noise Exposure Forecast/Index)

The ANEF is the measure used to forecast noise impact in Australia. It is based on a combination of noise levels and perception surveys. It is broadly equivalent to the Leq 35; therefore the 20 ANEF contour is equivalent to the 55Leq.

DNL

O'Hare airport uses the DNL measure which, similar to Lden is a measure of noise over a 24 hour period, with additional weighting given to night time noise.

2.5 Limitations of the Review

Each airport is unique in a range of factors including its location, size and approach to noise measurement. In preparing this report, we have assessed the compensation packages and measures from the point of view of the local communities, i.e., focusing on what is made available to them rather than the economic or legal context for doing so.

Each airport studied is located in a country with its own system of government, legal frameworks, airport ownership structure and cultural tradition, each influencing the approach to airport operation and expansion. We have not studied the individual countries' legislation to determine the legal rationale for providing the types and amounts of mitigation and

[2] Acoustic Glossary – Frequency Weighted Sound Levels: Definitions, Terms, Units, Measurements, Gracey and Associates, http://www.acoustic-glossary.co.uk/frequency-weighting.htm

compensation to residents impacted by the airport. We have noted various pieces of legislation that have been issued in relation to new runways opening, however this should not be viewed as all encompassing.

Each airport studied has a different ownership structure and is funded from different sources. For example Sydney Airport is a privatised listed company, while O'Hare is fully owned by the City of Chicago. The airports we studied in Europe tended to be public listed companies yet the government retain a majority ownership stake. For this reason, we have not attempted to compare the airports on the basis of whether the funding for compensation or mitigation packages are provided by the airport operators or government sources; instead we have focused on what was made available to the impacted population.

Furthermore, each airport will have a differing impact on its communities depending on its location with respect to populated areas. Some airports are located within heavily built up areas such as Sydney or are located further out of the city such as O'Hare. Furthermore, countries adopt different approaches to measuring noise. While European countries use Lden as the standard measurement other countries use their own measurement units such as Australia ANEF. These units are not necessarily equivalents or can be easily converted for comparison.

In our quantitative data analysis, we have compared the compensation packages based on the amount spent annually per passenger across all airports but we have confined comparisons on the amount spent per resident to the European airports included in the study using the 55 LDEN metric[3]. This information was provided by the CAA and only in reference to European airports. The timing of the compensation packages varied between airports, however it tended to be spent in both discrete periods or on a longer term basis. The amounts expended have been indexed using each country's historical average CPI rates. The midpoint of the expenditure period was used as the base year to apply inflation and index into 2016 in the local currency. Using a March 2016 exchange rate, these amounts were converted into the local currency of GBP.

The data differs to the CAA analysis for a variety of reasons including differing exchange rates, inflation periods and data sources

[3] CAA Analysis within the Airports Commission: Final Report, Table 14.3 Comparison of historic airport spend on compensation and noise mitigation as part of airport expansion with Heathrow Airport Ltd (HAL) proposals, Airports Commission, July 2015, https://www.gov.uk/government/organisations/airports-commission

3. Summary of Comparator Airports

3.1 Frankfurt am Main – Frankfurt, Germany

3.1.1 Airport Summary

Frankfurt am Main airport (Frankfurt) in Germany is the primary airport serving the Frankfurt region and is the fourth busiest airport in Europe. The airport is located approximately 11km from downtown Frankfurt and surrounded by the Frankfurt City Forrest and residential suburbs. Its facilities include four runways, with the most recent runway opening in 2011. In 2015, the airport handled 61.0 million passengers.

The opening of the new runway in 2011 increased capacity by approximately 40% and coincided with new noise regulations. Despite the additional noise regulations, noise from the airport continues to be protested against. In 2007 an initial package of 7 noise abatement measures were agreed with Fraport, the German State of Hesse and the Regional Dialogue Forum[4].

In 2012, the Alliance for More Noise Abatement identified a further 19 noise abatement measures that have been placed in operation, in trial phase or currently under development. The Alliance for More Noise Abatement 2012 represents the State of Hesse, the Regional Airport Forum and representatives of the airlines and air traffic control.

3.1.2 Noise Compensation Measures

Frankfurt has an extensive array of measures operating during the day and night designed to reduce in the impact of aircraft noise. The following operational measures apply:

- Preferential runways for landings and departures, also dictated by the aircraft's noise certificate
- Limitation on reverse thrust
- Restrictions on engine tests, run-ups and extensive maintenance
- Increased ILS[5] glide slope of 3.2 degrees

Specifically, in the evening period:

- All flights banned between 11pm to 5am
- Capped number of flights in the evening shoulder periods
- Restrictions on when noisy aircraft can fly
- Seven hour respite periods currently being tested
- Use of Continuous Descent Approach

These measures are supported by a noise insulation program and the Casa Program – a voluntary program for the acquisition or compensation of noise affected properties. The Casa Program was expanded under the Alliance for More Noise Abatement in 2012 and the deadline extended to October 2014. Homes in the day and night protection zones as defined by the Aircraft Noise Abatement Act were eligible for passive noise abatement measures. The day protection zone 1 is statutorily defined as 60dB LAeq Day and the night protection zone

[4] The Regional Dialogue Forum 2000-2008 – 33 members including representatives of towns and cities, NGOs, industry, airport, airlines and air traffic control, churches, unions

[5] ILS refers to Instrument Landing System; an internationally normalized system for navigation of aircrafts upon the final approach for landing, providing the horizontal as well as the vertical guidance necessary for an accurate landing approach. Source: Instrument Landing System, Sulovsky, A, 2016, http://instrument.landingsystem.com/

as 50dB LAeq Night At the end of 2014, there were over 75,000 people living in the night protection zone.

The Casa Program covered areas under low altitude flight paths. Depending on location, you were offered acquisition at market value or compensation based on a value per square unit. Approximately 266 compensation payments were made and 250 properties acquired

3.1.3 Expenditure on Compensation Measures

The sound insulation program began in 2001 and approximately €420mn in funding is available. €270mn is provided by the Regional Fund and €150mn is provided by the airport, funded through noise charges levied. These charges include

- Noise abatement charge with a fixed and variable component. The variable component is based on noise category with a surcharge for movements at night

Funding available under the Casa Program was increased from €70m to EUR100m in 2012 and expanded to a wider area. For modelling accuracy, we have focused on the increased commitment of the program. The figures below have been indexed to 2016.

Program	Expenditure in local currency	Expenditure in GBP (XR 1GBP = 1.25EUR)
Insulation	€468m	£374m
Casa Ext'	€31m	£25m
Total	**€498m**	**£399m**
	Program began	**Program ended**
Insulation	2001	Ongoing
Casa Ext'	2012	2014
	Period of Program	**Passenger numbers at end of period**
Insulation	15 years+	61m (2015)
Casa Ext'	2 years	60m (2014)
	Population within the 55db Lden Contour	
	238,700	
	Annual Spend per Passenger	**Annual Spend per Passenger in Contour**
Insulation	GBP 0.41	GBP104.48
Casa Ext'	GBP 0.21	GBP51.65
Total	**GBP 0.62**	**GBP 156.13**

We have not quantified the impact of other operational noise abatement measures in place at the airport. Additional charges related to noise, however not used to specifically fund noise mitigation measures include:

- Noise charge as part of take-off and landing charges, which is based on noise category and time of day/night. Marginally compliant aircraft with respect to ICAO standards receive an additional surcharge, while quieter aircraft receive a discount

- Airlines are eligible for a partial refund on their fees under an incentive program whereby growth in passenger numbers is achieved with quieter aircraft.

3.2 O'Hare International Airport – Chicago, USA

3.2.1 Airport Summary

O'Hare International airport (O'Hare) in Chicago, USA is the primary airport serving the Chicago region and the fourth busiest airport in the world in terms of passenger numbers. The airport is located approximately 30km northeast from downtown Chicago and surrounded

by suburbs on all sides. Its facilities include eight runways, with the most recent runways opening in 2008 and 2013. In 2015, the airport handled 76.95 million passengers.

In 2001, the Mayor announced the O'Hare Modernisation Program, which would reconfigure the airfield into a parallel east-west runway layout and increases the airport's safety and capacity. The shift from diagonal to an east-west runway configuration has seen a surge in noise complaints, in particular with the opening of the new runway in October 2013. The City of Chicago Department of Aviation (airport owner and operator) has traditionally addressed aircraft noise through the formation of the O'Hare Noise Compatibility Commission and the voluntary 'Fly Quiet' program operational procedures.

More recently in February 2016, the Department of Aviation announced it had reached agreement with the major airlines to build a new runway, due for completion in 2020. This new runway would complete the modernisation program and see the decommissioning of an existing runway. Details of any planned compensation measures have not been released, however the Department of Aviation in conjunction with the O'Hare Noise Compatibility Commission, are currently reviewing changes to the Fly Quiet Program.

3.2.2 Noise Compensation Measures

Since 1997, the airlines have voluntary adopted the recommendations of the Fly Quiet Program. The program is a set of operational procedures to be followed between 10pm and 7am and include the following recommendations:

- Preferential runway combinations for arrivals and departures
- Recommended flights paths and use of runways to limit noise on surrounding communities
- Quiet climb configuration until 3000 feet and requirement to maintain 4000 feet until turning on final approach
- Engine tests to take place in the purpose built Ground Run Up Enclosure

The key component of noise compensation measures is the Residential Sound Insulation Program and the School Sound Insulation Program. Residential properties and schools identified in noise contour of the O'Hare Modernisation Program Environmental Impact Statement were eligible. To date 10,922 homes have been insulated and all 124 eligible schools have received funding for insulation measures.

3.2.3 Expenditure on Compensation Measures

The Residential Sound Insulation Program began in September 2005 and will conclude by the completion of the O'Hare Modernisation Program expected to be in 2020. Approximately $200mn has been spent on the program to date.

The School Sound Insulation Program began in 1982 and 123 of 124 eligible schools has been insulated with the remaining school in process. Approximately $350mn has been spent on the program to date.

The program is funded 80% by the US Federal Aviation Administration and 20% by airport revenues. The figures below have been indexed to 2016.

Program	Expenditure in local currency	Expenditure in £ (XR 1GBP = 1.43$)
Residential	$222mn	£155mn
School	$511mn	£357mn
Total	**$732mn**	**£512mn**
	Program began	**Program spending to date**

Program	Expenditure in local currency	Expenditure in £ (XR 1GBP = 1.43$)
Residential	2005	Ongoing – due 2020
School	1982	Ongoing
	Period of Program	**Passenger numbers in year 2015**
Residential	10 years	77mn
School	33 years	77mn
	Annual Spend per Passenger	
Residential	GBP 0.20	
School	GBP 0.14	
Total	**0.34**	

We have not quantified the impact of other operational noise abatement measures in place at the airport.

3.3 Paris Charles de Gaulle – Paris, France

3.3.1 Airport Summary

Paris Charles de Gaulle airport (Charles de Gaulle) in France is one of two international airports serving the Paris region, however the largest in terms of passenger numbers and the second busiest airport in Europe. The airport is located approximately 26km from central Paris and is surrounded by predominately agricultural land, with some populated areas. Its facilities include four runways, with the most recent runways opening in 1998 and 2000. In 2015, the airport handled 65.8 million passengers.

Various authorities and measures are in place to monitor noise impacts. The ACNUSA (Autorité de Contrôle des Nuisances Aéroportuaires) is a national body and was created in 1999 following the opening of the third runway. The Authority's purpose is to develop economic activity and employment generated by aviation, while balancing the environment of the local residents. In 2003, the government implemented the IGMP 'Indicateur Global Mesuré Pondéré'), the Measured and Weighted Noise Indicator. This is a regulatory noise cap ensuring noise levels can't exceed average noise levels recorded between 1999 and 2001.

3.3.2 Noise Compensation Measures

The airport has a range of noise abatement procedures in place. These include:

- Preferential runways for take-offs and landings
- Procedures for take-off and initial climb
- Restriction on engine trials in the evening
- Restriction on the use and time noisy aircraft can operate
- Use of Continuous Descent Approach in the evening
- Capped number of evening flights
- Requirement for a slot to take-off/depart in the evening

Residents around the airport are also offered financial grants to soundproof their homes. The Noise Disturbance Plan map of their airport determines which residents are eligible for aid. Since 1995, 15,537 homes and 69 public buildings have received insulation.

3.3.3 Expenditure on Compensation Measures

The sound insulation program began in 1995 and is ongoing. The French Civil Aviation Authority provides funding to the program through applying a noise pollution tax reflecting the aircraft's departure time and acoustic group. Landing fees are also adjusted based on the aircraft's acoustic group and time of movement

We have modelled the most recently available data of 8 years between 2007 and 2014, where €203mn was spent on the sound insulation program. Figures below have been indexed to 2016.

Expenditure in local currency	Expenditure in GBP (XR 1GBP = 1.25EUR)
€214mn	£171mn
Program data start date	**Program data end date**
2007	2014
Period of Program Data	**Passenger numbers in year 2014**
8 years	64mn
Population within the 55dB Lden Contour	
171,300	
Annual Spend per Passenger	**Annual Spend per Resident in Contour**
GBP 0.34	GBP 125.14

We have not quantified the impact of other operational noise abatement measures in place at the airport.

3.4 Schiphol – Amsterdam, the Netherlands

3.4.1 Airport Summary

Amsterdam Airport Schiphol (Schiphol) in Amsterdam, the Netherlands is the primary airport serving Amsterdam and the Netherlands. The airport is located approximately 16km northeast from central Amsterdam and surrounded by suburbs and pastoral land with the ocean to the west. Its facilities include five runways, with the most recent runways opening in 2003. In 2015, the airport handled 58.2 million passengers.

To coincide with the opening of the new runway, new noise and environmental restrictions for the operation of Schiphol were introduced in the Aviation Act. The Act came into effect in 2003 and was followed by the Airport Traffic Decree and Airport Planning Decree, stipulating limits for noise pollution, maximum noise volume and land use surrounding the airport. In 2009, the Alders Platform (a consultative advisory body) also recommended a cap on the number of flights until 2020.

3.4.2 Noise Compensation Measures

Schiphol has a range of operational procedures and legislative restrictions governing aircraft noise:

- Maximum celling of overall aircraft movements per year and in the night until 2020
- Slots allocated for all departures and arrivals
- Use of continuous descent approach in the evening
- Preferential runways to reduce noise impact
- Maximum annual noise level requiring shift to other runways
- Restrictions on when 'noisy aircraft' can operate

These measures are in addition to a noise insulation program and a property acquisition and demolition program. Sound insulation has been available for eligible buildings since 1984 and been provided to over 13,297 homes. With the introduction of new noise limits in 2003, 125 houses and 32 other buildings were acquired and demolished for noise and safety reasons.

3.4.3 Expenditure on Compensation Measures

The sound insulation program has taken place over three phases and cost approximately €805mn since the program began in 1984. The demolition and acquisition program took place between 2003 and 2005 and cost €63mn. An additional demolition and acquisition program took place between 2008 and 2015 for residents living just outside the contours that were not eligible for the main program and cost €30mn

The programs have been historically funded by a Government Planning Compensation Levy, an Airport Noise Insulation Levy and take-off/landing charges that were adjusted for noise category and time of arrival/departure.

The figures below have been indexed to 2016.

Program	Expenditure in local currency	Expenditure in GBP (XR 1GBP = 1.25€)
Noise Insulation (Phase 1-3)	€805mn	£644mn
Demolition and Acquisition – Main	€76mn	£61mn
Demolition and Acquisition – Ex Contour	**€32mn**	**£26mn**
Total	**€813mn**	**£730mn**
	Program began	**Program ended**
Phase 1	1984	1997
Phase 2	1997	2005
Phase 3	2005	Ongoing
Demolition and Acquisition – Main	2003	2005
Demolition and Acquisition – Ex Contour	**2008**	**2015**
	Period of Program	**Total Spending Period**
Phase 1	13 years	31 years
Phase 2	8 years	
Phase 3	10 years	Passenger Numbers at End of Spending Period
Demolition and Acquisition – Main	2 years	58mn
Demolition and Acquisition – Ex Contour	7 years	
	Annual Spend per Passenger	**Annual Spend per Resident in Contour**
Average	**GBP 0.41**	**GBP 539**

We have not quantified the impact of other operational noise abatement measures in place at the airport.

3.5 Sydney Airport – Sydney, Australia

3.5.1 Airport Summary

Sydney Airport (Sydney) in Australia is the only commercial domestic and international passenger airport serving the Sydney region. The airport is located 12.5km away from downtown Sydney and surrounded on three sides by suburbs and a bay on the fourth side. Its facilities include three runways, with the third runway opening in 1994. In 2015 the airport handled 39.7 million passengers

The opening of the runway was heavily criticised for the additional noise it created over residential areas and the communication of the expected impacts in the runway's Environmental Impact Statement. In response the Government introduced several key pieces of legislation to balance the impact of aircraft noise with the efficient operation of the airport. These legislative measures along with the airport's Long Term Operating Plan were also designed to share the aircraft noise across the community rather than it being concentrated under the same flight paths. These measures are discussed in the following sections and are a key reason for including this airport in this report.

Following decades of indecision on addressing future airport capacity constraints, the Government has elected to build a second airport for the Sydney region 'Western Sydney Airport'. The Government has nominated a site for the new airport approximately 50km to the west of the current airport and downtown Sydney and commenced development negotiations. We have not included any compensation measures planned for noise impacts from the new airport, as the airport is still in planning stages and is located in a rural area.

3.5.2 Noise Compensation Measures

Following the opening of the runway, various operational measures were introduced to address aircraft noise. Key measures of the Sydney Airport Curfew Act 1995, Sydney Airport Demand Management Act 1997

- Cap of 80 runway movements per hour and requirement for an allocated slot for take-off and landing
- Noise sharing targets for the areas surrounding the airport
- Directing as many flights as possible over water and non-residential areas
- Rotating preferential runways to enable respite periods
- Ban on night flights between 11pm and 6am with the exception of freight operators, which receive a quota and a maximum of 24 international passenger landings each week between 5am and 6am.
- Restrictions on when 'noisy' aircraft can operate

Under the Sydney Airport Noise Amelioration Program, residential properties were voluntary acquired or offered financial assistance for sound insulation measures depending on the application of the noise contour, which was reviewed annually. Public buildings such as schools, hospitals and churches also received sound insulation. 4,083 homes and 99 public buildings were insulated, and 147 residences were voluntary acquired.

3.5.3 Expenditure on Compensation Measures

The sound insulation and acquisition program began in November 1994 and concluded in – mid 2004. Approximately AUD 408mn were spent on the program. The sound insulation and acquisition program was fully funded by a noise levy on all landings under the Aircraft Noise Levy Act 1995. The figures below have been indexed to 2016.

Nominal Expenditure in local currency	Expenditure in GBP (XR 1GBP = 1.87AUD)
AUD 654mn	£350mn
Program began	**Program ended**
End of 1994	Mid-2004
Period of Program	**Passenger numbers in year 2004**
10 years	28mn
Annual Spend per Passenger	
GBP 1.27	

We have not quantified the impact of other operational noise abatement measures in place at the airport.

3.6 Suvarnabhumi Airport, Bangkok

3.6.1 Airport Summary

Suvarnabhumi Airport (Suvarnabhumi) in Bangkok, Thailand is the primary airport serving the Bangkok region. The airport opened in 2006 and took the majority of traffic from the existing Don Muenag Airport. The airport is located approximately 30km east from downtown Bangkok and surrounded by pastoral land, villages and suburbs. Its facilities include the original two runways, with a third runway in the assessment stage.

In FY 2015, the airport handled 52 million passengers and 800 flights per day, far exceeding the intended capacity of 45 million passengers and 600 flights per day. Various expansion projects are being planned including a new domestic and satellite terminal, expansion of the current terminal and a third runway. These projects when complete in 2020 would increase capacity to 85 million passengers.

3.6.2 Noise Compensation Measures

The airport has historically been run to maximise the highest rate of arrivals and departures and has limited operational measures designed to reduce noise impact. Previous requests to institute a limit on night flights were rejected on the basis of economic impact. The measures noted are:

- Departure and arrival procedures requiring acceleration to 3000 feet and reduced thrust
- Ban on certain noisy aircraft

As an ICAO Contracting State, the airport has banned aircraft exceeding 103 dB, however it is unknown whether the recommendation to ban Chapter 2 aircraft has been adopted as seen in continental Europe.

Residents impacted by noise were offered compensation for sound insulation measures or acquisition of their properties, based on the noise contours developed by the Pollution Control Department, Thailand. Initially the program was only to apply to properties prior to construction to 2001; however this was amended to include certain properties constructed prior to 2006. Since the airport opened up until August 2014, 14,916 households and 21 noise sensitive buildings (e.g., hospitals and religious buildings) had received compensation.

3.6.3 Expenditure on Compensation Measures

The total compensation available for the program was revised in response to protests and disputes with the affected residents. Initially THB 736 million was made available when the airport opened and was subsequently increased in 2009 to THB 11.2 billion. The government (also majority owner of the airport) is understood to have provided a level of funding.

From opening date up until August 2014, approximately THB 4,099 million had been paid in compensation, however this program is ongoing. The figures below have been indexed to 2016.

Expenditure in local currency	Expenditure in GBP (XR 1GBP = 50.3THB)
THB 4,667mn	£93mn
Program began	**Program data end date**
2006	2014
Period of Program	**Passenger numbers in year FY2014**
8 years	46 million
Annual spend per passenger	
GBP 0.25	

We have not quantified the impact of other operational noise abatement measures in place at the airport. Suvarnabhumi is currently in the early stages of planning an additional runway. The government has previously indicated THB 7,900mn/£157mn in compensation would be available; with an average of 85 million passengers expected by 2025 this would equate to a total of GBP 1.85 per passenger.

4. Noise Compensation Offered by Potential Expansion Airports

In July 2013, the Airports Commission received proposals from 52 interest parties regarding long term aviation capacity. The Airports Commission reviewed the proposals and published an interim report in December 2013. Of these proposals, two options for additional capacity at Heathrow Airport and one at Gatwick Airport were shortlisted by the commission as credible options. The two proposals at Heathrow were put forward by Heathrow Airport Limited (HAL) and Heathrow Hub Limited (HHL). The two proposals are quite different but for the purposes of this study we have assumed that the proposal from HHL would be taken forward by HAL and we therefore only set out the compensation and mitigation package proposed by HAL.

Revised proposals were submitted by scheme promoters to the Airports Commission in May 2014, including the compensation and mitigation packages offered by promoters. A further iteration of compensation packages took place before the conclusion of the Airports Commission's work. [6] In February 2015, Heathrow Airport Limited published on its website a revised proposal for noise mitigation in residences with an updated proposed insulation package. The main components of the packages are summarised below. The information below reflects the most recent public positions of each of the airports as of 31 March 2016.

4.1 Gatwick Airport Limited

Features of Gatwick Compensation Scheme[7]
Contribution to council tax of £1,000 (indexed) for residents within the 57 dBA Leq 16 hour noise contour
Minimise noisy ground operations – Explore the possibility of a ground run up pen
Maintain restrictions on the use of noisy aircraft
£131mn allocated to compulsory purchase (168 properties) at 25% above unblighted market price plus taxes and costs. Expansion of Home Owners Support Scheme to owners of properties newly impacted by noise. Eligible property owners may have their homes purchase at unblighted market value
Avoid overflying over densely populated areas and review flights path to minimise the impact of noise
Introducing night time preferential runways, allowing for respite periods
Noise insulation scheme to all properties in 60dB LAeq newly impacted by the runway
£46.5mn Community Infrastructure Fund to support housing growth at £5,000 per house.

4.2 Heathrow Airport Limited

Features of Heathrow Compensation Scheme[8]
Over £1bn allocated to noise insulation or compensation. Properties within the worst affected noise areas (the 69dBLeq) contour will continue to qualify for relocation assistance.
Steeper landing approaches and landing 700m further down the runway
Phasing out of the remaining noisiest aircraft (chapter 3) – already charge more for noisy aircraft to land, and less for quieter aircraft
£300mn allocated to compulsory purchase of 750 homes, 25% above unblighted market value plus legal fees and stamp duty costs on their new home. £250m allocated to voluntary purchase of 3,750 homes in 'Heathrow Villages'.

[6] Airports Commission: Final Report, Airports Commission, July 2015, https://www.gov.uk/government/organisations/airports-commission
[7] A Second Runway for Gatwick – Updated Scheme Design Submission, Gatwick, May 2014, http://www.gatwickairport.com/globalassets/publicationfiles/business_and_community/all_public_publications/second_runway/airports_commission/gatwick_sd4_mitigation_strategies_final.pdf
[8] Taking Britain Further – Heathrow's plan for connecting the UK to growth, Heathrow, May 2014, http://www.heathrow.com/file_source/Company/Static/PDF/Companynewsandinformation/taking_britain_further.pdf http://your.heathrow.com/newpropertycompensation/; http://your.heathrow.com/heathrow-unveils-new-world-class-insulation-scheme/

Redesigning arrival and departure flight paths to reduce impact of noise
No increase (or reduction in night flights). Rotation of runways at night would reduce night flights on existing flight paths and allow for respite periods
£700mn budget for insulating properties, which compares to £30mn over the past 20 years. In total Heathrow estimate that over 160,000 residences would be eligible for some form of support.
Residences would qualify for insulation works if they fell within the 55dBLden contour. Residences within the 60dBLeq contour would qualify for full noise insulation. Heathrow estimates that in 2011 there were 39,500 properties in this range. Other residences would be offered insulation up to a cap of £3,000
Works necessary for noise insulation would be established by independent survey paid for by the airport. The works are likely to include acoustic double glazing, insulation to bedroom ceilings and loft insulation and ventilation
Support only giving new capacity to airlines operating quieter aircraft
Contributions to programs for the community including, £60mn for Community Infrastructure Levy, £57mn for S106 payments and £40mn for schools and community building insulation
5000 new apprenticeships 2015-2030

4.3 Conclusions of the Airport Commission in relation to noise

In July 2015, the Commission published its final report and recommended Heathrow Airport as the site for an additional runway. As part of this report, the Commission recommended a series of measures to address the impact of a new runway on the local environment and communities.

Recommendations Made by the UK Airports Commission[9]

Following construction of a third runway at the airport there should be a ban on all scheduled night flights in the period 11:30pm to 6:00am. This is only possible with expansion.
A clear ‘noise envelope’ should be agreed and Heathrow Airport must be legally bound to stay within these limits. This could include stipulating no overall increase above current levels.
A third runway should allow periods of predictable respite to be more reliably maintained
Heathrow Airport Ltd should compensate those who would lose their homes at full market value plus an additional 25% and reasonable costs. It should make this offer available as soon as possible.
Heathrow Airport Ltd should be held to its commitment to spend more than £1 billion on community compensation. In addition, a new aviation noise charge or levy should be introduced to insure that airport users pay more to compensate local communities. Taken together these would fund enhanced noise insulation and other schemes. Support for schools should be included as a priority.
A Community Engagement Board should be established under an independent Chair, with real influence over spending on compensation and community support and over the airport’s operations.
An independent aviation noise authority should be established with a statutory right to be consulted on flight paths and other operating procedures
Training opportunities and apprenticeships for local people should be provided so that nearby communities benefit from jobs generated by the new infrastructure
A major shift in mode-share for those working at and arriving at the airport should be incentivised, through measures including new rail investments and a continuing focus on employee behaviour change. A congestion or access charge for motor vehicles should also be considered.
Additional operations at an expanded Heathrow must be contingent on acceptable performance on air quality. New capacity should only be released when it is clear that air quality at sites around the airport will not delay compliance with EU limits.
A fourth runway should be firmly ruled out. The government should make a commitment in Parliament not to expand the airport further. There is no sound operational or environmental case for a four runway Heathrow.

[9] Airports Commission: Final Report, the Airports Commission, July 2015, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf

1. Works necessary for noise insulation would be established by independent survey paid for by the airport.

2. The works are likely to include

    a. Acoustic double glazing

    b. Insulation to bedroom ceilings

    c. Loft insulation and ventilation

5. Comparison and Analysis

5.1 The Purpose of the Analysis

We have been asked by the DfT to examine the approach of airports comparable to Heathrow or Gatwick, to mitigating and compensating local communities for the impact of airport operations and expansion projects. In this report we have set out the approaches of the airports based on information available in the public domain and, where possible, through communication with appropriate personnel at the airports.

The actions and mechanisms employed by these comparator airports represents the components of mitigation and compensation packages deployed globally, and therefore provides a measure of what should be considered 'world class' in the context of mitigation and compensation for noise impacts on affected communities.

5.2 Main Elements of World Class Mitigation and Compensation Packages

5.2.1 Local Drivers of Mitigation and Compensation

Each of the airports studied have created compensation and mitigation packages that first and foremost have been developed for their own local circumstances. This includes circumstances such as:

Ownership of the airport

The sources of funds, the approach to community engagement and the bodies through which mitigation and compensation payments are made, differ across our sample of airports in line with the differing ownership models of the airports.

The O'Hare Noise Compatibility Commission (ONCC) in Chicago for example, is an inter-governmental body bringing together local and city representatives to engage with local communities. The programmes at O'Hare are largely funded by Federal resources which in turn, dictate factors such as spending limits and timing, key factors in ONCC's development of a remediation works programme. This reflects the publicly owned status of O'Hare.

Sydney Airport, on the other hand, is privately owned and much of the current mitigation measures undertaken are initiatives funded by the airport. However, the previous noise insulation programme at the airport was in fact a Government programme but funded through noise levies on airlines using Sydney Airport.

Therefore, the nature of the package can change depending upon the consequences of the package for the ultimate owners of the airport, or the legislative ownership environment in which it operates.

Previous approaches and experience in noise management and compensation

In our analysis there was a clear desire for airports and authorities to respond to the lessons learned from early noise and expansion schemes, both locally and across the world. This was particularly the case where the prevailing view was that previous measures had been inadequate or poorly implemented.

Frankfurt and Schiphol have both stated publically that their current approach has been directly influenced by the lessons of past schemes.

Local community preferences

All of the airports we discussed these issues with highlighted the need to structure the package to address local concerns rather than be comparable to generic packages elsewhere.

Frankfurt Airport for example put in place an extensive public engagement programme to ensure that locally affected communities could help shape the structure of the compensation and mitigation package and thereby enhance its acceptability to the relevant parties. Equally in the case of O'Hare, the local government representation in the ONCC strongly incentivised the group to respond to local preferences.

Claims management process

The mechanisms for processing claims for support or direct intervention by the appropriate authority (the airport or other agency), is to a degree driven by the scale of claims that are likely to be experienced. In the case of ONCC, there were potentially a large number of properties subject to works or claim and combined with an annual budget cycle, the creation of an efficient process of claim handling was essential to controlling the quality of works undertaken and costs of the claim handling process.

5.2.2 Elements Common to Approaches to Mitigation and Compensation

Our review has identified the following elements which are common to approaches adopted by the comparator airports and within which local variations have been accommodated.

In order for the UK capacity expansion compensation package to be considered 'world class', the package should arguably contain at least the elements discussed below, recognising that local priorities may affect their relative contribution.

Direct measures to mitigate noise within properties

All of the airports considered included measures whereby residents affected by aircraft noise could benefit from installation of noise mitigation measures within their properties. The approach of each airport to this element of mitigation and compensation is discussed in the following sections.

Financial compensation to residents

In this report we have drawn a distinction between measures mitigating noise in properties, and compensation provided to owners or residents for loss of utility of their properties.

Typically financial compensation is paid to affected residents as part of a home purchase scheme. This is distinct from the purchase of properties where land is purchased to allow physical expansion of the environs of the airport (compulsory purchase in the UK).

Where properties are purchased to enable expansion of the airport, the local legal mechanisms relating to compulsory purchase typically apply, and therefore, the compensation amount is directly related to the market value of the property (assuming no expansion were to occur).

Community engagement and public realm measures (including Air Quality)

These measures include actions undertaken by the airport or responsible noise body to engage with local communities. For example the establishment of public engagement bodies or committees is a common approach to engaging with the local community.

Also included within this category of measures, is expenditure on community and public realm assets that enhance the general utility of the area or address particular community concerns.

The last component of this measure is any actions related to enhancing air quality. Within the EU, it is a legal requirement of the airport to ensure that air quality standards are met.

Traffic management including airspace management

The final group of measures we identified were actions taken by or imposed upon the airport to limit noise through restrictions on air traffic. This includes limitations on the operating hours

of the airport, adjustments to existing flight paths and ground operation limitations. Each of these restrictions is described in more detail below.

5.2.3 Direct Measures to mitigate noise within properties (Insulation)

Each of the airports considered had mechanisms to support residents in the installation of noise mitigation measures within dwellings most impacted by aircraft noise.

The table below shows the total of these costs identified at each airport under review.

	O'Hare	Schiphol	Frankfurt	Sydney	Charles de Gaulle	Suvarnabhumi
Total Spend (£'mn)	512	644	374	350	171	93

The calculation of these values is set out in Appendix A-F. The drivers of these costs are set out below.

Areas impacted by noise and numbers of properties affected

There are numerous international standards for measuring the impact of noise on local populations and within the airports we have studied, these have changed over time. There are also significant differences in population density at the respective airports and as such, the scale of expenditure will also vary.

In the following cases, we have been able to establish the number of properties that have been subject to funded insulation measures and therefore can estimate the expenditure per property.

	O'Hare	Suvarnabhumi	Sydney
Insulation spend per property (£'000)	14	6	81

The result for Sydney is not directly comparable as it includes significant costs incurred on public buildings and other noise sensitive properties. It is also worth noting in the case of Sydney, a significant number of lightweight construction houses were present within the noise contours, which required substantial additional structural works to allow sufficient insulation.

In the final iteration of the Sydney scheme, the value of insulation costs for domestic properties were capped at A$60,000 (initially this was A$40,000). We do not have access to detailed expenditure by class of dwelling to disaggregate the total programme costs by property type. However, the final number of residences insulated was 4,083 and therefore if each property was subject to the maximum expenditure (A$60,000) then the total domestic expenditure would be in the region of $245mn, which compares to total real program estimate of A $408mn

Our review of insulation activity in Charles de Gaulle suggested that insulation works in 2004 were on average c€10,000 per property (£9,200 nominal), representing approximately 85% to 95% of the actual costs incurred.

For comparison to the UK Gatwick Airport currently caps expenditure on noise insulation to £3,000 per property.

Heathrow does not impose a cap but will currently fund up to 50% of glazing works and all loft insulation works. The revised proposals from Heathrow would on average lead to expenditure of £8,600 on the 56,000 worst affected properties. For the remaining 106,000 properties a financial contribution to works would be made, with an approximate spend per property of £2,200.

Flexibility in spending is inevitable. Although some of the airports in this study set aside a publicised amount of money for nose insulation, it has been an assessment of the needs of individual properties – the qualification criteria – usually determines the final cost.

Expenditure by population

An alternative approach to assessing expenditure is to consider the total expenditure per resident in the airport's chosen noise insulation area. This is an indirect measure as it is commonly recognised that noise impacts are not evenly distributed across areas in contours and that an individual's perception of impact may also differ.

	Sydney*	Schiphol	Charles de Gaulle	Frankfurt
Insulation spend per capita in 55 Lden Contour (£)	3,800	3,000	1,000	1,600

[1]Sydney is based upon the population within the 20 ANEI contour as this is the nearest equivalent contour to 55 Lden.

In comparison, if Heathrow's proposal of £700mn is applied to the 55Lden[10] population, the per capita spend would be c£1,091. The capita per spend would increase to £2,800 using the UK standard of 57 Leq due to the substantial reduction in population size in this contour.

5.2.4 Specification of Works

The review of expenditure in section 5.2.3 has highlighted the significant variation in the cost of insulation programmes across comparable airports. One of the main drivers may be the impact of local market prices, with cost alone a poor indicator of the comparability of insulation strategies adopted by airports.

In order to remove the impact of local market costs, we have considered the scope of works that airports have undertaken to insulate homes. This approach focuses upon the objective of insulation works rather than the input cost to the airport or public authority.

In determining the scope of works to be carried out, a number of choices and scoping strategies have been adopted by the airports as discussed below:

Sydney Airport

The scope of works available to residents included the following

- Air conditioning and or ventilation
- Blocking of external vents and openings
- External door seals and sound proofing (including glass sliding doors)
- Acoustic and thermal proofing of glazing
- Ceiling and roof noise insulation

The precise nature of the works was established by an independent 'scoper'. Works were sourced by the homeowner and completed by contractors based upon three quotes.

[10] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/439684/noise-local-assessment-compendium-of-ancon-modelling-results.pdf

O'Hare Airport

In the case of O'Hare the works include

- Windows
- External doors and seals
- Sliding Glass doors
- External vents

Comparability Criteria

In order to be considered comparable to packages of mitigation works supported at other global airports, the UK compensation package should contain at least the following measures

- A clear and transparent criteria for the degree to which noise impacts would trigger support
- A clear description of the works that the occupier should expect to benefit from and the degree of noise reduction those measures would achieve
- A programme of works that enables the most affected properties to be addressed first
- Application of higher levels of noise mitigation to be applied in properties with noise sensitive or vulnerable groups, e.g., schools, hospitals, older persons residences

In order to ensure that the noise mitigation works are delivered on a cost effective basis, two main options have been applied in the comparable airports. These are

- Works are coordinated by a separate body responsible for the management of claims and delivering the works, although this can be outsourced to contractors
- Systems that allow residents to choose from pre-approved contractors, working to defined specifications and with set schedules of rates. This work is subject to external scrutiny

While these measures are primarily aimed at ensuring value for money, they have the additional advantage of ensuring noise mitigation standards are achieved in a timely manner and facilitating access to assistance for residents. It was also noted by surveyed airports that these approaches were a good way of engaging residents and reducing resistance to the works process, and thereby aiding the successful delivery of the insulation programme.

All of the insulation schemes we have examined have been carried out over a number of years. This has been particularly the case where public funds have been used to fund the insulation costs. In any event, where the insulation works programme is expected to be extensive, giving the worst affected occupiers confidence they will be addressed first is an important part of building positive stakeholder relationships.

Funding of Insulation Works

The way in which costs of these direct measures was funded fell into two categories

a. Costs were incurred and paid for directly by the airport in question or related central government funds

b. Costs were incurred by the resident and reimbursed by the airport or central government funds

The use of central government funds is limited to cases where the airport is majority owned by public bodies.

5.2.5 Financial Compensation to Residents

In this report we have drawn a distinction between measures mitigating noise in properties and compensation provided to owners or residents for loss of utility in their properties. Typically financial compensation is paid to affected residents as part of a home purchase scheme. This is distinct from the purchase of properties where land is purchased to allow physical expansion of the environs of the airport (compulsory purchase in the UK). Where properties are purchased to enable the development of the airport, the local legal mechanisms relating to compulsory purchase typically apply, and therefore the compensation amount is directly related to the market value of the property (assuming no expansion were to occur).

In our review of the approach to mitigation and noise compensation, we have identified three airports where the airports have put in place voluntary schemes for property purchase to mitigate the noise impacts.

Frankfurt CASA Programme

In the case of Frankfurt, the purchase scheme was pursued through the CASA programme. Residents located within an area where the flight path was less than or equal to 350m above ground, were offered financial compensation or the purchase of their property. This height was chosen as it represented a threshold where aircraft noise and disruption was most significant to residents.

By October 2014, 247 compensation payments had been made and 245 properties had been purchased. At that time a further 156 applications for compensation had been made by residents and 188 additional applications for purchase were under consideration.

This voluntary programme costs cEUR100m. Properties purchased by this scheme are managed by a subsidiary of Fraport and will be either sold on or let to tenants for market rents.

O'Hare

A similar scheme has been deployed in O'Hare where properties have been purchased at market value. In the case of O'Hare, residents qualified for an additional package of assistance from the Federal Relocation Programme enabling them to benefit from measures such as relocation consultancy and moving costs. The Federal regulations require purchasers to make an offer to the owner which is 'just' and not less than an independent view of unblighted market value. We have not been able to identify whether the 'just' offer represents any average premium to market value. We note however that the market value informing the basis of the offer had been established before the changes in the housing market from 2008 onwards.

Schiphol

Schiphol was the only other airport we found in our study to have had an extensive property purchase and demolition programme. This was driven largely by the view that properties in the highest noise affected zones should be limited to industrial and commercial use. Between 2003 and 2005 the airport purchased 43 domestic properties and 11 other buildings within the 65Ke and 71dB (A) contours. This programme cost €22.8m (real) and the properties were scheduled for demolition. The purchase price was based upon market value (unimpaired) plus costs to move.

5.2.6 Community Engagement and Public Realm Expenditure

The following airports have put in place independent organisations to manage engagement with the community and manage delivery of mitigation and support packages.

O'Hare

The O'Hare Noise Compatibility Commission is a public body which is independent of the airport and responsible for reducing the impact of noise in communities surrounding the airport. Its members are drawn from elected representatives of local government including city, county and town authorities. Amongst other responsibilities of the body is management of the mitigation programme across communities.

Schiphol

Since 2015, environmental and development issues impacting the regions surrounding Schiphol are considered by the Environment Council Schiphol. The ECS was created by the merger of the Alders Platform and the Regional Consultation Committee Schiphol Airport.

The ECS consists of two elements. The first of these is the Regional Forum which brings together communities, residents and the aviation industry. The second is the Advisory Board which advises the Ministry of Infrastructure and Environment on issues of policy as they relate to Schiphol.

Both parts of the ECS work under a single President.

The Regional Forum is the part of the ECS most relevant to the expansion of capacity in the UK as it relates to community engagement. The RF consists of

- Reps from Regional Government
- Nine reps from municipalities within the 48 dB(A) Lden
- 10 resident reps form areas within the 48 dB(A) Lden
- A Ministry of Environment representative
- Airline representatives
- A local business representative
- A rep from an environmental NGO

The RF reflects all of the potential interests in the area, and is essentially an extension of the previously constituted Alders Platform. This has been highlighted by other consultee airports as a market leading community engagement mechanism.

Frankfurt

The construction of Frankfurt's West Runway in the 1980s created exceptionally difficult relationships between Fraport and elements of the local community. This resulted in large scale protests and disruption.

In planning the further development of the airport, the Prime Minister of the Hessian region was expressly concerned with vastly improving community and airport relations. This resulted in a three stage process of engagement namely

- A mediation stage where key issues and concerns were addressed and outline solutions identified;
- The creation of a Regional Dialogue forum where the detail of solutions and impacts were brokered; and
- The creation of the Forum Airport and Region (FFR) being the ongoing monitoring and engagement body.

The mediation process was facilitated by three mediators. It included representatives of

- Town and cities;
- NGOs;
- Local business;
- Lufthansa and Board of Airlines; and
- Hessian State officials.

The mediation process took three years to complete. Amongst its recommendations was the creation of a Regional Dialogue forum to ensure ongoing engagement with stakeholders would occur. Ultimately this led to the creation of the Forum Airport and Region (FFR).

The FFR has three directors being

- 1 independent representative
- 1 aviation industry representative
- 1 towns and city representative

The decision making body (Steering committee) draws from the Directors, Hessian State Chancellery and Transport department and experts. Its primary functions are to provide independent data and analysis to the public.

Role of Planning and Approval Authorities

Our analysis has highlighted the need to ensure that the locally affected population is consulted at the time of expansion and throughout the operation of the airport. It should be noted however, the consultative bodies identified in other countries can only recommend changes to the legally responsible bodies in those countries. For example, the consultative bodies do not themselves have planning powers or the ability to change airspace structures.

They do however retain significant role in influencing the decision making authorities. This is particularly the case where, for example in Frankfurt, bodies of State are represented.

The surveyed airports highlighted the importance of these bodies in ensuring clear and effective communication between the airport and communities. In particular, the ability of airports to target measures at priority issues for communities and thereby increase the effectiveness of interventions was seen as an important part of building effective relationships.

The approach adopted in Frankfurt can be seen as mapping to the planning and consenting processes in the UK, in so far as the period through the development of airport proposals and the drafting of the NPS, enables formal and informal consultation to take place. Following the DCO process, formal engagement and monitoring could be undertaken by a body similar to the FFR.

Public Realm Expenditure

As part of a more in depth community engagement process, we identified expenditure, particularly at Schiphol, where the airport has funded public realm works. These projects are typically developed with local communities for local amenity spaces such as parks.

Schiphol currently budgets for c€1m for cultural and community programmes and has a small scale community scheme aimed at projects less than €100k. The Airport Commission scheme of £50m per annum is therefore substantially greater than this level of spend at Schiphol, which is currently seen as a market leader in this field.

5.2.7 Traffic Management including Airspace Management

In addition to measures to mitigate noise impacts within properties and residences, comparator airports have put in place measures to reduce the noise generated by aircraft movements.

There are a number of measures used by comparator airports including

- Night time and other scheduling of runway operations to remove concentrations of noise over particular areas or at particular times
- Changes or restrictions to on-field aircraft operations including engine trials and taxiing procedures
- Adaptations to descent and approach procedures

Night Time and other restrictions

The airports recognised that noise impacts at night are particularly troubling for local populations and have put in place measures to address this. The comparator airports can be split into two categories:

1. Airports with bans on flights in night time hours
2. Airports applying additional limits to, but not bans, on night flying

The airports which have put in place complete limits on night time flying include

- Sydney – no flights scheduled between 23:00 and 06:00 except freight flights and up to 24 international flights a week
- Frankfurt – no flights between 23:00 and 05:00 and set limits for evening shoulder periods

The remaining airports have put in place measures to constrain the number of flights and aircraft that may operate at night. For example

- Paris Charles de Gaulle – Limited to 55 flights per night
- Schiphol – Limit of 32,000 flights per annum and a total noise limit applied over a year
- O'Hare – There is no night flight limitation; however proposed changes to the Fly Quiet procedures include rotating runway used in night hours to allow respite periods.

The impact of night time bans were identified by all the airports we contacted as being potentially very significant. One operator of a major airport indicated that in their view such a ban was inconsistent with the operation of a major international hub. This was particularly the case, where such a ban would severely impact flights from major markets where either arrivals or departures might be mis-aligned due to time zone differences.

Other Constraints on aircraft movement numbers

In addition to the constraints on night flights, several airports operate under additional restrictions on aircraft movements.

Details of each airports approach to operating procedures to limit noise impacts are contained in the appendices. Typically the measures take the form of

- Limiting the number of flights either per hour of per day

- Restricting the use of noisier aircraft through either charge incentives or operating restrictions
- Managing flight paths away from populations
- Rotating runway use so as to spread noise patterns across wider areas
- Restrictions on ground handling procedures such as engine run-ups, use of reverse thrust and ground power units.

Descent and Departure Adaptations

A common measure put in place to moderate the impact of noise on surrounding communities is the adaptations of descent and departure paths. Fraport for example has extensive measures in place and under development to moderate the noise impact of arrivals and departures. These include

- Limiting take off speed
- More frequent continuous descent operations
- Increasing the glide angle
- Raising the minimum downwind approach altitude
- Raising the final approach height

Measures currently under development include

- Continuous climb operations
- Increasing ILS
- Steeper approach procedures
- Amending the point merge procedures.

Ultimately in the UK the structure and operation of local airspace will be a matter for the airport and regulatory authorities to agree however, the extensive list above shows the types of measures that might be deployed.

6. Conclusions on 'World Class' Compensation Packages and UK Proposals

In line with the scope of our work, we have considered the packages offered by Heathrow Airport Limited and London Gatwick Limited for how they address compensation for noise and other impacts on local populations

We have identified four key elements that are present in global comparators that therefore we expect the UK approach to include to some degree. These are

1. Direct measures to insulate properties affected by aircraft noise

2. Financial compensation to owners who will be required or desire to move as a result of noise

3. The creation of effective and comprehensive engagement with local communities

4. Active measures to control noise generated as a result of aircraft operations.

Our findings under each of these categories are as follows

6.1.1 Direct Insulation Measures

The proposals from HAL and GAL include measures for the installation of noise insulation in properties affected by noise.

The scope of works proposed is comparable to the measures funded by overseas schemes.

HAL specific observations

The current proposals from HAL indicate that the full costs of works would be funded for the worst affected properties. This they define as those properties within the 60dB Leq contour.

The value of support offered to properties outside this contour would be capped at £3000 per property.

While the scope of works would appear to be consistent and driven by survey findings, the capped amount of £3,000 is lower than the amount funded in comparable schemes elsewhere. The lower contour of 55Ldn within which properties would qualify is consistent with other comparable airports.

GAL Observations

As is the case with HAL, the capped value of support would appear to be lower than the costs typically incurred in other insulation measure schemes. The range of works that may be supported is however consistent with the measures undertaken elsewhere.

Drivers for cost differentials

We have not considered the benchmarking data that HAL and GAL point to as relevant in the UK. We would however note some of the potential drivers that may explain significant cost variations between countries.

1. Airports such as Sydney, O'Hare and Suvarnabhumi are located in climates that get significantly warmer than the UK and for which significant costs for including air conditioning or additional ventilation following noise insulation works may be incurred

2. Paris Charles de Gaulle has not imposed a value cap on the value of works; rather it has adopted a subsidy based on percentage of costs incurred by the owner (85%-95%). This may result in costs significantly greater than £3,000 being met by the insulation fund.

3. Many of the programmes identified have been administered by central government and funded in whole or in part from noise charges raised at the relevant airport. This has led to some instances, e.g., Sydney where the administration of the fund and financing of works has been less efficient.

4. It is unclear whether surveys carried out in affected properties have adopted an output based criteria (i.e., that works will be sufficient to lower noise to a defined level) or on input based criteria (i.e., that measures will be defined and the resultant noise will be determined by those set measures). This is likely to have a significant impact upon cost. For example the prevalence of lightweight timber construction methods in Australia meant that significantly more measures were required to reduce noise through walls. Local factors therefore may have a significant effect on the insulation costs. These will be more significant if output based noise measures are adopted in scoping works.

Summary

The insulation proposals in the UK appear to be consistent with comparable measures elsewhere. The cost per property of these measures varies significantly by country and so is in itself a poor indicator of the likely costs that would incurred in the UK; however the allowance for costs by both HAL and GAL would appear to be low compared to other major western hub airports. It is important to note however that GAL and HAL have extensive experience of the nature of works needed to be undertaken within the properties in the UK and therefore have a good understanding of UK cost drivers. This should enable them to make better cost estimates for the UK and mitigate the need to assume costs in international comparators as indicators of programme costs.

6.1.2 Financial Measures for Loss of Property or High Levels of Noise

All of the airports in this study seek to make financial compensation for properties located within the boundary of any expansion. Commercial property can form a large part of this but is outside of the scope of this study. In the UK such properties fall within the scope of Compulsory Purchase. There are two elements to compulsory purchase in the UK. Firstly payment of an unblighted fair market price and secondly the addition of a compensatory element for home loss of 10% of unblighted fair market price, with a cap in place to limit payment.

For the airports in this study, the focus has been on the provision of fair market price rather than the payment of a compensatory element, although at some airports the distinction is not always clear. Both HAL and GAL have made an offer of 125% of unblighted market value plus taxes and costs. It is worth noting that the total cost of the HAL offer is much larger than GAL because the airport is located in a more densely populated housing area. On this basis we consider the HAL and GAL offers to be more valuable to owners than any offers made by comparable airports.

In addition to property required for the construction of a new runway, all of the schemes considered contained some provision for the purchase of properties that were in the worst noise affected zones. A number of measures were used to define when a property would qualify, e.g., in Schiphol the use of the 65ke measure was used to identify 43 houses and 11 other buildings for demolition.

The most common method for purchasing homes as a result of aircraft noise impacts was to base the offer on market value (assuming no impairment as a result of the noise impacts). In general the costs of the vendor were also met in full, or by lump sum.

We would note however that in the case of Frankfurt the airport has put in place a voluntary scheme where properties may be purchased at market value. The criteria for inclusion in the Casa programme is vertical clearance of air traffic relative to the property (i.e., within 350mn). This can be seen as a proxy for noise but it is not clear what the equivalent dB noise value in these properties would be.

HAL by adopting a valuation of a premium of 25% to the unimpaired market value of the properties in question (approx. 3,750 in the 'Heathrow Villages') have exceeded the levels seen in comparable airports. We would note that the sum set aside for voluntary house purchases is £250m net. If this amount is to fund a 25% premium plus costs across the 3,750 homes identified, then the implied average market price is £330,000. This is broadly consistent with the existing average price in the postcodes eligible under the scheme.

GAL has made an offer to pay a 25% premium to homes subject to compulsory purchase, this may not however be related to noise impacts... The voluntary purchase element of the GAL offer (and indeed their insulation offer) needs to take into account that the operator is promising an annual cash 'Council Tax' rebate of £1,000 to eligible properties within the 57dB Leq noise contour, arguably in lieu of expenditure on compensation programmes elsewhere. We did not identify any comparator airport that had adopted the approach suggested by GAL that all residents would be given a local tax subsidy. It is however the case that the involvement of local public bodies in the ownership of some airports (e.g., O'Hare is 100% owned by the local city authority) could be seen as providing local tax subsidies to those residents in receipt of support.

Conclusion

The financial compensation packages offered by HAL and GAL are prepared on a basis that appears advantageous to offers made in comparable airport schemes in other countries.

6.1.3 Community Engagement and Public Realm works

The airport authorities consulted in our review each placed some emphasis upon the importance of local community engagement. Frankfurt and Schiphol both highlighted the difficulty that can be experienced when community engagement is not in place.

Both HAL and GAL have existing consultative bodies that are constituted on a basis similar to that seen in other jurisdictions. O'Hare however has put in place a commission in which the members are largely representatives of local government bodies. This reflects the public ownership of O'Hare and the US approach to local representation. It also reflects the largely government funded nature of the compensation works in this project.

We note the Airports Commission recommended the creation of a dedicated engagement body. This recommendation is consistent with the views we received in our consultation with airports. It should be noted however that such a body must be constituted in a way that maximises effective local engagement and should reflect the respective interests of local and regional stakeholders, including airport users and management.

There is no perfect engagement model. Despite the comprehensive approach to engagement at Frankfurt, there is still ongoing criticism of the expansion with a demonstration against airport noise taking place in one of the terminal buildings on a monthly basis.

Conclusion

The approach by GAL and HAL to public engagement to date is in line with that seen in other jurisdictions. However it is likely, based on the experience of other airports, that greater engagement with the public on

1. The nature and specification of insulation works to be undertaken

2. The negotiation of access to properties to allow for works to be undertaken

3. Change to airspace planning and airport operation procedures will be necessary if the engagement process is to be effective.

6.1.4 Air Traffic Management and Night Time Flights

The Airport Commission proposed that should Heathrow be taken forward for expansion then there would be a ban on night flights. Neither HAL nor GAL proposed a ban on night flights but rather proposed restrictions on night flight numbers.

Frankfurt Airport was the only comparator airport where a total ban on flights between 23:00 and 05:00 be enforced. Sydney Airport has very limited night operations, but is consistent with all other comparator airports in operating night time restrictions.

The comparator airports were sensitive to the impact of night operations and had proposed measures to moderate the impact such as runway rotation, total noise based or movement based restrictions, and limits on particularly noisy aircraft. The airports were also sensitive the commercial impacts of a ban on night flights; although where a ban has been implemented at Frankfurt it has been more manageable than was expected.

In respect of airfield operations, including approach and departure management there are a wide range of possible measures, many technology enabled, that should reduce the impact of noise on communities.

Conclusion

The application of a ban on night flights would place HAL, and if it were to be applied to GAL, on a similar basis to Frankfurt, but this is seen in the airports we consulted, as being challenging in the context of operating a major international hub airport. The recommendations of the Airports Commission in this area such as periods of respite and a noise envelope are consistent with the approaches taken at the airports within this study.

Appendix A Summary Data – Frankfurt am Main, Frankfurt, Germany

Airport Overview

- Two terminals and four runways – under normal operations, two runways are used for landings and two runways are used for take-offs.
- Total of 61.04 million passengers and 468,153 air craft movements were recorded in 2015.[11]
- Maximum terminal capacity is 64 million passengers and expected to be reached before 2021.[12]
- In 2007 an initial package of 7 noise abatement measures were agreed with Fraport, the German State of Hesse and the Regional Dialogue Forum. In 2012, the Alliance for More Noise Abatement identified a further 19 noise abatement measures that have been placed in operation, in trial phase or currently under development.
    - The Alliance for More Noise Abatement 2012 represents the State of Hesse, the Regional Airport Forum and representatives of the airlines and air traffic control.

Expansion History

- The fourth runway was opened in October 2011 and the third runway was opened in 1984.
- The fourth runway increased capacity from 90 to 126 movements per hour[13].
    - The opening of the runway coincided with new noise regulations
    - The noise from the opening of the runway continues to be protested against
- The first construction phase of terminal 3 will add an additional 14 million passengers of capacity when it opens in 2022[14]

Noise Abatement Operational Procedures[15]

- Engine tests, run-ups and extensive maintenance restricted to authorised areas and between the hours of 0600 and 2200.
- Preferential runways for landing and departures, and restrictions on use of runway for landing based on the aircraft's noise certificate
- Reverse thrust cannot be used on the runways
- Continuous Descent Approaches are to be used between 11pm and 5am; this technique will commence earlier and finish later if capacity allows.

[11] Traffic Figures, Fraport, http://www.fraport.com/en/investor-relations/financial-and-air-traffic-figures/traffic-figures.html
[12] Expansion Projects, Fraport, http://www.fraport.com/en/our-expertise/frankfurt-airport-development/expansion-projects.html
[13] Runway Northwest, Fraport, http://www.fraport.com/en/our-expertise/frankfurt-airport-development/expansion-projects/runway-northwest.html
[14] 2015 Facts and Figures on Frankfurt Airport, Fraport, http://www.fraport.com/content/fraport/en/misc/binaer/press-center/publications/2015/2015-facts-and-figures-on-frankfurt-airport/jcr:content.file/facts-and-figures_2015.pdf
[15] Frankfurt, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/frankfurt.html

- Fraport is working with airlines on the implementation of vortex generators for A320 airlines.

- Increased ILS (Instrument Land System) glide slope of 3.2 degrees approved for use on Runway Northwest. Resulted in a noise reduction of between 0.5 and 1.5 db(A) [16]

Operational Restrictions[17]

- All flights banned between 11pm to 5am from October 2011 unless special permission is granted by the authority.
    - The ban impacted 17 flights and was Karl-Ulrich Garnadt, Lufthansa Cargo Chief-Executive was quoted that the ban would cost €40mn in lost earnings per year.
    - Maximum number of flights in the shoulder period (10-11pm and 5-6am) was reduced from 150 to 133 and aircraft must be compliant with ICAO Annex 16, Chapter 4 limits.[18]
- Aircraft that are only marginally compliant with ICAO Annex 16, Chapter 3 are not permitted to take off or land between 2000 and 0800 on all days of the week and restricted from flying between Friday 2000 and Monday 0800[19]
- Noise respite periods between 10-11pm and 5-6am are currently being tested at the airport under a one year trial that began in April 2015. The respite is achieved through the use of dedicated runways for take-offs and landings and would last for 7 hours when combined with the 6 hour curfew. This would benefit approximately 40,000 people.[20]

Noise Charges[21]

Take-off and Landing Charges

- Noise Charges: The airport levies a noise charge as part of the take-off and landing charges, based on the aircraft's noise category. These charges are not tied to funding of noise mitigation measures
    - Aircraft are classified into 16 categories, with the fee ranging from €43 to €22,680 per movement. Charges in categories 1 through 12 are less than €755
    - An additional night surcharge is levied for movements between 2200-2259 and 0500-0559, ranging between €21.57 to €11, 340. Charges in categories 1 through 12 are less than €378
    - An additional night surcharge is levied for movements between 2300-0459, ranging between €86.27 to €45, 360. Charges in categories 1 through 12 are less than €1,509
- Surcharge for Marginal Aircraft: An additional surcharge of 50% is added to the noise charges for take-offs and landings for aircraft that only marginally comply with ICAO Annex 16 Chapter 3 recommendations between 8pm Friday to 8am Monday.

[16] Frankfurt Airport Pioneers Active Noise Abatement, Manuel, Stefan, International Aiport Review, http://www.internationalairportreview.com/digital/iar-issue-4-2015/files/76.html
[17] Lufthansa hit as Frankfurt night flight ban upheld, Bryan, Victoria and Maushagen, Peter,4 April, 2012 http://uk.reuters.com/article/uk-frankfurt-nightflights-idUSLNE83300W20120404
[18]Frankfurt/Main Airport Briefing, Jeppesen, http://www.europlanet.de/vaFsP/charts/EDDF.pdf
[19]Frankfurt/Main Airport Briefing, Jeppesen, http://www.europlanet.de/vaFsP/charts/EDDF.pdf
[20] Frankfurt Airport Pioneers Active Noise Abatement, Manuel, Stefan, International Aiport Review, http://www.internationalairportreview.com/digital/iar-issue-4-2015/files/76.html
[21] Airport Charges according to Art. 19b Air Traffic Act (LuftVG), Charges for Central Ground Handling Infrastructure Frankfurt Airport, Fraport, January 1, 2015, http://www.fraport.com/content/fraport/en/misc/binaer/our-expertise/aviation-services/airport-charges-2015/jcr:content.file/entgelte-charges-2015.pdf

- Noise Rating Index: Aircraft operators are also incentivised to use quieter aircraft through the application of the internationally standard 'Noise Rating Index' to noise charges. The index categorises aircraft based on the cumulative margins relative to the ICAO Annex 16 Chapter 3 limits. A maximum reduction of 10% on noise charges is applied depending on the aircraft's noise category.

Noise Abatement Charge

- A noise abatement charge, with a fixed and variable component is also paid and used to fund noise mitigation measures:
  - Variable: EUR0.24 is charged per departing passenger and EUR0.04 is charged per 100kg of freight and mail tonnage on departing and arriving flights
  - Fixed: The airport levies a fee based on the aircraft's noise category, ranging from EUR1.50 to EUR 750 during the day and an additional night surcharge of between EUR0.75 and EUR375 in the shoulder period and EUR3 to EUR1,500 in the night period.

Incentive Program[22]

- The airport also implemented an incentive program at the start of 2014, aimed at promoting international passenger growth using low-noise aircraft.
- Incentives are only available for continental (excluding domestic travel) and international passenger travel, where an airline has a minimum of 7,500 departing passengers and achieves at least 1% growth each year.
- If these criteria are met, the airlines are refunded an amount between EUR4 and EUR10 per passenger, of growth in excess of 1% that the airline achieved using low-noise aircraft types.

Insulation Program

- The Aircraft Noise Abatement Act defines noise abatement zones around the airport. There are three zones; day protection zone 1 and 2 and the night protection zone, classified according to the modified equivalent continuous sound level (Leq)
- A surveyor would analyse the level of noise in a property and determine what insulation works was require to achieve the expected noise level in the area
- Homes surrounding the airport in the statutory protection zones are eligible for passive noise abatement measures. The following populations lie within the contours at the end of 2014.[23]

[22] Airport Charges according to Art. 19b Air Traffic Act (LuftVG), Charges for Central Ground Handling Infrastructure Frankfurt Airport, Fraport, January 1, 2015, http://www.fraport.com/content/fraport/en/misc/binaer/our-expertise/aviation-services/airport-charges-2015/jcr:content.file/entgelte-charges-2015.pdf
[23] Abridged Environmental Statement 2015, Fraport AG, 2015 http://www.fraport.com/content/fraport/en/misc/binaer/sustainability1/stakeholder-dialog/environmental_statements/abridged-environmental-statement-2015/jcr:content.file/abridged-environmental-statement-2015.pdf

Protection Zone	Noise Contour	Population in 2014	Claimable
Day Protection Zone 1	$L_{Aeq\ Day}$= 60 dB(A) Day = 06:00 to 22:00 hrs	3,307	Living rooms and communal spaces, impairments of use in outdoor living spaces
Day Protection Zone 2	$L_{Aeq\ Day}$ = 55 dB(A)	101,042	N/A
Night Protection Zone	$L_{Aeq\ Night}$ = 50 dB(A) Night= 22:00 to 06:00 hrs	75,192	Structural sound insulation in bedrooms and children's rooms

- Some of the statutory claims for compensation are subject to a five year waiting period.[24].
- Total funding for the program is EUR415-420mn.[25]
  - €150mn is funded through noise related charges levied by the airport[26]
  - EUR265-270mn is funded by the Regional Fund. The fund was established by the Hesse State Government and Fraport in February 2012 as part of the Alliance for Noise Abatement. [27] Measures beyond the statutory requirements are financed by the Regional Fund. [28]

Property Compensation (Casa Program)

- The Casa2 Program compensates owners of properties that bought or constructed property prior to the zoning decision for the Runway Northwest and lie within a flight path of low altitude fly-overs.[29]
- In 2012 under the Alliance for more Noise Abatement 2012, the program was expanded from the original program and extended to October 2014. The financial commitment was increased from €70m to €100m and eligible applicants to include properties in the transition zones.[30]
- The core zone covered an area directly under the approach line of a width of 180 metres. The transition zone I covered an area 60m wide either side of the core zone, and the transition zone II covered an area 60m wide on either side of the transition zone I. [31]
  - Residents of Raunheim were offered compensation payments where the flight path is at an altitude of less than 350 metres.
    - 122 compensation payments[32] were made and based on the following criteria[33]

[24] Noise Abatement, Fraport, http://sustainability-report.fraport.com/noise-abatement/passive-noise-abatement/
[25] Noise Abatement, Fraport, http://sustainability-report.fraport.com/noise-abatement/passive-noise-abatement/
[26] Connecting Sustainability, Online Report 2013, Fraport, http://www.fraport.com/content/fraport/en/misc/binaer/sustainability1/stakeholder-dialog/sustainability-reports/connecting-sustainably-2013/jcr:content.file/connecting_sustainably2013.pdf
[27] Connecting Sustainability, Online Report 2013, Fraport, http://www.fraport.com/content/fraport/en/misc/binaer/sustainability1/stakeholder-dialog/sustainability-reports/connecting-sustainably-2013/jcr:content.file/connecting_sustainably2013.pdf
[28] Noise Abatement, Fraport, http://sustainability-report.fraport.com/noise-abatement/passive-noise-abatement/
[29] 2014 Compact Fraport Finance Sustinability, Fraport, 2014, http://www.fraport.com/content/fraport/en/misc/binaer/sustainability1/stakeholder-dialog/sustainability-reports/2014-kompakt_e/jcr:content.file/2015_05_07_fraport_kurzbericht_e_final.pdf
[30] Casa Program, Fraport, http://sustainability-report.fraport.com/noise-abatement/casa-program/#Statusoftargetattainment
[31] Gute Nachbarschaft als Programm, Fraport Casa2, 29 February 2012 http://sustainability-report.fraport.com/wp-content/uploads/2014/02/Gute_Nachbarschaft_als_Programm_Fraport_Casa2.pdf
[32] 2014 Compact Fraport Finance Sustinability, Fraport, 2014, http://www.fraport.com/content/fraport/en/misc/binaer/sustainability1/stakeholder-dialog/sustainability-reports/2014-kompakt_e/jcr:content.file/2015_05_07_fraport_kurzbericht_e_final.pdf

- Zone I and Transition Zone I: EUR 100 per square meter
- Transition Zone II: EUR 50 per square meter

- Offers were made to buy residential properties or receive compensation payments in Flörsheim and Kelsterbach where the flight path is at an altitude of less than 350 metres.[34]
  - In the core zone, transition zone I and II, owners could receive an equalisation payment per square meter or the purchase of the property at market value. The market value would be determined by a certified expert and not take into account the operation of the runway. [35]
  - A total of 250 properties were purchased under the scheme. These properties are re-let by Fraport where possible, with occupancy rates of approximately 90%. [36]
  - 144 compensation payments[37] were made based on the following criteria[38]
    - Zone I: EUR 150 per square meter
    - Transition Zone I: EUR 100 per square meter
    - Transition Zone 2: EUR 50 per square meter

[33] Gute Nachbarschaft also Programme, Fraport Casa2, 29 February 2012 http://sustainability-report.fraport.com/wp-content/uploads/2014/02/Gute_Nachbarschaft_als_Programm_Fraport_Casa2.pdf
[34] Gute Nachbarschaft als Programm, Fraport Casa2, 29 February 2012 http://sustainability-report.fraport.com/wp-content/uploads/2014/02/Gute_Nachbarschaft_als_Programm_Fraport_Casa2.pdf
[35] Gute Nachbarschaft als Programm, Fraport Casa2, 29 February 2012 http://sustainability-report.fraport.com/wp-content/uploads/2014/02/Gute_Nachbarschaft_als_Programm_Fraport_Casa2.pdf
[36] 2014 Compact Fraport Finance Sustinability, Fraport, 2014, http://www.fraport.com/content/fraport/en/misc/binaer/sustainability1/stakeholder-dialog/sustainability-reports/2014-kompakt_e/jcr:content.file/2015_05_07_fraport_kurzbericht_e_final.pdf
[37] 2014 Compact Fraport Finance Sustinability, Fraport, 2014, http://www.fraport.com/content/fraport/en/misc/binaer/sustainability1/stakeholder-dialog/sustainability-reports/2014-kompakt_e/jcr:content.file/2015_05_07_fraport_kurzbericht_e_final.pdf
[38] Gute Nachbarschaft als Programm, Fraport Casa2, 29 February 2012 http://sustainability-report.fraport.com/wp-content/uploads/2014/02/Gute_Nachbarschaft_als_Programm_Fraport_Casa2.pdf

Appendix B Summary Data – O'Hare International Airport, Chicago, USA

Airport Overview

- Four passenger terminals with eight active runways and 189 gates[39]
- Total of 76.95 million passengers and 875,136 air craft movements were recorded in 2015.[40]
- The airport was the fourth busiest airport in the world in 2015 in terms of passenger numbers[41]
- O'Hare is now the primary airport serving Chicago. Midway Airport serves as a secondary airport and is approximately 10km closer to downtown Chicago

Expansion History

- In 2001, the Mayor announced the O'Hare Modernisation Program, which would reconfigure the airfield into a parallel east-west runway layout and increases the airport's safety and capacity. The estimated cost of the expansion is over US$8 billion.[42]
- The airport had six runways between its opening in 1943 and 1971. The next runway was opened in 2008 and a further runway was opened in 2013. The ninth runway was opened in 2015 and coincided with the permanent closure of an existing runway.[43]
- In February 2016, the City announced that it had reached agreement with United Airlines and American Airlines to build a new runway, which would conclude the modernisation plan. The new runway is expected to be complete by 2020. An existing diagonal runway would be decommissioned.[44]
- Noise complaints have surged since October 2013, with the opening of the new runway and shift to the east-west parallel runway configuration.[45]
- The O'Hare Noise Compatibility Commission was formed in 1996 to provide input and oversight to the implementation of noise programs.[46]

Noise Abatement Operational Procedures

- Noise abatement runways to be used when acceptable for turboprop, turbojet and large prop aircraft[47]

[39] O'Hare Facility Data, Chicago Department of Aviation, http://www.flychicago.com/OHare/EN/AboutUs/Facts/Facility-Data.aspx
[40] Monthly Operations, Passengers, Cargo Summary By Class, For December 2015, O'Hare International Airport, Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/Facts%20and%20Figures/Air%20Traffic%20Data/1215%20ORD%20SUMMARY.pdf
[41] Airport World exclusive: The world's busiest passenger airports in 2015, Aviation Media, 16 February 2016, http://www.airport-world.com/news/general-news/5450-airport-world-exclusive-the-world-s-busiest-passenger-airports-in-2015.html
[42] Connecting the world to Chiacgo, The conference, University of Illinois, 24 February 2015, http://www.theconf.com/presentations/2015/O'Hare%20Modernisation%20Update.pdf
[43] O'Hare Facility Data, Chicago Department of Aviation, http://www.flychicago.com/OHare/EN/AboutUs/Facts/Facility-Data.aspx
[44] O'Hare To Get 6th Runway, But Without Expanded Terminals, Delays May Continue, Schaper, David, 1 February, 2016, http://www.npr.org/sections/thetwo-way/2016/02/01/465101435/ohare-will-get-a-sixth-runway-but-without-expanded-terminals-delays-may-continue
[45] O'Hare noise complaints top 2 million for year, Hilkevitch, Jon, Chicago Tribune, 4 September, 2015, http://www.chicagotribune.com/news/ct-ohare-noise-complaints-met-0905-20150904-story.html
[46] Fact Sheet – Fly Quiet at O'Hare International Airport, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/Fly%20Quiet/ORD_FlyQuiet_FactSheet.pdf

- Engine tests to be conducted in the Ground Run-Up Enclosure built in 1997, designed to reduce the noise impact on residents living around the airport. The GRE is a non-roofed, three-sided facility with acoustic panels that absorb and attenuate noise. [48]

Operational Restrictions

- Since 1997, the airlines have agreed to voluntarily use noise abatement procedures recommended by the Fly Quiet Program. The program encourages use of procedures between 10pm and 7am designed to direct traffic over less populated areas. [49]
    - Recommended flights paths and preferential runway configurations designating arrivals and departures on particular runways, designed to limit noise on surrounding communities[50]
    - Limit the use of reverse thrust[51]
    - Quiet climb configuration until 3000 feet, maintain 4000 feet until turning on final approach[52]
- Changes to the Fly Quiet Program are currently being reviewed such as rotating the runways used at night. The Program currently recommends four combinations of runways to be used – one runway designated for arrivals and one for departure. However, the night period would be shortened from 10pm-7am to 11pm to 5am, and have some flexibility in using more than two runways during the busiest of the hours 10-11pm and 5-7am[53]

Noise Charges

- Passenger Facility Charges are primarily based on weight and not linked to time of arrival or noise certificate[54]

Insulation Programs

Residential Sound Insulation Program

- The program is overseen by the O'Hare Noise Compatibility Commission and administered by the Chicago Department of Aviation. [55]
- Single family and multi until dwellings that fall within the noise contour identified in the O'Hare Modernisation Program's Environmental Impact Statement (September 2005)

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[47] O'Hare International Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/ohare.html
[48] Fact Sheet – Fly Quiet at O'Hare International Airport, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/Fly%20Quiet/ORD_FlyQuiet_FactSheet.pdf
[49] O'Hare Fly Quiet Program, Chicago Department of Aviation, http://www.flychicago.com/OHare/EN/AboutUs/NoiseManagement/FlyQuiet/Pages/Fly-Quiet-Program.aspx
[50] Fly Quiet Program Manual, Chicago O'Hare International Airport, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/NoiseManagement/FlyQuiet/FQManual11-08-15.pdf
[51] Fly Quiet Program Manual, Chicago O'Hare International Airport, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/NoiseManagement/FlyQuiet/FQManual11-08-15.pdf
[52] Fly Quiet Program Manual, Chicago O'Hare International Airport, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/NoiseManagement/FlyQuiet/FQManual11-08-15.pdf
[53] Weekly O'Hare Nighttime Runway Rotations Could Start By May, http://chicago.cbslocal.com/2016/02/17/weekly-ohare-nighttime-runway-rotations-could-start-by-may/
[54] Chicago O'Hare International Airpor, Summary – 2016 Terminal Rentals, Fees and Charges, January 1, 2016, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/Facts%20and%20Figures/FinancialData/Summary%202016%201st%20Half%20Rates%20and%20Charges%20ORD.pdf
[55] Fact Sheet – Residential Sound insulation Program at O'Hare International Airport, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/NoiseManagement/Sound%20Insulation%20Programs/ORD_Fact_Sheet_RSIP_2016.02.pdf

are eligible for sound insulation. The noise reduction goal is to reduce aircraft noise levels by at least 5 decibels and to attain an interior noise level of 45 dB. [56]

- The eligibility criteria is that the home's annual day/night average sound level is equal to or greater than 65 decibels (65 DNL); and
  - Houses must have been constructed before September 30, 2005
  - Only residential portions of mixed use buildings will be insulated
  - Home must be on a block where an individual home is within the 65 DNL noise contour, and in such cases, homes on both sides of the street and up to the next intersection or street change are eligible[57]
- The insulation work is managed by a single contractor – Cotter Consulting Inc. [58]
- The program is expected to continue until the O'Hare Modernisation Program is completed around December 2020. All homes must be insulated prior to the completion of the program[59]
- The program is funded 80% by the US Federal Aviation Administration and 20% by the city through airport revenues.
- To date 10,922 homes have been insulated and approximately $200m expended[60]

School Sound Insulation Program

- The program is overseen by the O'Hare Noise Compatibility Commission and administered by the Chicago Department of Aviation. [61]
- The program began in 1982 and is the largest program of its type in the world. Eligible schools receive design and construction grants for sound insulation[62]

[56] Fact Sheet – Residential Sound insulation Program at O'Hare International Airport, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/NoiseManagement/Sound%20Insulation%20Programs/ORD_Fact_Sheet_RSIP_2016.02.pdf
[57] Fact Sheet – Residential Sound insulation Program at O'Hare International Airport, Chicago Department of Aviation, http://www.flychicago.com/SiteCollectionDocuments/OHare/AboutUs/NoiseManagement/Sound%20Insulation%20Programs/ORD_Fact_Sheet_RSIP_2016.02.pdf
[58] Eligibility, O'Hare Noise Compatibility Commission, http://www.oharenoise.org/noise-mitigation/residential/eligibility
[59] Residential FAQs, O'Hare Noise Compatibility Commission, http://www.oharenoise.org/noise-mitigation/residential/faqs
[60] O'Hare Sound Insulation Programs, Chicago Department of Aviation, http://www.flychicago.com/OHare/EN/AboutUs/NoiseManagement/SoundPrograms.aspx
[61] Fact Sheet – School Sound Insulation Program at O'Hare International Airport, Chicago Department of Aviation, http://www.oharenoise.org/sitemedia/documents/noise_mitigation/SSIP/ORD%20Fact%20Sheet%20SSIP%202015.10-1.pdf
[62] School Sound Insulation Program, O'Hare Noise Compatibility Commission, http://www.oharenoise.org/noise-mitigation/schools

- Schools are selected based on established criteria and then tested over a four day period. The criteria including:[63]
  - The school's annual day/night average sound level is equal to or greater than 60 decibels (60 DNL); and
  - The school's measured, A-weighted, windows-open interior sound level is equal to or greater than 45 decibels (45 Leq) resulting from aircraft operations.
- The program is funded 80% by the US Federal Aviation Administration and 20% by the City of Chicago through airport revenues.[64]
- The final of the 124 qualified schools eligible to receive insulation received funding in September 2014. Over $350mn has been expended on the program[65]

[63] Fact Sheet – School Sound Insulation Program at O'Hare International Airport, Chicago Department of Aviation, http://www.oharenoise.org/sitemedia/documents/noise_mitigation/SSIP/ORD%20Fact%20Sheet%20SSIP%202015.10-1.pdf
[64] School Sound Insulation Program, O'Hare Noise Compatibility Commission, http://www.oharenoise.org/noise-mitigation/schools
[65] School Sound Insulation Program, O'Hare Noise Compatibility Commission, http://www.oharenoise.org/noise-mitigation/schools

Appendix C Summary Data – Paris Charles de Gaulle Airport, Paris, France

Airport Overview

- Three terminals and four runways – two independent runway pairs. with one runway specialised for take-offs, and the other for landings
- Total of 65.77 million passengers and 475,810 air craft movements were recorded in 2015.[66]
- Maximum airport capacity is 80 million passengers and expected to be reached between 2023-2025[67]

Expansion History

- The third runway was opened in November 1998 and the fourth runway was opened in September 2000.
- The ACNUSA (Autorité de Contrôle des Nuisances Aéroportuaires) was created in 1999 to develop economic activity and employment generated by aviation, while balancing the environment of the local residents.[68]
    - The authority has the ability to make recommendations regarding harmful environmental impacts (including noise) around the airport, alert breaches of noise regulations and investigate noise relating to the airport such as flight paths, take-offs/landings.
    - The authority can act as a mediator and also issue fines.

Noise Abatement Operational Restrictions[69]

- Since 2011, chapter 3 aircraft that have a cumulative margin of less than 5 EPNdB cannot operate at the airport.
- No engine trials between 2200 and 0600
- One runway specialised for take-offs, and the other runway for landings
- Procedures for take-off and initial climb regarding power and speed for all airlines until 3000 feet.
- Implementation of Continuous Descent Approaches between 0000 and 0500[70]

Operational Restrictions[71]

[66] Union des Aéroports Français, Statistiques annuelles, http://www.aeroport.fr/view-statistiques/paris-charles-de-gaulle
[67] Roissy CDG: un nouveau terminal (colossal) est prévu dans 10 ans (PDG d'Aéroports de Paris), Gliszczynski, Fabrice and Mabille, Philippe, 06/06/2014, http://www.latribune.fr/entreprises-finance/services/transport-logistique/20140606trib000833813/roissy-cdg-un-nouveau-terminal-colossal-est-prevu-dans-10-ans-pdg-d-aeroports-de-paris.html
[68] The Authority – Background… Autorité de Contrôle des Nuisances Aéroportuaires, http://www.acnusa.fr/en/presentation/the-authority/52
[69] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[70] Aircraft Noise Factsheet, European Express Association, http://www.euroexpress.org/uploads/ELibrary/EEA-Aircraft_Noise_FACTSHEET.pdf

- Night operating procedures were introduced March 28, 2004[72]
- Introduced in 2003, no take-offs between 00h00 and 04h59 without an issued departure slot. The number of slots has been limited since 2003 to a maximum of 20,000 per annum, with unused slots being lost. [73]
- The airport has an average of 162 daily night flights. There has been an increased observance in movements outside the restricted period between 22:00 and 0000 and 0500 and 0600. [74]
- Restrictions on Chapter 3, ICAO Annex 16, compliant aircraft that can take off and land during the night based on EPNdB levels[75]
    - No take off of aircraft between 1200 and 0459 with an exceeding value of 99 EPNdB
    - No landing of aircraft between 1230 and 0529 with an exceeding value of 104.5 EPNdB
    - No landing between 2330 and 615 or take-off between 2315 of aircraft that have a cumulative margin of more than or equal to 5 EPNdB and less than 8 EPNdB

Noise Charges

- Failure to comply with the restrictions above may result in a fine from the Airport Pollution Control Authority (ACNUSA); a maximum €1,500 for individuals and €40,000 for corporations[76]
- The French Civil Aviation Authority (DGAC) applies a noise pollution tax (Taxe sur les nuisances sonores aériennes or TNSA) to all take-offs based on the aircraft's maximum take-off weight and departure time and acoustic group. The proceeds are used by Aéroports de Paris for financing sound-proofing measures for local residents and around the airport. [77]
- From February 2009, landing fees are also adjusted based on the aircrafts acoustic group and time of movement. [78]
- In 2003, the government implemented the IGMP 'Indicateur Global Mesuré Pondéré'), the Measured and Weighted Noise Indicator.[79]
    - The IGMP is a regulatory noise cap based on average noise measured between 1999 and 2001.[80]

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[71] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[72] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[73] Night flight restrictions and airline responses at major European airports, Jasper Faber, Linda Brinke, Martine Smit, Delft, CE Delft, September 2012, www.ce.nl
[74] Night flight restrictions and airline responses at major European airports, Jasper Faber, Linda Brinke, Martine Smit, Delft, CE Delft, September 2012, www.ce.nl
[75] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[76] Issuing of Fines, ACNUSA (Authority for Airport Nuisance Control), http://www.acnusa.fr/en/acnusa-fines-system/issuing-of-fines/72
[77] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[78] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[79] Aeroports de Paris management report – 2014 financial year, Aéroports de Paris management report 2014 Financial Year, Aéroports de Paris, https://www.aeroportsdeparis.fr/docs/default-source/groupe-fichiers/finance/actionnaires-individuels/assemblee-generale/2015/iv-1-management-report-for-the-aeroports-de-paris-group-2014-financial-year.pdf?sfvrsn=2

- Noise is measured at either end of the runways and multiplied by a factor of 3 between 6pm and 8pm and a factor of 10 between 10pm and 6am. [81]
- In 2013 the index level was at 83[82]

Insulation Program

- Residents around the airport are offered financial grants to sound proof their homes. Applications for grants are made to Aéroports de Paris SA
- The Noise Disturbance Plan (PGS – Plan de gene sonore) map of the airport determines which residents are eligible for aid, based on three zones of noise pollution.[83]
  - Zone I represents a very high level of noise pollution and within the Lden 70 index curve;
  - Zone II represents a high level of noise pollution between the Lden 70 and Lden 65 or 62 curves;
  - Zone III, represents a moderate level of noise pollution between the Lden 65 or 62 and Lden 55 index curves.
  - Aéroports de Paris SA manages the applications from residents
- Data on the program[84]
  - 1995-2003: €40mn spent insulating 4,597 residences, €9.55mn spent insulating 55 public buildings. [85]
  - 2004-2008: €97mn spent insulating 10,940 residences, €4.7mn spent insulating 14 public buildings. [86]
  - Between 2007 and 2014, €203.3mn was spent on the sound insulation program[878889]

[80] Noise issues around Charles de Gaulle airport "The French System", Royal Aeronautical Society, 15 October 2013, http://aerosociety.com/Assets/Docs/Events/723/Pierre%20Caussade_PDF.pdf
[81] Noise issues around Charles de Gaulle airport "The French System", Royal Aeronautical Society, 15 October 2013, http://aerosociety.com/Assets/Docs/Events/723/Pierre%20Caussade_PDF.pdf
[82] Implementation of the Balanced Approach, the Paris-Charles De Gaulle Case, Elisabeth Le Masson – Delegate for Sustainable Development, Paris-Charles De Gaulle & Paris Le-Bourget, Aéroports de Paris, ICAO Symposium on Aviation and Climate Change, 'Destination Green', 14-16 May 2013.
[83] PGS – Noise Disturbance Plan, ACNUSA (Authority for Airport Nuisance Control), http://www.acnusa.fr/en/noise-and-mapping/mapping/pgsnoise-disturbance-plan/65
[84] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[85] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[86] Charles de Gaulle Airport, Boeing, http://www.boeing.com/resources/boeingdotcom/commercial/noise/degaulle.html
[87] Aéroports de Paris management report, Social environmental and social responsibility information, Aéroports de Paris, 2014, p40, https://www.aeroportsdeparis.fr/docs/default-source/groupe-fichiers/finance/actionnaires-individuels/assemblee-generale/2015/iv-1-management-report-for-the-aeroports-de-paris-group-2014-financial-year.pdf?sfvrsn=2
[88] Rapport de responsabilité sociétale d'entreprise 2012, Aeroports de Paris, 2012, p 79, http://www.aeroportsdeparis.fr/docs/default-source/groupe-fichiers/rse/rapports-rse/rapport_rse_2012.pdf?sfvrsn=2
[89] Rapport de responsabilité sociétale d'entreprise 2009, Aeroports de Paris, 2009, p79

Appendix D Summary Data – Amsterdam Airport Schiphol, Amsterdam, the Netherlands

Airport Overview

- One terminal divided into three halls and five runways with an additional runway used for general aviation.
- Total of 58.2 million passengers and 450,679 air craft movements were recorded in 2015.[90]
- Maximum airport capacity is 60-65 million passengers and 110 movements per hour.[91]

Expansion History

- The fifth runway was opened in February 2003, increasing capacity from 460,000 movements to 600,000[92]
- The Alders Platform was a consultative body advising the government on balancing aviation expansion and the disturbance of the residential environment. A series of recommendations were adopted in 2009 including:[93]
  - Maximum ceiling of 580,000 aircraft movements in 2020 (70,000 from regional airports)
  - Maximum of 32,000 flights at night between 2300 and 0700
- Since 2015, environmental and development issues impacting the regions surrounding Schiphol are considered by the Environment Council Schiphol. The ECS was created by the merger of the Alders Platform and the Regional Consultation Committee Schiphol Airport
- The Aviation Act (Wet luchtvaart), chapter 8, part 4, governs the operation of Schiphol Airport. The new Act came into effect in 2003 to coincide with the opening of the new runway and contained new environmental and noise restrictions.[94]
- The Airport Traffic Decree, also introduced in 2003, set out the rules for airport use and stipulates limits for noise levels, air pollution and risks to public safety[95]
- The Airport Planning Decree defines the airport zone, take-off and landing strips and restrictions on use of the area in and around the airport[96]
- In 2007, the airport underlined the need for a sixth runway to meet expected passenger throughput of 80 million passengers by 2025 and 600,000-650,000 flights[97]

[90] 2015 Traffic Review, Schiphol Group, 2015, http://trafficreview2015.schipholmagazines.nl/summary.html
[91] Airport Facts, Schiphol Group, http://www.schiphol.nl/B2B/RouteDevelopment/AirportFacts2.htm#airport
[92] Schiphol finally operates 5th runway, New Europe Brussels team, 11 February 2003, http://neurope.eu/article/schiphol-finally-operates-5th-runway/
[93] Noise and disturbance reduction, Schiphol Group, http://www.schiphol.nl/NoiseAndDisturbanceReduction.htm
[94] Friends of the Earth Netherlands (FoE) vs. Schiphol Airport (group), van der Zwart, Alex and van Tulder, Rob, April 2006, http://www.ib-sm.org/CaseSchiphol.pdf
[95] Schiphol Group Annual Report 2013, Schiphol Group, 2013, http://2013.annualreportschiphol.com/
[96] Schiphol Group Annual Report 2013, Schiphol Group, 2013, http://2013.annualreportschiphol.com/
[97] Amsterdam Airport Schiphol anticipates strong growth, plans sixth runway, Air Transport World Plus, 4 June 2007, http://atwonline.com/airports-amp-routes/amsterdam-airport-schiphol-anticipates-strong-growth-plans-sixth-runway

Noise Abatement Operational Procedures

Airport Procedures

- The number of flights is capped by the slot coordinator.[98]
  - The peak departure period (0700-2139) is capped at 36 arrivals and 74 departures
  - The day peak arrival period (0700-2139) is capped at 68 arrivals and 38 departures
- Use of Continuous Descent Approach for aircraft between 2200-0530[99]
- Preferential runway system: departure and landing takes place on separate runways. Assignment of runways based on noise influences and traffic handling. The use of non-preferential runways only permitted for safety reasons.[100]
- In 2015, the maximum total growth of the airport until 2020 was reduced from 510,000 to 500,000. This concession was made to allow Schiphol to use its fourth runway more regularly, which had been restricted under the Alders Platform.[101]

Total Noise Volume

- The Aviation Act that limits the total noise volume (TVG) that can be generated and required the distribution of air traffic to other runways once the maximum noise level had been reached. [102]
- According to the Airport Traffic Decree (LVB), the maximum noise calculated over a year of use:[103]
  - Day Period: total volume of noise is not more than 63.46dB(A)
  - Night Period, 23pm – 7am: total volume of noise is not more than 54.44dB(A)

Operational Restrictions

- To comply with the maximum annual cap on flights and maximise airport efficiency, a slot coordinator declares and allocates the slots available for each summer and winter season.[104]
- Slots are available for day, off-peak and night mode and allocated based on historical allocation, actual usage as well as requests from new entrants.[105]
  - Schiphol is open 24 hours per day, however is restricted to a maximum annual number of 32,000 night flights. The number of flights between the hours of 2300 and 0559 is capped at 24 arrivals and 25 departures per hour.
  - The number of flights between the hours of 0600 and 0659 is 24 arrivals and 30-40 departures.
  - To compensate for the delayed introduction of CDAs, the maximum annual number of night flight to is expected to be reduced to 29,000.

[98] Declared capacity, Airport Coordination Netherlands, 2016, http://www.slotcoordination.nl/declared-capacity
[99] Schiphol Airport, Boeing,http://www.boeing.com/resources/boeingdotcom/commercial/noise/schiphol.html
[100] Schiphol Airport, Boeing,http://www.boeing.com/resources/boeingdotcom/commercial/noise/schiphol.html
[101] Noise, Schiphol Group Annual Report 2014, http://www.annualreportschiphol.com/pdfondemand/printpdf?docId=252017&nodes=253958&variant=eco
[102] Schiphol Airport, Boeing,http://www.boeing.com/resources/boeingdotcom/commercial/noise/schiphol.html
[103] Luchthavenverkeerbesluit Schiphol, Article 4.2, wetten.overheid.nl/BWBR0014330
[104] Declared Capacity, Airport Coordination Netherlands, 2016 http://www.slotcoordination.nl/declared-capacity
[105] Capacity declaration Amsterdam Airport Schiphol; summer 2016, Airport Coordination Netherlands, 2016 http://www.slotcoordination.nl/declared-capacity

- Aircraft that are marginally compliant with Chapter 3 (cumulative margin of less than 5EPNdB)[106]
    - Engine bypass ratio is less than or equal to 3, cannot operate between 1700 and 0700
    - Engine bypass ratio >3, cannot take off between 2200 and 0500
- Reverse thrust not to be used after landing between 2200-0600[107]

Noise Charges

- Landing and take-off charges are determined by the aircraft's maximum take-off weight, noise category and time of arrival/departure. Fees are adjusted as follows for aircraft classified as Chapter 3 and Chapter 4:[108]
    - Cumulative margin between 0 and less than 5 EPNdB: Base charge +60%
    - Cumulative margin between 5 and less than 9 EPNdB: Base charge +40%
    - Cumulative margin between 9 and less than 18 EPNdB: Base charge
    - Cumulative margin of 18 EPNdB of greater: Base charge -20%
- Governmental Planning Compensation Levy: The levy is used to fund claims, the demolition of buildings and relocation of houseboats in the vicinity of Schiphol that were pre-financed by the Government. [109]
    - Charged at EUR0.50 per landing, per tonne of maximum take-off weight
- Airport Noise Insulation Levy (charged up until July 2015) [110]
    - Charged at EUR 84.25 per landing

Noise Insulation Programs

- Sound insulation has taken places over several phases. Eligible buildings were within the:
    - 40, 50 and 60 Ke contours over a 24 hour period[111]
    - Required inside sound exposure level should not exceed Laeq = 26 dB(a) for the night period[112]
        - Insulation only available for bedrooms

[106] Schiphol Airport, Boeing,http://www.boeing.com/resources/boeingdotcom/commercial/noise/schiphol.html
[107] Schiphol Airport, Boeing,http://www.boeing.com/resources/boeingdotcom/commercial/noise/schiphol.html
[108] Summary airport charges, Schiphol Group, 1 April 2016, http://www.schiphol.nl/B2B/RouteDevelopment/ChargesAndSlots/AviationChargesAndConditions1.htm
[109] Summary airport charges, Schiphol Group, 1 April 2016, http://www.schiphol.nl/B2B/RouteDevelopment/ChargesAndSlots/AviationChargesAndConditions1.htm
[110] Summary airport charges and conditions, Schiphol Group, 1 April 2015, http://www.schiphol.nl/B2B/RouteDevelopment/ChargesAndSlots/AviationChargesAndConditions1.htm
[111] Schiphol Airport, Boeing,http://www.boeing.com/resources/boeingdotcom/commercial/noise/schiphol.html
[112] The design of sound insulation measures for dwellings around Amsterdam Airport Schiphol, Vercammen, M.L.S, http://www.peutz.de/pdf/Internoise_2004_sounddwellings.pdf

Phase	Year	Total Properties	Total Cost
Phase 1	1984-1997	**13,297**	**€577mn**
Phase 2	1997-2005		
Phase 3	2005 to current		

Demolition and Acquisition

- Between 2003-2005 with the introduction of new noise limits, buildings within the 65Ke and 71 dB(A) contours were subject to demolition:[113]
  - 43 houses and 11 other buildings demolished due to noise limits at a cost of €22.8mn
  - 82 houses and 21 buildings demolished for external safety reasons at a cost pf €39.8mn
- Between 2008 and 2015, a separate demolition and acquisition program was made available for residents living just outside the contours of the main program. Approximately €30mn was spent on the program and a second phase of the program is planned to be launched in the near future.

[113] Schiphol Airport, Boeing,http://www.boeing.com/resources/boeingdotcom/commercial/noise/schiphol.html

Appendix E Summary Data – Sydney Airport, Sydney, Australia

Airport Overview

- Three passenger terminals, freight facilities and three runways
- Total of 39.7 million passengers and 310,007 aircraft movements were recorded in 2015.[114]
- Only commercial passenger airport serving Sydney, with two small general aviation airports. Located 12.5 km from downtown Sydney. The airport is surrounded by residential areas on three sides, with a bay on the fourth side.

Expansion History

- The airport's third runway was completed in 1994. The aircraft noise was heavily protested against and prompted a senate inquiry. In 1995, the Senate Select Committee identified many deficiencies in the way in which aircraft noise information had been conveyed to the public in the Environmental Impact Statement for the Third Runway at Sydney Airport.[115]
- The Government has debated since the 1940s, how to address the growth in air travel and future capacity constraints at Sydney Airport.[116] Options have included adding two parallel runways to the existing airport or building a second Sydney airport.[117]
- In 2014, the Australian Government officially designated the site for a second Sydney airport, 'Western Sydney Airport' at Badgerys's Creek. The site is located approximately 60km from the Sydney CBD in a rural area. The operator of Sydney Airport has the first right of refusal to develop the airport and is due for completion in mid-2020.[118]

Noise Abatement Operational Procedures

- The Sydney Airport Demand Management Act 1997 limits the number of aircraft movements at the airport to 80 runway movements per hour. The cap is designed to limit noise and environmental impacts. Airlines must receive an allocated slot to take-off and land at the airport.[119]
- The Long Term Operating Plan was developed through a consultative process in 1997 in response to community pressure to share the noise generated by Sydney Airport. The plan has been adopted by the airport and has the following targets:[120]

[114] Airport Traffic Data, The Department of Infrastructure and Regional Development, 2 March 2016, https://bitre.gov.au/publications/ongoing/airport_traffic_data.aspx
[115] Discussion paper, Expanding Ways to Describe and Assess Aircraft Noise, Department of Transport and Regional Services, Commonwealth of Australia, March 2000, https://infrastructure.gov.au/aviation/environmental/transparent_noise/expanding/pdf/sepb_discussion_paper.pdf
[116] Second Sydney Airport – A Chronology, Parliament of Australia, Williams, Paula, Parliament of Australia, 29 June 1998, http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Publications_Archive/Background_Papers/bp9798/98BP20
[117] NSW Treasurer Mike Baird back more runways, no new airport for Sydney, Clennell, Andrew, The Australian, 12 November 2012, http://www.theaustralian.com.au/news/nsw-treasurer-mike-baird-backs-more-runways-no-new-airport-for-sydney/story-e6frg6n6-1226514736234
[118] Western Sydney Airport, The Department of Infrastructure and Regional Development, 8 March 2016, http://westernsydneyairport.gov.au/
[119] Slot Management at Sydney Airport, The Department of Infrastructure and Regional Development, 29 February 2016, https://infrastructure.gov.au/aviation/airport/planning/apr_slots.aspx
[120] The Long Term Operating Plan, Sydney Airport Community Forum, 14 May 2015, http://sacf.infrastructure.gov.au/LTOP/index.aspx

- Noise sharing targets for the areas north, south, east and west of the airport. These runway targets have not been particularly to the north and west of the airport[121]
- As many flights as possible over water or non-residential areas
- Different combinations of preferential runways being used at different times of the day to provide individual areas with respite periods from noise

- Limitations on use of reverse thrust during the curfew period

Operational Restrictions

- In 1995 following the opening of the runway, the Sydney Airport Curfew Act 1995 was introduced. The curfew operates between 11pm and 6am, with take offs and landings restricted to specific types of aircraft and operations: [122]
  - A maximum of 24 international passenger landings allowed between 5am and 6am and must be in aircraft that meets the strictest ICAO Chapter 3 noise standards.
  - Zero aircraft movements between 11pm and midnight
  - Aircraft are not permitted to take off over suburbs after 10.45pm
  - 3 freight operators receive a quota of 146 movements each per week and must be Chapter 3 aircraft
  - Restricted flights paths over Botany Bay (water) during the curfew period and in the shoulder periods of the curfew on the weekends.

Noise Charges

- Fines of up to AUD $850,000 for a body corporate for breaking the curfew restrictions. [123]
- In October 1995, a levy for each aircraft was introduced under the Aircraft Noise Levy Act 1995. The levy continued until June 30, 2006 when all costs of the insulation program had been recovered. The levy was applied to all landings and based on the noise characteristics of each aircraft.[124]
- The airlines recovered their cost by levying an amount of AUD$3.40 per passenger[125]

[121] Sydney Airport, Master Plan Chapter 14: Noise Management, Sydney Airport, https://www.sydneyairport.com.au/corporate/~/media/files/corporate/environment%20plan/master%20plan/2033/chapter%2014_noise%20management.pdf?force=1.
[122] Curfew at Sydney Airport, Department of Infrastructure and Regional Development, 26 February 2015, https://infrastructure.gov.au/aviation/environmental/curfews/SydneyAirport/SydneyCurfewBrief.aspx
[123] Curfew at Sydney Airport, Department of Infrastructure and Regional Development, 26 February 2015, https://infrastructure.gov.au/aviation/environmental/curfews/SydneyAirport/SydneyCurfewBrief.aspx
[124] Residential Insulation Scheme around Sydney Airport, Burgess, M, Cotton, M, Butler, K, Department Transport and Regional Services, 2000, http://www.conforg.fr/internoise2000/cdrom/data/articles/000358.pdf
[125] Goods and Services Tax Industry Issues Tourism and Hospitality Industry Partnership, Australian Taxation Office, https://www.ato.gov.au/law/view/document?docid=GII/GSTIITH7/NAT/ATO/00001

Insulation Program

- The noise insulation program began in November 1994 to address the impact of the opening of the third runway. The following properties were eligible:[126]
  - Australian Noise Exposure Index (ANEI) 40 (approx. L_{DN} 75): Residences were acquired and the land converted to a park[127]
  - ANEI 30 contour (approx. L_{DN} 65): Residential properties received financial assistance for sound insulation.
  - ANEI 25 contour: public buildings – schools, churches, day care centres and hospitals
- The geographical boundaries for eligibility were reviewed annually to reflect any changes in aircraft activity.[128]
- The government funded up to a maximum of AUD$60,000 per house hold. [129]
- The program has now closed and all properties had been insulated. The cost of the scheme was AUD$408mn and funded through the Aircraft Noise Levy:
  - 4,083 homes and 99 public buildings were insulated, and 147 residences voluntary acquired[130]

[126] Sydney and Adelaide Noise Insulation Program, Department of Infrastructure and Regional Government, 20 October 2014, https://infrastructure.gov.au/aviation/environmental/insulation/
[127] Residential Insulation Scheme around Sydney Airport, Burgess, M, Cotton, M, Butler, K, Department Transport and Regional Services, 2000, http://www.conforg.fr/internoise2000/cdrom/data/articles/000358.pdf
[128] Cost Recovery Impact Statement (CRIS) Noise amelioration – Sydney and Adelaide Airports, Department of Transport and Regional Services, 2005, https://infrastructure.gov.au/department/statements/2005_2006/budget/pdf/CRIS-NOISE_AMELIORATION_DOTARS.pdf
[129] Cost Recovery Impact Statement (CRIS) Noise amelioration – Sydney and Adelaide Airports, Department of Transport and Regional Services, 2005, https://infrastructure.gov.au/department/statements/2005_2006/budget/pdf/CRIS-NOISE_AMELIORATION_DOTARS.pdf
[130] Managing noise, Sydney Airport Limited, https://www.sydneyairport.com.au/corporate/community-environment-and-planning/environment/managing-noise.aspx

Appendix F Summary Data – Suvarnabhumi Airport, Bangkok, Thailand

Airport Overview

- Two parallel runways and two parallel taxiways to accommodate simultaneous departures and arrivals
- Total of 52.38 million passengers and 310,870 air craft movements were recorded in FY 2015.[131]
- The airport is designed to accommodate only 45 million passengers and 600 flights per day (currently averaging 800 flights per day)[132]

Expansion History

- The airport opened in 2006 with two runways
- Various expansion projects are being planned including a new domestic and satellite terminal, expansion of the current terminal and a third runway. These projects would increase capacity to 85 million passengers. These projects are due for completion by 2020.[133]
- The building of the third runway is undergoing an Environmental Health Impact Assessment (EIA) by the Office of Natural Resources and Environmental Policy and Planning[134]. In 2011, there were plans to build a fourth runway by 2020 and a fifth runway by 2024.[135]

Noise Abatement Operational Procedures

- Runways are operated to achieve the highest possible rate of arrivals and departures[136]
- Since late 2006, aircraft exceeding 103 dB are banned from operation at the airport[137]
- Thailand is an ICAO Contracting State, however unknown whether recommendation phasing out Chapter 2 airlines has been adopted. [138]
- All departing aircraft required to apply thrust reduction at 1500 feet and acceleration at 3000 feet[139]

[131] Air Transport Statistic, Airports of Thailand PLC 2015, http://aot.listedcompany.com/transport.html
[132] Open-sky policy must continue, says airlines, The Sunday Nation, 24 May 2015, http://www.nationmultimedia.com/business/Open-sky-policy-must-continue-say-airlines-30260797.html
[133] Second phase expansion of Bangkok's Suvarnabhumi airport delayed, Airport Technology, 22/05/2015http://www.airport-technology.com/news/newssecond-phase-expansion-of-bangkoks-suvarnabhumi-airport-delayed-4583666
[134] AOT outlines major expansion, Ngamsangchaikit, Wanwisa, July 2015 http://www.ttrweekly.com/site/2015/07/aot-outlines-major-expansion/
[135] Thailand Unveils Suvarnabhumi Airport's $5.47bn Plan, 3 August 2011, Airport Technology, http://www.airport-technology.com/news/news126228.html
[136] VTBS, Suvarnabhumi Intl, Jeppesen, http://www.fly-sea.com/charts/VTBS.pdf
[137] VTBS, Suvarnabhumi Intl, Jeppesen, http://www.fly-sea.com/charts/VTBS.pdf
[138] VTBS, Suvarnabhumi Intl, Jeppesen, http://www.fly-sea.com/charts/VTBS.pdf
[139] VTBS, Suvarnabhumi Intl, Jeppesen, http://www.fly-sea.com/charts/VTBS.pdf

Operational Restrictions

- Use of reverse thrust limited between 0200 and 600am local time[140]
- In 2007, residents applied to the Central Administrative Court for a night flight ban between 10pm and 5am[141], impacting around 166 flights, however this was rejected due to the economic impact[142]

Compensation Measures

- The AOT calculated that 640 buildings were affected in the NEF>40 area and 15,676 buildings were affected in the NEF 30-40 area.[143]
- The initial compensation package of THB 736 million baht was applied to
  - NEF>40 Areas: purchase land and buildings (constructed prior to 2001) or if the owners did not agree to sell, receive compensation for building and installing noise insulation measures.
    - Values of the properties were based on expropriated real estate legislation without deducting depreciation cost, however adding marketing margins[144]
  - NEF 30-40 Areas: provide compensation to improve buildings and structures to reduce noise impact if the noise disturbance level exceeds 10 decibels from standard noise level (applicable to buildings constructed before 2001).
    - This criteria was amended to be based on a noise contour map developed by the Pollution Control Department, Thailand[145]
  - Two years after the airport opened, THB 402 million had been paid in compensation.
    - THB 220 million for purchasing in areas with NEF>40 and
    - THB 182 improving 10 buildings in areas with NEF30-40[146]
- In March 2009, the government approved a noise compensation budget of THB11.2 billion (approx. GBP225m) [147]
- As of February 2011, BHT 1.25 billion in compensation had been paid to populations in the NEF>40 and NEF 30-40 areas[148]

[140] VTBS, Suvarnabhumi Intl, Jeppesen, http://www.fly-sea.com/charts/VTBS.pdf
[141] Airport area residents seek halt to flights, 6/12/2007, http://suvarnabhumi-info.blogspot.co.uk/2007_12_01_archive.html
[142] Residents suffer setback in noise battle, Bangkok Post, 01/03/2012, http://www.bangkokpost.com/print/282243/
[143] Corporate Social Responsibility, Airports of Thailand Public Company Limited, 2014, http://www.airportthai.co.th/uploads/files/CSR_Report_of_2014.pdf
[144] Compensation for noise impact from the operation of Suvarnabhumi Airport Information for consideration, Airports of Thailand Public Company, https://airportthai.co.th/uploads/profiles/0000000009/filemanager/files/2013/7.Compensation.pdf.
[145] Compensation for noise impact from the operation of Suvarnabhumi Airport Information for consideration, Airports of Thailand Public Company, https://airportthai.co.th/uploads/profiles/0000000009/filemanager/files/2013/7.Compensation.pdf.
[146] Aviation Impacts on Property Values and Management: The Case of Suvarnabhumi International Airport, Limlomwongse Suksmith, Patcharin and Nitivattananon, Vilas, Volume 39, Issue 1, July 2015 http://www.sciencedirect.com/science/article/pii/S038611121400020X?np=y
[147] Aviation Impacts on Property Values and Management: The Case of Suvarnabhumi International Airport, Limlomwongse Suksmith, Patcharin and Nitivattananon, Vilas, Volume 39, Issue 1, July 2015 http://www.sciencedirect.com/science/article/pii/S038611121400020X?np=y
[148] Aviation Impacts on Property Values and Management: The Case of Suvarnabhumi International Airport, Limlomwongse Suksmith, Patcharin and Nitivattananon, Vilas, Volume 39, Issue 1, July 2015 http://www.sciencedirect.com/science/article/pii/S038611121400020X?np=y

- In October 2013, the government agreed to extend the compensation to buildings built up until 2006. An additional 58 buildings were found to be affected in the NEF>40 area and 3,406 buildings in the NEF 30-40 area. [149]

- As of opening date until August 2014,[150]

  - NEF >40: 96.81% of affected properties received compensation, across 605 properties for BHT941.28 million

  - NEF 30-40: 91.29% of buildings affected received compensation across 14,311 buildings for THB 2,865.57 million, 141 buildings were waiting to receive compensation or did not agree with the appraised value. 699 buildings were abandoned or had no owner found.

  - Improvements were made to 21 buildings in noise sensitive areas such as hospitals and religious buildings of BHT292.537 million

- In planning for a third runway, Suvarnabhumi Airport director Somchai Sawasdipol in 2012 said that approximately 4,000 houses were expected to be affected by the construction of the third runway and THB 7.9 billion had been set aside in compensation.[151]

[149] Corporate Social Responsibility, Airports of Thailand Public Company Limited, 2014, http://www.airportthai.co.th/uploads/files/CSR_Report_of_2014.pdf
[150] Corporate Social Responsibility, Airports of Thailand Public Company Limited, 2014, http://www.airportthai.co.th/uploads/files/CSR_Report_of_2014.pdf
[151] Noise dispute over third runway revives, Bangkok Post, 26/09/2012http://www.bangkokpost.com/print/314063/

Appendix G Introductory Email

Dear [XXX],

I work within the Infrastructure Transport and Government team in EY London. We have been engaged by the Department for Transport (a department of the UK Government) to assist them with their consideration of options for expanding airport capacity in the UK at either Heathrow or Gatwick airports.

DfT want to understand the scale and structure of compensation packages that have been offered to populations living close to comparable airports, particularly during periods of significant airport expansion.

DfT have identified [XXX] as a comparable project and so would like to include it within the study.

The process we propose is that you, or the appropriate person, be sent a short questionnaire which sets out the DfT areas of interest. We will then conduct a short telephone interview to discuss your responses.

It is expected that the individual responses will be non-attributable but that data would be presented on an airport basis.

My contact details are below if you would like to discuss further. We are unfortunately under some tight time constraints and so we should be grateful of a response by [XXX].

Background Points to the Survey

- UK airport capacity in south east England is constrained.
- In July last year, an independent commission appointed by the UK Prime Minister, recommended the construction of an additional runway at Heathrow Airport as a solution to the capacity problem but also said that a new runway at Gatwick Airport was credible.
- The commission's report recommended that a 'world class' compensation package for local residents was required. This compensation package should address, for example, impacts on property values, noise impacts and seek to ensure that local residents share the economic benefit of expansion.
- The UK Government wants to understand compensation packages offered by airports outside of the UK to help them to form a view on appropriate packages for Heathrow and Gatwick airports
- DfT has asked EY to approach international airports on their behalf and to report on what has been offered by expanding airports in other jurisdictions.

Appendix H Compensation Package Script and Questionnaire

Introduction

[NAME], on behalf of the UK Department of Transport, we thank you for taking the time to speak with us today and the responses you have provided us with. In the room with me I have [NAME], [POSITION] from [ORGANISATION], [NAME], [POSITION] from [ORGANISATION], and [NAME], [POSITION] from [ORGANISATION].

Can I ask who you have with you on the call?

Just a few administrative matters, we want to advise you that we will be taking notes today during our meeting; however we can provide you with a copy of these after the meeting. Also any information we discuss today may end up in the public domain so please keep that in mind as we move through the questions.

As we set out in our introductory email, the UK Department for Transport is currently considering options for expanding airport capacity in London. The current options for expansion include building an additional runway at either Heathrow Airport or Gatwick Airport, with Heathrow nominated as the preferred site by the Airports Commission last year. Before the UK Government nominates the site for expansion, it wants to understand the compensation packages offered by each of the Heathrow and Gatwick airport operators in comparison to what has been offered by other major international airports. This will allow the UK Government to determine whether the packages offered by Heathrow and Gatwick Airport can be considered world-class

To clarify, we refer to compensation as the financial and non-financial measures offered by the airport to the surrounding population that have been negatively impacted by the construction of the additional runway through increased aircraft noise or from the proximity to the airport. The types of financial measures include mandatory and voluntary purchases of homes and funding of insulation programs for affected residents. Non-financial measures would be night flight restrictions and changes to airport operations such as mandating continuous descent approaches or reconfiguration of runways. Do you need any more information as to what we would like to discuss?

The main questionnaire

The Elements of the Compensation Package

You currently have a suite of measures in place to manage the impact of noise on the surrounding populace. We have sent you a table setting out the information we have been able to research into the scope and cost of those measures.

Can you talk us confirm these numbers accurately reflect your understanding of what your Airport does in relation to noise impacts, or describe where you think there are differences in scale or scope.

[Response]

DfT are considering the issues of noise management, and wider compensation in the context of runway expansion. Can you describe how in either your, most recent experience of expansion, or if expansion is contemplated in the near future, how your organisation approached these issues

[Response]

How did you balance the relative contributions of each of the package measures, e.g., determine the length of night flight bans relative to financial support to noise management measures in private property?

[Response]

Details of the Measures

Noise Insulation Works

Part of your measures in addressing airport noise for residents is a financial package to support noise reduction works in private properties. Can we expand on this package.

How did private dwellings qualify for financial support?

[Response]

Did owners/landlords have to make a claim to you or did you proactively address them.

[Response]

What were the criteria for a successful claim

[Response]

Were owners required to source their own works/contractors or did you assist in the procurement of service providers

[Response]

Was the offer to owners time bound, i.e., did a claim have to made within a certain period of time

[Response]

Was the offer of financial assistance specific to the circumstances of the property or was it a fixed sum per property. Was the offer capped by property

[Response]

And when was this measure announced in relation to the runway being opened? How long did it take for the population to receive their pay-outs?

[Response]

Is this program ongoing

[Response]

Overall, would you say the uptake has been above or below expectations?

[Response]

Within the reported costs we have identified would there be costs related to non-residential properties (e.g., schools, commercial premises) and if so how much would you estimate that to be.

Night Flight/Airport Restrictions

In relation to the [night flight/airport restrictions], why were these implemented? And are there any more restrictions planned?

[Response]

And have you quantified what impact this has had on revenues? Was there any compensation paid to the airport operator?

[Response]

[Land Acquisition through compulsory purchase., etc.]

In the course of operating or expanding the airport have you had a need to acquire property through compulsory or statutory measures?

[Response]

Where such purchases took place how was the purchase value established

[Response]

Do you have any information that would indicate whether the prices paid for property were different to existing Open Market Value

[Response]

Do you have any information where you believe a premium to existing use value was paid, what the level of that premium was.

[Response]

[Taxes and Landing Charges]

[We understand there is a noise tax]/[are there any specific taxes or fees levied for noise pollution?] Can you explain why this was implemented?

[Response]

Do you have any estimates on what this cost is per flight and how much is raised per year?

[Response]

Closing

In terms of the measures have you quantified what is spent on each of the measures or on an annual basis?

[Response]

Overall, were these measures introduced for statutory reasons or based on market precedence?

[Response]

Are there any other measures, particularly in relation to expansion of airport capacity, that you would want to draw our attention to and why?

[Response]

What measures would you change if you had to do this process again.

[Response]

Do you have any questions for us

[Response]

Thank you for your time, we appreciate all the information you have given us. We send a long a copy of the notes in the next couple of days. We will then be compiling this information into a report. Is there a contact in your team we can follow up with if we want to confirm any details while we are compiling our report?

CLOSE

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