

# Heathrow Winter Resilience Enquiry

## Report of the Heathrow Winter Resilience Enquiry





# Chairman's Foreword

Colin Matthews

Chief Executive Officer

BAA

Dear Colin

I am pleased to submit the report of the Heathrow Winter Resilience Enquiry.

You commissioned me in December 2010 to chair an expert panel in order to establish the lessons to be learned following the severe weather at Heathrow in 2010. Our review makes a number of important recommendations on how BAA, working with the airline community, NATS and the CAA, can improve Heathrow's resilience to disruption in order to improve passenger welfare and experience.

Regardless of the cause of the disruption during December, many people from BAA and the airline community worked extremely diligently and for long hours during the crisis period. This needs to be borne in mind as you and colleague executives review this report.

The panel believes that the recommendations in its report will increase the quality of service provided to passengers and the Heathrow Community and ensure the airport is better placed to respond to a future event of this kind.

I would like to thank all BAA staff and other contributors who helped the panel develop its understanding of the events. We observed great openness and co-operation from all.

I would also like to thank the panel members for sharing their wisdom and expertise and their dedication in helping develop this report.

The panel recommends that BAA develops a detailed implementation plan for these recommendations and that the BAA Executive Committee has responsibility for its delivery. The panel would be happy to review this plan to help assure its delivery.

Yours sincerely

Professor David Begg

March 2011

# Contents

Section 1:	Context and purpose of the Enquiry	4
Section 2:	The Enquiry process	5
Section 3:	Heathrow Airport	6
Section 4:	Comparisons with other airports	13
Section 5:	Weather at Heathrow in December 2010	16
Section 6:	Events at Heathrow between 17 and 23 December 2010	18
Section 7:	Observations and Recommendations	26
	<i>Part A: Preparation and Planning</i>	28
	<i>Part B: Command and Control</i>	34
	<i>Part C: Communications</i>	38
	<i>Part D: Passenger Welfare</i>	41
Annex A:	Terms of Reference	44
Annex B:	Enquiry Methodology	49
Annex C:	Persons appearing at the Enquiry and written submissions received	52
Annex D:	Timeline	57
Annex E:	Weather at Heathrow in December 2010	64
Annex F:	Glossary	73

# Executive Summary

- 1 The unusual weather conditions experienced in Heathrow in December caused disruption on a number of fronts. Passengers were unable to travel at an important time of the year; over 4,000 flights were cancelled, causing significant impact to airline schedules globally; and Heathrow Airport's reputation was damaged.
- 2 Colin Matthews, the CEO of BAA, established the Heathrow Winter Resilience Enquiry to examine BAA's performance during this event and other snow events in 2010 and recommend changes. This report is the product of the Enquiry. It is focused on the lessons that BAA - working closely with Heathrow's airlines and other external agencies - needs to learn so that it can strengthen the airport's resilience by improving its ability to plan and respond to adverse weather incidents, as well as deliver quality services to passengers during such periods. The Enquiry was not a general enquiry into the event in that it only looked at BAA's performance. The Enquiry focused on three areas:
  - i. Heathrow's plan in preparation for the adverse weather forecast;
  - ii. Heathrow's execution of the crisis management plan and response of the operation during the period of adverse weather disruption;
  - iii. Heathrow's recovery of operations after the adverse weather disruption had passed.
- 3 The panel placed a priority on consulting widely - within BAA, airlines, passengers, and airport stakeholders. The panel collected and reviewed material through six days of meetings and through written evidence submitted to it by the airline community, government, and trade bodies. The Enquiry collected experiences and views from passengers in three ways: focus groups, direct correspondence and a dedicated website set up to collect passengers' views. In total, this provided feedback from over 2,000 passengers.
- 4 This allowed the panel to form a picture of what it considers to be the key events experienced at Heathrow between 17 and 23 December 2010. The evidence base has allowed the panel to understand the problems faced by the Heathrow community, to form a view on the lessons to be learned and to make recommendations in the context of how Heathrow responds to future severe weather events.
- 5 BAA has historically demonstrated its ability to respond well to earlier weather events such as those in February 2009, January and November 2010. This was reported to the panel by BAA and by airlines. The main focus of this report has therefore been on the lessons to be learned from the response to the weather conditions experienced during the period 18 - 23 December 2010.
- 6 The weather during the month of December was unusual. It was the coldest December for 100 years. There were two extended snowfalls during the month, the first early in December, with Gatwick and Stansted experiencing significant snowfalls, but with less snow at Heathrow. All three airports were affected by the second snowfall. The actual snowfall at Heathrow (over the crisis period) occurred on the morning of Saturday the 18th - which resulted in a maximum snow depth of 9cm. The snow accumulated rapidly with 7cm falling in

the hour before midday. The Met Office confirmed that this level of snow fall was unusual, particularly with reference to recent years, and that the rate of accumulation was rare.

- 7 There was no single event or decision which led to the disruption experienced during the 18 - 23 December period. The following seem to the panel to be the most important factors which together led to the events on those days:
- The potential impact of the weather forecast was not fully anticipated in the days preceding the event. This led to a low state of preparedness ahead of the snow and insufficient stock of critical supplies;
  - Stand clearance rate was slower than required and slower than rates achieved elsewhere. This was because the condition of snow on stands became very difficult as a result of earlier aircraft de-icing and stand gritting. Airlines and BAA had not agreed priorities and protocols for dealing with and resourcing this situation. BAA did not have specialised equipment for under aircraft stand clearance;
  - BAA's crisis management system was invoked on Friday 17 December to deal with congestion in Terminal 5. The response to the snow on 18 December was initially not effective. There were failures in communication and coordination within BAA, and between BAA and airlines, which led to ineffective engagement between different parties, resulting in ineffective situational awareness and a delay in response and escalation;
  - Confused and conflicting messages caused incorrect signals to go to airlines, to passengers, and from airlines to passengers;
  - The Executive Crisis Management Team (ECMT) and the Capacity Constraints Group (CCG) proved effective in managing the crisis once invoked. Both groups should have been mobilised earlier.
- 8 Passengers experienced distress as a result of the disruption at Heathrow. This was a result of the following:
- There was an apparent lack of compliance, by some airlines, with EC Regulation 261/04. This sets out obligations on airlines to provide compensation and assistance to passengers in the event of cancellation, long delays and being denied boarding;
  - There were different and conflicting messages to passengers about the state of the airport and of flights;
  - There was a slow reaction to terminal congestion by BAA. BAA's response to terminal congestion and support for passenger welfare was increasingly effective from 20 December onwards.
- 9 The panel recommends that Heathrow Airport – because of its critical importance to air transport in the UK and globally – should adopt an improved resilience target that the airport never closes as a result of circumstances under its control, except for immediate safety or other emergency threats. This is a demanding target but one which the panel believes is achievable and appropriate for Heathrow. Achieving this target will require BAA to lead a collaborative programme of work and investment with the airlines, other airport stakeholders, NATS and the Civil Aviation Authority (CAA). The panel recommends that these constituents actively work together to implement improved snow plans, improve command and control processes, and establish approaches to passenger welfare that are focused on the needs of the passenger. The panel understands that the CEO of BAA is seeking to establish a

Strategic Board, led by BAA, with senior representatives from airlines, NATS and the CAA to improve Heathrow resilience. The panel supports this aim.

- 10 This report makes 14 specific recommendations. The panel asks that BAA takes responsibility for their delivery and execution. The recommendations are set out in detail in Section 7. In summary, the recommendations are:
- Preparation and Planning: BAA should lead work, together with airlines, NATS, the CAA, and other airport stakeholders, to agree an enhanced Heathrow snow plan. This should aim to ensure that the airport remains open at all times, except when it has to be closed for safety reasons. This may require additional investment from BAA and airlines. BAA needs to own the snow plan and ensure that it is reviewed, improved and tested regularly by all airport stakeholders;
  - Command and Control: There is a need for BAA to adapt its approach to emergency planning, response and recovery to better align with best practice. It should involve: simplifying BAA's crisis management process to the standard three tier process used by central, regional and local government and the emergency services across the UK; adoption of new systems, processes and information systems; and the full and structured engagement of stakeholders, especially airlines and ground handlers, as well as police, fire and rescue services;
  - Communications: A single physical control centre should be established for the management of major incidents, where parties can meet to make more informed decisions. BAA's command and control infrastructure should be consolidated into one Airport Communication and Control System providing improved situational awareness to all. Improved processes should be established for the rapid flow of information between airfield status, airline flight schedules, and airport information systems. This should also extend to establishing a clear agreement with airlines and handlers on the manner in which decisions will be taken and communicated to passengers, media, government and the public at large. Communications to passengers must be improved
  - Passenger Welfare: BAA, together with airlines and retailers should prepare and routinely test a sustainable welfare plan that can be triggered immediately. The plan should include measures to ensure adequate, trained persons are available from BAA and the airlines and systems are in place to provide accurate information on flight and airport status.
- 11 Whilst the focus of the Enquiry has been on how BAA and the airline community responds to future adverse weather events, the panel is of the view that many of the lessons to be learned are important in relation to how BAA plans, tests and responds to resilience threats more generally. Consideration should therefore be given to the impact of the Enquiry's report in the context of the airport's wider resilience agenda.
- 12 The panel recognises that BAA has been making changes since the event in December. It is not the point of this report to investigate the adequacy of those; rather to focus on the lessons to be learned.

Heathrow Winter Resilience Enquiry Panel

March 2011

## Section 1: Context and purpose of the Enquiry

- 13 In December 2010 Heathrow Airport experienced a period of disruption caused by a snowfall on the morning of 18 December. This was one of the busiest times of the year with many passengers wanting to travel before Christmas. The snowfall came in the middle of a period of extreme cold which lasted from 16 to 27 December. The cold weather had already caused disruption to some passengers travelling via Heathrow as a result of delays caused by de-icing of aircraft by airlines, and the closure or partial closure of airports throughout Northern Europe.
- 14 Heathrow was closed for arrivals and departures at 1130 on Saturday 18 December. A limited number of flights subsequently took place during Sunday 19 December. The flow rate at the airport was increased to 33% capacity on the morning of Monday 20 December with one runway open. Capacity was increased further on Tuesday 21 December, and at 1630 that day both runways were opened. The airfield was fully operational, with all capacity constraints removed, by 0900 on Wednesday 22 December.
- 15 Over 4,000 flights were cancelled, disrupting the plans of many passengers. The impact was felt globally. BAA received much adverse media criticism of its handling of the event.
- 16 As a result of the disruption, BAA's CEO, Colin Matthews, set up the Enquiry which is aimed at learning lessons from this event. The Heathrow Winter Resilience Enquiry was established in December 2010 and has been conducted by a panel of experienced executives with, collectively, strong aviation sector experience. The Enquiry was chaired by Professor David Begg, a Non-Executive Director of BAA and Chairman of the Business Infrastructure Commission. The Enquiry has been advised by David Quarmby CBE, who recently completed a review on the resilience of England's transport system in Winter<sup>1</sup> for the Secretary of State for Transport. Full membership of the Enquiry panel is set out in Annex A.
- 17 This report is the final and only report of the Enquiry. Its focus is on the lessons to be learned, so that the disruption which occurred in December 2010 can be avoided for the future; and on recommending the development of the plans and preparations which BAA – working with Heathrow's airlines and other external agencies – should make to ensure that in similar adverse circumstances, quality services are reliably provided to passengers.
- 18 A full glossary can be found in Annex F. The following definitions have been used in the report to describe the organizations involved:
  - BAA: the group of legal entities which manages Heathrow (including Heathrow Airport Ltd), Stansted, Aberdeen, Edinburgh, Glasgow and Southampton airports;
  - Heathrow (also referred to as the Heathrow Community): the collective community of service providers at Heathrow, including Heathrow Airport Ltd, airlines and their ground handlers, NATS, and other bodies.

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<sup>1</sup> The Resilience of England's Transport Systems in Winter (Final Report) Published October 2010



## Section 2: The Enquiry process

### Terms of reference

- 19 The terms of reference of the Enquiry are attached as Annex A.

### Process and independence

- 20 The biographies of panel members can be found in Annex A. Lists of those who appeared in person before the panel and of the organizations that made written submissions is at Annex C.
- 21 The terms of reference require the panel to carry out a “forensic fact-based review” and to make recommendations. In order to carry out that review and make those recommendations it has been necessary for the panel to form an understanding of the relevant events before, during and after the period from 18 to 23 December 2010, as well as of the relevant plans and preparations which were in place. That understanding has necessarily been conditioned by an analysis of the information which has been made available to the panel by BAA, Heathrow Airport Ltd (HAL), airlines, other interested parties and passengers, as well as by its own collective experience, and the panel has not sought to reach a definitive determination of these matters for legal or other purposes.
- 22 In accordance with the objectives set for it, the panel has been careful to approach its work in a fully independent manner. The following conflicts of interest were declared and have been kept in mind by the panel in doing its work:
- Professor David Begg has been a Non-Executive Director of BAA since November 2010;
  - Jim Hunter MBE is the General Secretary and Managing Director of the Heathrow Airline Operators Committee and was a member of the BAA Crisis Support Team, representing Heathrow airlines, during the event.
- 23 Further details of the process and methodology adopted by the panel are at Annex B.
- 24 The panel was impressed by the openness with which those who provided information did so and is grateful to BAA management for encouraging its personnel to adopt this approach. A near final draft of this report has been provided to BAA management in order that they can comment on its factual accuracy and on the panel’s compliance with its terms of reference. While the panel has taken account of the points made by BAA it has not accepted all that BAA has suggested; the contents of the report remain the responsibility of the panel alone.

## Section 3:

# Heathrow Airport

- 25 This section provides a description of Heathrow Airport, including background contextual information on its business structure, regulation and operating model.

### Overview of Heathrow

- 26 Key facts about the airport:
- Opened in 1946, Heathrow is located 24km west of Central London and is the world's busiest airport in terms of international passengers, and the busiest airport in Europe in terms of total passengers;
  - Heathrow is the UK's only hub airport used almost wholly by network airlines and has a significant proportion of transfer traffic;
  - Heathrow handles approximately 70% of all the UK's long haul air traffic and 51% of all air traffic in the Greater London area;
  - Heathrow is served by two parallel runways which generally operate in 'segregated mode', with arriving aircraft allocated to one runway and departing aircraft to the other at the same time;
  - Heathrow is permitted to schedule up to 480,000 air transport movements (ATMs) per year and currently operates at approximately 95% of its permitted capacity;
  - Heathrow has five terminals (including T2 which is currently under construction) which handled 65.7 million passengers in 2010;
  - Heathrow's extensive ground transport links facilitate access to the airport for passengers, cargo transporters and airport personnel, including integrated road, rail and underground connections.

### Key Statistics 2010

#### *Movements*

Annual air transport movements:	449,220
Daily average air transport movements:	1,247
Vehicles per day/week passing through the main tunnel:	Approx 50,000 per day (entering the Central Terminal Area) 350,000 per week.

*Airside Infrastructure*

Runways:	Northern Runway: 3,902m long Southern Runway: 3,658m long
Number of aircraft stands served by an air bridge:	118
Number of remote stands:	80

*Destinations and Airlines*

Number of Airlines:	95 (Heathrow based airlines are: British Airways, Virgin Atlantic and BMI)
Number of destinations served:	201

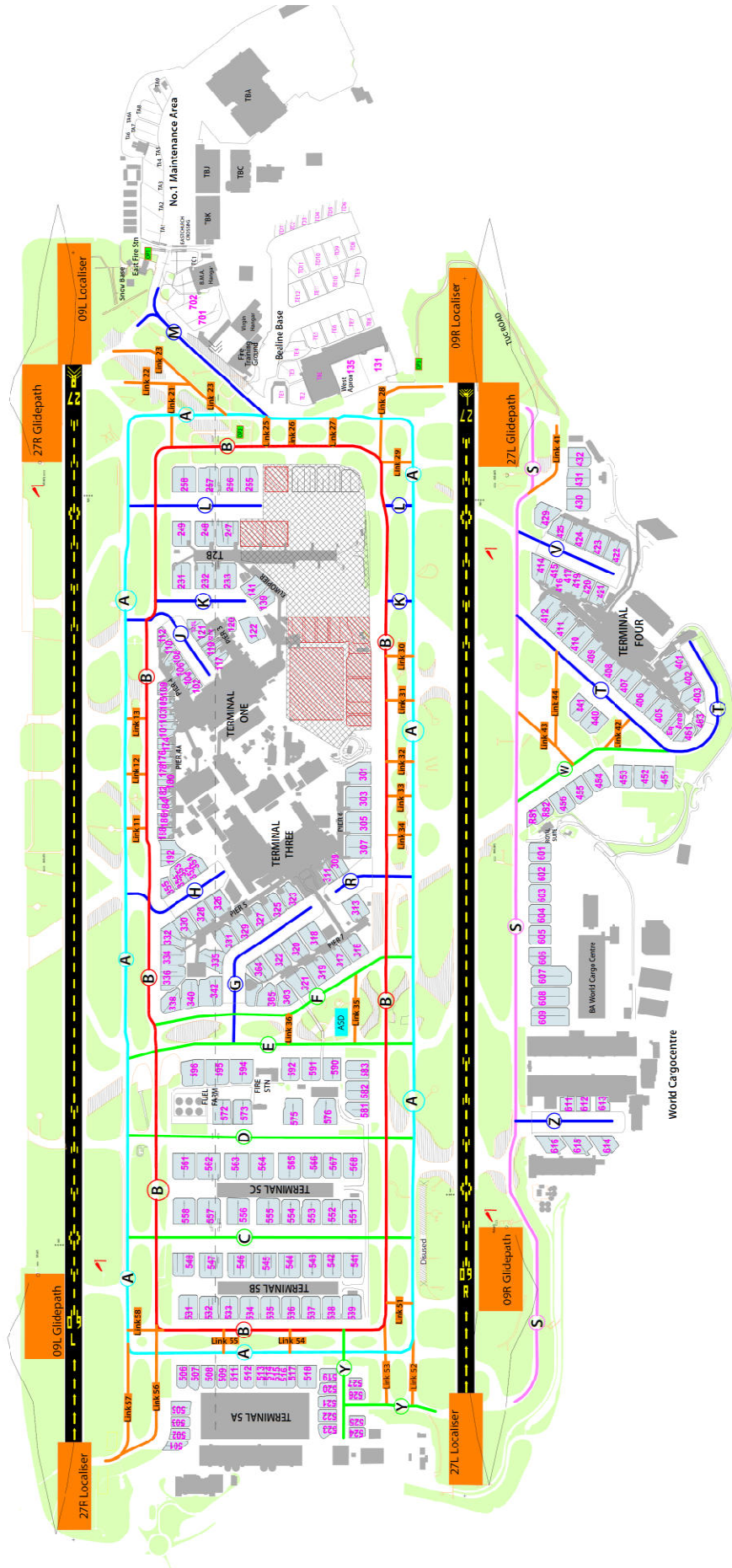
*Passenger Numbers*

Number of passengers arriving and departing per day:	Average 182,631 (split 50/50 between arriving and departing)
Number of passengers arriving and departing in 2010:	65.7 million
Percentage of international passengers:	92.6% (60.6 million)
Percentage of domestic passengers:	7.4% (4.9 million)
Percentage of transfer passengers:	37% (24.3 million)

*Terminals*

	T1	T2	T3	T4	T5
Opening	1968	2014	1961	1986	2008
Surface	74,601m <sup>2</sup>	185,000m <sup>2</sup>	98,962m <sup>2</sup>	105,481m <sup>2</sup>	353,020m <sup>2</sup>
Passengers (2010)	13.6 million	0	20.4 million	8.3 million	23.4 million
Airlines	20		38	36	1

Layout of Heathrow



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**KEY**

- 09L/27R & 09R/27L Runways
- ISL Critical Areas
- Taxiway
- ASD
- Outside Safety Department
- Disused Areas
- UNDER CONSTRUCTION
- Stand

## Regulation

- 27 Heathrow Airport works in an environment which is highly regulated both by the UK authorities and the EU. Compliance provides an important context for much of its business. The main regulatory bodies that influence BAA's operations include:
- Department for Transport: the government department responsible for transport policy, including aviation security, regulatory policy, and implementation of EC directives;
  - Civil Aviation Authority (CAA): the UK's independent aviation sector regulator that, among other things, is responsible for economic regulation, airspace policy, safety regulation, aerodrome licensing and consumer protection;
  - Competition Commission: involved in the price control determinations for the three London airports carried out typically every five years, as well as being the UK's overall competition regulator.

## Passenger rights

- 28 The panel understands that European law (Regulation EC 261/04) requires the airline (and not the airport) to provide assistance to passengers during delays. This includes catering, communications and overnight accommodation if necessary. If a delay extends beyond five hours passengers can request a refund if they choose not to travel. If a flight is cancelled alternative flight options should be offered. Where these are unacceptable a full ticket refund should be provided, and in some instances compensation.
- 29 Heathrow, like most airports, has a plan to respond to mass congestion in the airport. This has been agreed informally with the Airline Operators Committee (AOC) and the CAA and requires BAA to provide information and certain emergency welfare items (e.g. water, chairs, ponchos and blankets) to passengers, and additional shelter via marquees, when disruption is expected to exceed six to eight hours.

## Heathrow Operations

- 30 BAA works closely with many other service providers to deliver a safe, reliable service to passengers and airlines. Its stated aim is to "make every journey better". Hundreds of different businesses, as well as government agencies, work at Heathrow, from the largest airline alliances to small, independent businesses. In addition to carrying out their own responsibilities, BAA has to ensure that all these organizations work together seamlessly in the interests of passengers and other customers. This section explains the role of each principal agent:
- **Heathrow Airport Limited (HAL):** HAL owns and manages the airport infrastructure that enables airlines to operate their schedule and passengers to arrive and depart. A nominated HAL senior manager is also the airport licence holder under the CAA regulation and is responsible for ensuring that all safety requirements are met. Specific accountabilities include:
    - Airbridges – HAL owns and maintains the airbridges linking planes to the terminal buildings. Airlines are responsible for manoeuvring airbridges to the planes;

- Airfield maintenance – HAL is responsible for safe runway operations and runway lighting;
  - Airport utilities – HAL manages the provision of electricity, heating, water, lighting, fire alarms, etc;
  - Baggage – HAL is responsible for providing and maintaining baggage systems. Airlines manage hold baggage screening and handling;
  - Fire Service – HAL has responsibility for all fire service activities at the airport;
  - Flight information – HAL operates the flight information display screens in the terminals and online. This information is derived and republished from airline information;
  - Property – HAL's portfolio is diverse, including offices, airline lounges, business centres, warehouses, fuel facilities, crew reporting centres and aircraft hangars;
  - Retail – HAL develops, lets and manages retail units, including car parks, shops, catering outlets, currency exchanges and car hire;
  - Roads – HAL maintains the road network in and around the airport, which consists of over 50 kilometres of road carrying over 100,000 vehicles every day;
  - Safety and security – HAL's number one priority is the security of passengers. More than half of Heathrow's staff work in security and are responsible for passenger and staff screening, as well as general security around the airport.
- **Airlines:** Airlines are responsible for checking-in passengers, delivering hold luggage and cargo to its final destination, fuelling and de-icing aircraft, boarding passengers, passenger safety and on-board catering. Some airlines employ their own ground handling agents to carry out this work.
  - **Airport Coordination Limited (ACL):** Owned by the airlines, ACL is responsible for slot allocation, schedules facilitation and schedule data collection at Heathrow Airport. Slot allocation is a technique designed to balance the supply and demand for scarce airport capacity, in order to avoid unnecessary congestion and delays, through the issue of permissions for aircraft to land and take off at particular times.
  - **Airline Operators Committee (AOC):** Supports the airline community at Heathrow Airport and consults and collaborates with BAA in the common cause of providing a high standard of passenger service.
  - **Civil Aviation Authority (CAA):** The CAA controls all flight paths and aircraft routes at UK airports, regulates airlines, airports and NATS (see below). The CAA also sets airport charges at the London airports.
  - **Commercial Services:** Individual businesses provide catering, shopping facilities, car hire, car parking and banking services.
  - **Metropolitan Police:** The Heathrow Division provides an armed response to terrorist incidents in addition to its general law and order policing role.
  - **National Air Traffic Services (NATS):** Responsible for air traffic control and management, including managing arrivals and departures from the airport, and ensuring aircraft flying in UK airspace and over the eastern part of the North Atlantic are safely separated.
  - **Public transport operators:** National Express and other companies operate long-distance coaches to destinations around the UK. National Express also runs the Hotel Hoppa

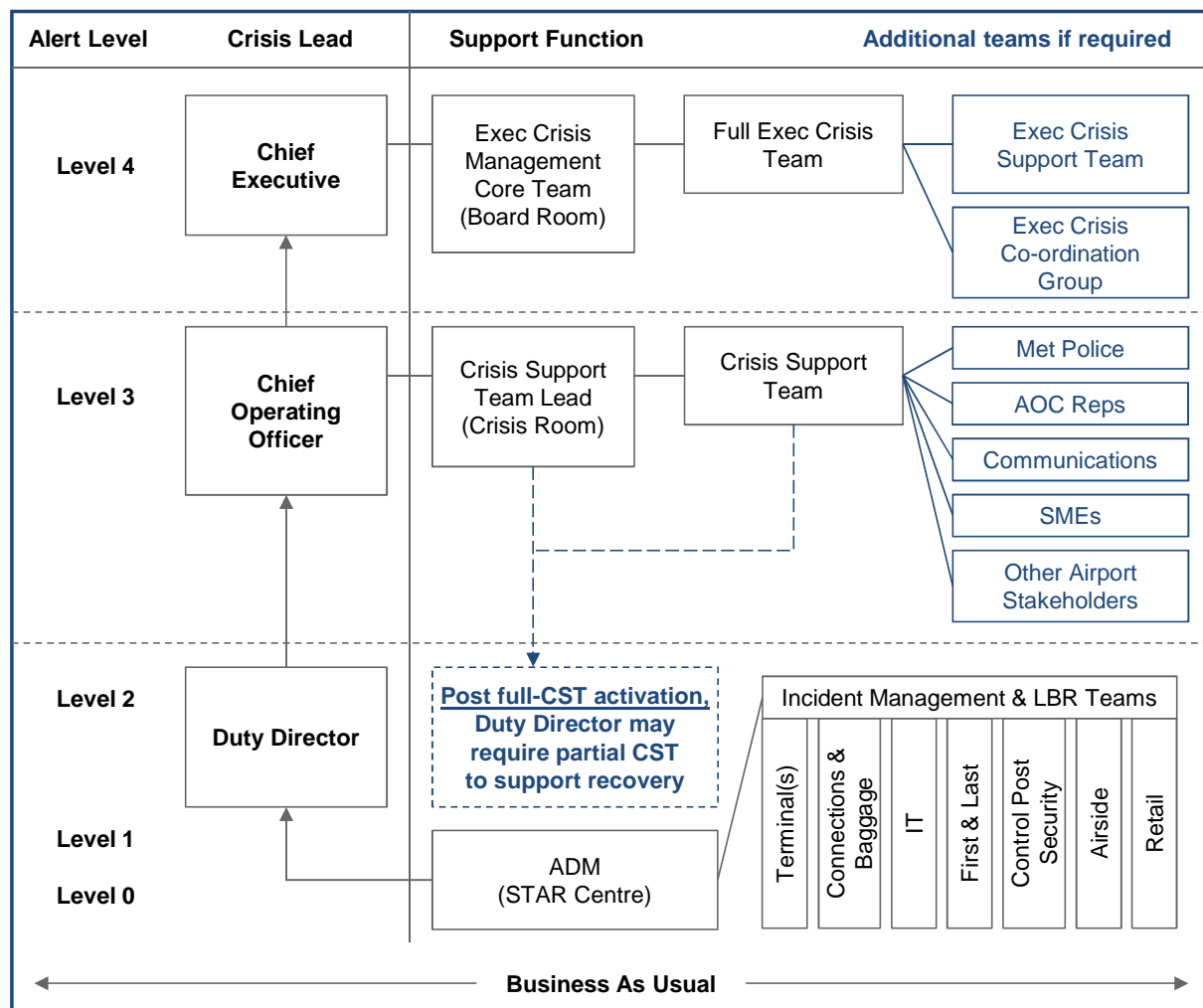
services to and from local hotels. Transport for London and other bus providers run local services to destinations around Heathrow, West London and the Thames Valley. London Underground Piccadilly Line operates to Central London. Taxis leave from all terminals. BAA operates the Heathrow Express to Central London;

- **UK Border Agency (UKBA):** Responsible for securing the UK border and controlling migration. It manages border controls, enforcing immigration and customs regulations, and considers applications for permission to enter or stay in the UK, including for citizenship and asylum.

## Heathrow Crisis Management

- 31 BAA’s crisis management framework aims to achieve business recovery in the shortest possible time, to minimise disruption to operations and passengers, limit reputational damage, and provide reassurance to both stakeholders and shareholders.
- 32 At the time of the crisis there were five levels of incident defined within the crisis framework ranging from Level 0, which is considered business as usual, through to Level 4 (which is a major cross-terminal crisis). Levels 1 and 2 fall within the incident management category; and Levels 3 and 4 trigger crisis management responses. This is shown in Figure 1 below:

Figure 1: Heathrow Airport Crisis Management Framework



- 33 Level 1 and 2 events activate Local Business Recovery Teams (LBRT). The main aim of an LBRT is to focus on and assist with the recovery of the operation. This involves providing support to those involved in the incident, providing communications links to the Crisis Lead and business partners, and overseeing a structured return to normal operations post incident. The LBRT is the information hub for the event and co-ordinates the immediate and mid-term response activity. In some cases additional Heathrow Community crisis teams are established to support the recovery, for example in a snow event the snow plan requires that Airside Operations establish a snow cell and an aircraft de-icing cell.
- 34 The overall control of the airside snow clearance operation is exercised by the Snow Cell (also referred to as the Airside LBRT). Its purpose is to:
- review all aspects of readiness, predictable and actual weather conditions and to act as a focal point for communications on aspects of adverse weather between all parties involved;
  - make decisions on the resumption of normal operations;
  - facilitate a meeting of all those involved in advance of any adverse weather; and
  - act as airside contact for all external snow clearance requests/activities as passed on from the Operations Monitoring Centre/Terminals.
- 35 The aircraft de-icing cell consists of BAA, airlines and de-icing service providers. Whilst the airlines remain responsible for de-icing aircraft, the purpose of the cell is for stakeholders to work together to maximise planned departures during adverse weather conditions.
- 36 A Level 3 event activates the Crisis Support Team (CST) and, when requested, the Capacity Constraints Group (CCG). The CST provides support to the Crisis Lead (i.e. the Chief Operating Officer or Duty Director) and co-ordinates stakeholder messaging, liaison with control authorities and provides expert support. The CCG is established at the request of the Crisis Lead and will seek to achieve agreement amongst the Heathrow Community on the appropriate response to the imbalance between capacity and demand caused by the event.
- 37 A Level 4 crisis activates the Executive Crisis Management Team (ECMT) which sets the strategy for handling the crisis, provides reassurance to external stakeholders, and provides internal leadership throughout any major operational disruption or an adverse business climate.



## Section 4:

# Comparisons with other airports

- 38 To help inform the Enquiry, information was gathered from a number of UK, European and North American airports. This included airports that are subject to regular severe snow fall, (e.g. Chicago, Montreal and Zurich); others for which severe snow is a less frequent (e.g. Amsterdam, Dallas / Fort Worth and Vancouver); and other airports in BAA (Aberdeen, Edinburgh, Glasgow, Stansted and Southampton).
- 39 Snow plans, winter operations plans and similar documents were requested and additional data was collected on key differences in the approaches taken to snow clearance and the management of snow events. Media statements and press articles were also reviewed.
- 40 The panel believes the recommendations in this report identify ways to substantially reduce the impact of a snow event at Heathrow and it has taken into account the best practice at other airports.

### Performance comparison

- 41 The panel heard from both airlines and BAA that prior to the incident on 18 December 2010 Heathrow had established a good reputation for its ability to clear snow. This had been demonstrated three times during the previous two years:
- February 2009: Heathrow closed both runways due to snow. The Northern runway was closed for ten hours, while the Southern runway closed for three hours. Reduced capacity operated throughout the day; full operational capacity resumed the next day;
  - January 2010: Both Heathrow runways fully operational throughout snow event, airport operated with some airline cancellations;
  - Early December 2010: Both Heathrow runways fully operational and minimal operational disruption.
- 42 During November/ early December 2010 several European and UK airports experienced a level of disruption due to severe weather. Aberdeen and Glasgow airports were both closed for short periods, Gatwick was closed for a period of two days in early December, and both Frankfurt and Paris Charles de Gaulle airports experienced some periods of closure during the month of December.
- 43 The cold period from 16 to 27 December affected many airports in Northern Europe. The panel has collected data on the performance of these airports during the period 16 to 21 December. Data collected has included the number of hours for which the airport was zero-rated<sup>2</sup> at Eurocontrol and the daily percentage of flight departures that were subject to cancellation. These data are summarised in Table 1 below for a selection of UK and European airports.

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<sup>2</sup> An airport which is zero-rated may still have a limited number of aircraft movement

- 44 It is quite normal for flights to be disrupted by weather, and for some airlines to pro-actively cancel parts of their schedule in response to severe conditions. However, it is clear that during this period Heathrow was closed for longer, and suffered comparatively more flight cancellations, than other airports in both UK and Europe.

Table 1: Notified zero rating and % cancelled flight departures for selected European airports 16-21 Dec 2010

Zero flow-rate (h:m)	Thu 16 Dec	Fri 17 Dec	Sat 18 Dec	Sun 19 Dec	Mon 20 Dec	Tue 21 Dec	Total
<i>% departure cancellations</i>							
Aberdeen	3h40 38%	2h30 41%	0:00 62%	0:00 71%	0:00 44%	0:00 43%	6h10
Amsterdam	0:00 4%	4h05 71%	0:00 26%	0:00 19%	0:00 10%	0:00 11%	4h05
Edinburgh	0:00 5%	0:00 24%	0:00 71%	5h20 82%	0:00 48%	0:00 43%	5h20
Frankfurt	0h50 22%	0:00 42%	0:00 23%	0:00 52%	0:00 34%	4h00 51%	4h50
Gatwick	0:00 1%	0:00 16%	13h40 76%	6h00 21%	4h00 21%	0:00 10%	23h40
Glasgow	0:00 3%	0:00 27%	0:00 69%	0:00 56%	0:00 48%	0:00 58%	0:00
Heathrow	0:00 7%	0:00 24%	10h30 79%	24h00 95%	5h20 65%	0:00 56%	39h50
Madrid	0:00 3%	0:00 20%	0:00 42%	0:00 58%	0:00 39%	0:00 24%	0:00
Paris CDG	0:00 2%	0:00 13%	0h30 16%	5h40 56%	4h30 47%	0:00 13%	10h40
Southampton	0:00 n/a	0:00 n/a	0h20 n/a	0:00 n/a	0:00 n/a	0:00 n/a	0h20
Stansted	0:00 n/a	0:00 n/a	6h00 n/a	0:00 n/a	0:00 n/a	0:00 n/a	6h00

Source: Eurocontrol; flightstats

- 45 Because of Heathrow's status as an international hub airport of global significance, performance comparisons with other non-hub airports are of limited use. This does not, however, preclude drawing lessons about snow clearance techniques and operations from these airports.

### Planning for severe weather

- 46 The Enquiry received snow plans, and winter operations plans, from a number of airports with different configurations and weather expectations. These differences make comparison difficult. Nevertheless, the panel identified a number of elements that may inform Heathrow as areas for learning and improvement:
- **Performance standards for airfield clearance:** Minimum performance standards are advised by the regulator in some regions (e.g. FAA in the United States). In the UK and Europe, there is no target beyond the broad aim to maximise airfield availability on the basis of operating through snow conditions, so the airfield is closed for the minimum time;
  - **Aircraft de-icing:** A range of different options is used at the airports surveyed. These include: de-icing on stand, shared de-icing pads or 'drive-through' de-icing facilities. The panel considers that on-stand de-icing may be not optimal as aircraft may not be cleared for departure, or be able to depart, in sufficient time after de-icing. Shared de-icing pads can be more attractive environmentally as they allow reclamation and re-use of de-icing fluids. Drive-through facilities are often found at airports that have both the space and the severity of climate to justify the necessary investment;
  - **Snow clearance from stands:** A few airports have specialist facilities such as under-stand heating. Broadly, efficient decontamination is progressed best by ensuring that aircraft are moved off stand to allow a clean sweep of snow from the stand;
  - **Investment in equipment and resources:** The number and capability of snow-clearing equipment varies widely from airport to airport. At the top end, equipment is available that can achieve runway clearance in a single pass at speed. However it is clear that in the majority of cases, equipment and resourcing levels are based on the performance levels agreed with airlines and defined in the snow plans;
  - **Communication:** Many snow plans include diagrams, maps, photographs and similar location-specific information that supplements text. Some airports' plans also include detailed operational processes and procedures, staff training, exercises and even full-scale pre-season rehearsals.

## Section 5: Weather at Heathrow in December 2010

- 47 This section provides a summary of the weather experienced at Heathrow in December 2010. It examines the forecasts provided to BAA prior to 18 December and provides an assessment of the weather conditions experienced on that day. This section also provides a brief summary of evidence provided by the UK Met Office and the Department for Transport's Chief Scientific Advisor on historical weather conditions and future expectations for weather respectively. A more comprehensive picture of the weather experienced is set out in Annex E.
- 48 December 2010 in South-East England was the coldest December, and the tenth coldest month, for 100 years. It is unusual, but not unprecedented, to have a month as cold and snowy as this in South East England. Spells of significant snow have affected South East England around 20 times in the last 50 winters.
- 49 The month had two lengthy cold spells, the first giving significant snowfalls at Stansted and Gatwick, but little snow at Heathrow; the second giving significant snowfalls at all three airfields. The snow event of 18 December occurred near the beginning of the second cold spell, a belt of snow crossing Gatwick during the morning, Heathrow around midday, and Stansted during the late afternoon and evening.

### Weather forecasts predicted the snow on 18 December

- 50 Heathrow Airport Ltd sources its weather forecasts from the Met Office and a company called "WSI Hubcast". Both forecasts provide comprehensive, quantitative assessments of weather conditions for the next five days, including the likelihood of snowfall. Both forecasts had predicted heavy snowfalls as likely for the 18 December from 14 December onwards.

### The amount of snow that fell at Heathrow was unusual

- 51 The maximum snow depth at Heathrow was 9cm in the early afternoon of December 18. In the context of the long record of snow depths at Heathrow since the winter of 1948/49, this is not particularly rare and has an average "return period" of approximately 1 in 5 years. The return period is an estimate of the likelihood of an event – a return period of 1 in 5 implies this has an estimated 20% chance of happening in any one year. However, in the context of the 22 mainly mild winters immediately preceding the recent colder winters of 2008/9, 2009/10 and 2010/11, it is unusual, with 9cm or more having been recorded only once (in 1991) at Heathrow.

### The rate of snow that fell at Heathrow was rare

- 52 The most significant feature of the snow event of 18 December at Heathrow may have been the rate at which snow fell, with nearly 7cm falling within the hour prior to midday. This is rare at Heathrow. A snowfall rate of 7cm in one hour has not been observed at Heathrow since hourly records began in 2005. Daily snowfall increments of 7cm or more have occurred only six times since 1970. Rates of snowfall at Gatwick and Stansted for this event did not exceed 5cm in one hour and 3cm in one hour respectively.

- 53 The Met Office considers that two other factors which may have prolonged the disruption caused by the snowfall may have been the very cold night of 19/20 December (the temperature falling below  $-9^{\circ}\text{C}$ ), and the persistence of cold, frosty weather for nine days after the snow event, with some further light snowfall.

### Even under global warming, periods of extreme cold are still possible for the UK

- 54 The panel has sought expert scientific advice from the Met Office and the DfT on the implications of global warming on the future likelihood of and scale of snow events at Heathrow.
- 55 The panel heard from Professor Brian Collins, DfT's Chief Scientific Advisor, that:
- “There is a general trend for the mean atmospheric temperature across the planet to increase. But whilst that is happening local conditions may well produce perverse weather events.”
- 56 This trend was also reported in David Quarmby's Winter resilience report:
- “The starting point is the slow but steady rise in average global temperatures. The consensus on the UK is that on average summers will become warmer, and winters will become warmer and wetter, though the next 10–15 years may be dominated by natural variability. When severe weather events happen they may be more extreme in terms of heat and rainfall. Although the probability of severely cold winters in the UK is gradually declining, there is currently no evidence to suggest similar changes in episodes of extremes of snow, winds and storms in the UK”<sup>3</sup>.
- 57 The Chief Scientific Advisor of the Met Office supported the above views. The panel noted that further, more focused, research will commence in this area, led by the Met Office, and urges BAA to understand the implications of any subsequent findings from this research.

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<sup>3</sup> The Resilience of England's Transport Systems in Winter (Final Report) October 2010

## Section 6:

# Events at Heathrow between 17 and 23 December 2010

58 This section provides a summary of what the panel considers to be the key events experienced at Heathrow between 17 and 23 December 2010. Annex D provides a more complete graphic representation of this timeline. This provides information on the airport status throughout this period and highlights events of importance. The timeline has been extracted from the information collected for the Enquiry, including from logs, media statements and meeting minutes, and has been reviewed with BAA. This timeline is incomplete because some BAA crisis management teams did not maintain contemporaneous logs during the crisis period and the panel had no access to the logs of third parties.

### Prior to 17 December 2010

59 The weekend of 18 - 19 December was expected to be Heathrow's busiest weekend of the year, with the majority of airlines operating full schedules and close to 100% of available seats booked. This meant that cancellations of flights during this period were particularly problematic because of the difficulty of rebooking. Passengers placed a significant premium on their ability to fly that weekend.

60 BAA had received weather forecasts from 14 December onwards which indicated, with a high degree of probability, that it would snow at Heathrow on 18 December.

61 On 16 December BAA published a statement on the heathrow.com website warning passengers of severe weather and potential disruption.

62 On 16 December, Heathrow Airport had 206,810 litres of glycol available and 105,960 litres on order. Due to the cold weather it was using an average of 75,000 litres per day.

### Friday 17 December 2010

63 BAA had received weather forecasts in the morning from both the Met Office and WSI Hubcast which forecast snow on Saturday 18 December. The panel was informed that these forecasts were discussed that day at the daily operations management team morning call, and again during the weekly operations call.

64 The likelihood of snow was re-communicated to the operations management team by email. A full operational rota of staff was agreed for the weekend and plans put in place to book hotel rooms for operational duty staff for the weekend.

65 During the day the weather was very cold with temperatures ranging from 0 to -4°C; this required all airlines at Heathrow to de-ice aircraft prior to departure. Aircraft de-icing is the responsibility of the airline.

66 The panel was informed by airlines that snow and cold weather in other European airports caused delays to many flights at Heathrow. These resulted in a number of cancellations and

Air Traffic Control delays. A number of airlines, including BMI and Lufthansa, cancelled some of their flight schedule because of delays experienced as a result of snow at other Northern European airports.

- 67 British Airways informed the panel that it had been experiencing delays during the day to its schedule as a result of Air Traffic delays and its own de-icing delays. At 1715 British Airways cancelled all its short haul flights from Terminal 5 for the rest of the day, due to these delays. This resulted in congestion in Terminal 5. British Airways activated its re-ticketing / hotel process.
- 68 Because of this congestion, BAA declared a Level 3 crisis in the afternoon. The BAA COO assumed responsibility for the event and BAA Crisis Management teams were mobilised.
- 69 At 1753 BAA's Crisis Support Team (CST) was mobilised and BAA staff were in attendance at Terminal 5 to manage terminal congestion.
- 70 The panel understands the Terminal 5 Local Business Recovery Team (LBRT) was mobilised in Terminal 5 to support British Airways, although there is no record of this available.
- 71 At 1800 75% of aircraft stands were occupied across Heathrow. This is approximately 26% more than the percentage occupied on a normal day.
- 72 At 2000 BAA issued a media statement confirming that Heathrow was open with most flights operating, although some airlines were experiencing delays and cancellations.
- 73 At 2120 the CST activated to support British Airways in Terminal 5 was stood down.

### **Saturday 18 December 2010**

- 74 At 0624 BAA reactivated the CST to continue to focus on passenger welfare in Terminal 5. The Airline Operators Committee (AOC) and British Airways were notified; the General Secretary of the AOC joined the CST in person; British Airways joined by telephone.
- 75 At 0720 BAA was told that British Airways was cancelling all flights between 1000 and 1700. British Airways explained that this decision was driven by two factors: (a) its expectation that there would be disruption at the airport as a result of the weather forecast; and (b) Terminal 5 was already near full capacity.
- 76 Some other airlines, including Lufthansa and BMI, also cancelled parts of their schedules on Saturday, largely due to conditions at other airports.
- 77 At 0800 BAA issued a media statement communicating the airport was open but that British Airways passengers should stay at home because all of its flights were cancelled.
- 78 At 0900 members of the BAA Executive Committee were briefed about the situation by telephone.
- 79 There was intermittent snow at Heathrow between 0900 and 1500. The most significant period of snowfall was between 1100 and 1200, when 7cm of snow accumulated. The snowfall resulted in a snow depth of 9cm within two hours.
- 80 At 1035 airport food retailers were contacted by BAA CST and advised of the need to remain open until late.

- 81 At 1049 a ClickSMS text message was issued by the Terminal 3 LBRT communicating that a reduced aircraft arrival flow rate was in effect due to low visibility. One minute later a ClickSMS text message was issued by the same team communicating that Heathrow Airport would remain closed for all arrivals and departures for the rest of the day.
- 82 At 1115 BMI cancelled its domestic flight schedule because of the accumulation of snow at the airport.
- 83 At 1130 Air Traffic Control advised BAA that as the runway markings were not visible, the airfield would be unavailable for arrivals and departures.
- 84 At 1150 concerns raised by the Metropolitan Police over the safety of road surface access resulted in the closure of the M4 spur road into Heathrow.
- 85 At 1230, following a CST conference call, a media statement was released communicating: "Heathrow's runways are currently closed until at least 1600, to allow snow clearing and to keep the airport safe".
- 86 Once blizzard conditions had stopped, operations to clear the snow from the airfield began. A decision was taken to clear the Northern runway first, as this was the runway allocated to aircraft arrivals and was prioritised for safety reasons in line with aviation best practice.
- 87 At 1330 BMI cancelled all remaining flights from the schedule.
- 88 At 1340 BAA issued a NOTAM<sup>4</sup> communicating that the airfield was closed to arriving aircraft.
- 89 At 1400 members of the BAA Executive were briefed on progress. Offers of additional resource from BAA's construction contractors to help in snow clearing were apparently made but do not appear to have been followed up.
- 90 At 1406 the Northern runway was cleared of snow and ice. However, at 1430 the wind changed direction causing aircraft flightpath to change. BAA standard practice required additional turn-offs to be cleared of snow and this in turn delayed the opening of the runway.
- 91 At 1430 the Airfield LBRT requested priorities for stand clearance from the CST. The CST log notes that the request was discussed during an Operations conference call at 1500. However the Airfield LBRT received no response and gave priority to stands at Terminals 3 and 5.
- 92 By 1500 the additional turn-offs for the Northern runway were cleared. Priority was then given to clearing the taxiways, followed by the aircraft stands. The panel heard that the layout of Heathrow makes stand clearance difficult as many stands are situated in cul-de-sacs, which have a blocked end. This means there is limited room in which to manoeuvre equipment and no clear exit route for removal of the snow. At this time many stands were occupied, making stand clearance more difficult.
- 93 At 1650 there is a record in the CST log that a text message was issued to the AOC communicating that there would be limited aircraft departures from 1800 and no aircraft

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<sup>4</sup> NOTAM: Notice to Airmen, See Glossary (Annex F) for description



arrivals for the remainder of the day, except for emergencies. At 1656 BAA issued a media statement confirming that passengers should, until further notice, check with their airlines before travelling to the airport, and that regular updates would be provided.

- 94 A number of loaded aircraft (between 12 and 16) had remained on stand or on the taxiway, in anticipation of a possible departure. Passengers and their baggage were disembarked at various times throughout the Saturday.
- 95 At 1730 BAA issued a NOTAM to communicate that the airfield was closed to arrivals.
- 96 By 1830 the Northern runway and 4 taxiways out of 24 were open or partially open (A, B, E and F). Evidence was presented to the panel that no stands had been cleared to an operational standard and that there were reports of significant quantities of snow behind stands. The panel also heard evidence that the stands were heavily contaminated with de-icing media and that as a result of the rapid drop in temperature experienced after the snow, ice had formed on stands. This was making stand clearance difficult and dangerous.
- 97 At 1900 BAA issued a NOTAM, and at 1930 a media statement, to communicate that no aircraft arrivals or departures would be taking place for the rest of Saturday. Clearing of stands and taxiways continued overnight. Cold conditions and the variable nature of snow on the stands made clearing difficult. The intention on Saturday evening was to continue stand clearance overnight and reopen the airfield at 0600 for limited departures and 1000 for limited arrivals. This was communicated to the airlines via ClickSMS text messaging.
- 98 The panel heard that some airlines had sent their ground handling crews home, because there were no turn round operations for them to conduct, and they were therefore unable to help with stand clearance.
- 99 The panel observed that whilst many airlines arranged overnight accommodation for passengers in line with their obligations under European law, many apparently did not. The panel heard evidence from passengers, airlines and BAA that many passengers refused to leave the airport because of a determination to fly and an anxiety that they would lose their place in a queue.
- 100 It is estimated that 9,500 passengers spent the night in Heathrow terminals on Saturday night. Blankets and water were provided to some, but not all passengers. Over 1,000 hot meal vouchers were provided to passengers. BAA attempted to source additional blankets for passengers but the lorry carrying these was forced to turn round on the M25 due to the road conditions. Many passengers sought refuge in the subways leading to the underground and Heathrow Express stations. This caused additional congestion and blocked access to transport links.

## **Sunday 19 December 2010**

- 101 At 0200 additional contractor resource to assist with snow clearance was requested by the HAL operation.
- 102 At 0218 a decision was taken by BAA to continue to close the airfield to aircraft arrivals and departures throughout Sunday

- 103 At 0500 BAA issued a media statement communicating that the airfield would be closed to aircraft arrivals and open for a limited number of departures only on Sunday. As a result a number of airlines stood their ground handlers down.
- 104 Snow clearance continued and by 0630 20 stands (at Terminals 3 and 5) were clear.
- 105 At 0633 a NOTAM was issued announcing the airfield was closed to all arrivals and announcing agreed departures from Terminals 3 and 5. A small number of arrivals and departures were achieved per hour during the rest of Sunday.
- 106 At 1100 BAA met with airlines and the AOC and a decision was taken to invoke the Capacity Constraint Plan.
- 107 Additional contractor resource arrived throughout Sunday and progressed with snow clearance on stands.
- 108 At 1210 a representative of Virgin Atlantic Airways (VAA) attended the BAA CST.
- 109 At 1330 the heathrowairport.com website was updated to state that Heathrow would run a full schedule on 20 December.
- 110 At 1500 BAA met with airlines. At 1630 a decision was taken in conjunction with the airlines to maintain focus on clearing stands rather than clearing the second, Southern, runway (Southern). This decision was taken to ensure that the airfield would remain open (with one runway) in the event of a further snowfall. At that time BAA had concerns over the future stock of de-icer should the weather deteriorate. Some airlines report that discussions were held at this meeting about the mobilisation of military support. This is not recorded in the log nor recalled by the BAA attendees.
- 111 At 2030 the Capacity Constraint Group met, including Airport Coordination Ltd (ACL), which manages slot allocation at Heathrow. The group agreed a reduced capacity schedule for Monday.
- 112 The panel heard that there is a 17 hour lead time on long-haul flights (including check-in) for some sectors. Some airlines expressed a view to the panel that there was limited recognition of this when NOTAMs were issued by BAA, and that the event was managed as a local rather than a global incident.
- 113 It is estimated that 5,600 passengers spent the night in the terminals on Sunday night. BAA sourced a further 4,000 blankets and provided free Wi-Fi, pharmacy essentials, hot drinks and hot meals to some passengers.

### **Monday 20 December 2010**

- 114 At 0000 BAA issued a media statement communicating that the airfield would be open to limited aircraft departures and arrivals by 0600 Monday morning.
- 115 By 0800 over 100 aircraft stands had been cleared and access to the Northern runway was clear from all areas.

- 116 At 0900 the Capacity Constraints Group met. A decision was taken by the group that the Southern runway would not open due to concerns over sustainability of flight operations, because of forecast weather and stocks of de-icer.
- 117 At 0930 British Airways cancelled its short haul flight schedule for 20 December.
- 118 At 0958 the CST noted that there were differences between the status of flights being displayed by BAA on its heathrowairport.com website and on its flight information display screens in terminals and the status as shown on some airlines' websites. The panel understands that BAA information is sourced directly from the ACL system which in turn is updated by the airlines. The panel concludes that this difference was because some airlines were updating their own systems but not reflecting these changes in ACL.
- 119 At 1059 a NOTAM was issued confirming a target capacity reduction of 67%. A 34% flight operation (219 arrivals, 219 departures) was actually achieved that day.
- 120 At 1100 the CST was informed that all terminals were congested. Police support was requested to assist with congestion due to safety concerns. Airside raised a concern on a CST call that more than 80 inbound flights had departed for Heathrow, which indicated that some airlines were not adhering to the agreed capacity restrictions.
- 121 At 1107 the BAA Executive Crisis Management Team met.
- 122 At 1155 BAA was given permission to reduce the restrictions on night flights.
- 123 At 1230 BAA issued a media statement which communicated that Heathrow would be open and operate a limited number of aircraft arrivals and departures from 0600 on Monday morning. By 1235 all Heathrow-based Metropolitan Police officers were deployed within the terminals to assist with passenger congestion and access control.
- 124 At 1408 all KLM flights from Terminal 4 were cancelled due to the closure of Schiphol Airport.
- 125 At 1500 BAA mobilised a contingency plan to move passengers from the terminal forecourt into hotels, and provided free transport on the Heathrow Express for passengers to travel into London.
- 126 At 1535 problems were reported with some passengers getting out of vehicles in the tunnel leading to the airport and continuing on foot with their luggage.
- 127 At 1604 marquees were ordered from suppliers for Terminals 1 and 3.
- 128 At 1630 BAA placed a request to London Underground to keep the underground running overnight from Heathrow.
- 129 At 1830 the weather forecast was for moderate snow fall overnight.
- 130 By 1930 BAA had relocated a number of passengers from the terminals to hotels, where free internet access and the use of laptops were provided for passengers to re-book flights with their airline.
- 131 At 2300 the CST invoked the Ops Support Programme which calls for BAA office-based staff to volunteer to support the operation in the terminals.

- 132 It is estimated that 4,935 passengers were in terminals overnight on Monday 20 December and 465 were in BAA provided hotels.

## **Tuesday 21 December 2010**

- 133 At 0400 BAA issued a media statement communicating that Heathrow would be operating a reduced flight schedule on Tuesday and referring passengers to the [heathrowairport.com](http://heathrowairport.com) website for a full list of flights which would be operating. Passengers were advised that they should not travel to Heathrow if their flight was not on the list, and to check with airlines before travelling.
- 134 At 0630 marquees were available for passengers' use at terminals 1, 3 and 4. These provided heating, toilet facilities, catering and seating, and were equipped with flight information display screens, internet access and international telephones for passengers to use to re-book flights with their airline.
- 135 At 0800 the Capacity Constraints Group met. A decision was taken in conjunction with the airlines to retain 67% capacity reduction in arrivals and departures until 0600 on Thursday 23 December. At 0922 a NOTAM was issued to this effect.
- 136 BAA office staff were mobilised into terminals from 0850 onwards. A decision was taken to convert office space (Voyager facility) into accommodation for passengers from Terminal 1.
- 137 At 1100 airlines were informed that single runway operations would continue as a result of concerns over de-icer stocks and the risk of snow and cold weather.
- 138 At 1230 a decision was noted at the ECMT to start clearing the second (Southern) runway. All stands were reported as cleared. At 1440 this was communicated to the airlines.
- 139 By 1600 the Southern runway had been cleared. Capacity was increased to 30 arrivals and 30 departures per hour. A 50% flight operation was achieved – 338 departures, 308 arrivals.
- 140 At 1630 a NOTAM was issued to communicate this.
- 141 At 1700 the ECMT was briefed that 700 hotel rooms had been provided by BAA for displaced passengers.
- 142 At 1717 BAA issued a communication via the Heathrow Twitter account that the second runway was now open but airlines were still operating a reduced schedule as diverted aircraft and crew were moved back into position. A media statement communicating the same information had been issued at 1700.
- 143 It is estimated that 1,510 passengers were in terminals and 1,090 passengers were in hotels overnight.

## **Wednesday 22 December 2010**

- 144 By 0230 all aircraft stands (apart from four) were fully operational.
- 145 At 0523 BAA issued a media statement communicating that Heathrow would be operating a reduced flight schedule on Wednesday and referring passengers to the [heathrowairport.com](http://heathrowairport.com) website for a full list of flights which would be operating. Passengers were advised in this

statement that they should not travel to Heathrow if their flight was not on the list, and to check with airlines before travel.

- 146 At 0900 the Capacity Constraints Group met. A decision was taken in conjunction with the Airlines to remove the capacity reduction constraint with immediate effect. The airfield was now fully operational for arrivals and departures.
- 147 A 70% flight operation – 456 arrivals and 425 departures – was achieved during the day.
- 148 It is estimated that 450 passengers were in terminals and 1,150 passengers were in hotels overnight.

### **Thursday 23 December 2010**

- 149 A 93% flight operation – 569 arrivals and 603 departures – was achieved.
- 150 It is estimated that 79 passengers were in terminals, and 491 passengers were in hotels overnight.

## Section 7: Observations and Recommendations

- 151 The panel has made the following observations from its analysis of the facts and information presented to the Enquiry.
- 152 BAA has historically demonstrated its ability to respond to severe weather events as was reported to the panel by BAA and airlines with evidence from events of February 2009, January and November 2010. The main focus of this report and the lessons learned relate to the severe weather conditions during the period 18 - 23 December 2010.
- 153 The weather during the month of December was unusual. It was the coldest December for 100 years. There were two extended snowfalls during the month, the first early in December, with Gatwick and Stansted experiencing significant snowfalls, but with little snow at Heathrow. All three airports were affected by the second snowfall. The actual snowfall at Heathrow (over the crisis period) occurred on the morning of Saturday the 18th - which resulted in a maximum snow depth of 9cm. The snow accumulated rapidly with 7cm falling in the hour before midday. The Met Office confirmed that this level of snow fall was unusual, particularly with reference to recent years and that the rate of accumulation was rare.
- 154 There was no single event or decision which led to the disruption experienced during the 18 - 23 December period. The following seem to the panel to be the most important factors which together led to the events on those days:
- The potential impact of the weather forecast was not fully anticipated in the days preceding the event. This led to a low state of preparedness ahead of the snow and insufficient stock of critical supplies for an event of this scale;
  - Stand clearance rate was slower than required and slower than rates achieved elsewhere. This was because the condition of snow on stands became very difficult as a result of earlier aircraft de-icing and stand gritting. Airlines and BAA had not agreed priorities and protocols for dealing with and resourcing this situation. BAA did not have specialised equipment for under aircraft stand clearance;
  - BAA's crisis management system was invoked on Friday 17 December to deal with congestion in Terminal 5. The response to the snow on 18 December was initially not effective. There were failures in communication and coordination within BAA, and between BAA and airlines, which led to ineffective engagement between different parties and resulting in weak situational awareness and a delay in response and escalation;
  - Confused and contradictory messages caused incorrect signals to go to airlines, to passengers, and from airlines to passengers;
  - The Executive Crisis Management Team and the Capacity Constraints Group proved effective in managing the crisis once invoked. Both groups should have been mobilised earlier.

- 155 Passengers experienced distress as a result of the disruption at Heathrow. This was a result of the following:
- There was an apparent lack of compliance, by some airlines, with EC Regulation 261/04. This sets out obligations on airlines to provide compensation and assistance to passengers in the event of cancellation, long delays and being denied boarding;
  - There were different and conflicting messages to passengers about the state of the airport and of flights.
  - There was a slow reaction to terminal congestion by BAA. BAA's response to terminal congestion and support for passenger welfare was increasingly effective from 20 December onwards.
- 156 The impact of the above observations is heightened by the critical importance of Heathrow as a national and global hub, and by the timing of this particular event. The weekend was expected to be the busiest in Heathrow's history; flights were heavily booked, making rebooking very difficult; and passengers placed a premium on reaching their destination in the holiday period.
- 157 The panel recommends that Heathrow Airport – because of its critical importance to air transport in the UK and globally – needs to adopt an improved resilience target that it never closes, except for safety or other emergency situations. Achieving this target will require BAA to lead a collaborative programme of work and investment with the airlines, NATS and CAA. The panel recommends that these parties collectively work together to implement improved snow plans, agree investments in additional equipment and resources, improve and collaborate more effectively on command and control processes, improve consistency of passenger communications, and establish approaches to passenger welfare that are focused on the needs of the passenger. The panel understands that the CEO of BAA is seeking to establish a Strategic Board, led by BAA, with senior representatives from airlines, NATS, and the CAA, to improve Heathrow resilience. The panel supports this aim.
- 158 This section presents the detailed recommendations of the panel. These are presented in four main areas:
- **Preparation and Planning:** how can the Heathrow community plan for events like this to minimise their impact?
  - **Command and Control:** how should BAA and the Heathrow Community direct and control events like this better?
  - **Communications:** how can all parties (passengers, airlines and BAA) get better information on what is happening?
  - **Passenger Welfare:** how can welfare for stranded passengers be improved?

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## Part A:

# Preparation and Planning

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- 159 The panel considers that the potential impact of the weather forecast was not fully anticipated in the days preceding the event. This led to a low state of preparedness ahead of the snow and insufficient stocks of critical supplies for an event of this scale.
- 160 The panel considers that the stand clearance rate was slower than required and slower than the panel would have expected. This was because the condition of snow on stands became very difficult as a result of earlier aircraft de-icing and stand gritting. Airlines and BAA had not agreed priorities and protocols for dealing with and resourcing this situation. BAA did not have specialised equipment for under aircraft stand clearance;
- 161 The panel makes recommendations in the following areas:
- Enhancing the snow plan for Heathrow;
  - Reviewing the snow plan for Heathrow;
  - Greater collaboration in snow preparation at Heathrow;
  - Supply.

## Enhancing the snow plan for Heathrow

- 162 The snow plan is a critical document. All licensed aerodromes and airports are required to produce a snow plan to demonstrate how they will maintain the availability and safety of the aerodrome for arriving and departing aircraft in the event of snow.
- 163 The Heathrow snow plan developed by BAA for the Winter season 2010/11 was based on earlier snow plans which had been used by Heathrow Airport successfully in 2009 and earlier in 2010. For a number of years, the Heathrow snow plan has followed a generic BAA template used in all its airports. The Heathrow snow plan builds on this template with the description of specific roles and responsibilities, a list of contact details and a schedule of mechanical equipment.
- 164 The 2010/11 Heathrow snow plan was reviewed in Summer 2010 and provided to airlines by means of an Operational Safety Instruction<sup>5</sup> dated 23 November 2010. A desktop exercise was conducted on 4 October 2010 to prepare for the Winter season. The panel heard from BAA management and airlines that the snow plan had been successfully deployed in the past – most notably in the events of February 2009 and January 2010 - and it appears to have been considered fit for purpose ex ante.
- 165 The Heathrow snow plan was reviewed by the panel. The panel considers that it provided a comprehensive plan setting out the priorities and approach to runway and taxiway clearance; but that it provided little detail concerning the approach to, and responsibilities for, clearing aircraft stands.

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<sup>5</sup> Reference: OSI/25/10: Winter Hazards and the Aerodrome Snow Plan



- 166 The plan specifies five “operational capabilities” and explains the operational consequences of these. These are:
- Light/intermittent snow – no visible settling;
  - Moderate snow – visible settling up to 3cm;
  - Heavy continuous or intermittent snow – visible deposits exceeding 2cm;
  - Blizzard conditions – continuous heavy/driving snow – visibility below 200m;
  - Light/cleared snow which subsequently freezes – 3/4mm black ice or frozen thin snow.
- 167 The plan makes it clear that in the conditions experienced on 18 December “it is likely that aircraft movements will be suspended for the duration of the blizzard event, and for a protracted period after the event” and that “serious disruption and cancellations affecting all carriers are likely after any period of blizzard conditions”.
- 168 As already reported, BAA and airlines had seen forecasts from 14 December onwards predicting heavy snowfalls as likely for the weekend of 18 December. The panel is concerned – especially given the consequences of such a snow event as outlined in the snow plan – that more was not done by the Heathrow community to prepare better for the event.
- 169 The panel observes that the initial clearance of runways and taxiways proceeded as per plan on 18 December.
- 170 However, progress on clearing stands was slower than required and slower than the panel would have expected. The initial stand clearance appeared to the panel to be delayed and was not given clear priority. The panel understood that there are a number of reasons for this:
- There was no consistent agreement between BAA, airlines and their ground handlers on the operational standard required for clearing aircraft stands. BAA sought to clear stands to “black top” which was seen by both BAA and the airlines as the required standard. The panel understands this is not necessary and a more lenient standard could have been applied. There were differences in opinion reported between BAA and some airlines over whether stands which BAA thought satisfactory were acceptable to the airline;
  - Although the Airside LBRT requested priority for stand clearance this was not given sufficiently quickly;
  - The panel heard evidence from BAA that the earlier application of aircraft de-icing media and grit on stands by some airlines and their ground handlers – combined with the rapid drop of temperature after the snowfall – led to difficult and icy conditions on stands, which slowed clearance;
  - The panel also received evidence from BALPA that the practice of de-icing on stands, rather than using remote de-icing pads, may have led to dangerous conditions for aircraft crew and ground handlers;
  - Some airlines had released their airside ground handler crews on Sunday because of the decision to declare the airport closed. As a result they were not available to support stand clearance;
  - There was a lack of clear understanding between BAA and the different ground handlers and airlines about who would do what to clear stands. The snow plan refers to ‘self-help’ but this was not effectively codified;

- The snow clearance teams had difficulty disposing of high quantities of contaminated snow from stands as this is a pollutant and needs careful handling.
- 171 The panel concludes that an enhanced snow plan should be developed for Heathrow which caters for a broader range of snow events than the current plan. The panel recommends that Heathrow – because of its extreme importance to the UK and global air transport industry needs to adopt a target that it never closes as a result of circumstances under its control, except for immediate safety and other emergency threats. Whilst it is safe to operate aircraft movements at Heathrow the airport should remain open, operating within any flow rate restrictions. Although this is a challenging target, the panel believes it is achievable and mirrors best practice at other leading hub airports. It is only achievable if BAA takes a lead with and collaborates with the airlines, NATS and CAA at Heathrow, because it requires improved collaboration, communication, command and control across all parties.
- 172 The panel heard from the CEO of BAA that he wishes to establish a Strategic Board, led by BAA, with senior representatives from airlines, NATS, CAA and other airport stakeholders, which is intended to agree the targets for resilience; approve the snow plan; agree investment plans for BAA and airlines in improving resilience; approve joint command and control processes; and assure implementation of these. The panel supports this suggestion.

### *Recommendation 1:*

The panel recommends that BAA work with airlines, NATS and the CAA to agree an enhanced snow plan. This should seek to ensure that Heathrow never closes for circumstances under its control, except for safety or other emergency situations. The snow plan should adopt a systems approach and should define, for a broad range of expected snow events, the tasks, priorities, resources and operating standards that should apply. The plan should:

- Be tailored to the Heathrow environment, recognising the high occupancy levels, capacity constraints and stand configurations;
- Address a broader range of snow and cold conditions than the current plan, taking into account current scientific advice on future climate;
- Describe clearly the sequence of clearance for specific weather and runway use scenarios, the direction of vehicle movements, giving priority to runway clearance, then taxiway and stand clearance;
- Define the processes, specialised equipment, resources and logistical requirements that are needed to achieve these plans;
- Define the locations for storing and, if possible, recycling media from contaminated snow;
- BAA should continue to rely on multiple weather forecasts and should routinely assume the worst forecast;
- Establish an operating instruction that specifies clearly the role of ground handlers, airlines and BAA in cold weather and defines the standards for aircraft de-icing clearing operations from stands.

- 173 An important part of any plan for cold weather is how the airlines, Air Traffic Control and the airport maintain satisfactory flow rates when the temperature and humidity conditions require aircraft to be de-iced. When cold damp air or snow hits an airport, it rapidly becomes difficult to satisfy scheduled flow rates and aircraft de-icing requirements. The result, at highly utilised and capacity constrained airports like Heathrow, where aircraft will miss their slots, is that departure rates can reduce within a short time of the snow or cold.
- 174 At Heathrow airlines are responsible for aircraft de-icing. The majority of airlines employ on-stand de-icing which is standard practice across the UK. The delays caused by on-stand de-icing can block up parking stands, so arriving aircraft may not be able to disembark their passengers; cause the stands to become covered with de-icing product, complicating the conditions and clearing techniques following a snow event; and increase the likelihood of Holdover Time expiry<sup>6</sup>. To mitigate these issues BAA has introduced two remote de-icing stands. The panel observes that remote de-icing stands and “drive through” de-icing pads are used with success in some other airports.
- 175 The panel considers that important factors in restoring and maintaining flow rate, both during and after any snow event, are the development of an improved capability for aircraft de-icing and the improvement of procedures for scheduling departure of de-iced planes so as to restore flow rate rapidly after an incident.

### *Recommendation 2:*

The Panel recommends that BAA work with airlines, NATS and other relevant stakeholders to review and invest in the aircraft de-icing processes and infrastructure to ensure the airport can maintain its flow rate in inclement weather. Consideration should be given to reviewing the slot procedure in conditions of freezing precipitation to support remote de-icing procedures

## Reviewing the snow plan for Heathrow

- 176 The panel understands that the Heathrow snow plan had not been subject to any significant review or test by BAA or by the airlines for some time:
- The review process in Summer 2010 did not generate any substantive changes to the snow plan. The plan was neither reviewed by executive management nor by the BAA Board after any of the unusual snowfalls in 2009 or 2010
  - Although the plan was signed off by airlines this appears to have been a matter of form rather than a substantive review;
  - The panel has seen no evidence of any review of the snow plan in light of the rare snow events experienced by Gatwick and other UK airports in late November;
  - There was no evidence that best practice in snow planning had been shared between Heathrow and other BAA airports following any of the unusual snowfalls in 2009 or 2010;

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<sup>6</sup> After spraying, aircraft have to push back, start engine, and taxi out to the runway, This significantly increases the likelihood of aircraft having to return to stand for repeated treatment

- The panel heard from both BAA and the airlines that BAA's success at clearing snow in 2009 and earlier in 2010 had created a high level of confidence in snow removal;
- There have been no crisis command rehearsals of a snow event in recent years.

177 The panel concludes that there was insufficient attention given by BAA and the airline community at Heathrow to reviewing and improving the snow plan and testing its application.

### *Recommendation 3:*

The panel recommends that BAA, together with the airlines and other relevant stakeholders, establish processes continuously to review its snow plan through regular review, external review, benchmarking, desk and field rehearsals and post-event reviews. BAA should work closely with the Met Office to understand better the expected impact of climate change on the airport. Every year, HAL should review its snow plan and establish the level of contingent resources required for the execution of the snow plan, that are needed to supplement permanent airport staff and other airside workers. The snow plan should be reviewed at the BAA Executive Committee each year.

### *Need for greater collaboration on snow at Heathrow*

- 178 The panel observed that there was limited forward planning between BAA and airlines to discuss and plan for the forecast snow. The panel heard examples of important decisions and plans not being effectively coordinated or communicated between the airport and airlines. Decisions appear to have been made independently by BAA and the airlines based on each organization's assumptions about the operability of the airfield.
- 179 The Heathrow snow plan recommends that if a significant snowfall likely to affect the operation is forecast, BAA may call a Snow Contingency Meeting in advance of the formation of the snow cell or the aircraft de-icing cell. The purpose of this meeting should be to review the actions to be implemented by BAA and others, including identifying any mutual assistance that can be provided with snow clearance. There is no evidence that this meeting was held, or that the formation of the snow cell (Airside LBRT) or the aircraft de-icing cell was communicated adequately in advance of the event.
- 180 The panel considers that had such a contingency meeting been held it is likely that Heathrow's co-ordinated response to the snow event would have been more effective.

### *Recommendation 4:*

The panel recommends that at an early stage, when a forecast indicates a possible snow event, BAA should hold a Snow Contingency Meeting with the airlines, their ground handlers, NATS and the AOC to plan an effective response and contingencies.

## Supply

- 181 Heathrow Airport stores and uses a variety of different anti-icing and de-icing products for runways, taxiways and stands. These include a number of products e.g. Clearway 3, Clearway 6, Konsin, Safegrip and aviation grade grit. Supplies of these products are stored airside. During cold weather and at times of snow, runways, taxiways, stands and aircraft must be de-iced to maintain safe operations. This is usually combined with anti-icing to protect the infrastructure and aircraft from further snow and ice deposition.
- 182 On 16 December, Heathrow Airport had 206,810 litres of de-icing product available and 105,960 litres on order. Due to the cold weather, it was using an average of about 75,000 litres per day. By 19 December it had 129,770 litres available. At this time, the supply was adversely affected by distribution problems. Additional supplies were sourced from other distributors. By 23 December, Heathrow Airport had 433,295 litres available and 549,000 litres on order.
- 183 The panel observed that concerns about the forecast forward level of stocks of de-icing media in the event of a second snowfall influenced the decision to maintain single-runway operations through Saturday afternoon until Tuesday when the weather forecast improved and additional media was sourced.
- 184 Had there been greater certainty around the availability and supply of sufficient stocks of media, a dual-runway operation could have been restored sooner.
- 185 The panel notes that stocks of other emergency supplies (e.g. blankets, food and water) available to BAA on Saturday were insufficient to cope with the high number of passengers in the terminals.
- 186 The panel was asked to consider whether stocks should be shared e.g. with other airports. The panel does not recommend this as it is always going to be a priority to re-open Heathrow, and sufficient stock needs to be held at Heathrow to do that.

### *Recommendation 5:*

The panel recommends that BAA dynamically maintain its levels of stock of anti-icing/de-icing media and other emergency supplies at levels that are driven by the forecast weather, expected rate of use, reliability of supply, and other factors.

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Part B:

## Command and Control

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- 187 The panel considers that the response to the snow on 18 December was initially not effective. There were failures in communication and coordination within BAA, and between BAA and airlines, which led to ineffective engagement between different parties and resulted in weak situational awareness and a delay in response and escalation. These factors led to confusing and conflicting messages to passengers, airlines and BAA staff and restricted information to support decision making. The ECMT and the Capacity Constraints Group proved effective in managing the crisis once invoked. Both groups should have been mobilised earlier.
- 188 The panel makes recommendations in the following areas:
- Strengthen BAA's crisis management process;
  - Early and automatic invocation of crisis response;
  - Early application of Demand Management Policy;
  - Sustainable crisis response.

### Strengthen BAA's crisis management process

- 189 The panel considers that BAA's initial crisis management response was not effective. The CST which had been mobilised earlier to deal with Terminal 5 congestion was focused on that, and did not appear to be effectively prepared for a snow event. There were communications and coordination problems between Local Business Recovery Teams and the Crisis Support Teams. Conflicting messages were sent to airlines about airport status. Airlines, their de-icing agents and their ground handlers were not formally engaged as members of the snow cell.
- 190 The panel was also concerned that some levels of the crisis management structure did not have adequate administrative resources. The LBRTs in some terminals and airside were not staffed with appropriate resources for log-taking, decision tracking or information sharing.
- 191 The ECMT, which was mobilised on Monday 20 December, proved effective in managing the crisis once invoked. It could have been invoked earlier.
- 192 BAA's crisis management structure, described earlier, is a four tier structure. This is unusual. Most emergency responders in the UK use a three tier command and control structure with a "Gold" command (providing strategic command of a situation); "Silver" (providing tactical command); and "Bronze" (providing operational control). The teams in such a structure should include representatives from key stakeholders.
- 193 The panel is of the opinion that the four tier command structure is unnecessarily complex and may have contributed to issues observed above.

- 194 BAA's crisis management processes include membership of the home based airlines and the AOC in the CST but make no provision for any stakeholder engagement in the ECMT. A member of the AOC attended the CST for much of the time (though was excluded from one BAA operational meeting) and only one airline member was invited. Formal airline engagement did not take place until Sunday morning at 1100, at the request of the AOC, although there were numerous conference calls, telephone conversations and SMS messages on Saturday. The panel was also concerned that representatives from IT and Communications were not automatically members of the CST.

### *Recommendation 6:*

The panel recommends that:

- there is a need for BAA to adapt its approach to emergency planning response and recovery to better align with best practice. It should involve simplifying BAA's Crisis Management process to the standard three tier process, used by central, regional and local government and the emergency services across the UK. Staff in BAA and stakeholders should be trained in the new structure and the different roles they play in it;
- key stakeholders (e.g. airlines, Met Police etc.) be automatically invited at the appropriate level as members of the new "Gold" "Silver" and "Bronze" crisis teams;
- wherever practical, and where time permits, decisions critical to airport status (e.g. flow rate restrictions) be made in consultation with key Heathrow stakeholders;
- the "Silver" command team automatically include BAA representatives from Communications and IT and a representative dedicated to Passenger Welfare;
- all crisis teams use an advanced web-based Incident Management System to record decisions, events and communicate with other teams;
- sufficient resources be made available to support the crisis management process;
- BAA needs to establish a formal, disciplined communications structure with clear interfaces between BAA, airlines, NATS and other appropriate parties;
- the BAA Crisis Management Process be the responsibility of the CEO and should be reviewed at least annually with the Board;
- all the above processes are tested regularly with relevant stakeholders.

### *Early and automatic invocation of crisis response*

- 195 The panel heard that the airside LBRT had been mobilised on 16 December to deal with the cold weather. The panel was concerned at the late mobilisation of the CST in anticipation of the forecast snow incident, and the delay in escalating the worsening situation in the airport to the ECMT. The CST had been mobilised on Friday and again on Saturday. This was in response to the congestion in Terminal 5 and there appears to have been limited preparation by the CST for the expected snow, but its frame of reference was initially focused on dealing with the situation in Terminal 5, and not the expected snow. As has already been reported, no snow contingency meeting happened, although this is recommended in the snow plan.

196 The panel believes that early management response to forecasts of snow and other extreme conditions will help in ensuring that: sufficient resources are made available to support snow clearance and passenger welfare; airline and ground handler engagement is better managed; communications to passengers and airlines are made clearer; and that the appropriate crisis management teams are mobilised. BAA managers who presented to the panel accepted that their early response in this situation had not been effective.

*Recommendation 7:*

The Panel recommends that triggers for escalation should be defined that are clear and ensure early deployment of the higher level command and control structures. Any forecast snow event of a material size should automatically trigger:

- The implementation of the snow contingency process, including holding a snow contingency meeting, the mobilisation of the “snow cell” with BAA, airlines and their ground handlers, NATS and ACL representation. The snow cell, once activated should remain fully operational and functional until the event is over and operations have normalised. The snow cell should not be deactivated without a closing debriefing with stakeholders;
- The notification of non-operational staff and contractors that they may be called up (subject to prior contractual agreement);
- The invocation of the Bronze, Silver or Gold Command depending on the nature and expected severity of the event;
- The mobilisation of the Capacity Constraints Group as soon as it is clear that Heathrow is expected to have an extended period of constrained capacity (see below);
- The planned and rehearsed terminal congestion response (referred to later), including the early erection of marquees, and the procurement of heating, hot food, water, phone chargers, and computers for rebooking;
- Accelerated clearance (with prior DfT agreement) of access rights for any staff or contractors expected to work airside;
- A constant review of the level of escalation by the “Gold Commander”.

**Early use of the Capacity Constraints Group**

197 The panel heard reports that passengers and some airlines were confused between December 18 and 20 about the current and expected future status of the airport. On 18 December some airlines kept flights open due to communications from BAA that the airfield would re-open for operations. On 19 December there are reports that many airlines showed scheduled flights on their systems and in ACL, despite having been informed that the airfield was closed to all arrivals and that “limited departures would take place from Terminal 3 and Terminal 5 with prior agreement from airport operator” and despite not having planes at Heathrow. If a flight is open on the airline’s system, then this status is automatically replicated in ACL systems and in BAA’s internal systems, FIDS screens, and web pages. As a result many passengers travelled to or stayed at the airport in the hope of flying and, once there, were reluctant to leave.



- 198 The Capacity Constraints Group (CCG) – formed at 2030 on 19 December – eventually became an effective mechanism for managing the matching of demand and supply and ensuring that airlines’ published schedules matched the available capacity at the airport. The panel understands that its processes have been further developed since December.

*Recommendation 8:*

The Panel recommends that the Capacity Constraints Group (CCG) be strengthened and formally recognised as the preferred mechanism for establishing an emergency timetable in times of crisis. This group should be formed as soon as it is clear that Heathrow is expected to have an extended period of constrained capacity and that its authority to maintain an emergency timetable be recognised explicitly in the Conditions of Use. As part of an airline’s Condition of Use, there should be an obligation to operate under the agreed emergency timetable and implement this through its own operational systems so that passengers get a consistent status.

The CCG should be charged with restoring flow rate to the airport as quickly as possible given the current status of the airport and the need to operate safely.

The CCG should be chaired by a dedicated BAA official who should be designated as the lead to drive joint decision-making with NATS, airlines, the AOC and ACL

*Sustainable Crisis Response*

- 199 The panel heard that there were many examples of BAA and airline employees working extremely long hours to manage the situation. There were also examples of where some airlines had no local cover in the airport, giving rise to additional frustration for passengers. Some airside ground handlers were at times unavailable, because they had been stood down by airlines.
- 200 In other instances, some LBRTs were insufficiently staffed to be effective because staff were covering operational and crisis management roles in parallel. This resulted in ineffective situational reporting.

*Recommendation 9:*

The panel recommends that steps be taken – by BAA and airlines – to ensure that every crisis response team has sufficient on-call dedicated resources rostered to enable it to function 24 x 7 for a sustained period. Such staff need to be trained and competent, and have the necessary leadership skills, to do that role in the event of a crisis.

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## Part C:

# Communications

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- 201 The panel considers that during the early days of the event, unclear and uncertain communications caused incorrect signals and messages to go to airlines, passengers and from airlines to passengers. This also limited information to support decision making. The panel considers that more needs to be done to provide a single authoritative source of information available globally on the status of Heathrow and its airlines.
- 202 The panel makes recommendations in the following areas:
- Communications with passengers;
  - Single Airport Command and Control Centre;
  - Improved situational awareness.

## Communications with passengers

- 203 The panel received input from a range of passenger sources indicating that information on the status of the airport and flights was conflicting and uncertain. Some airlines kept flights open on 18 December expecting the airport to re-open and, as already reported, some flights were shown as scheduled on 19 December despite the airfield effectively being closed. This had a significant effect on the scale of the congestion and welfare situation within the terminals. Many passengers preferred to travel to and then stay in the terminals in the hope that their flight would depart, rather than relocate to a hotel or return home.
- 204 There were discrepancies between different sources of information available to passengers. As has already been explained, these were caused by delays in communicating decisions about the status of the airport between the airport operator and the airlines, and the subsequent delay and challenge of getting information replicated between the airline system, ACL system, and then the display screens in the terminal and heathrowairport.com. Particular frustration was also experienced by many passengers who were unable to access the web sites or call centres of their airlines to rebook flights. The panel noted that the BAA web site was maintained throughout.
- 205 Passenger feedback suggests that many passengers relied on 24 hour news reporting, Twitter and Facebook for information. BAA and some of the airlines used social networking extensively to engage with passengers and passengers found this to be particularly helpful. These channels helped many understand better what was happening and allowed a more effective dialogue between passengers and the airport.
- 206 The panel concludes that BAA and the airlines need to work closely together to ensure that changes in airport status can be quickly and accurately communicated to passengers in order to establish a single and authoritative source of information available globally on the status of Heathrow and its airlines. At times of emergency, BAA needs to be able to control flight information so that it reflects current airport status.

*Recommendation 10:*

The panel recommends that:

- There should be a review of the process through which airport status changes and capacity constraint agreements are converted into updated airline flight schedules, and subsequently published on the websites of airlines and BAA, and on terminal flight information display screens. It is essential that these are undertaken in a timely manner which is agreed as acceptable by all parties. The agreed process should be tested regularly;
- Clear agreement should be established between BAA and the airlines serving Heathrow on the manner in which decisions concerning flight status will be taken and communicated to passengers, media, governments and the public at large;
- BAA should have the authority to control flight information in terminals during emergencies to ensure there is a single authoritative source of information;
- Airlines should seek to increase their website and rebooking capacity at times of disruption;
- BAA should work with airlines and NATS to improve the clarity and accuracy of global media communications.

### Single Airport Command and Control Centre

- 207 The panel was concerned that there was no single Airport Communication and Control Centre that enabled all parties to see a consistent real-time picture of the current status of the airport. The panel is of the opinion that this is a best practice and is seen in many other large airports globally such as Los Angeles (LAX) and Madrid-Barajas (MAD). This was both a physical and a system problem. For example, the airside LBRT operates from a room which has limited visibility of the airfield and lacks real-time sources of information. The CST room has no visibility of the airfield, has limited situational information, and is physically separate from the STAR centre which was actively monitoring landside status. Qualitative situation reports were passed by telephone or handheld radio from the snow clearing teams on the ground to the Airside LBRT. Crisis communications were very reliant on telephone conferences and SMS text messaging, with limited use of electronic communication and collaboration tools.
- 208 The panel considers that such approaches are not consistent with best practice and do not enable a complex operation such as Heathrow Airport to respond optimally at times of emergency.

*Recommendation 11:*

The panel recommends that:

- A physical control centre should be established for the management of major incidents (at “Silver” level), where parties can convene to combine situational awareness with face-to-face communications. Consideration should be given immediately to co-locating the CST and STAR rooms;
- HAL’s communication infrastructure should be centralised under one unified Airport Communication and Control Centre that utilises advanced technology to optimise situational awareness, facilitate informed decision-making, and enhance communication with key stakeholders. Technology should include real-time video displays of the airfield (including aircraft and vehicle locations), terminals, and landside areas. Hardware technology should be supported with software analytics, including advanced Incident Management Systems to facilitate improved communications, logging and better problem resolution and to normalise operations as soon as possible;
- An improved control centre should be established for the Bronze Airside LBRT that provides improved CCTV, stand status reporting, and weather telemetry.

*Improved situational awareness*

209 The panel observed that some status reporting at Heathrow is not automated. Decisions may therefore be taken at times of crisis without a full current understanding of the status of the airport. The panel heard that systems such as the stand status system used by the airside LBRT was helpful, but this information could not be shared remotely and that recent developments such as A-CDM<sup>7</sup> proved useful during the snow event. The panel was surprised that there was no single Incident Management System used across Heathrow. BAA should enhance these systems so they give a single, real-time web-based view of airfield terminal and landside status to all stakeholders, wherever they are, track decisions, and enable simulations to be run so as to support forward decision making.

*Recommendation 12:*

The Panel recommends that:

- Heathrow should plan for new systems that use real-time digital CCTV and telemetry to create a real-time and integrated visualisation of airport status and a forward picture of airfield performance;
- The status of the airfield, terminal and landside areas should be available to key BAA and stakeholder executives through a secure, web-based system that can be readily accessed from remote global locations;
- Heathrow needs a real-time incident management system available to all stakeholders that tracks and supports decision making.

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<sup>7</sup> See Glossary (Annex F ) for description

## Part D:

# Passenger Welfare

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- 210 Passengers experienced distress as a result of the disruption at Heathrow. This was a result of the following:
- There was an apparent lack of compliance, by some airlines, with EC Regulation 261/04. This sets out obligations on airlines to provide compensation and assistance to passengers in the event of cancellation, long delays and being denied boarding;
  - There were different and conflicting messages to passengers about the state of the airport and of flights;
  - There was a slow reaction to terminal congestion by BAA. BAA's response to terminal congestion and support for passenger welfare was increasingly effective from 20 December onwards.
- 211 The panel's experience is that the best way to address passenger welfare problems of the type experienced during the snow event is to prevent the conditions responsible for them. The earlier recommendations in this report are intended to avoid any mass congestion by getting aircraft taking off and landing as soon as possible and providing consistent, clear communications on status to all passengers. The panel makes recommendations in two further areas:
- Responsibility for passenger welfare;
  - Prepared and rehearsed welfare response.

## Responsibility for passenger welfare in times of crisis

- 212 Airlines operating in EU countries are, as have already been noted, responsible for passenger welfare under EC Regulation 261/2004. The panel understands that compliance with this regulation is a mandatory responsibility but is concerned that no sanction appears to be taken against airlines that do not comply. It considers that few passengers would have remained in the airport overnight if all airlines had offered them hotel accommodation more extensively.
- 213 The panel notes that the CAA has started an inquiry into how passengers feel airports, airlines and other companies operating at UK airports, met or failed to meet, their expectations during the period of disruption. The panel thinks this is an important step and asks that the inquiry establishes how this responsibility for passenger welfare should be enforced, and what rights and obligations are placed on an airport in the event of a failure to do this.

***Recommendation 13:***

The Panel recommends that the CAA Inquiry establishes how responsibilities under EC Regulation 261/2004 will be enforced and what rights and obligations are placed on an airport in the event of relevant parties failing to comply with those responsibilities.

Until this is complete, the panel recommends that BAA, airlines and the CAA seek to strengthen the current informal agreement to ensure that passengers do not experience distress at times of emergency and that the respective roles and responsibilities of all parties are clear.

**Prepared and rehearsed welfare response**

- 214 Despite the point made earlier on legal responsibilities, the panel recognises that BAA has to have contingency plans for dealing with mass congestion in terminals as a result of a crisis, through the provision of shelter, food and water. The panel heard that the CAA worked with BAA during 2009 and 2010 on ways of improving the passenger experience. Part of that work focused on ensuring that the airport's contingency plans considered passenger welfare issues, and resulted in a BAA and CAA joint planning document. The document outlines BAA, airline and CAA responsibilities for: information flow to disrupted passengers; logistics, including contingency stocks; response times; joint command and control structures; pre-planning and preparation in advance of events; denied boarding protocols; and mutual provision of training.
- 215 The initial response to terminal congestion by BAA and some airlines on 18 and 19 December was not effective, with many passengers left in distress. BAA's terminal congestion plan requires the erection of marquees and the provision of blankets and water. No marquees were erected and many people waited outside terminals in the cold. BAA ran out of supplies of blankets and other emergency equipment and was unable to source additional supplies because of road conditions. Many passengers were unable to get reliable information on what was happening.
- 216 The panel heard that BAA, retailers and airlines had responded with increasing effectiveness to the issues of congestion and welfare from Monday onwards. It received good feedback on this from some passengers and airlines. During the period from 18 December:
- BAA provided over 30,000 free hot drinks, over 30,000 free hot meals, accommodation in hotels or welfare facilities for more than 3,000 people, free Wi-Fi and reduced parking charges for 30,000 passengers;
  - Restaurants were kept open late, and coffee shops operated through the night. Some stores were also kept open late for the provision of health and hygiene supplies;
  - BAA provided a volunteer helpline to support staff in dealing with passenger requests they could not resolve, for example medical issues. Staff with key language skills were used on the helpline, in order to communicate with non-English speaking passengers, via volunteers, over the phone;
  - From early Tuesday morning marquees were available, fully equipped to provide hot meals and drinks, seating, flight information and free telephones for passengers' use;

- The Heathrow Airport website received 1.34 million unique visitors on Monday 20 December. This was over 19 times more than the number received on Monday 13 December. BAA call centres answered over 12,000 calls on Monday 20 December.

217 The panel considers that there was a slow reaction to terminal congestion and welfare issues by BAA. BAA's response to terminal congestion and passenger welfare was increasingly effective from 20 December onwards. The level of response by some airlines to their EU obligations appears to have been deficient.

#### *Recommendation 14:*

The panel recommends that BAA – together with airlines and retailers – prepare and routinely test a sustainable welfare plan that can be triggered immediately in the event of an emergency. The plan needs to:

- Ensure that sufficient persons from BAA, airlines and their agents, and retailers are available at Heathrow to support welfare and hotel booking, manage congestion and support rebooking;
- Mobilise BAA staff to the terminal for which they have been trained;
- Mobilise resources and supplies to retail outlets and provide extra resources to maintain hygiene facilities;
- Provide systems which give all staff timely, accurate and authoritative information on flight and airport status;
- Enable easy and clear communications to passengers in terminals on airport status;
- Allow passenger communications in a number of languages.

All airlines need to be engaged in this plan and need to commit to working together in order to have adequate resources on site. Terminal messages need to be coordinated with airline stakeholders to ensure consistency and clarity.

# Annex A:

## Terms of Reference

### Scope and Objectives

#### *Scope*

- 1 The Enquiry will conduct a forensic, fact-based review of Heathrow's performance during weather-related incident periods which took place in 2010. These refer specifically to the snow fall in January, November and December. The incident period is defined as when the adverse weather was forecast within a seven day period prior to the snow falling, to the point of return to 100% capacity with no impacted passengers.
- 2 The scope of the Enquiry is as follows:
  - Heathrow Airfield;
  - Terminals 1, 3, 4 and 5;
  - Passenger service wellbeing and facilities;
  - Logistics/supply chain;
  - Airport – airline coordination;
  - Other BAA airport performance during weather disruption.
- 3 The following areas are out of scope of the Enquiry:
  - Surface access to Heathrow;
  - Third party processes and response to the weather event (including airlines and external contractors).
- 4 The Enquiry focus will be on the following three areas:
  - Heathrow's Plan in preparation for the adverse weather forecast;
  - Execution of the crisis management plan and the response of the operation during the period of adverse weather disruption;
  - Heathrow's recovery in restoring the operation after the adverse weather disruption had passed.

#### *Objectives*

- 5 The Enquiry will specifically meet the following objectives:
  - Conduct a fully independent, forensic enquiry on behalf of the BAA Chief Executive Officer;
  - Conduct the Enquiry in the context of Heathrow's operating model, taking into account capacity constraints and the intensity of the rate of operation;



- Request and review fact-based data gathered from the operation during the incident period;
- Review written and oral evidence presented;
- Identify specific problems which arose within the three main focus areas: planning for the incident; execution of plans during the incident; and recovery from the incident;
- Offer recommendations on what the basic minimum expectation should be of Heathrow in responding to adverse weather conditions and which are relevant in the context of Heathrow's regulatory environment, business model and operating constraints;
- Offer recommendations on how Heathrow can improve its response to the next adverse weather incident.

## Enquiry Panel Members



### *Professor David Begg (Chairman)*

- 6 Professor David Begg has extensive expertise in the transport sector and is currently a Non-Executive Board Member of FirstGroup; Chairman of the Northern Way Transport Compact; Chairman of the Business Infrastructure Commission; Chief Executive of Portobello Partnership; a member of the High Speed Rail 2 External Challenge Group; adviser to the Greater Manchester Transport Executive; Publisher and contributor at Transport Times magazine; and Visiting Professor in Sustainable Transport at Plymouth University. He was previously Chairman of the Commission for Integrated Transport, an independent advisory body to the Government; and Chairman of Tube Lines, the company responsible for maintenance and upgrade work on three London Underground lines.
- 7 Professor Begg was appointed as a Non-Executive Director of BAA in November 2010.

*James Cherry*

- 8 James Cherry has over 30 years of experience in general management, project management and financial management in the International Aerospace, Defence and Rail sectors. Over this period he has worked in senior executive positions with Bombardier Inc., Oerlikon Aerospace Inc., CAE Inc. and ALSTOM Canada Inc. He joined Aéroports de Montréal as President and Chief Executive Officer in June 2001, and is a member of the Board of Directors of Aéroports de Montréal. He is the Immediate Past Chair of the Governing Board of Airports Council International and a member of the Board of the Canadian Airports Council.
- 9 James Cherry was supported in his role on the panel by Normand Boivin, who is the Vice President of Operations at Aéroports de Montréal.

*Ben DeCosta*

- 10 Ben DeCosta managed the Hartsfield-Jackson Atlanta International Airport for 12 years (1998 – 2010). Under his leadership, Atlanta's airport received numerous awards and national recognition in various areas, including airfield safety. Prior to taking the position of aviation general manager at Hartsfield-Jackson, Ben DeCosta worked for the Port Authority of New York and New Jersey, and served as the general manager of Newark International Airport.

*Josef Felder*

- 11 Josef Felder has 20 years' experience in the aviation industry. For 10 years he was an airline executive before he became CEO of Zurich Airport. Additionally, he served three years as Board of Director of Skyguide, the Swiss Air Navigation Company. He also spent seven years in the Board of ACI (Airport Council International).

*Sir Malcolm Field*

- 12 Sir Malcolm served as Chairman of the Civil Aviation Authority from 1996 to 2001, Chairman of Tube Lines Ltd between 2002 and 2006, and was an external policy adviser to the UK's Department for Transport from 2001 to 2006.

*Jim Hunter MBE*

- 13 Jim Hunter's airline career spanned 40 years at Heathrow, European and Domestic out-station and Gatwick – ultimately managing Domestic, Shuttle and European operations, based at Terminal One. For the last seven years Jim has been General Secretary of the Heathrow Airline Operators Committee – becoming Managing Director of Heathrow AOC Limited in 2009.
- 14 Jim was awarded the MBE, for Services to the Aviation Industry, in the New Year Honours list in 2011.

*Mary Rose Loney*

- 15 Mary Rose Loney is a Former Commissioner of Aviation for the Chicago Airport System responsible for managing O'Hare and Midway Airports, as well as the former Director of Aviation for Philadelphia International Airport. Mary Rose also directly managed Winter operations as First Deputy Commissioner of Aviation at O'Hare, prior to being appointed Commissioner of Aviation.

*Murray Sigler*

- 16 Murray Sigler is the President of Axia North America. Before joining Axia in 2009, Murray was Managing Director of the Government of Alberta's UK Office for 3½ years. Prior to that, he was President and CEO of the Calgary Chamber of Commerce, and had an extensive career in the aviation industry, including having led Canadian Airlines Corporation as President and COO of Canadian Airlines International and CEO of Canadian Regional Airlines. In the past, he has served on various Corporate Boards of Directors in the aviation, tourism and energy sectors.

*Robert Sutton*

- 17 Robert Sutton is a Senior Adviser to Macfarlanes, the City Law Firm. He was a Partner of the firm for 26 years, serving as Senior Partner from 1999 to 2008. He specialises in company law. In addition, Robert is Chairman of Tulchan Communications, the Financial Communications Consultancy and of OMC, the Management Consultancy. Robert was a passenger at Heathrow during the December snow disruption.

*Mark Swan (Observer)*

- 18 Mark Swan was appointed as a Civil Aviation Authority Board Member and Director Airspace Policy in March 2009. Mark Swan previously held numerous appointments in the Royal Air Force since joining as a pilot in 1979, Formerly Director Operational Capability, Ministry of Defence, 2006 – 08. IoD accredited Chartered Director.

*Roy Williams*

- 19 Roy Williams was Director of Louis Armstrong New Orleans International Airport for five years, and was in this role when the airport and region were hit by Hurricane Katrina in September 2005. Before New Orleans, Roy Williams directed the Dayton, Ohio, airport (a major air cargo hub for Emery Worldwide) and worked for Airport Group International, a private company managing airport operations in London (Luton) and Bolivia. He also worked for USAir, now known as US Airways, managing airport/airline relationships in the US and Europe.

*David Quarmby CBE (Advisor to the Enquiry)*

- 20 David Quarmby, Chairman of the RAC Foundation, is recognised as one of the UK's leading transport professionals, with a varied career across the industry and in government. He spent four years with the Ministry of Transport and 14 years with London Transport, of which the last six were as MD of London Buses. Four years as Sainsbury's Logistics Director was followed by eight years as Joint MD of Sainsbury's and as director or chairman of its

subsidiaries Homebase, Savacentre and Shaws in New England. Since the mid-1990s David has also been Chairman of Docklands Light Railway Ltd, Chairman of the British Tourist Authority, a member of the TfL Board, and Chairman of the Strategic Rail Authority.

- 21 During 2010 David Quarmby led an Independent Review on behalf of the Secretary of State for Transport into the response of England's transport systems to severe winter weather and in December carried out a further quick Audit.

*Philip Langsdale (Enquiry Secretary)*

- 22 Philip Langsdale is the BAA Chief Information Officer and is a member of the company's Executive Committee.

# Annex B:

## Enquiry Methodology

### The Enquiry Process

- 1 The Enquiry has not been constructed as a judicial process leading to legal conclusions.
- 2 The Enquiry conducted its review of Heathrow's performance during the events of 18 to 23 December 2010 supported by an analysis of the information which has been made available to the panel. Such information was provided in writing and orally by BAA, stakeholders, and other interested parties. In advance of the six Enquiry panel meetings, facts and data were collated within HAL and BAA by the Enquiry Secretariat and made available to all panel members in sufficient time for the information to be reviewed and interrogated.
- 3 Contemporaneous documents and other relevant data requested from HAL by the Enquiry secretariat were reviewed with HAL. External submissions (written and oral) were not checked for factual accuracy, nor were they shared with HAL or BAA management.
- 4 Airlines, the travel industry and other stakeholders, including scientific advisers and UK Government representatives, were contacted directly and given the opportunity to make written or oral submissions to the panel.
- 5 A number of BAA and HAL employees and external contributors attended the Enquiry panel meetings in person, to report to and answer questions from panel members on the sequence of events, and on written materials which had been submitted for panel members' consideration in advance.
- 6 Each session was recorded and transcribed. The transcripts were provided to each interviewee to check for transcription errors. Each interviewee was also given the opportunity to submit supplementary material and comments to the Enquiry if anything had been omitted or needed subsequent clarification.
- 7 An Enquiry website ([www.heathrowenquiry.com](http://www.heathrowenquiry.com)) was established to give passengers and other users of Heathrow the opportunity to submit their observations and experiences on the snow to the panel. The website was publicised via press release, social media, Heathrow and BAA websites, and by email to Heathrow users and recipients of its monthly newsletter (c.225,000 addresses). In addition, a request was made to airlines to publicise the website to their customers.
- 8 Ipsos Mori was commissioned to run passenger focus groups, to obtain more detailed, qualitative information about the experiences of those involved.
- 9 All written materials submitted were made available to panel members. This included correspondence sent directly to the Enquiry by passengers and other stakeholders.

## Information gathered

### *Written material*

- 10 More than 300 items of written material were submitted to panel members, including information and data on:
  - Heathrow's background and business model: context on Heathrow's regulatory environment, health and safety obligations, licence to operate and airfield management constraints;
  - BAA's crisis management plan;
  - Heathrow Airport's Snow Plan;
  - Contemporaneous logs: various logs kept throughout the event period, plus statistics on the use of Heathrow Airport Ltd volunteer resources;
  - Detailed data on the Incident: including rates of snow fall and clearance, stocks and use of de-icer, airfield status, and availability and deployment of equipment, resources and supplies during the event;
  - Airport / Airline Coordination: including minutes from joint capacity planning meetings, the log of NOTAMs issued and information communicated to passengers both at the airport and beyond;
  - Passenger information: data about the number of displaced passengers and the welfare provisions made by HAL for passengers, including statistics on the usage of critical supplies such as water, blankets, nappies etc;
  - Media coverage of the event: logs of external communications issued via press release, website and social media;
  - How other airports in Europe and North America plan for and manage in extreme weather conditions.
- 11 The Met Office was commissioned to provide a detailed analysis of the meteorological conditions during the event, including temperature and snow accumulation. Statistical analysis of historic snow fall and winter weather patterns for the past 40 years was also presented, as well as a view on the future long term weather predictions which Heathrow should be planning for.

### *Oral Presentations*

- 12 The first two day meeting of the Enquiry panel was dedicated to interviewing a number of BAA executives who were either on duty throughout the period or had been directly involved in the management of the event.
- 13 The second two day meeting of the Enquiry panel was dedicated to hearing evidence from external parties, including the airlines, aviation and travel industry, Civil Aviation Authority, NATS and the Department for Transport.
- 14 Panel members also took part in a comprehensive tour of Heathrow, which included familiarisation with the airfield and airside facilities, snow equipment, landside control room and the airport terminals.

- 15 The panel recognises the inherent weakness that oral accounts given to the panel in all good faith are nonetheless reliant on individual viewpoints and recollections. Nevertheless the panel valued such accounts which provided much useful material and is grateful to those who were interviewed for their time and the effort involved.

## Annex C: Persons appearing at the Enquiry and written submissions received

### Persons appearing at the Enquiry

Name	Job Title	Company
Nick Barton	Managing Director Stansted	BAA
Sarah Bater	HR Director - Policy & Process	BAA
Simon Baugh	Director of Airport Communications	BAA
John Bell,	General Manager UK Airports	Virgin Atlantic
Chris Bosworth	Managing Director	Airport Co-ordination Ltd (ACL)
Peter Brockwell	IT Relationship Manager	BAA
Chris Butler	Terminal Operations Director Terminal 4	BAA
Sean Butler	Head of Operations & Crewing	bmi
Mike Carrivick	Chief Executive Officer	Board of Airline Representatives in the UK (BAR UK)
Jonathan Coen	Head of Category	BAA
James Cole	Director ACL International	Airport Co-ordination Ltd (ACL)
Brian Collins	Chief Scientific Advisor	Department for Transport



*Persons appearing at the Enquiry and written submissions received*

Name	Job Title	Company
Clive Cook	Chairman	Airline Operators Committee, Heathrow
Nick Cullen	Chief Operating Officer, Heathrow Airport	BAA
Richard Deakin	Chief Executive Officer	National Air Traffic Services (NATS)
Jonathan Dutton	Forecasting and Service Delivery Manager (Transport)	Met Office
Terry Fusco	Head of Heathrow IT	BAA
Andy Garner	Director of Operational Planning	BAA
Emma Gilthorpe	Director of Regulation	BAA
Andrew Haines	Chief Executive Officer	Civil Aviation Authority
Tim Hardy	Airside Director	BAA
Chris Hemsley	Director, Consumers & Markets	Civil Aviation Authority
David Hill	Head of Coordination	Airport Co-ordination Ltd (ACL)
John Holland-Kaye	Commercial Director	BAA
Carol Hui	General Counsel and Group Company Secretary	BAA
Robert Kensey	Coordination Manager Heathrow	Airport Co-ordination Ltd (ACL)

*Persons appearing at the Enquiry and written submissions received*

Name	Job Title	Company
Corneel Koster	Director Operations, Safety & Security	Virgin Atlantic
Kathryn Leahy	Risk and Safety Management Director	BAA
Jose Leo	Chief Financial Officer	BAA
Fidel Lopez	Managing Director Airports' Division	BAA
Andy Lord	Director of Operations	British Airways
Andrew Macmillan	Strategy Director	BAA
Colin Matthews	Chief Executive Officer	BAA
Gary Moorshead	Chief Fire Officer	BAA
Steven Morgan	Capital Director	BAA
Terry Morgan	Technical Standards and Assurance Director	BAA
Cathy Mussert	Head of Public Affairs	BAA
Liz Neighbour	Terminal Operations Director Terminal 1	BAA
Matt Palmer	Capital Re-Engineering Director	BAA
John Parkinson,	Head of UK Aviation Policy Development	Department for Transport
Jeff Poole	Director Industry Charges, Fuel & Taxation	International Air Transport Association (IATA)

*Persons appearing at the Enquiry and written submissions received*

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Name	Job Title	Company
Jon Proudlove	General Manager - ATC Heathrow	National Air Traffic Services (NATS)
Steve Ridgway	Chief Executive Officer	Virgin Atlantic
Malcolm Robertson	Director of Communications	BAA
Fiona Rodford	Group HR Director	BAA
Graham Simpson	Security Improvement Director	BAA
Stuart Voller	Head of Regional Airports & Contingencies	Department for Transport
Bill Ward	General Manager Heathrow	bmi
Sally Westwood	Head of HR - Airside & Logistics	BAA
Stephen Wilkinson	Heathrow Property Director	BAA
Colin Wood	Airside Director	BAA
Allan Young	Head of Airport Infrastructure	Virgin Atlantic

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## Written submissions received

- 1 The Enquiry received written submissions on behalf of the following organizations:
  - ABTA
  - Airline Operators Committee (AOC) (Heathrow)
  - Aer Lingus
  - Air New Zealand
  - BAA
  - BALPA
  - Board of Airline Representatives in the UK (BAR-UK)
  - BMI
  - British Vehicle and Rental Leasing Association (BVRLA)
  - Cathay Pacific
  - Guild of Pilots and Air Navigators (GAPAN)
  - Lufthansa
  - NATS
  - Qantas
  - Singapore Airlines
  - UK Flight Safety Committee (UKFSC)
  - United Airlines
  - US Airways
  - Virgin Atlantic Airways
  
- 2 In addition, the Enquiry received submissions, including correspondence, and feedback submitted via the Enquiry website, from individual passengers and other Heathrow users.

## Annex D: Timeline

- 1 The Enquiry Secretariat produced a graphical timeline of the period 17-23 December, which highlights the key events and decisions that were made during this time.
- 2 The timeline is fact-based and has been constructed using evidence supplied to the Enquiry by BAA only:
  - Crisis Support Team Log;
  - Capacity Constraint Group – meeting minutes;
  - Terminal 1 and 4 Local Business Recovery Team Logs (T3 and T5 LBRT Logs not available);
  - Terminal 1 and 3 ClickSMS Logs (T4 and T5 not available);
  - Record of media statements issued;
  - Welfare data;
  - List of NOTAMs issued;
  - Met Office data (air temperature, snowfall and snow depth);
  - MayFly-DidFly arrival and departure flight data;
  - Runway availability Log.

# Heathrow Winter Resilience Enquiry Timeline 17 – 18 December 2010 (12pm – 12pm)

## Context

	17 December 2010												18 December 2010											
	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000	2000-2100	2100-2200	2200-2300	2300-0000	0000-0100	0100-0200	0200-0300	0300-0400	0400-0500	0500-0600	0600-0700	0700-0800	0800-0900	0900-1000	1000-1100	1100-1200
Crisis lead (Level 0-4)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	COO (3)	COO (3)	COO (3)	COO (3)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	Duty Dir (2)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)
Air Temp (°C)	-0.6	-2.1	-1.3	-1.0	-3.2	-2.6	-3.4	-3.8	-3.4	-3.6	-3.7	-4.4	-5.4	-5.6	-5.0	-5.7	-5.4	-4.9	-4.5	-3.7	-3.0	-2.1	-1.5	-0.2
Snow depth (cm)																			1					
North Runway Status	Runway available																							
South Runway Status	Runway available																							
Number of ARR	33	32	33	31	29	25	26	30	21	29	15	7	4	1	0	0	6	6	33	24	22	29	22	9
Number of DEP	28	15	32	31	15	26	40	24	29	32	36	26	7	5	1	2	0	0	2	29	31	24	15	3
Airfield status	Airfield operational																							

### Key

❄ Indicates time when snow was falling

Runway Status: ■ Runway available ■ Runway unavailable

Airfield Status: ■ Airfield operational ■ Airfield closed for flight safety reasons ■ Airfield open with reduced capacity ■ Airfield closed for reasons other than flight safety

## Timeline

⬇ Decision ⬇ Info shared across business units ⬇ Comms out of Crisis Team ! Issues \* Action

■ Airfield ■ Passenger Welfare ■ Terminal ■ Command and Control



## Detail

**13:36** \* SMS to airlines. Red snow warning; airside tractors mobilised; landside gritting in progress; Op Green at present **T3 ClickSMS**

**13:41** \* Email to Ops Mgt Team: Fri - A/field, stands Green. Upped anticler concentrate last night and not experiencing any airport related delays. Sat - curr f'cast 8-25cm of snow 0600-2100 with freezing temps. Variability makes it difficult to plan. If we get a sig fall, be prepared for SRO and/or temp closure for some hrs while we clear stands/r'ways and r'ways. Some disruption likely over next 48 hrs. CST on standby **Airside email**

**17:07** \* BA cancelling all short haul flights from 1715 today **Comms email**

**17:26** \* Email to Ops Mgt Team: Update on resources, equip, media res, comms plan, ops plan + add a field arrangements. Sat will be particularly challenging to ensure snow clearance and prevention of ice formation. LHR stocks are suitable for 5 days but dep on 3rd party supplier thereafter with concerns re ability to maintain 'constant' flow of supply. LHR overall perf will be co-dep on airlines and Ground Handlers' perf **Airside email**

**17:53** \* Crisis Support Team (CST) initiated **CST Log**

**17:55** \* CST Lead and DD decided that AOC Chair not required to attend CST room **CST Log**

**18:28** \* All Landside Caterers in T5 have been requested to extend operating hours wherever possible **Welfare email**

**20:00** \* H'row is open and airside teams have worked hard to get both r'ways clear. Most flights operating. Some airlines are seeing delays and cancellations **Media statement**

**21:10** \* CST to stand down and reconvene at 0630 on 18/12 **CST Log**

**21:20** \* CST stood down **CST Log**

**06:24** \* CST initiated **CST Log**

**07:20** \* Advised BA will cancel all flights between 1000 and 1700 **CST Log**

**08:00** \* H'row is fully operational but we are expecting more snow and planning for the worst. BA pax must stay at home as all BA flights are cancelled **Media statement**

**09:00** \* Exec call - BA cancel all flights between 1000 and 1700; Airfield Status Green; Stands Amber **CST Log**

**09:00** \* Retail food and beverage caterers in T5 to be put on standby for later today (Saturday); T5 car park overstay relief arranged **CST Log**

**10:00** \* Terminal 4 LBRT activated **T4 LBRT Log**

**10:30** \* CST update sent out to UK BAA AOC Airline Distribution list reference current state of affairs, and what is expected over next 24hrs **CST Log**

**10:35** \* CST contacted Retail re requirement to keep food retailers open into the night; Retail advised contingency plans in place **CST Log**

**10:49** \* ARR flow rate 26 per hr applied - low visibility; all snow clearing capability mobilised **T3 ClickSMS**

**10:59** \* Further CST update sent to UK BAA AOC Airline Dist List re flow rates of 26% **CST Log**

**11:30** \* NATS advise airfield is unavailable - zero rated **CST Log**

**11:50** ! Both r'ways closed, Police advise closing access to Terminals and M4 spur due to dangerous road conditions **CST Log**

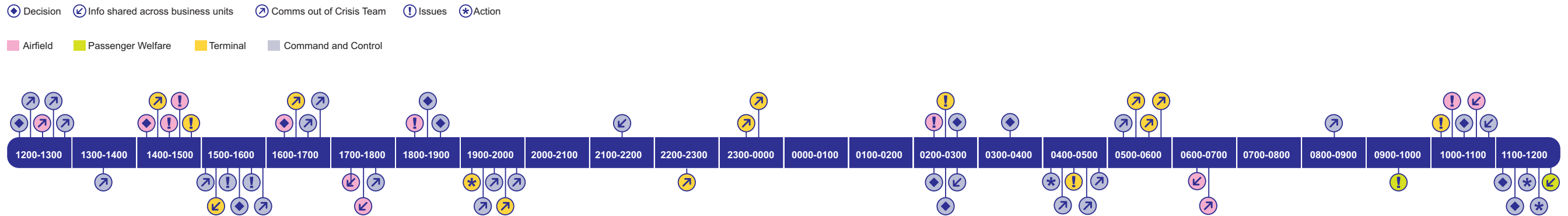
# Heathrow Winter Resilience Enquiry Timeline 18 – 19 December 2010 (12pm – 12pm)

## Context

	18 December 2010												19 December 2010											
	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000	2000-2100	2100-2200	2200-2300	2300-0000	0000-0100	0100-0200	0200-0300	0300-0400	0400-0500	0500-0600	0600-0700	0700-0800	0800-0900	0900-1000	1000-1100	1100-1200
Crisis lead (Level 0-4)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)
Air Temp (°C)	-0.1	0.2	0.1	-0.6	-0.6	-1.5	-1.6	-1.9	-1.8	-2.0	-0.6	-0.2	-0.9	-2.5	-2.7	-4.1	-5.2	-5.2	-5.1	-4.2	-3.1	-2.8	-2.1	-1.3
Snow depth (cm)	7	9	9	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	6	6
North Runway Status	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
South Runway Status	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Number of ARR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of DEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1
Airfield status	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational

- Key**
- ❄ Indicates time when snow was falling
  - Runway Status:** ■ Runway available ■ Runway unavailable
  - Airfield Status:** ■ Airfield operational ■ Airfield closed for flight safety reasons ■ Airfield open with reduced capacity ■ Airfield closed for reasons other than flight safety

## Timeline



## Detail

9,500 PAX in terminals overnight (Welfare data)

**12:00** Runways closed. Trying Single R'way Op + CTA + T4 (ie no T5) CST Log

**12:23** SMS to airlines reported ongoing closure of both r'ways with no ETA for re-opening T3 ClickSMS

**12:30** H'row's runways are currently closed until at least 1600 to allow snow clearing and to keep the airport safe. Pax should not travel to the airport until further notice Media statement

**12:45** SMS to airlines - airfield will remain closed until at least 1600 T3 ClickSMS

**12:50** UKBA advised that airfield closed until 1600 at earliest and inter-terminal bus suspended CST Log

**13:40** NOTAM A3705/10 issued: Aerodrome closed for ARR traffic NOTAM List

**14:30** PA announcement asking people to leave T1 LBRT Log

**14:30** CST call. Airside expect r'way at 1600. Request priority list from airlines to inform stand clearance plan CST Log

**14:30** Different turnoffs required due to wind change. Extends runway clearance CST Log

**14:30** Airlines waiting for r'way decision CST Log

**14:30** Concentrate on Nth r'way CST Log

**14:30** PA announcement asking people to leave T1 LBRT Log

**14:30** CST call. Airside expect r'way at 1600. Request priority list from airlines to inform stand clearance plan CST Log

**14:30** Different turnoffs required due to wind change. Extends runway clearance CST Log

**14:30** Airlines waiting for r'way decision CST Log

**15:00** Airside teams focusing on re-opening the Nth r'way around 1600, continue to work on the Sth r'way and plan to open that later this evening. Pax should not travel to the airport until further notice; will provide regular updates Media statement

**15:00** BA Cancel all short haul flights on 19th CST Log

**15:00** Airside report there is not sufficient resource to clear all stands CST Log

**15:00** Airport planned to open at 1730 for very ltd DEP & ARR given prior permission (PPR) CST Log

**15:00** CST to draft comms to airline on OP position - airport planned to open at 1730 for DEP & ARR given prior permission (PPR) CST Log

**15:08** SMS to airlines - r'ways will remain closed until at least 1600 T3 ClickSMS

**16:25** Airside report that airport will be closed until 1800 at earliest CST Log

**16:41** SMS to airlines - limited DEP from 1800; zero flow rate on ARR rest of day T3 ClickSMS

**16:50** SMS to Exec, SMT, Airlines (via AOC) - H'row expects to operate limited DEPs from 1800 at earliest. Zero flow rate for rest of day CST Log

**16:56** H'row r'ways will remain closed until at least 1730 to allow snow clearing. Airside teams focusing on re-opening Nth r'way around 1730, and cont. to work on Sth r'way and plan to re-open that later this evening. Pax should check with their airline before travelling to airport Media statement

**17:00** A & B r'ways clear; focus on Nth r'way; Sth r'way to be considered based on de-icer available CST Log

**17:00** 2 deliveries of de-icer CST Log

**17:30** NOTAM A3712/10 issued: Zero flow rate at Aerodrome. ARR considered by ppr NOTAM List

**18:30** Proposed: no inbound, concentrate on aircraft with pax ready to push back, should not confirm to airlines that r'way is open CST Log

**18:30** CST call. Keep airport closed CST Log

**19:00** Urgent request to airlines to cease check-in T4 LBRT Log

**19:00** NOTAM A3717/10 issued: Aerodrome closed for ARR/DEP traffic NOTAM List

**19:30** H'row Airport will remain closed for the rest of the day for arrivals and departures Media statement

**19:33** SMS to airlines - airport will remain closed for ARR and DEP for rest of day T3 ClickSMS

**19:40** 19:40: SMS to H'row SMT: "H'row will remain closed for rest of day for ARR & DEP. Not safe to operate" CST Log

**21:47** CST update - Operating zero flow rate for ARR until further notice. Aircraft should not plan to fly to H'row. Sth r'way remains closed; focus on sng r'way mixed mode op. Review status at 1000 19 Dec CST email

**22:23** SMS to airlines: Operating zero flow rate for ARR until further notice. Aircraft should not plan to fly to H'row. Sth r'way remains closed; focus on sng r'way mixed mode op. Review status at 1000 19 Dec T3 ClickSMS

**23:00** SMS to airlines: Sth r'way remains closed; focus on sng r'way mixed mode op. Review status at 1000 19 Dec T3 ClickSMS

**23:42** SMS to airlines: please direct all information regarding airline departure flying programme to [BAA email] lead for 0715 on Sunday T3 ClickSMS

**02:00** Airside update: Stands that have been cleared are not Green, at best Amber. Dispute with BA on conditions of stands. Snow has turned to compacted ice and proving difficult to move; issue over where to clear snow to CST Log

**02:00** ADM - Some serious issues with T1 re capacity constraints, police attending CST Log

**02:18** Request Kappa increase resource x5 (awaiting response) - Dep Director CST Log

**02:18** CST to request assistance from Capital team once requirements are understood CST Log

**02:18** Airport will not open today (Sunday) - COO decision during CST call CST Log

**02:58** Call to ADM to inform of decision that airport will not open on Sunday CST Log

**03:22** Comms to be issued around airfield being closed except for limited DEP CST Log

**04:00** Call to OCIC to request conf call with OCIC chair CST Log

**04:05** Call to AOC Gen Secretary to inform of position with airfield and imminent comms to airlines CST Log

**04:15** More info req'd around what arrangement will be available for PAX needing to leave airport CST Log

**04:36** SMS to airlines: There will be no flights (ARR and DEP) from T1 on Sun 19 Dec 2010. Overnight clearance of stands was not successful due to the snow turning to ice. Meeting to be held at 0600 to update you with more info and discuss the plans for today T1 ClickSMS

**04:50** To media and ops team: H'row not accepting ARR on Sun and only sml no. of DEP while airfield preps for a full re-opening on Mon CST Log

**05:00** No ARR + handful of DEP on Sunday 19 Dec Media statement

**05:16** SMS to airlines - H'row will not be accepting ARR on Sunday, and will only manage a handful of DEP T3 ClickSMS

**05:37** SMS to T1 airlines: No DEP or ARR from T1 as airfield teams cont. to deal with impact of yesterday's weather. Preparing for the airport to re-open on Monday 20 December T1 ClickSMS

**05:50** SMS to T3 airlines: current plan is to op from 6 cleared stands with 1QF, 1SK, 1AY, 1B, 1SQ, 3VS DEP. Please can AV/SQ contact T3 ops urgently to inform if able to operate off stand and if so what time T3 ClickSMS

**06:30** Stand requests rec'd from airlines. 20 stands clear at T3 and T5A; none at T1 and T4. Director is looking at extra Capital resource CST Log

**06:33** NOTAM A3732 issued - Aerodrome Closed to ARR. No DEP from T1 & T4. Min DEP from T3 & T5 NOTAM list

**08:30** No ARR + handful of DEP on 19 Dec. No flights will op T1 and T4; limited DEP from T3 and T5. Pax should contact their airlines before travelling to the airport Media statement

**09:30** Decision req'd on whether to invoke welfare options (these are free food l/s and a/s, newspapers and power sockets) CST Log

**10:15** Inaccurate SMS flight info to pax and comms did not want to switch off system in Term. CST to update airlines in 1100 meeting CST Log

**10:25** Airside Team requested CST to identify suitable areas of airport to dump snow CST Log

**10:40** Met Police support activated to support CST CST Log

**10:55** Message left with Airside Team re 2 potential sites for dumping snow CST Log

**10:56** ADM advised that access to H'row is now being restricted CST Log

**11:00** BAA and airline operators agree they should jointly concentrate on clearing head of stands and undercarriage track Airline meeting

**11:00** Capacity Reduction Plan to be invoked - convene at 1700 to set capacity for 20/12 Airline meeting

**11:15** Procurement talking to contractors to source people + equip for snow clearing. Exp 100-150 people (50 by 1245), no. of vehicles unknown CST Log

**11:20** Met Police arrive at Crisis Room CST Log

**11:36** Not charging pax for overnight stay in car parks; 20k bottles of water sourced CST Log

# Heathrow Winter Resilience Enquiry Timeline 19 – 20 December 2010 (12pm – 12pm)

## Context

	19 December 2010												20 December 2010											
	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000	2000-2100	2100-2200	2200-2300	2300-0000	0000-0100	0100-0200	0200-0300	0300-0400	0400-0500	0500-0600	0600-0700	0700-0800	0800-0900	0900-1000	1000-1100	1100-1200
Crisis lead (Level 0-4)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3)	COO (3) / CEO (4)
Air Temp (°C)	-0.8	0.0	0.5	0.1	-0.7	-1.8	-1.8	-1.8	-2.9	-4.0	-5.5	-5.3	-6.7	-7.3	-7.8	-9.4	-9.0	-8.7	-8.0	-7.5	-6.9	-5.1	-3.0	-2.2
Snow depth (cm)	6	6	5	5	5	6	6	6	6	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5
North Runway Status	Runway available																							
South Runway Status	Runway unavailable																							
Number of ARR	0	0	0	0	1	0	1	0	0	1	0	0	0	2	0	1	1	1	0	6	9	16	8	14
Number of DEP	3	2	1	2	1	1	0	2	3	1	4	3	0	1	0	1	0	0	0	3	6	7	7	16
Airfield status	Airfield operational																							

### Key

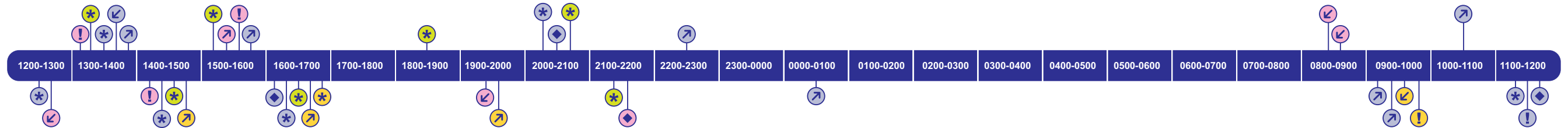
❄ Indicates time when snow was falling

Runway Status: ■ Runway available ■ Runway unavailable

Airfield Status: ■ Airfield operational ■ Airfield closed for flight safety reasons ■ Airfield open with reduced capacity ■ Airfield closed for reasons other than flight safety

## Timeline

- Decision
  - Info shared across business units
  - Comms out of Crisis Team
  - Issues
  - Action
- Airfield Passenger Welfare Terminal Command and Control



## Detail

**12:10** \* Virgin Atlantic Rep entered the Crisis Room *CST Log*

**12:30** \* Vehicles from Morgan Sindall arriving on site imminently, inc 6 tippers and 2 shovels *CST Log*

**13:07** ! Limited stands available for diverted aircraft. Airside LBRT to be contacted to ascertain which airlines would want to use available stands *CST Log*

**13:08** \* All internet terminals made free for re-booking *CST Log*

**13:20** \* Met Police exit Crisis Room *CST Log*

**13:20** \* Balf Beauty - 7 trucks, 8 tracked excavators + 2 lrg wheeled forklifts at T2, all with airside drivers. CST to notify airside LBRT to co-ordinate use *CST Log*

**13:30** \* H'row website states that the airport will run a full schedule on 20/12 *CST Log*

**14:00** ! Capital contractors to go to STAR centre; arrived without ID and vehicle ID *CST Log*

**14:00** \* CST request for stand availability from airside *CST Log*

**14:00** \* Free wi-fi activated in all terminals *Commercial email*

**14:54** \* SMS to T3 airlines: Opp for fixed PoC within LBRT and this person was exclusively dedicated to LBRT activities *CST Log*

**15:00** ! Airlines requested that the LBRT arrangements were urgently reviewed to ensure that operators had a fixed PoC within LBRT and this person was exclusively dedicated to LBRT activities *CST Log*

**15:30** \* No ARR + handful of DEP on Sunday 19 Dec *Media statement*

**16:30** \* Sth r'way no focus until stands cleared. Discussed reopening Sth r'way at 1900 *CST Log*

**16:30** \* 6 call centres working so wait no more than 1 minute *CST Log*

**16:30** \* 16:30: 6k vouchers out to terminals for pax *CST Log*

**16:45** \* T1 airline mtg - stand prioritisation discussed *T1 LBRT Log*

**18:30** \* Water - 2k bottles to T4, 2k to T3, 1.5k to T1, 1.5k blankets to T3 *CST Log*

**19:50** \* Southern r'way clearance cannot be guaranteed *CST Log*

**19:59** \* SMS to T3 airlines: Retail update - Pontis - 24hrs, Globe/Bite - open as long as req'd, 3 Bells - open until 0100, Costa/AMT open 24hrs as normal *T3 ClickSMS*

**20:30** \* CCG - agreed NOTAM to be issued stating reduced capacity - 0600-0700 15A/10D, 0700-1200 10A/15D *CCG Minutes*

**20:30** \* CCG - agreed that ACL would clear slots and reallocate in accordance with revised capacity pro rata on app by airlines (req'd to advise ACL by 2300). ACL agreed to produce a revised schedule by 2359 *CCG Minutes*

**20:30** \* Retail vouchers issued to info desks and T5 TSC *CST Log*

**21:00** \* All Landside caterers requested to open late / go to 24hrs *Welfare team*

**21:10** \* Capita/Blue Arrow stood down *CST Log*

**22:22** \* NOTAM A3760/10 issued: OP capacity as follows 0600-0700 15A/10D, 0700-1200 10A/15D *NOTAM List*

**00:00** \* H'row will be open and operate a limited schedule of ARR and DEP from 0600 on Monday morning *Media statement*

**08:00** \* > 100 stands operational, 70 still to be cleared. Access to runway secured from all areas *CST Log*

**08:00** \* Ops dir conf call: 30% of southern runway cleared. Aim to have 100% by midday *CST Log*

**09:00** \* CCG - plan to keep SRO and reduced capacity in place until 0600 22/12 *CCG Minutes*

**09:00** \* BA cancel all short haul flights for remainder of day *CST Log*

**09:58** ! FID's still showing flights which have been canx (airlines have not formally canx through ACL) *CST Log*

**10:59** \* NOTAM A3769/10 issued: capacity reduction of 67% until 0600 until 22/12 *NOTAM List*

**11:07** \* Executive Crisis Management Team (ECMT) initiated *ECMT Minutes*

**11:30** ! CCG. NATS concerned about ability for AP to maintain clear stands for incoming aircraft *CCG Minutes*

**11:55** \* Night noise extension granted (DEP until 0100 and ARR ad hoc) *CST Log*

5,600 PAX in terminals overnight (Welfare data)



# Heathrow Winter Resilience Enquiry Timeline 20 – 21 December 2010 (12pm – 12pm)

## Context

	20 December 2010												21 December 2010											
	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000	2000-2100	2100-2200	2200-2300	2300-0000	0000-0100	0100-0200	0200-0300	0300-0400	0400-0500	0500-0600	0600-0700	0700-0800	0800-0900	0900-1000	1000-1100	1100-1200
Crisis lead (Level 0-4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)
Air Temp (°C)	-1.2	-0.5	-0.3	0.8	0.5	0.9	0.8	0.7	0.5	0.3	0.5	0.7	0.6	0.7	0.6	0.9	0.7	0.8	1.2	0.7	0.3	0.2	0.4	0.6
Snow depth (cm)	5	5	5	4	5	5	5	5	5	4	5	5	5	5	5	5	5	4	4	4	4	4	4	4
North Runway Status	Runway available																							
South Runway Status	Runway unavailable																							
Number of ARR	15	20	6	18	19	7	8	11	13	16	14	14	16	7	2	2	4	6	11	19	9	13	13	16
Number of DEP	15	16	14	17	21	23	20	10	7	8	9	18	16	11	10	5	0	0	1	12	9	12	17	22
Airfield status	Airfield operational																							

### Key

❄ Indicates time when snow was falling

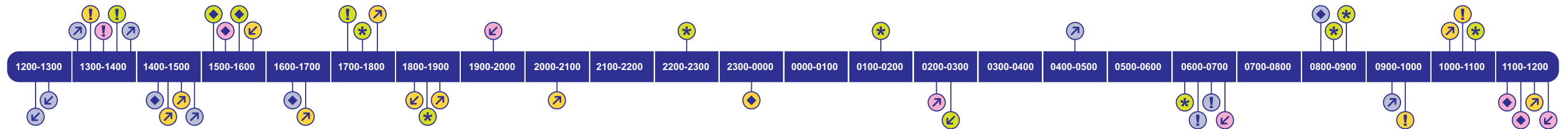
Runway Status: ■ Runway available ■ Runway unavailable

Airfield Status: ■ Airfield operational ■ Airfield closed for flight safety reasons ■ Airfield open with reduced capacity ■ Airfield closed for reasons other than flight safety

## Timeline

Decision Info shared across business units Comms out of Crisis Team Issues Action

Airfield Passenger Welfare Terminal Command and Control



## Detail

4,935 PAX in terminals overnight; 465 in welfare (Welfare data)

**12:30** ECMT - Ops update 120 stands available; de-icer on critical path; Sth r'way to remain closed *ECMT minutes*

**12:30** Unplanned ARR are taking up slots so that DEP are not able to leave. ATC have implemented zero ARR flow rate from 14:30 to assist *CST Log*

**13:00** Question was asked at Ops Director call whether Marquess were required? *CST Log*

**13:00** H'row will be open and operate a limited schedule of ARR and DEP from 0600 on Monday morning. Pax should not travel to airport without confirmed booking *Media statement*

**14:00** CCG: draw up a list of airlines not agreeing Capacity Constraint Policy and Operation Safety Instruction (OSI) *CCG Minutes*

**14:00** T1 and T3 extremely congested and we are unable to accept any more pax coming to these terminals. Therefore asking pax not to travel to H'row T1 and T3 until further notice (review at 1600) *Media statement*

**14:36** SMS to airlines: Zero flow rate for ARR effective from 14:30 local. BAA has requested no further pax come to T1 or T3 due to congestion *T3 ClickSMS*

**14:40** Reduced flying schedule until 0600 on Wed 22 Dec - max 33% of flights likely to op. Pax should not travel to H'row without a conf' booking. H'row website showing latest flight info, if website shows 'contact airline' then flight will not be operating today *Media statement*

**15:00** Putting contingency plan in place to move people on forecourt into hotels. Can use hotels overnight if needed *CST Log*

**15:35** DIT to allow night flights up to and including 747's. Arrivals likely until 0200 *CST Log*

**15:35** T1 and T3 Marquess requested. This will take a minimum of six hours to set up *CST Log*

**15:54** SMS to airlines: Zero flow rate restored *T3 ClickSMS*

**16:00** CCG: it was decided that ACL would provide a list of potential movements for the DIT after 21:00 *CCG Minutes*

**16:50** SMS to airlines: Reception Centre now available at local hotel for pax unable to travel. Please encourage your pax to take advantage of this facility *T3 ClickSMS*

**17:00** Marquess unlikely to be up until morning *CST Log*

**17:00-19:00** Hot food arrangements confirmed for T1 and T3 *Welfare team*

**17:30** SMS to airlines: Reception centre for T3 will now be located at different local hotel. 300 places available *T3 ClickSMS*

**18:51** SMS to airlines: Please do not encourage pax w/out confirmed seats to return to airport tomorrow. DEP building will be fully access controlled from start up and only those with confirmed seats with confirmed flights will be allowed access *T3 ClickSMS*

**18:30** BA issued a flight list for Tuesday 21 with 30% of flights operating *CST Log*

**19:30** Airfield amber. SRO until Wednesday. No grit or de-icer issues *CST Log*

**20:13** SMS to airlines: Pax not making full use of facility *T3 ClickSMS*

**22:25** Four laptops purchased and issued to hotels (to assist pax rebooking) *CST Log*

**23:00** Ops Directors have confirmed that Ops Support Programme will be required tomorrow and needs to be deployed to man the doors asap *CST Log*

**01:35** Evidence of marquess being erected on forecourts T1, T3 and T4 *CST Log*

**02:30** The Capacity Constraint Policy was communicated to LBRs and the importance of the airlines cancelling flight plans was re-iterated *CST Log*

**02:30** Marquess in T1 due to be up at 0400. T3 Marquess operational by 0500. T4 Marquess underway *CST Log*

**04:00** Reduced flight schedule today. Full list of flights that H'row plans to op is published on H'row website. Pax should not travel to H'row if their flight is not on the list. If flight is on list, pax should still conf with airline before leaving for airport as cont. bad weather in Europe may lead to further delays / cancellations through the day *Media statement*

**06:00** First volunteer briefing for terminal support volunteer hotline set up *Welfare Team*

**06:30** T3 ADM concerned that flight plan is unrealistic *CST Log*

**06:30** CST - Capacity constraints meeting with airlines for 0800 - request for LBRs to contact airlines directly and urge flight plans to be cancelled *CST Log*

**06:30** Marquess available for pax use in T1, T3 and T4 *CST Log*

**08:00** CCG: Extend the validity of the existing NOTAM A3795/10 issued: capacity reduction of 66% until 0600 until 23/12 *NOTAM List*

**08:45** Capital Director has confirmed that the T2A space (Voyager House) will be converted into accommodation for displaced passengers from T1 *CST Log*

**08:50** Welfare teams from Compass Centre have been dispatched to each terminal. Additional resource in Compass is to be coordinated into night/late shifts *CST Log*

**09:22** NOTAM A3795/10 issued: capacity reduction of 66% until 0600 until 23/12 *NOTAM List*

**09:50** Passengers struggling to get through to BA web site and phone lines, which is resulting in passengers turning up at T5 regardless of their flight status *CST Log*

**10:10** Reduced flight schedule until 0600 on Thu 23 Dec. Full list of flights that H'row plans to op is published on H'row website. Pax should not travel to H'row if their flight is not on the list. If flight is on list, pax should still conf with airline before leaving for airport as cont. bad weather in Europe may lead to further delays / cancellations *Media statement*

**10:16** Paddington station reporting via public address that T1 and T4 terminals are closed. CST contacting Paddington station to resolve *CST Log*

**10:20** E10 Catering Vouchers distributed to terminals for customers *CST Log*

**11:00** CCG: SRO will continue due to the stocks of de-icer and Antipater deliveries *CCG Minutes*

**11:00** CCG: maintain the arrival and departures rates *CCG Minutes*

**11:45** SMS to airlines: Airline representation remains a challenge - please provide staff for the forecourt and marquess *T3 ClickSMS*

**11:55** Night noise extension granted (DEP until 0100; ARR ad hoc) *CST Log*

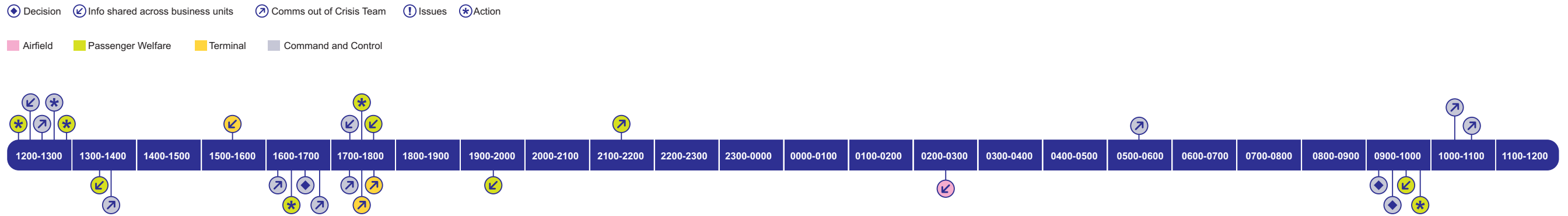
# Heathrow Winter Resilience Enquiry Timeline 21 – 22 December 2010 (12pm – 12pm)

## Context

	21 December 2010												22 December 2010											
	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000	2000-2100	2100-2200	2200-2300	2300-0000	0000-0100	0100-0200	0200-0300	0300-0400	0400-0500	0500-0600	0600-0700	0700-0800	0800-0900	0900-1000	1000-1100	1100-1200
Crisis lead (Level 0-4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)
Air Temp (°C)	0.9	1.4	1.7	1.7	1.0	1.0	1.2	1.2	1.4	1.4	1.3	1.2	1.2	1.2	1.2	0.9	0.9	1.0	0.9	1.0	1.1	1.1	1.0	1.2
Snow depth (cm)	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2
North Runway Status	[Green bar]																							
South Runway Status	[Red bar]																							
Number of ARR	15	15	18	18	20	17	23	17	19	15	7	6	1	1	0	0	2	9	21	28	19	30	26	21
Number of DEP	11	20	20	16	21	23	19	23	22	16	21	11	6	5	1	0	0	0	7	13	14	25	20	22
Airfield status	[Orange bar]																							

- Key**
- ❄ Indicates time when snow was falling
  - Runway Status:** [Green] Runway available [Red] Runway unavailable
  - Airfield Status:** [Green] Airfield operational [Light Green] Airfield closed for flight safety reasons [Orange] Airfield open with reduced capacity [Red] Airfield closed for reasons other than flight safety

## Timeline



## Detail

**1,510 PAX in terminals overnight; 1,090 in welfare (Welfare data)**

- 12:00** Hot food served on T1, T3, T4 forecourts. *Welfare team*
- 12:30** All stands now clear with exc of some in cargo. Sth r'way being cleared. Due to wind change anticipated later there is need to have Nth r'way closed to allow clearing of r'ways to enable ops from the East. *ECMT minutes*
- 12:30** H'row is operating around one third of a normal flight schedule until 0600 on Thursday 23rd December. *Media statement*
- 12:45** CEO, SoS and internal photographer tour Crisis Facility. *CST Log*
- 12:50** Laptops prepared for pax rebooking. *Welfare team*
- 13:00** Airline websites checked for consistency of messaging. *Welfare team*
- 13:47** Response to MoD offer - Grateful for offer of manpower assistance from MoD and while airport is still suffering from disruption our recovery efforts are focused on customer service and use of specialist a'field equip to return op to normal. Currently have over 200 volunteers supporting our pax in terminals and have engaged construction contractors to assist with snow clearance. *Media statement*
- 15:59** SMS to airlines: Hopeful that Sth r'way will open in evening. If it re-opens, the current schedule will stand and plans will be developed to maximise operations from tomorrow. *T3 ClickSMS*
- 16:00** CCG update: Southern r'way coming back into op at 1635, ARR on the northern, DEP on the southern, easterly ops. *CCG Minutes*
- 16:00** Protocol on free staff meals implemented in all areas. *Welfare team*
- 16:00** R'way capacity increased to 60 flights per hour. *CCG Minutes*
- 16:30** NOTAM A3814/10 issued: AD now op dual r'way op: 30A/30D. *NOTAM list*
- 17:00** CCG conf dual r'way operation. *ECMT minutes*
- 17:00** Hot food served on T1, T3, T4 forecourts. *Welfare team*
- 17:00** 700 rooms to be made available. Vouchers being issued and volunteers working well. *ECMT minutes*
- 17:00** Sth r'way now open. Airlines currently op reduced schedule. Extremely important that pax do not travel to airport unless they have confirmed booking with airline and flight is shown as operating on H'row website. *Media statement*
- 17:26** SMS to airlines: Please be advised reception centre is available at the Sofitel for up to 600 pax with sleeping bags, cold food etc. *T3 ClickSMS*
- 17:51** SMS to airlines: Sth r'way back in operation. *T3 ClickSMS*
- 19:00** Request for 'side caterers to continue as per last night. *Welfare team*
- 21:11** SMS to airlines: Please encourage pax to use local hotel for hot drinks, food, cinema and communal are. *T3 ClickSMS*
- 02:30** All stands Green except 1 (Amber) and 3 snow dump stands. *CST Log*
- 05:23** H'row is op a reduced flight schedule today, Wed 22 Dec. Pax should check our website for a full list of flights that airlines are planning to op today. Pax for flights not on the list should not travel to H'row. Pax for flights on list should still confirm their flight before leaving for the airport. *Media statement*
- 09:00** CCG: R'way capacity restriction to be lifted immediately. *CCG Minutes*
- 09:00** CCG: ACL to stand down its 24/7 operation. *CCG Minutes*
- 09:00** 2 main facilities being used for pax stuck in terminals: Sofitel 700, Capital facility Voyager 500. *ECMT minutes*
- 09:00** Laptops with Wi-Fi being supplied and volunteers helping with rebooking. *CST Log*
- 10:34** NOTAM A3833/10 issued: AD resumed normal ops. *NOTAM list*
- 10:37** NOTAM A3834/10 issued: Night noise restrictions alleviated by SoS. *NOTAM list*

# Heathrow Winter Resilience Enquiry Timeline 22 – 23 December 2010 (12pm – 12pm)

## Context

22 December 2010

23 December 2010

	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000	2000-2100	2100-2200	2200-2300	2300-0000	0000-0100	0100-0200	0200-0300	0300-0400	0400-0500	0500-0600	0600-0700	0700-0800	0800-0900	0900-1000	1000-1100	1100-1200
Crisis lead (Level 0-4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)	CEO (4)
Air Temp (°C)	2	2	1.7	1.4	1.5	1.4	1.0	0.8	0.3	-0.1	-0.2	-0.1	-0.1	-0.3	-0.7	-1.1	-0.9	-1.0	1	-0.5	0.3	0.8	1.4	1.8
Snow depth (cm)	1.4	1.5																						
North Runway Status																								
South Runway Status																								
Number of ARR	29	22	24	22	33	31	25	36	27	25	16	8	4	2	1	0	4	13	26	28	30	24	29	37
Number of DEP	33	26	28	32	20	25	29	27	27	24	28	13	4	2	1	0	0	0	6	27	25	31	37	36
Airfield status																								

### Key

❄ Indicates time when snow was falling

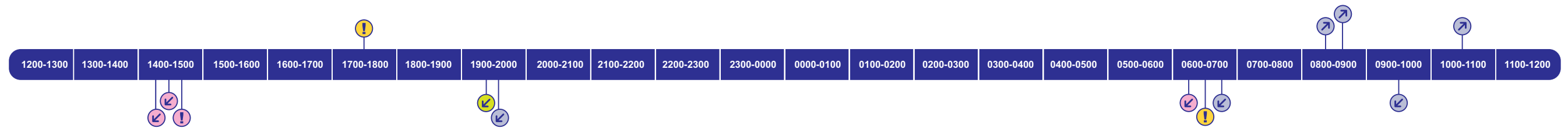
Runway Status: ■ Runway available ■ Runway unavailable

Airfield Status: ■ Airfield operational ■ Airfield closed for flight safety reasons ■ Airfield open with reduced capacity ■ Airfield closed for reasons other than flight safety

## Timeline

Decision Info shared across business units Comms out of Crisis Team Issues Action

Airfield Passenger Welfare Terminal Command and Control



## Detail

14:00

Airside status good with no delays in/out. Temp dropping to -2 after midnight, no anti-icing will be carried out before then  
CST Log

14:30

Stand 527 - 100 lorry loads of snow removed, 2/3 of way through. Should be carried out by end of day so stand is available  
CST Log

14:30

Airside seeking view on how to dispose of snow contaminated with glycol  
CST Log

17:30

T3 - 80% marquee full - used as holding pen. Zones B and E problem as 40/50 pax missed flight and told to put name on standby list which disappears  
CST Log

19:05

Welfare call: maintain catering at Sofitel and Voyager for tomorrow night; FID screen set up in Voyager to provide pax with info; catering in place and well stocked; volunteers - sourcing resource via suppliers to meet req'd numbers  
CST Log

19:29

AOC rep states that press releases are still very poor and that PR need to manage that  
CST Log

79 PAX in terminals overnight; 491 in welfare (Welfare data)

06:25

Airside media used overnight - 31,000 lts of Glycol; 2 tonnes of solid Glycol  
CST Log

06:30

All terminals congested in baggage reclaim  
CST Log

06:55

OCIC update: no real issues, happy with T5 congestion. Concern with aircraft availability. Issue with oversold New York flights  
CST Log

08:00

Both runways are open and H'row is operating around 91% of a normal flight schedule. Pax should not travel to airport unless airline has confirmed they will be able to fly  
Media statement

09:00

Final CCG meeting. Changes to Capacity Constraint Policy discussed  
CCG Minutes

10:00

H'row is fully open and over 90% will open today. More than 200,000 pax likely to travel today - 20,000 more than on a typical day  
Media statement

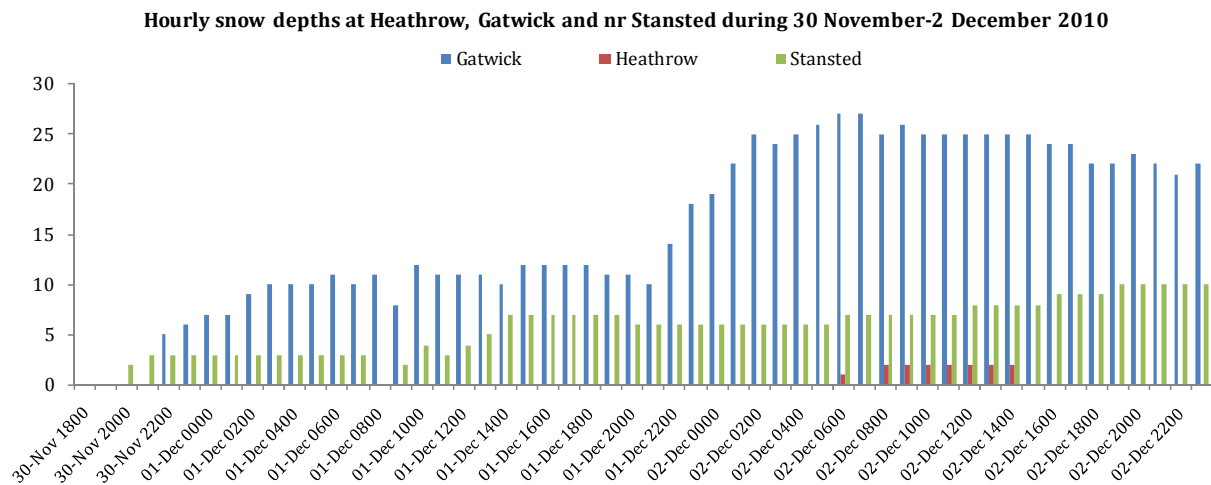
# Annex E: Weather at Heathrow in December 2010

1 This section provides a summary of the weather experienced at Heathrow in December 2010 and then compares this with historical records in order to draw conclusions about the likelihood of such events. It draws extensively upon an analysis of the weather produced for the Enquiry by the Meteorological Office (Met Office) and information provided by the Chief Scientific Adviser to the Department for Transport.

## Weather conditions in December 2010

- 2 December 2010 had two cold spells which resulted in snow falls in the South East.
- 3 The first cold spell, covering late November and early December, brought significant snowfalls to Stansted<sup>8</sup> and Gatwick, with Gatwick<sup>9</sup> airport experiencing 27cm of snow. Gatwick airport suffered considerable disruption. Heathrow, by comparison, experienced very little snow during the same period and remained open. See Figure 2 below:

Figure 2: Snow depths at Gatwick, Heathrow and near Stansted – 30 November-2 December 2010



Source: Met Office

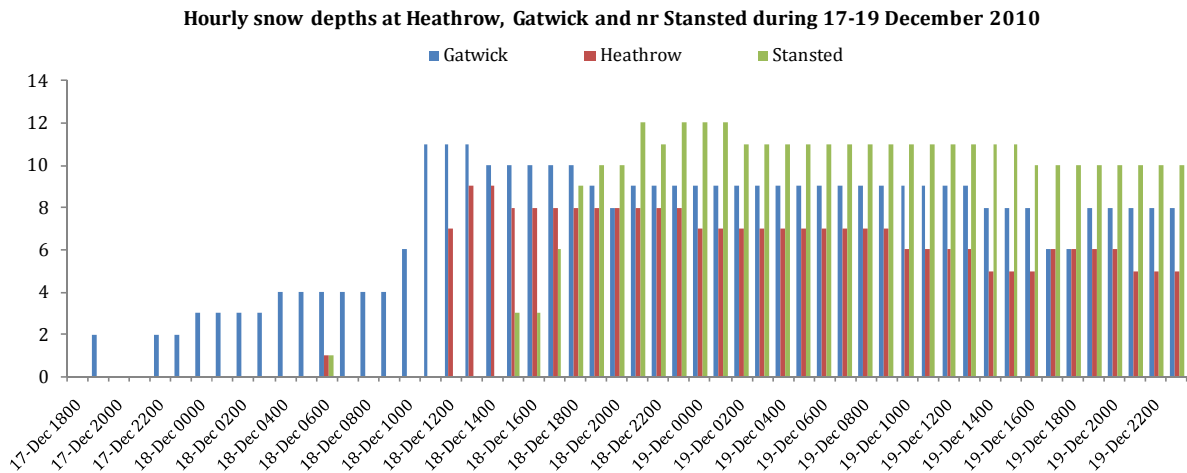
4 Snow depths at Gatwick reached 27cm on 2 December following accumulations of up to 5cm per hour; temperatures reached lows of -9.5°C. Stansted experienced snow depths of 10cm following accumulations of up to 3cm per hour; temperatures reached lows of -5.8°C. The Met Office reports the duration of snow cover at Gatwick during this period to be 233 hours and 242 hours at Stansted; the equivalent figure for Heathrow is 7 hours.

<sup>8</sup> Data for Stansted is based on data recorded at Andrewsfield which is located approximately 16 km east of Stansted in climatologically representative terrain.

<sup>9</sup> Data for Gatwick is based on data recorded at Charlwood which is located approximately 3 km WSW of Gatwick terminal buildings, which places it only about 1 km outside the western perimeter of the airfield

5 The second cold spell began on 16 December and continued to 27 December. On 18 December Heathrow, Gatwick and Stansted experienced snowfalls, each caused by the same belt of snow that travelled north-eastwards from the English Channel. Although the total snowfall amounts at each airport were similar, Heathrow experienced a higher rate of fall. A prolonged snowfall at Stansted led to a slightly deeper snow cover. See Figure 3.

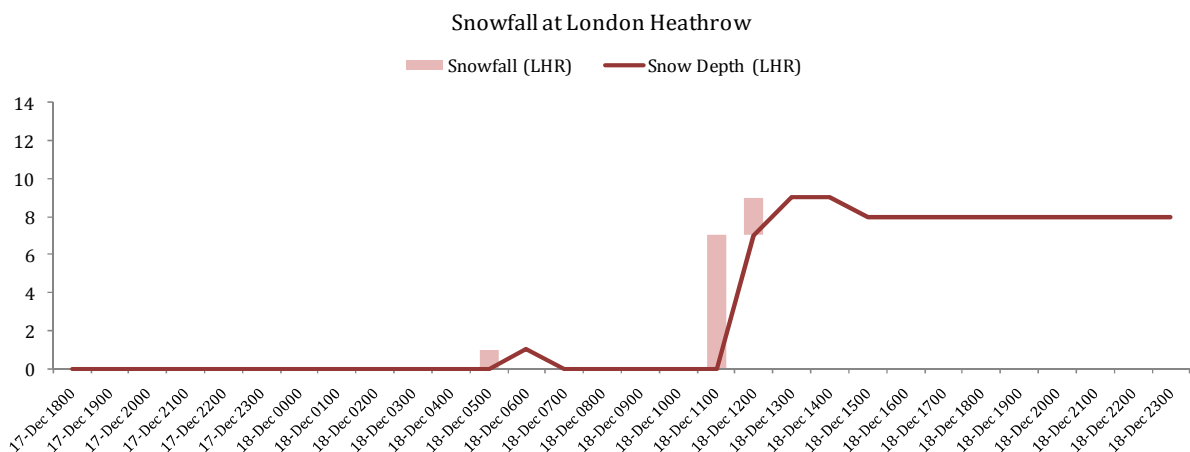
Figure 3: Snow depths at Gatwick, Heathrow and near Stansted – 17-19 December



Source: Met Office

6 Snow depths reached 9cm at Heathrow at 1pm on Saturday 18 December following a 2 hour blizzard, during which 7cm of snow fell in a single hour (see Figure 4). Snow depth remained at 8cm until 19 December before gradually decreasing to below 2cm by the afternoon of 22 December. No other significant snowfall occurred during 18-22 December.

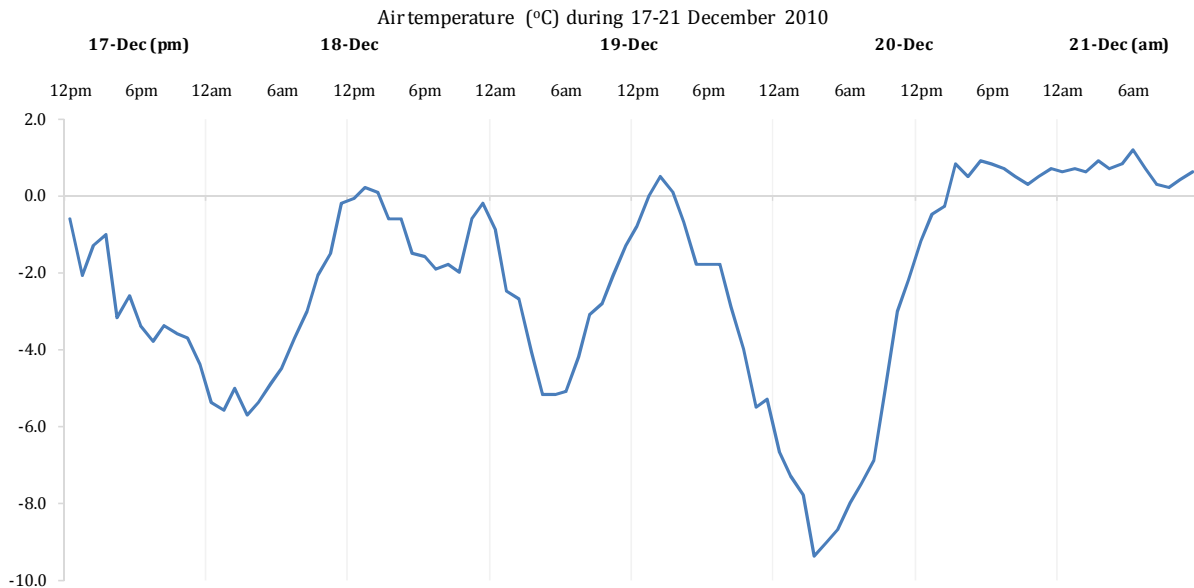
Figure 4: Snowfall and snow depth at Heathrow, 1800, 17 December– 2300, 18 December



Source: Met Office

7 The temperature on 18 December leading up to the snowfall reached lows of -5.7°C. Immediately before and after the snow fell, temperatures increased to -0.2°C and 0.2°C respectively. Temperatures beyond 18 December fluctuated but generally stayed below freezing, reaching lows of -5.2°C and -9.4°C during the early hours of 19 and 20 December respectively. Temperatures increased by the afternoon of 20 December and remained above freezing for 48 hours before freezing again late evening on 22 December. See Figure 5.

Figure 5: Air temperature (°C) during 17-21 December 2010 Heathrow

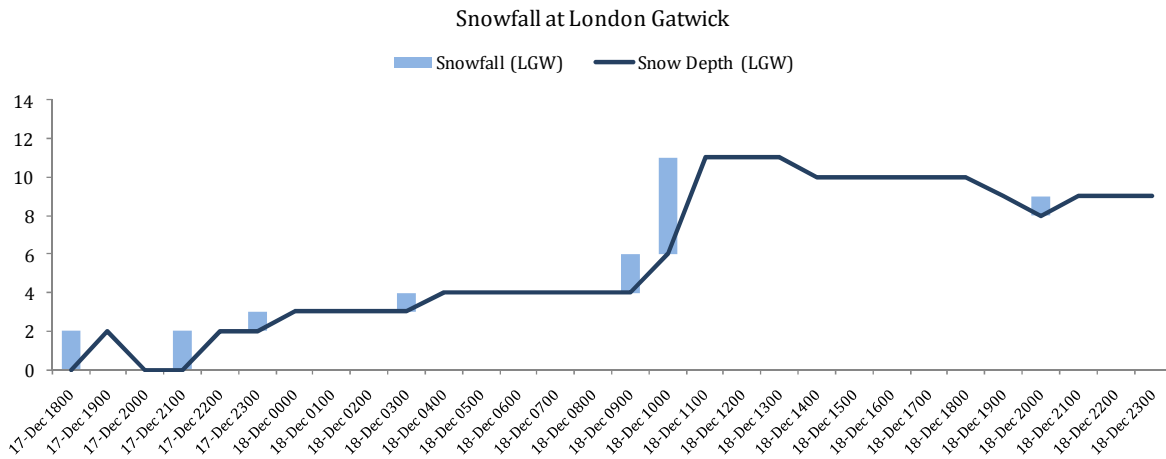


Source: Met Office

### Gatwick and Stansted also experienced snowfall on the weekend of 18 December

8 Figure 6 shows that there was snow on the ground at Gatwick leading up to heavy snowfall at 10am on Saturday 18 December (an hour earlier than when heavy snowfall hit Heathrow). Gatwick experienced 14cm of snowfall during the 30-hour period shown below. The maximum accumulation in any single hour was 5cm, which occurred in one hour only, and the maximum snowfall in any other hour was 2cm.

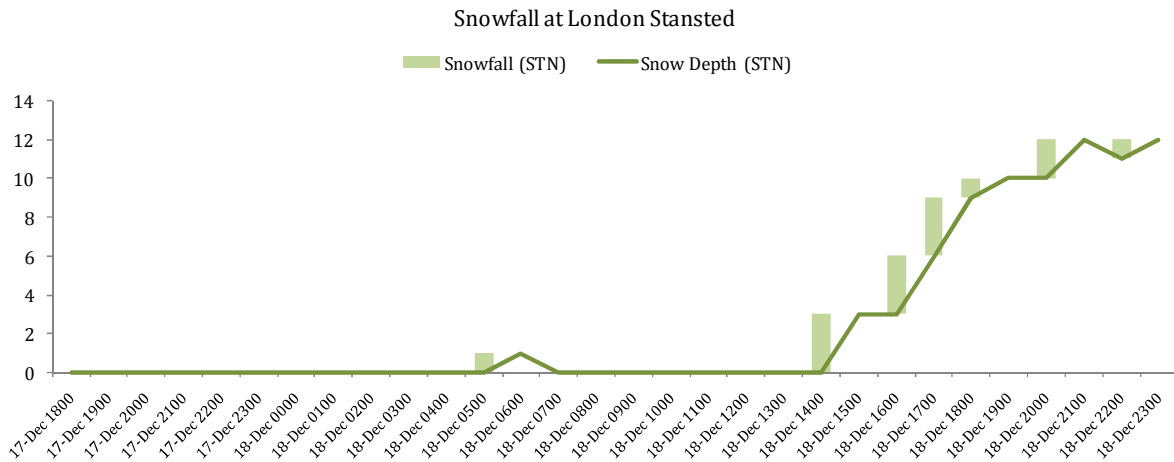
Figure 6: Snowfall and snow depth at Gatwick 1800, 17 December– 2300, 18 December



Source: Met Office

9 Figure 7 shows that Stansted experienced snowfall from 2pm on Saturday 18 December; three hours later than when heavy snowfall hit Heathrow. Stansted experienced 13cm of snowfall between 1400 and 2300 on Saturday, with the maximum accumulation in any single hour being 3cm.

Figure 7: Snowfall and snow depth near Stansted, 1800, 17 December– 2300, 18 December

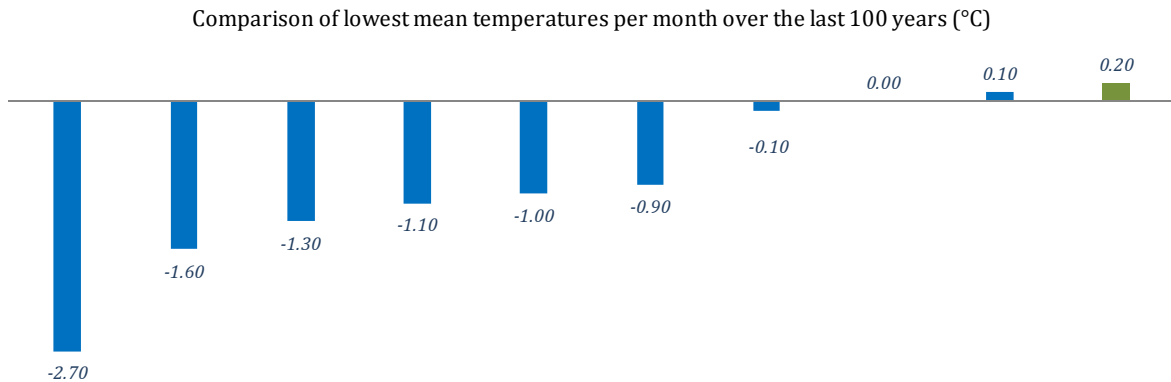


Source: Met Office

### December 2010 was unusually cold and snowy

- 10 The mean temperature for December 2010 was 0.2 degrees centigrade. The month had two lengthy cold spells, the first giving significant snowfalls at Stansted and Gatwick (but little snow at Heathrow), the second giving significant snowfall at all three airfields.
- 11 As can be seen in Figure 8 below, December 2010 in South-east England was the coldest December for 100 years.

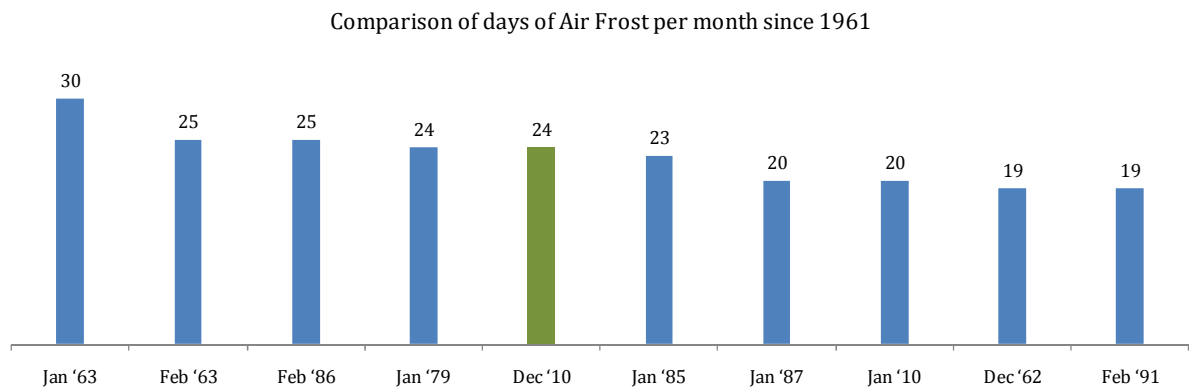
Figure 8: The 10 lowest mean monthly temperatures for the last 100 years in South East England



Source: Met Office

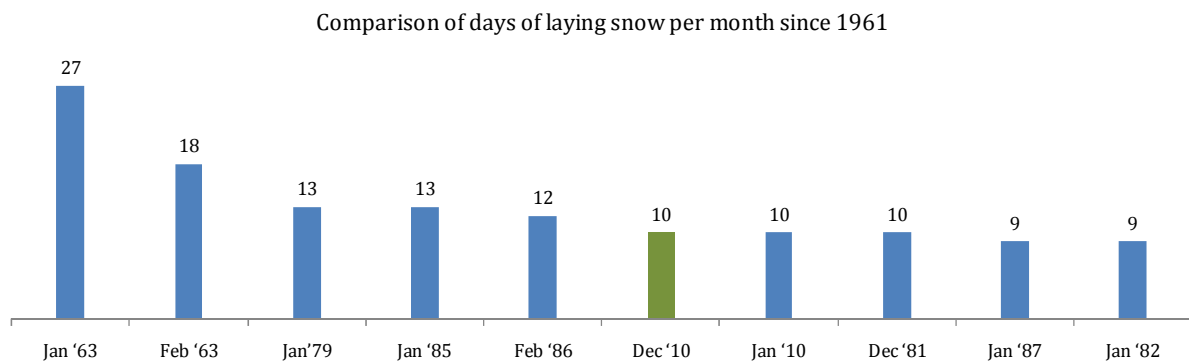
- 12 December 2010 had the fifth highest days of air frost in South East England, and the sixth highest number of days of laying snow, per month since 1961; see Figure 9 and Figure 10.

Figure 9: Days of air frost per month in South East England



Source: Met Office

Figure 10: Days of laying snow per month in South East England



Source: Met Office

### The amount of snow that fell at Heathrow on 18 December was unusual

- The maximum snow depth at Heathrow was 9cm in the early afternoon. In the context of the long record of snow depths at Heathrow since the winter of 1948/49, this is not particularly rare and has an average “return period” of five years. The return period is an estimate of the average time between events and gives an indication of the probability of an event occurring in any one year, given current climate. However, in the context of the 22 mainly mild winters immediately preceding the colder winters of 2008/9, 2009/10 and 2010/11, the Met Office conclude that this is unusual, with 9cm or more having been recorded only once (in 1991) at Heathrow.

### The rate of snowfall at Heathrow on 18 December was rare

- The most significant feature of the snow event of 18<sup>th</sup> December at Heathrow appears to have been the rate at which snow fell, with nearly 7 cm falling within the hour to midday. The Met Office considers this rare. A snowfall of 7cm in one hour has not been approached at Heathrow within the available hourly records (since 2005) and the Met Office estimates that snowfall increments of 7cm per hour have only occurred six times since 1970. Rates of snowfall for this event at Gatwick and Stansted did not exceed 5 cm and 3 cm respectively.



## Statistical analysis of Heathrow's snow history provides some insight to the future

- 15 The Met Office has provided an analysis of winter conditions from 1948/49 to the present day which estimates the 'return period' of given conditions and gives their "Best Estimate" of these conditions. Their analysis is based on historical conditions and makes no reference to any future changes in climate. The analysis is shown in Table 2 Below.

Table 2: Return Period Analysis

Estimated 0900GMT snow depths corresponding to return periods from 5 to 1000 years, based on the Heathrow record, winters 1948/9 to 2009/10.						
Return period:	1 in 5 year	1 in 10 year	1 in 20 year	1 in 50 year	1 in 100 year	1 in 1000 year
Annual % probability:	20%	10%	5%	2%	1%	0.1%
Best estimate:	9 cm	12 cm	16 cm	20 cm	23 cm	33 cm
95% range of uncertainty:	7-11 cm	10-16 cm	12-22 cm	15-31 cm	17-36 cm	22-52 cm

Source: Met Office

- 16 This table shows, for example, that a snow depth at 0900 GMT of between 12 and 22 cm with a best estimate of 16cm is estimated to have a 5% chance of occurring in any given winter.

## Met Office forecasts

- 17 Forecasts for Saturday 18 December 2010 were received daily from the Met Office from 14 December. A severe weather warning was also issued by the Met Office leading up to 18 December.

Table 3: Snow forecasts for 18 December (14-18 December)

Date / Time of forecast	Likelihood of snowfall	Details
14/12/2010 0743	80%	From Friday onwards, an increasing risk of snowfall with significant accumulations possible (low to moderate risk of 5-10cm).
15/12/2010 0955	70%	Saturday and Sunday remain very cold, with an increased risk of significant snowfall. Small risk of freezing fog patches.

Date / Time of forecast	Likelihood of snowfall	Details
16/12/2010 1000	70%	Saturday: Low pressure moves across southern UK, bringing the risk of significant snow accumulations. Poor visibilities and low cloud bases expected.
17/12/2010 0744	Times are given rather than a % figure – details to the right.	Snow forecast 0000-1200 on 18 Dec. Occasional light snow flurries can be expected after midnight, with more significant snow expected to move in from the west after 1000 tomorrow morning, though confidence in this is low.
	80%	Forecast from 1200 18 Dec: Heavy snow is expected to affect the area on Saturday afternoon, before moving away to the northeast during the evening.
17/12/2010 1119		Weather Warning (Preliminary Snow warning): Heavy snow is forecast; accumulations of 10-20cm Valid between 2300 on 17 Dec – 2100 on 18 Dec
17/12/2010 1231	Times are given rather than a % figure – details to the right.	Snow forecast 0000-1200 on 18 Dec. Occasional light snow flurries can be expected after midnight, with more significant snow expected to move in from the west after 0900 tomorrow morning. Accumulations of between 10-15cms are likely, with a possibility of 20cm.
	80%	Forecast from 1200 18 Dec: Heavy snow is expected to affect the area on Saturday afternoon, before moving away to the northeast during the evening.
18/12/2010 1000	Times are given rather than a % figure – details to the right.	Snow forecast 1200-2400 on 18 Heavy and persistent snow will affect the airport until around 1600 (accumulations 1200-1600: 8-10 cm, low risk up to 15 cm). The snow becoming somewhat lighter and intermittent this evening, before petering out altogether around midnight (1600 until midnight: 2-5cm).

Source: Met Office

## WSI Hubcast forecasts

- 18 Forecasts for Saturday 18 December 2010 were published daily by WSI Hubcast from 14 December.

Table 4: Snow forecasts 14-18 December

Date / Time of forecast	Details
14/12/2010 1155	Some heavy snowfalls overnight on Friday 17 December; accumulations not known at this time. Occasional snow showers expected on Saturday – low accumulation.
15/12/2010 1224	Dry cold/clear with ground ice/air frost on Friday 17 December. Risk of snow around 0600-1500 on Saturday 18 December, some moderate falls with 2-5cm possible. Turning dry by dusk with clearing skies. Risk of snow showers (slight accumulations) on Sunday.
16/12/2010 2115	Low risk of snow showers at 0500 on Friday 17 December.
17/12/2010 0400	No snow from 0400-1200 on Friday 17 December.
18/12/2010 0220	Snow showers forecast at 0500, 0700 and 0900 on 18 December. Snow forecast at 1400 and 1500. Accumulations of 0.8cm (1100), 0.5cm (1200), 0.5cm (1300), 2cm (1400) and 2cm (1500).
18/12/2010 0250	Snow now forecast from 1500 until 2100 <sup>10</sup> .

Source: WSI Hubcast

<sup>10</sup> Forecast accumulation not clear from evidence provided

## Weather forecasts suggested further snowfall during 19-23 December

- 19 Further snowfall was forecast with high likelihood for the period 19-23 December. However this did not materialise.

Table 5: Snow forecasts for 19-23 December

Time/Date of forecast	Likelihood of snowfall:					Details
	19 Dec	20 Dec	21 Dec	22 Dec	23 Dec	
18/12/2010 0914	60%	70%	50%	50%	Not supplied	Very cold for period, with the prospect of further heavy snowfall from pm on 20 Dec to early hours of 21 Dec.
19/12/2010 0817	N/A	30%	60%	30%	70%	Some light snow possible on 20-21 Dec, likely to be negligible. Period of potential disruptive snow from 23 Dec, with 10-15cms possible.

Source: Met Office

## Annex F: Glossary

Term	Description
09L / 27R	Northern runway
09R / 27L	Southern runway
A-CDM	A-CDM is a system that delivers core operational information on aircraft status to users.
ACL	Airport Coordination Limited - responsible for slot allocation, schedules facilitation and schedule data collection at a large number of varied airports and, in addition, provides a wide range of services to the aviation industry
ADM	Airport Duty Manager
Aerodrome	Any area of land or water affording facilities for the landing or departure of aircraft
Airside	The area of an airport beyond security, passport and customs controls, accessible only to those specially authorised, e.g. passengers with valid boarding cards and airline, airport and other authorised staff
Air Transport Movement (ATM)	A flight carried out for commercial purposes and includes scheduled flights operating according to a published timetable, charter flights and all-cargo flights
AOC	Airline Operators Committee - a committee of representatives of each airline operating at an airport or terminal. It acts as one of the main points of contact between airlines and the airport for local operational and development issues
Apron	An area of airfield infrastructure which is typically adjacent to an airport terminal and is used for aircraft manoeuvring and parking but is separate from the runway and taxiway system
BA	British Airways Plc (airline)

BAA	The group of legal entities which manages Heathrow (including Heathrow Airport Ltd), Stansted, Aberdeen, Edinburgh, Glasgow and Southampton airports.
BMI	The trading name of British Midland Airways Ltd (airline)
CAA	Civil Aviation Authority - the UK's independent aviation industry regulator that is responsible for most civil aviation regulatory functions
CCG	Capacity Constraints Group – Organisation made up of airlines and airport to determine the reduced capacity of the airport
CFMU	Central Flow Management Unit
CTA	Central Terminal Area
Click SMS	During an incident there may be a requirement to share brief updates with a wider audience. Predefined groups have been setup within Click SMS; these groups are BAA Exec Committee, Heathrow Senior Operations team and Stakeholders. The message content will be scripted by CST Lead and then sent to the appropriate group by CST Recorder or CST Info In & Out role. CST Recorder would then update the log with the message content
CST	Crisis Support Team – Team brought together to manage airport operations in a time of crisis (Silver)
DD	Duty Director
DfT	Department for Transport
DMA	Duty Manager Airside
ECMT	Executive Crisis Management Team - Executive Team brought together to manage airport operations in a time of crisis (Gold)
F24	A web based alerting system, used for Heathrow incidents and Heathrow and Exec Crisis team activation
FAA	Federal Aviation Administration (USA)
FIDS	Flight Information Display System
Flow Rate	The rate of aircraft arrivals and departures

<b>GAL</b>	Gatwick Airport Limited. The company which has the management of Gatwick Airport
<b>Ground handling</b>	Services provided to airlines at airports, including passenger and baggage handling, documents and load control, cargo and mail, ramp services, surface transport, catering services and security (excluding functions provided by BAA)
<b>HAL</b>	Heathrow Airport Limited. The company which has the management of Heathrow Airport
<b>Heathrow Community</b>	The collective community of service providers at Heathrow, including Heathrow Airport Ltd, airlines and their ground handlers, NATS, and other bodies.
<b>HEX/Heathrow Express</b>	Both the express (non-stop) rail service and the stopping rail service, Heathrow Connect, between Heathrow and central London
<b>IATA</b>	International Air Transport Association. The scheduled airlines' international trade association
<b>Landside</b>	The area of an airport which is open to the public generally
<b>LBRT</b>	Local Business Recovery Team – Crisis teams at a lower level, each terminal will have a LBRT
<b>LHR</b>	London Heathrow Airport
<b>Met Office</b>	The Met Office is the UK's National Weather Service
<b>NATS</b>	National Air Traffic Services Ltd. The company responsible for all en route air traffic control and for providing approach and visual air traffic control at many airports, including Heathrow and Gatwick
<b>NOTAM</b>	Notice to Airmen – The method of communication between the airport and airlines regarding airport airside operations, despatched by the CAA on behalf of all airports.
<b>OCIC</b>	Operational Crisis Information Centre. British Airways' crisis control centre that is activated during periods of disruption.
<b>Ops Support Programme</b>	BAA programme which calls on trained, office-based staff to volunteer to support the operation in terminals in times of disruption

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M4	Motorway from London heading west and the road connecting Heathrow to the UK larger road network
PAX	Passengers
PPR	Prior Permission Required
SMT	Heathrow Senior Management Team
SoS	Secretary of State for Transport
SRO	Single Runway Operation
STAR Centre	BAA Control Centre
STAL	Stansted Airport Limited
Stand	An aircraft parking stand; these can be “pier-served”, which means they are adjacent to the terminal, enabling passengers to walk directly on and off aircraft parked on the stand, or they can be “remote,” which requires passengers to be transported by coach between the stand and the terminal
Taxiway	A marked route along which aircraft taxi between an apron and a runway
VAA / Virgin	Virgin Atlantic Airways Ltd (airline)

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Heathrow Winter Resilience Enquiry