



# Gatwick Airport Limited Airspace Office 2023 Quarter 4 Report

This report covers the period 1<sup>st</sup> October – 31<sup>st</sup> December 2023



**LONDON GATWICK**

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# Executive Summary

During the fourth quarter of 2023, Gatwick Airport had a 9.6% increase in movements when compared to the same quarter in 2022, with 60,433 movements recorded, which is a 9.59% decrease on the previous quarter. When comparing to pre-pandemic levels, Q4 2023 had ~94% of the movements of Q4 2019. As is normally the case after the busy summer, movements gradually fell throughout October, dropping a further 3% in November as we crossed into the winter season. Movements increased again in December by 22% as demand increased due to the holiday season. Compared with December 2022, this reflects a 14% increase in movements.

The Airspace Office met with 3 airlines during this quarter as part of our airline engagement programme, bringing the total to 21 engagements for the year. These meetings were with new airlines to Gatwick; Maleth-Aero, Ethiopian Airlines and China Southern. The Airspace Office will continue with the programme of engagement into 2024 and will invite open communication with airlines to drive continuous improvement.

Overall, track keeping conformance increased to 91.30% in Q4 compared to 85.76% in Q3. A contributing factor was the increase in Route 4 (26LAM) departure conformance, which increased to 75.7%

from 68.9%. The Noise and Track Keeping system Noise Preferential Route (NPR) was revised from the 1st April 2023 for Route 4, as instructed by the Department for Transport. Further information regarding this can be found on page 15.

CDO performance for arrivals in Q4 2023 was 88.39% compared to 89.83% in Q4 2022. The main factors affecting both CDO and track keeping were adverse weather conditions, with several days experiencing strong, gusting winds and localised thunderstorms throughout the quarter. The CDO performance per runway for the three months during Q4 was broadly aligned with the long-term average for westerly and easterly operations. However, during December, performance dropped below these levels, mainly driven by increased traffic levels due to the holiday season and adverse weather.

Work continued on the construction of the Rapid Exit Taxiway (RET) with the Main Runway being closed during the night period for a number of days to allow the work to take place. Q4 saw an increase in usage of the Northern Runway versus Q3, with 25 days of usage during November.

# Executive Summary

There was a 2% increase in noise complaints recorded and a 7% reduction in the number of individual complainants versus Q4 2022. Although the number of complaints and individual complainants decreased in October and November, December saw an increase in complaints which can be attributed to the increased traffic levels due to the holiday season. Overall, the number of complainants decreased versus Q3.

Through the innovative projects that form our Noise Management Board Workplan, London Gatwick is committed to mitigating the impact of operations on local communities.

Furthermore, we will continue to do our utmost to keep our communities informed of operations at the airport, including providing detailed responses to any complaints in line with our Complaints Handling Policy.

If you would like to know more about aircraft operations and noise, make a complaint about aircraft noise, or learn about the airspace around Gatwick, we would invite you to visit our [website](#). We would also encourage you to visit our upgraded “[InsightFull](#)” pages which now provide more precise overflight information tailored to your location. We have also added more material explaining aircraft noise, how we measure it and how it has changed in the past. As before, you can find these pages under “[Noise Explained](#)”.

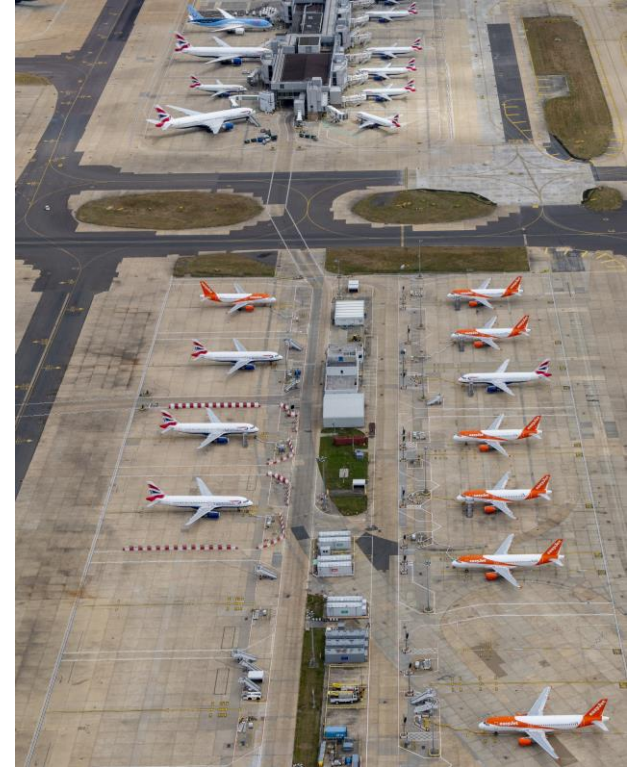
**Airspace Office**  
London Gatwick

# About This Report

This report is produced by the Gatwick Airport Airspace Office. This team is responsible for recording, investigating and responding to aircraft noise enquiries as well as monitoring airline conformance to noise mitigation measures as detailed in the UK Aeronautical Information Publication (AIP). This team also actively engages with airlines to help improve their adherence to the airport's noise mitigation measures and in addition manages the night-time restrictions on flying at Gatwick.

This report contains detailed data on aircraft activity at Gatwick including the adherence to the noise mitigation measures detailed in the UK AIP, an airline noise performance table, a report on night flying during the period, and an analysis of noise complaints received during the period.

Footnotes which provide an insight into the regulatory basis of the reported figures are explained in Annex B.



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# Performance Summary

## Key Performance Indicators

This section details how the airport is performing in conjunction with its Key Performance Indicators (KPIs), the change in traffic numbers over the course of the year and provides information of the types of aircraft and airlines which operate at the airport. The KPIs are in line with the noise mitigation measures set out in the UK Aeronautical Information Publication (AIP). The “chapters” refer to the [noise standards](#) set out by the International Civil Aviation Organisation (ICAO).

A 15-year KPI table can be found in [Annex E](#) where comparisons to previous years can be made.

KPIs	Q1 2023	Q1 2023 vs Q1 2022	Q2 2023	Q2 2023 vs Q2 2022	Q3 2023	Q3 2023 vs Q3 2022	Q4 2023	Q4 2023 vs Q4 2022
Total Aircraft Movements	50,548	↑ 79.59%	68,645	↑ 8.44%	77,205	↑ 8.16%	60,433	↑ 9.59%
Percentage of Chapter 14 Aircraft	63.18%	↑ 7.15%	65.60%	↑ 6.28%	62.58%	↓ -0.96%	60.96%	↓ -3.24%
Percentage of Chapter 4 Aircraft & Above	99.85%	± 0.00%	99.85%	↑ 1.07%	99.89%	↑ 0.79%	99.92%	↑ 0.41%
Percentage of Chapter 3 & Below Aircraft	0.03%	↑ 0.02%	0.08%	↑ 0.04%	0.02%	↓ -0.04%	0.02%	↓ -0.04%
Continuous Descent Operations (CDO) Performance	89.79%	↓ -1.94%	89.22%	↑ 2.14%	88.21%	↑ 0.43%	88.39%	↓ -1.44%
Track Keeping Conformance	98.24%	↓ -0.57%	91.94%	↓ -5.51%	85.76%	↓ -11.33%	91.30%	↓ -5.57%
Total Noise Infringements	0	0	0	0	0	0	0	0
Noise Complaints Received	1836	↓ -36.29%	2939	↓ -117.39%	3964	↓ -22.98%	2055	↑ 2.04%
Individual Complainants	81	↓ -22.86%	233	↓ -5.28%	427	↓ -2.73%	103	↓ -6.36%
Enquiry Response Performance Target is 95% Within 8 Days	99.89%	↑ 0.39%	98.43%	↓ -0.19%	95.80%	↑ 0.37%	98.80%	↓ -0.30%

# Airline Noise Performance Table

Rank by ATMs	Airline name	Total movements	QC/Seat	Rank (QC)	CDO performance	Rank (CDO)	TK conformance	Rank (TK)
1	EasyJet	28,646	0.00173	7	94.74%	3	99.47%	21
2	British Airways	6,948	0.00252	24	88.53%	7	99.00%	28
3	Vueling	4,307	0.00188	10	83.42%	11	99.56%	20
4	TUI Airways	2,634	0.00245	22	92.26%	5	99.34%	25
5	Norwegian	2,624	0.00321	27	89.56%	6	97.13%	31
6	Ryanair	1,950	0.00247	23	97.03%	2	99.59%	18
7	WizzAir UK	1,704	0.00152	5	87.92%	8	99.02%	27
8	Wizz Air Malta	1,333	0.00163	6	65.22%	26	98.95%	29
9	Aurigny	1004	0.0023	19	94.62%	4	99.60%	17
10	Aer Lingus	754	0.00212	15	81.70%	14	99.47%	22
11	Norse Atlantic Airways	628	0.00216	17	97.78%	1	99.62%	16
12	TAP Portugal	600	0.00226	18	66.67%	25	99.33%	26
13	Emirates	552	0.00278	26	72.83%	19	100.00%	1
14	Turkish Airlines	546	0.00177	8	86.81%	9	100.00%	1
15	Eastern Airways	475	0.00192	11	83.19%	12	99.56%	19

Airlines are ranked by the number of movements in the current quarter. The ranking within each metric is presented.

This table includes 97.7% of all movements which operated at Gatwick Airport throughout Q4 2023.

Figure 2a: Q4 2023 Airline Noise Performance Table

\* Route 4 Track-Keeping performance is excluded from the airline noise performance table.

# Airline Noise Performance Table

Rank by ATMs	Airline name	Total movements	QC/Seat	Rank (QC)	CDO performance	Rank (CDO)	TK conformance	Rank (TK)
16	WizzAir Hungary	419	0.00186	9	63.64%	27	100.00%	1
17	Air Europa	368	0.00374	29	52.72%	29	99.46%	23
18	Iberia Airlines	362	0.00212	14	70.72%	20	99.45%	24
19	Air Baltic	356	0.00132	3	78.09%	17	100.00%	1
20	Lufthansa	332	0.00209	13	67.47%	23	100.00%	1
21	Air India	312	0.00244	20	76.28%	18	100.00%	1
22	JetBlue	312	0.00245	21	70.51%	21	100.00%	1
23	Air Transat	282	0.00214	16	79.43%	16	100.00%	1
24	Jet 2	256	0.00392	30	81.40%	15	100.00%	1
25	SunExpress	240	0.00273	25	43.33%	30	100.00%	1
26	Qatar	212	0.00195	12	67.92%	22	100.00%	1
27	Air Malta	186	0.00121	1	86.02%	10	97.75%	30
28	Sky Express	184	0.00124	2	61.96%	28	100.00%	1
29	Icelandair	174	0.00149	4	82.76%	13	100.00%	1
30	Royal Air Maroc	170	0.00325	28	67.06%	24	100.00%	1
31	Air China	152	0.0048	31	22.37%	31	100.00%	1

Figure 2b: Q4 2023 Airline Noise Performance Table

\* Route 4 Track-Keeping performance is excluded from the airline noise performance table.



# Airline Noise Performance Table – Methodology Statement

This page describes the methodology used to calculate the three metrics that form the Airline Noise Performance Table (ANPT) and explains some of the key terms.

In order to drive continuous improvement and to help showcase airline performance in relation to noise, an Airline Noise Performance Table has been developed. In collaboration with airlines, Gatwick Airport Limited identified strategic and operational metrics which are being monitored and reported against.

QC/seat is the strategic metric in the performance table, whilst both Continuous Descent Operations (CDO) and Track-Keeping (TK) are operational metrics. Airlines with more than ten movements per week are included in the ranking. Carriers with a base at Gatwick are highlighted in **bold**.

Airlines with CDO or track keeping performance in the red or amber range will be considered as priority for engagement and we will work with them to improve their operational performance.

## Noise Quota Count (QC) per Seat

This metric assesses the average Quota Count (QC) per seat per flight. Individual aircraft have a defined QC value for arrival and departure, which is dependent on noise performance of the aircraft. The QC value is determined by the Effective Perceived Noise Level (EPNdB) stated on its noise certificate and may be affected by the type of engines used, certified Maximum Take-Off Weight (MTOW) and any applicable noise modifications (e.g. landing gear plugs for B787). QC/seat is a strategic metric as it can only improve in the longer term when airlines change their fleet mix, introduce newer aircraft types, or modify existing aircraft to reduce their noise impact.

Airlines operating modern and quieter aircraft will have a lower QC/seat score. For example, a typical A320 has a QC value of 0.25 for arrival and 0.5 for departure and a typical number of seats would be around 180, although this may vary between airlines.

Therefore, an A320 would normally have an average QC/seat score =  $(0.25 + 0.5) / (180 * 2) = 0.00208$ , as each rotation of the aircraft requires one arrival and one departure.

For comparison, an A320 NEO would typically have an arrival and departure QC equal to 0.125, which reflects the fact that it is much quieter than its predecessors within A320 family, but the number of seats is roughly the same. An A320 NEO's QC/seat score would therefore be  
=  $(0.125 + 0.125) / (180 * 2) = 0.00069$ .

## Continuous Descent Operations (CDO) Performance

CDO performance is the first operational metric in the ANPT and relates to the vertical profiles flown during arrival. CDO performance is equal to the proportion of arrivals that meet the criteria for CDO, i.e., no level segment longer than 2.5 nautical miles below the altitude of 7,000ft. Continuous descent approaches reduce the noise impact because they require lower engine thrust and the aircraft stays higher for longer. The airport-wide CDO performance is also presented separately in this report.

RAG definition: **Green** ≥ 85%   **70% ≤ Amber** < 85%   **Red** < 70%

## Track Keeping (TK) Performance

Track keeping performance is the second operational metric in the ANPT and applies to the lateral departure track. All departures are required to stay within the Noise Preferential Routes (NPRs) defined by the Department for Transport to avoid more densely populated areas. Track keeping performance is equal to the proportion of departures that stay within the NPRs until they reach an altitude of 3,000ft or 4,000ft depending on the route. Note that the Route 4 NPR has been excluded from the ANPT statistics for the time being due to the more challenging flyability and its inclusion would unfairly penalise airlines with a higher proportion of Route 4 departures. Track keeping performance at airport level is also presented separately in this report.

RAG definition: **Green** ≥ 95%   **90% ≤ Amber** < 95%   **Red** < 90%

# Airport and Runway Statistics

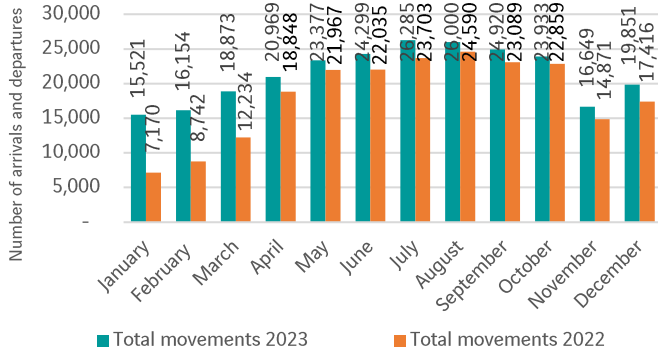


Figure 3: Number of arrivals and departures for this year and last

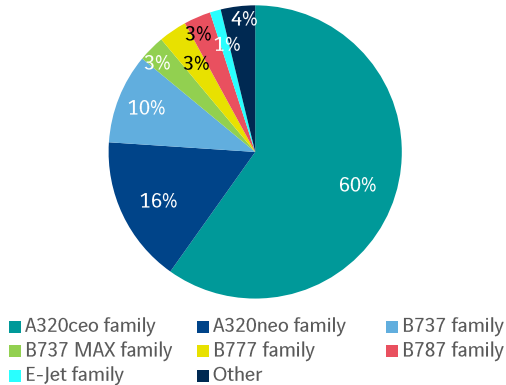


Figure 5: Aircraft fleet mix in 2023

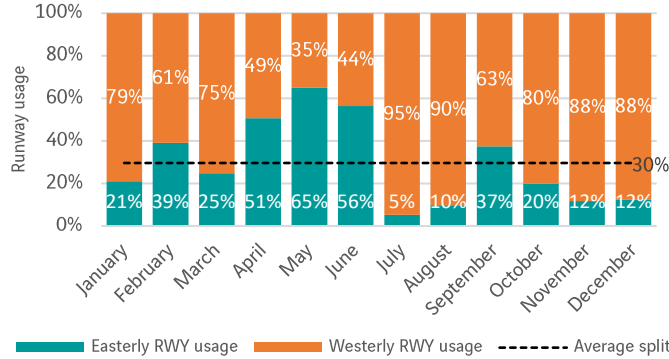


Figure 4: Comparison of easterly and westerly runway usage

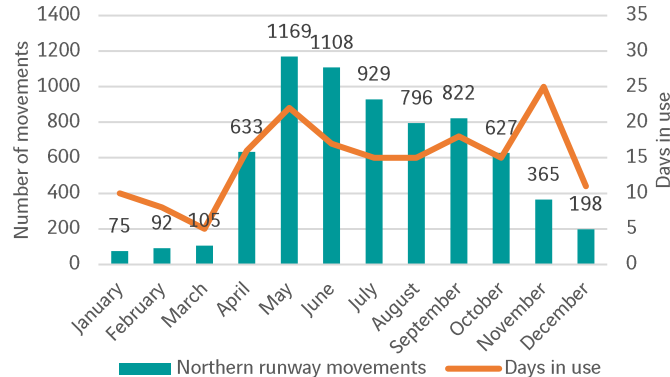


Figure 6: Northern runway usage

Figure 3 shows a 9.59% increase in movements in Q4 2023 when compared to Q4 2022.

Figure 4 shows operations were predominantly westerly in Q4 2023, at or above 80% across the 3 months. This is greater than the average 70/30 split we would normally expect. Typical operations at London Gatwick are westerly as winds from the west are most common.

Newer generation aircraft, including A320 NEO and B737 MAX, make up the same total proportion of the aircraft fleet mix of 19% compared to Q3 2023.

The number of days the Northern Runway was in use was greater in Q4 compared to Q3, mainly due to the Main Runway being closed for the Rapid Exit Taxiway (RET) works.

# Arrivals Statistics – Continuous Descent Operations<sup>1</sup>

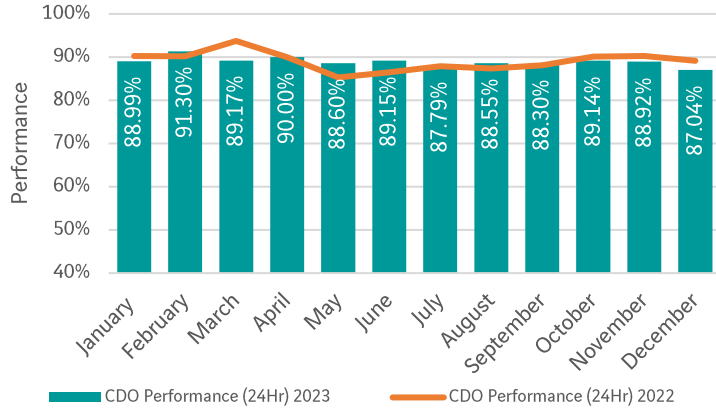


Figure 7: CDO performance (24 hours)

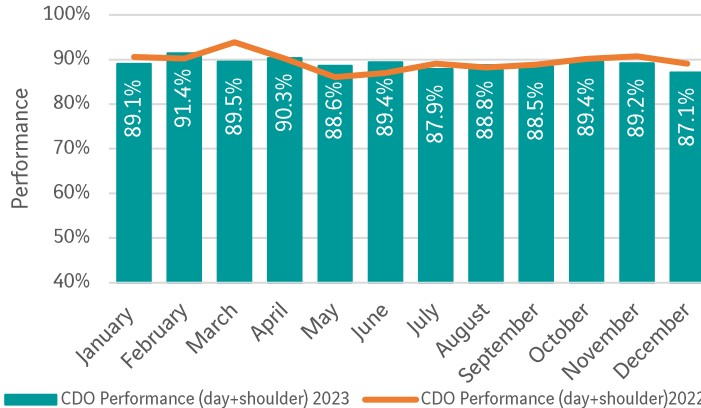


Figure 8: CDO performance (Day & Shoulder periods)

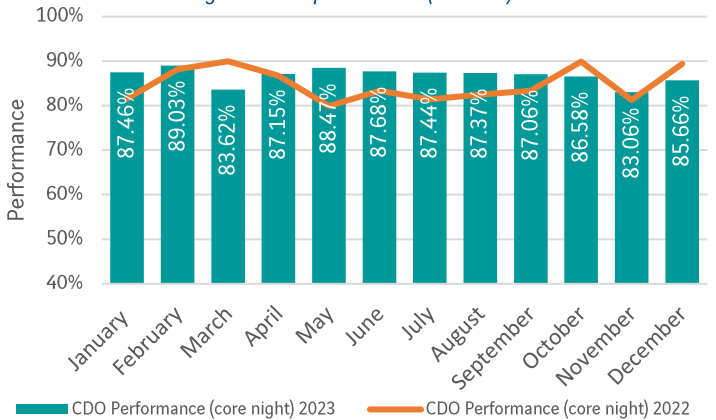


Figure 9: CDO performance (Core Night Period)

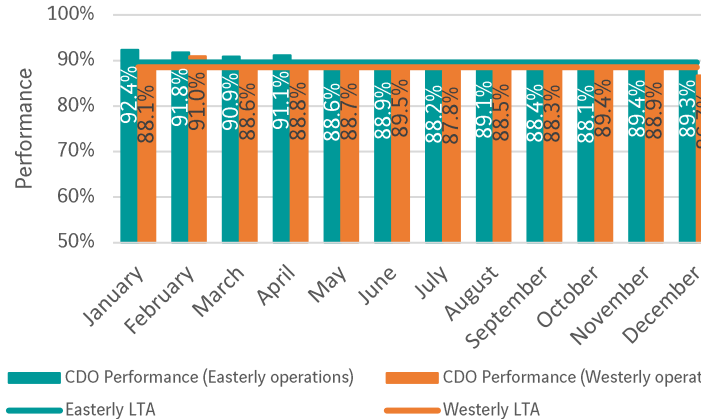


Figure 10: CDO performance per runway

Figures 7 and 8 show that overall CDO performance in Q4 2023 was slightly lower than Q4 2022. This can be attributed to several days of strong, gusting winds which adversely affects CDO.

CDO performance during the core night period in Q4 2023 was lower than in the same period in 2022.

Figure 10 shows that CDO performance across both easterly and westerly operations remained broadly in line with the respective long-term averages in Q4, but westerly dropped below the average in December. Again, this can be attributed to the increase in movements for the holiday season, and poor weather.

# Arrivals Statistics – Go-Arounds

A go-around is a safety procedure performed when an arriving aircraft on final approach aborts landing and climbs away from the airport by applying take-off power. It is a standard procedure to be followed by the flight crew in the event of an aircraft being unable to land. The procedure is published so that ATC and pilots can anticipate where the aircraft will fly following the decision to go around.

The standard missed approach procedure at Gatwick Airport requires a climb straight ahead to 3,000ft. On passing 2,000ft or 1DME (Distance Measuring Equipment), whichever is later, aircraft will turn heading 180 to the runway direction. This may or may not result in aircraft overflying the town of Crawley or outlying areas. The number and reasons for go-arounds are routinely discussed at FLOPSC meetings, as they are performed to avoid potentially unsafe situations and maintain a safe separation between aircraft.

If a flight performs multiple go-arounds before landing, only one is recorded in the NTK (Noise and Track keeping) system. If a flight diverts after multiple landing attempts, then a go-around is not recorded as the aircraft did not land at Gatwick.

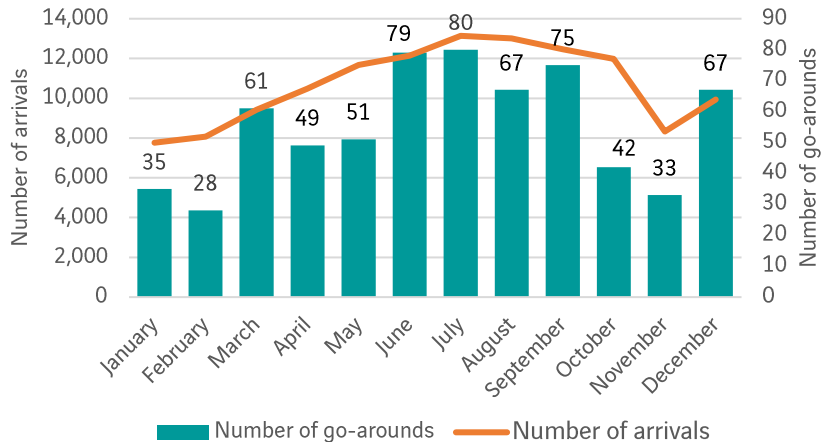


Figure 11: Number of arrivals and go-arounds

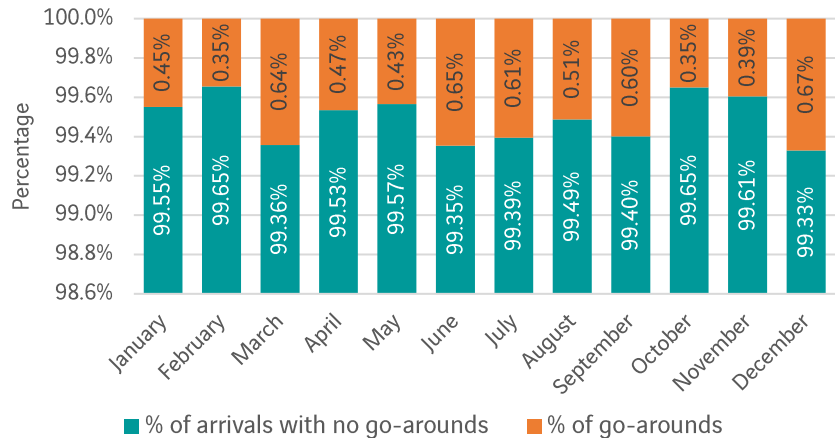
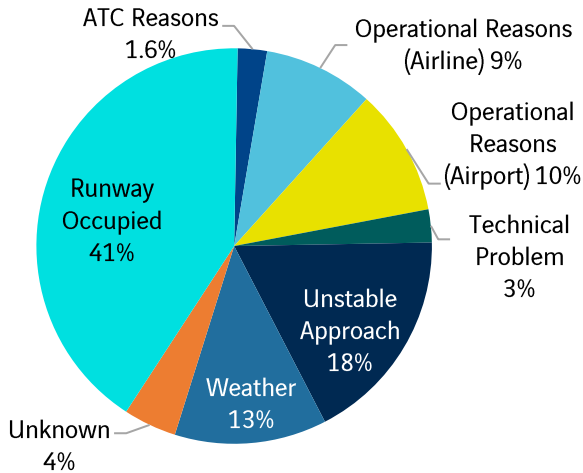


Figure 12: Ratio of go-arounds

# Arrivals Statistics – Go-Arounds

The causes for go-arounds are recorded by controllers in the ATC tower and provide an insight into the operational situations causing them to happen. The top three reasons in Figure 13 (left) are runway occupancy, unstable approach and weather. As an occupied runway may be caused by a range of conditions, the root causes are further broken down in Figure 13 (right).

## GO-AROUND MAIN CAUSES



## CAUSES OF RUNWAY OCCUPANCY

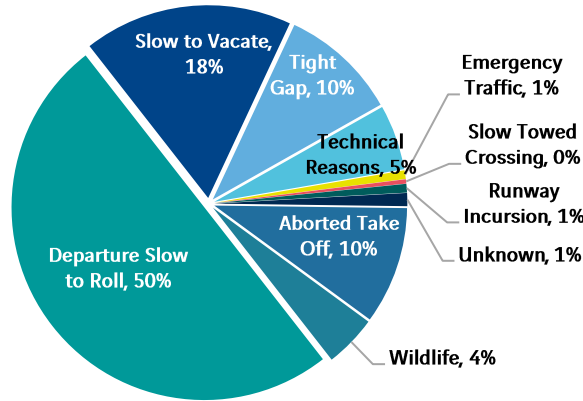


Figure 13: Reasons for go-arounds in 2023

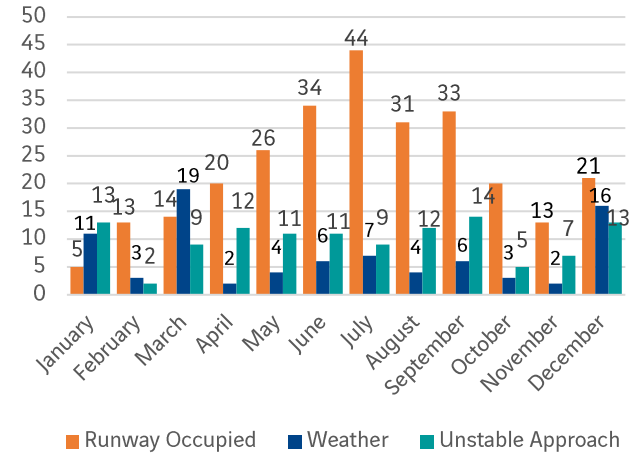


Figure 14: Ratio of main reasons for go-arounds per month

# Arrivals Statistics – Joining Point

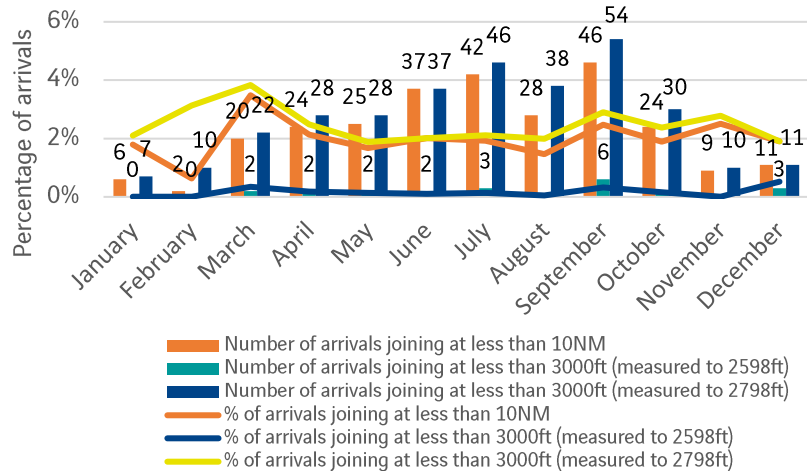


Figure 15: Night time joining point violations<sup>2</sup>

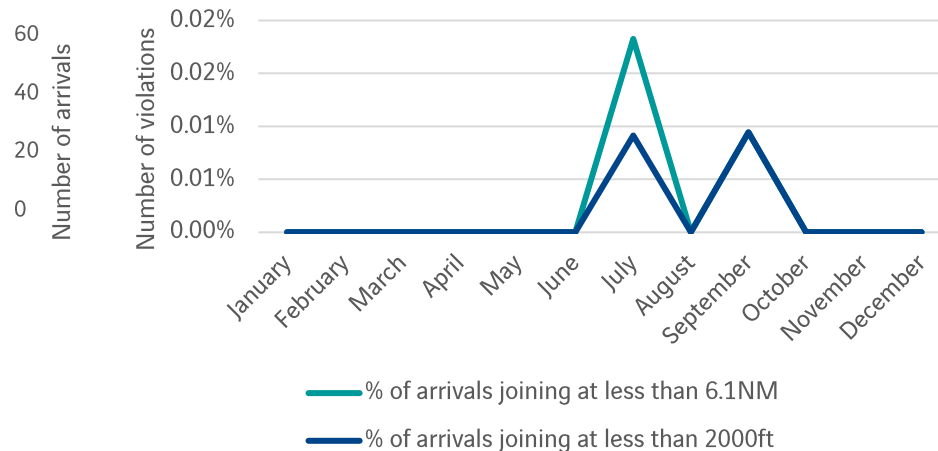


Figure 16: Day time joining point violations

As per the [AIP](#), aircraft shall not join the ILS at less than 10NM from touchdown or below 3,000ft at night. The number of those joining at less than 10nm has decreased by 62% in Q4 (44) versus Q3 (116), mainly due to the decline in traffic movements. Those joining below 3,000ft decreased by 63% in Q4 (51) vs Q3 (138). This will mainly be attributed to the decrease in movements moving into the winter season, along with northern runway operations, weather avoidance and aircraft arriving with medical emergencies.

During the day, the DfT noise abatement procedures stipulate that arrivals shall not descend below 2,000ft before intercepting the ILS glidepath; this equates to 6.1NM from touchdown. We continually monitor this for conformance and infringements are followed up with the airline and NATS for feedback on the event to prevent future infringements. Helicopters and calibration flights are excluded from this requirement. For detail on the monitoring of the arrivals swathe see [Annex C](#).

Joining point distance is measured from the approximate touchdown point abeam the Precision Approach Path Indicator (PAPI) lights.

Joining point altitude is assessed through the Noise & Track Keeping system, see [Annex B Note 2](#).

# Arrivals Statistics – Overflight

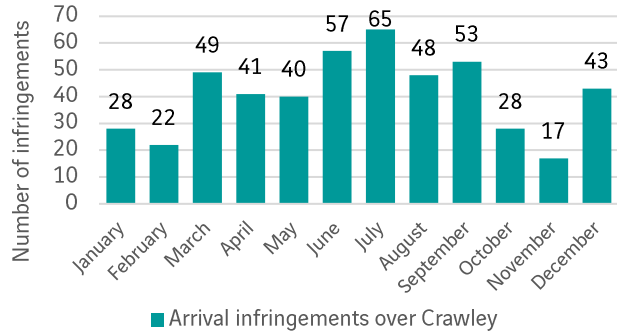


Figure 17: Arrival infringements over Crawley

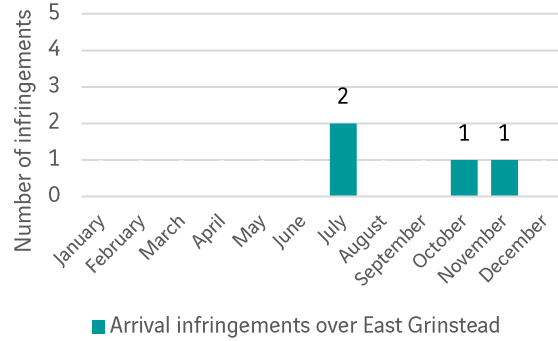


Figure 18: Arrival infringements over East Grinstead

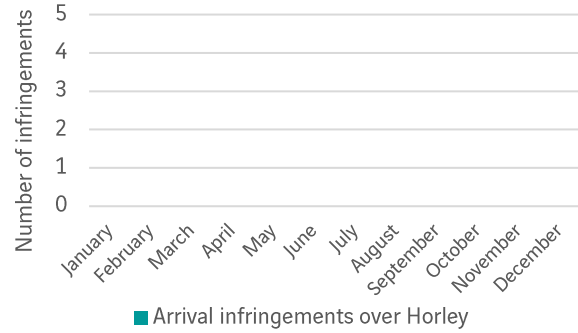


Figure 19: Arrival infringements over Horley

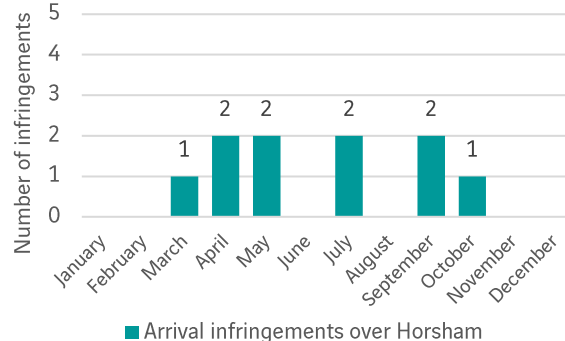


Figure 20: Arrival infringements over Horsham

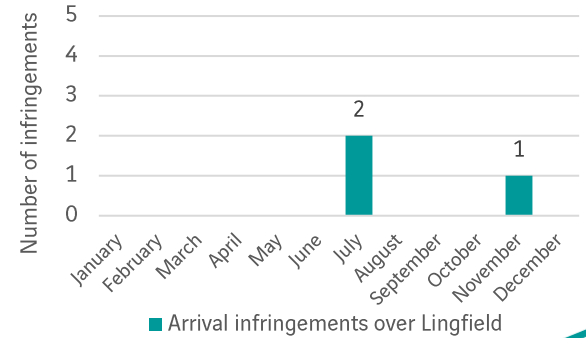


Figure 21: Arrival infringements over Lingfield

The Gatwick [AIP](#) does not allow arriving aircraft to pass over the congested areas of Crawley, East Grinstead, Horley or Horsham below the altitude of 3,000ft QNH or Lingfield below 2,000ft QNH.

The Q4 infringements shown in Figures 17, 18 & 20 were due to go-arounds, missed approaches and weather avoidance. The infringement in Figure 21 for November was followed up with the airline concerned, and pilot error was confirmed as the cause.

# Departure Statistics – Track Keeping

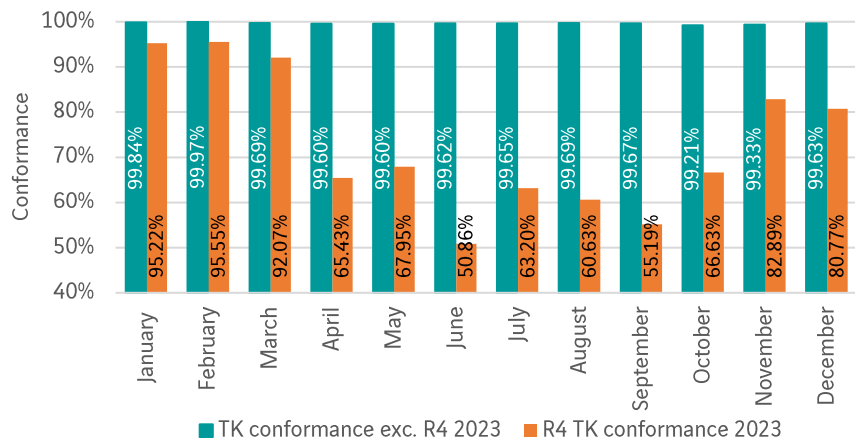


Figure 22: TK conformance (24 hours)

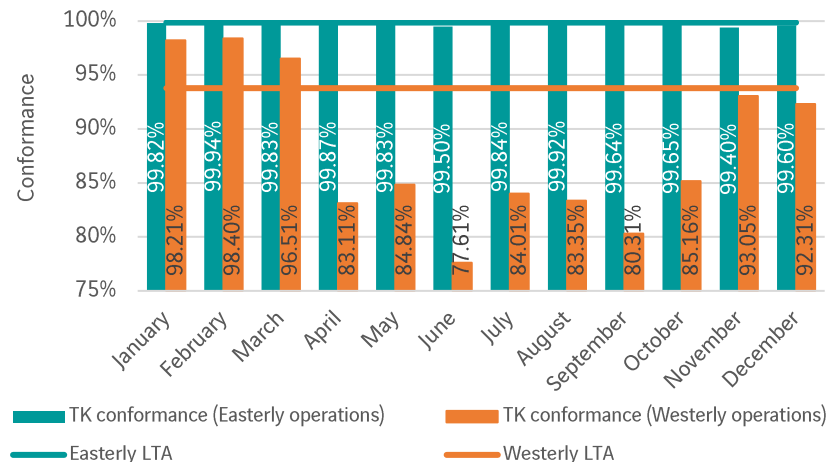


Figure 23: TK conformance per runway

From 1 April 2023, the Noise Preferential Route for Route 4 (26LAM) was updated in the Noise and Track Keeping system to conform with the conventional SID routings as specified by the DfT. This has only changed how track keeping conformance is monitored in the system and has had no effect on flight tracks over the ground. Route 4 conformance increased in October and November, but decreased in December which can be attributed to several days of adverse weather. Track conformance for all other routes remained above 99%.



# Departure Statistics – Track Keeping in 2023

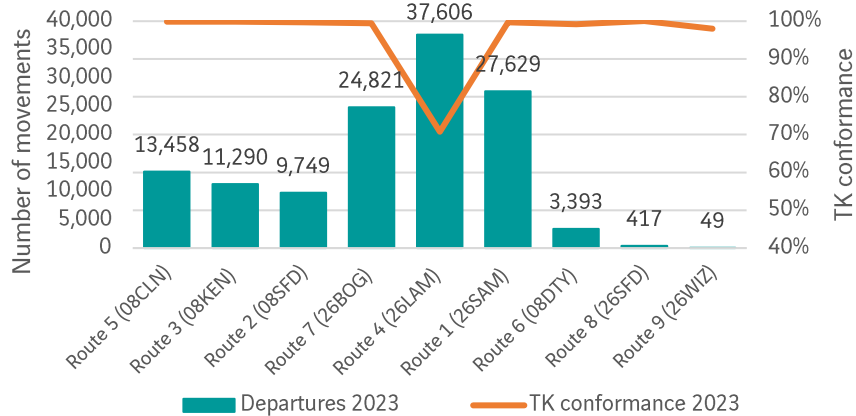


Figure 24: Track keeping and route usage

Figure 24 shows the most utilised routes in 2023 are 26LAM / Route 4, 26SAM / Route 1 and 26BOG / Route 7. Track keeping conformance was above 99.1% for all routes, except Route 4 (70.7%) and Route 9 (97.9%) which had 49 departures in 2023. Route 4 (26LAM) overall conformance for 2023 increased by 1.8% in Q4 2023.

Figure 25 shows a map of all nine Noise Preferential Routes for departures in use at Gatwick Airport. The table to the right lists the altitudes up to which aircraft are required to stay within the conformance monitoring swathe of the respective Noise Preferential Route. Once above the minimum vectoring altitude, Air Traffic Control may provide pilots with vectors to facilitate a more direct path towards their destination.

Although Figure 24 shows relatively low usage of 26WIZ / Route 9, especially compared to other departure routes, it is important to note this route option still exists as a tactical offload route and increased future usage of this route would not be atypical or a change to the airport’s existing operation.

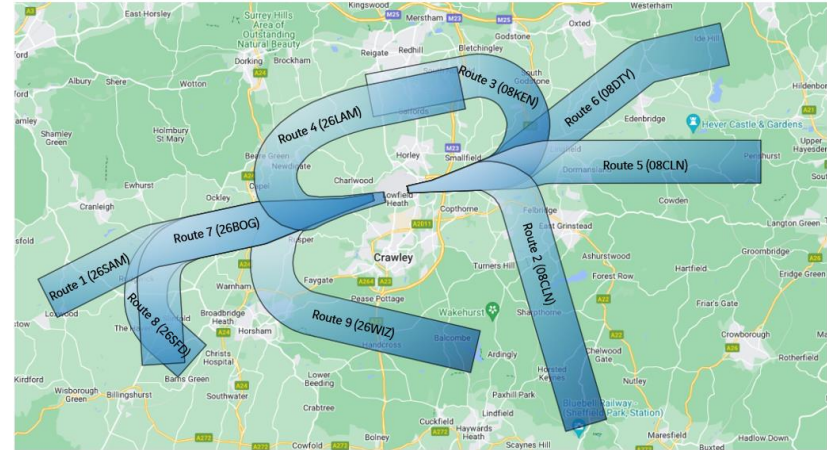


Figure 25: Noise Preferential Routes for departures

Route	Minimum vectoring altitude
Route 1 (26SAM)	3,000 ft
Route 2 (08SFD)	4,000 ft
Route 3 (08KEN)	3,000 ft
Route 4 (26LAM)	4,000 ft
Route 5 (08CLN)	3,000 ft
Route 6 (08DTY)	3,000 ft
Route 7 (26BOG)	4,000 ft
Route 8 (26SFD)	3,000 ft
Route 9 (26WIZ)	4,000 ft

# Departure Statistics – Noise, Climb and Overflight

There were no departure noise infringements during 2022 or 2023.

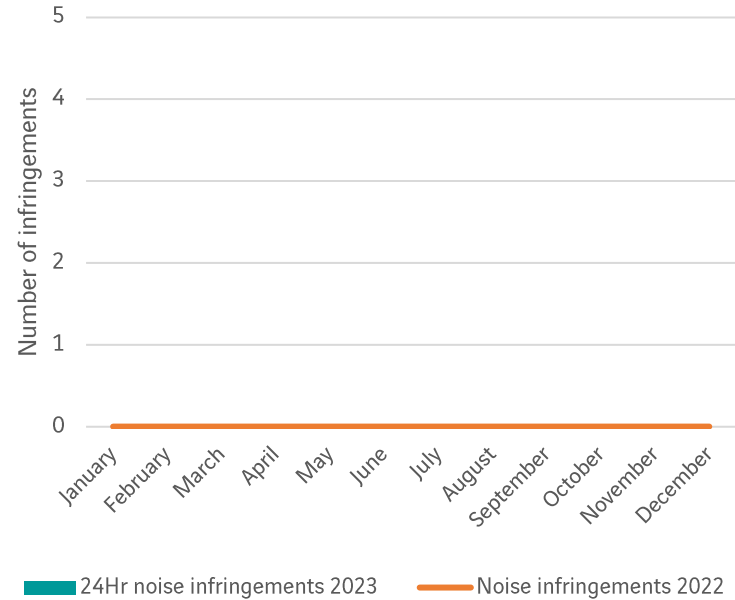


Figure 26: H24 noise infringements<sup>6</sup>

# Departure Statistics – Noise, Climb and Overflight

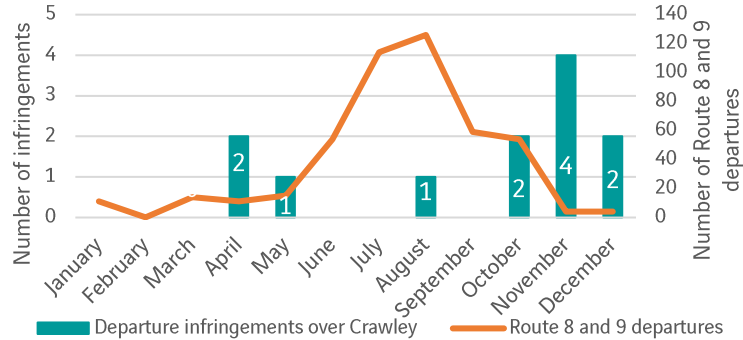


Figure 27: Departure overflight infringements over Crawley<sup>4</sup>

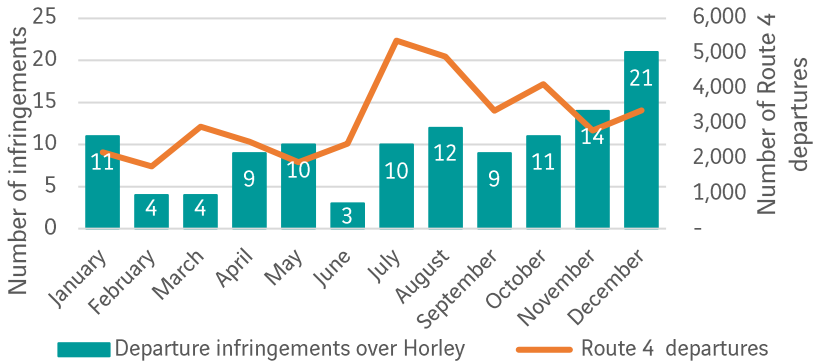


Figure 28: Departure overflight infringement over Horley<sup>4</sup>

The departures in Q4 that overflowed Crawley as depicted in Figure 27, occurred due to actions taken to avoid adverse weather conditions. This is a safety procedure.

The number of departures that overflowed Horley in Q4 increased slightly on Q3. Nearly all of these overflights were a result of ATC vectoring (85%), and the remaining were due to weather deviations. The overall number of infringements versus movements remains low at 0.3% for 2023. These overflights were due to weather avoidance and ATC vectoring.

Figure 29 shows that there were no 1,000ft infringements in Q4.

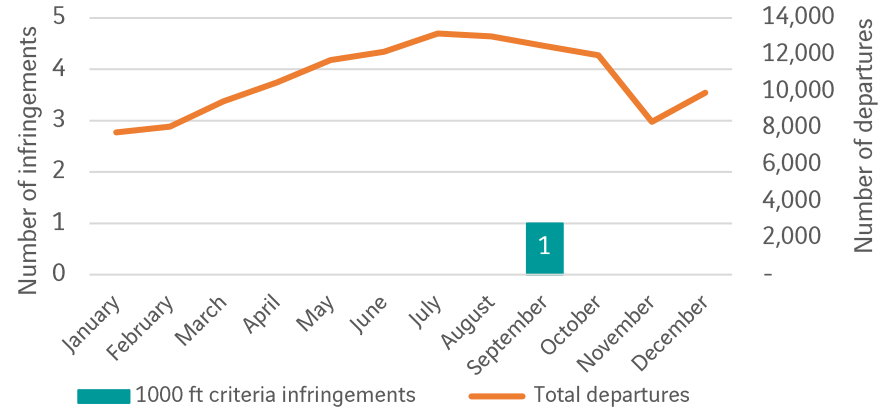


Figure 29: Number of aircraft not meeting the required climb performance<sup>5</sup>

# Night Operations – Summer Season

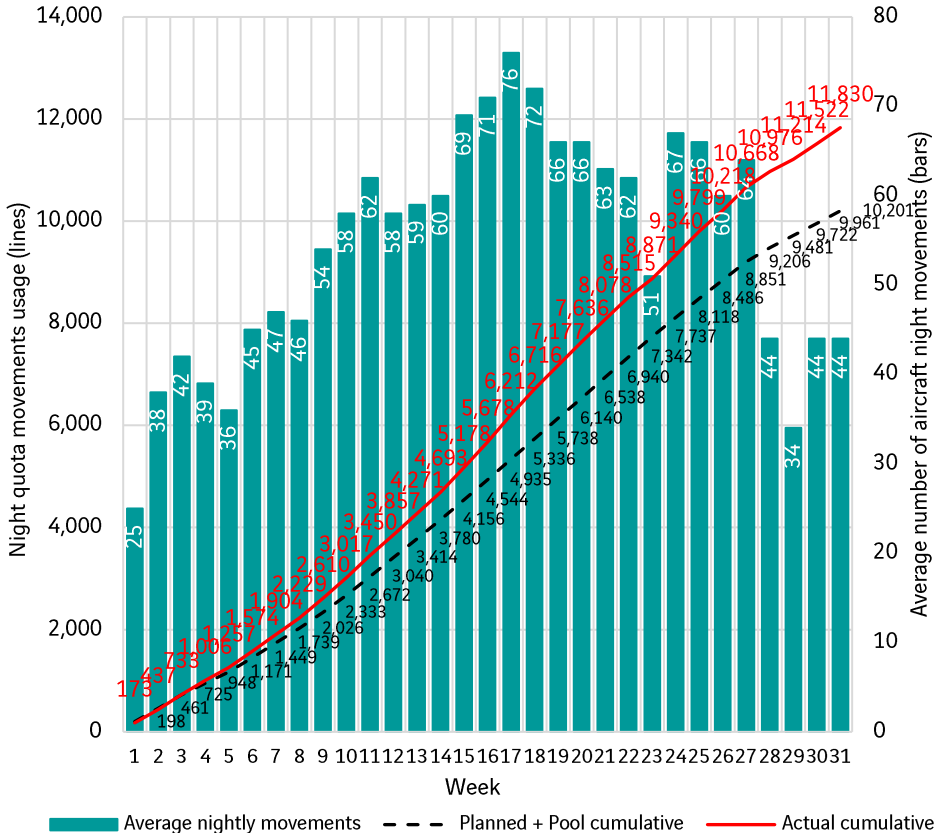


Figure 30 Night flight movements in summer

The Summer 2023 season began on 26<sup>th</sup> March 2023 (0100hrs local) and ended on 29<sup>th</sup> October 2023 (0159hrs local). Figure 30 depicts the planned and actual usage of the night flight movement and quota limits for the summer season.

Figure 31 provides a breakdown of the number of flights either avoiding the night quota period (avoided) or using unplanned quota usage (non-dispensed). GAL were granted 1,293 dispensations in 2023. 1,265 of these are due to widespread and prolonged disruption caused by events to include French ATC strikes, ATC staffing across the European network and thunderstorms (CB) in both Europe and the London area. There were also 24 Government (20 NATS system failure, 2 related to the King’s coronation, 2 for repatriation flights from Sudan/Israel) and 4 medical emergency dispensations granted.

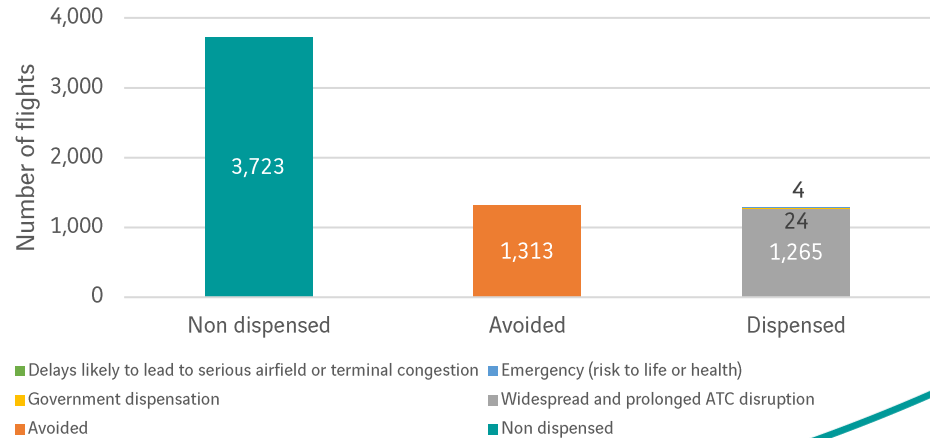


Figure 31: Number of non-dispensed, avoided and dispensed flights

# Night Operations – Winter Season

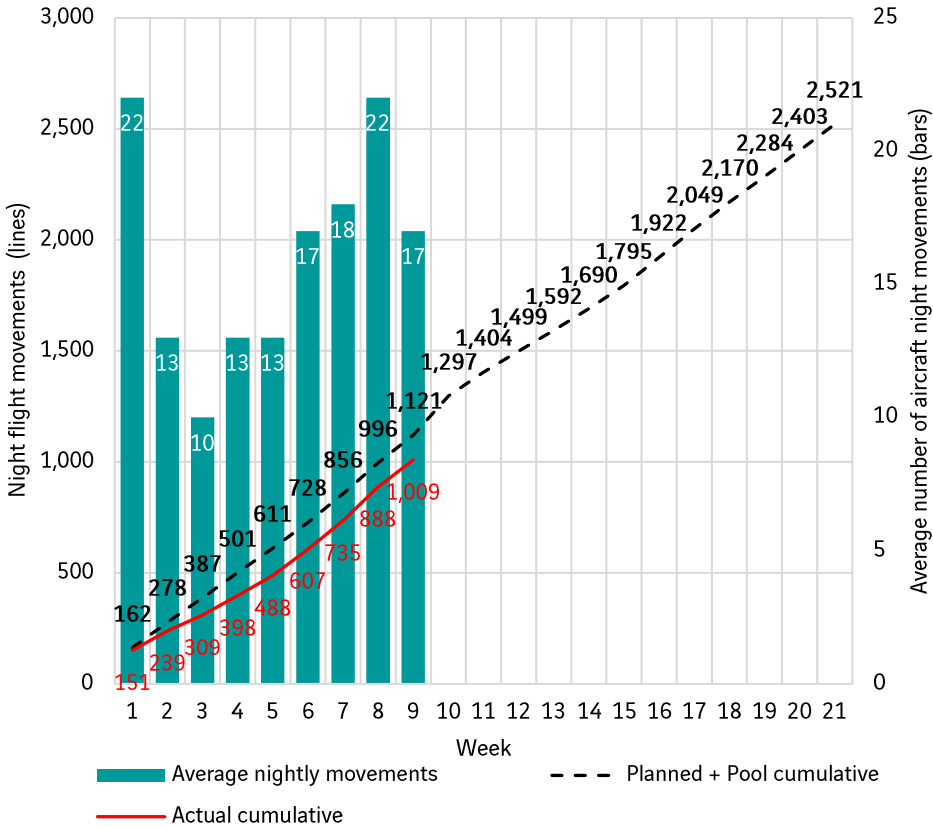


Figure 32: Night flight movements in summer

The Winter 2023 season began on 30<sup>th</sup> October 2023 (0200hrs local) and will end on 26<sup>th</sup> March 2024 (0059hrs local). Figure 32 depicts the planned and actual usage of the night flight movement and quota limits for the winter season thus far.

Figure 33 provides a breakdown of the number of flights either avoiding the night quota period (avoided) or using unplanned quota usage (non-dispensd). GAL has been granted 53 dispensations up to the end of Q4, all of which were due to widespread and prolonged ATC disruption caused by thunderstorms, low visibility and strong winds at Gatwick and in London and French ATC strikes and staffing.

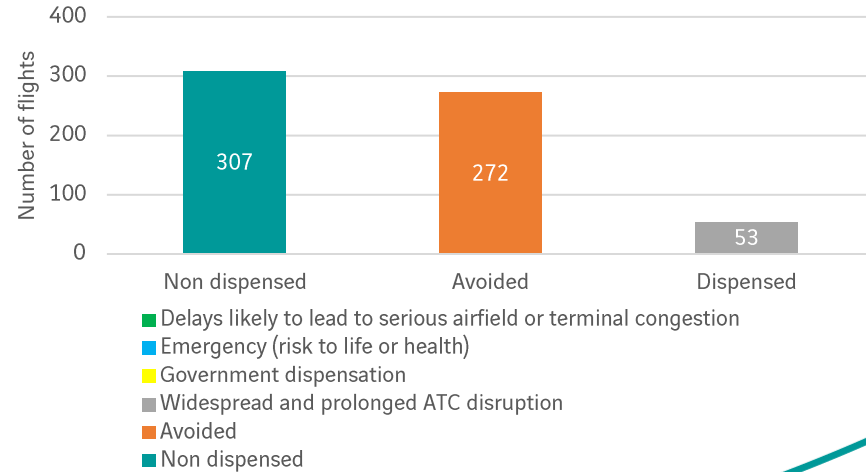


Figure 33: Number of non-dispensd, avoided and dispensd flights





# Complaints

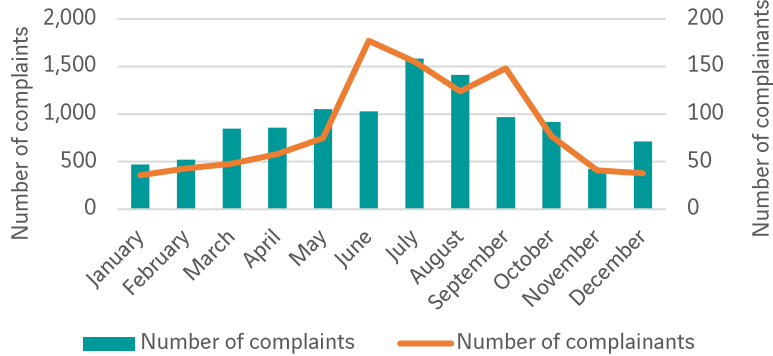


Figure 35: Number of complaints and complainants

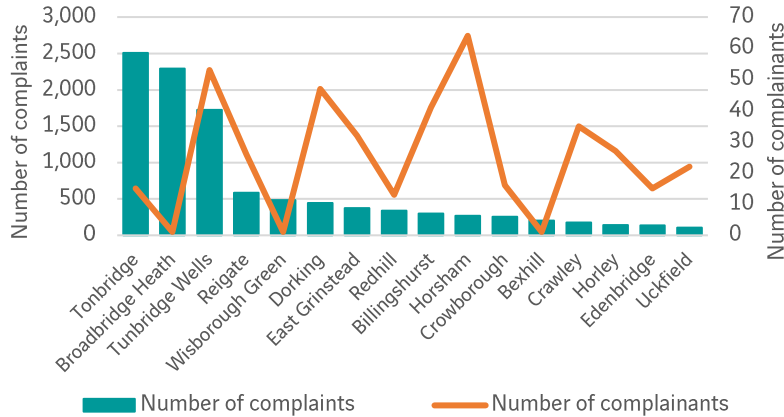


Figure 37: Areas with most complaints (whole year)

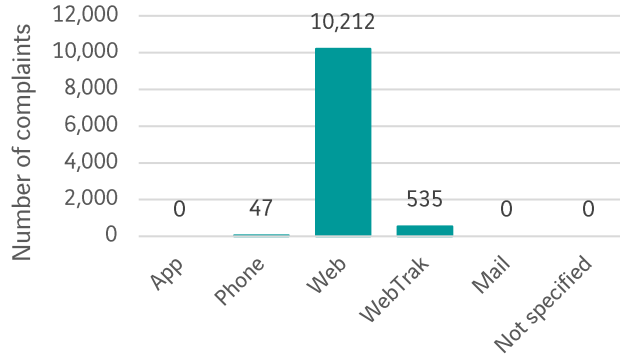


Figure 36: Complaints submission methods (whole year)

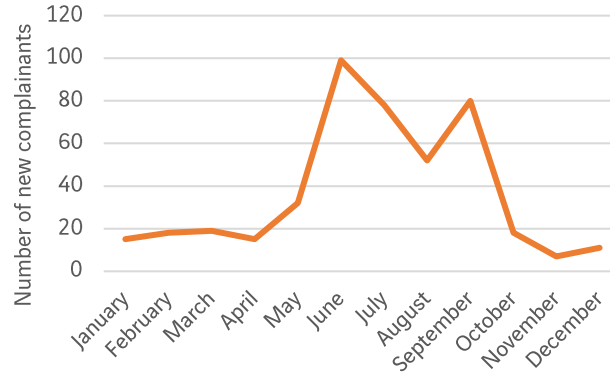


Figure 38: New complainants

Fewer complaints were recorded in Q4 compared to Q3, as we would expect. As in previous 4<sup>th</sup> quarters, reduced traffic movements and colder weather are the main contributing factors to the reduction.

Figure 36 shows that the online web form and WebTrak continue to be the preferred method of submitting complaints (>99%).

Figure 37 displays the areas with the greatest number of complaints recorded. In 2023, the areas with most complaints were Tonbridge, Broadbridge Heath (Horsham) and Tunbridge Wells. It is important to note that all Broadbridge Heath complaints are from a single individual.

The number of new complainants in Q4 continued to decrease in line with the number of complaints received. However, an increase in traffic movements due to the holiday season in December, contributed to an increase in new complainant numbers.

# Complaint Categories

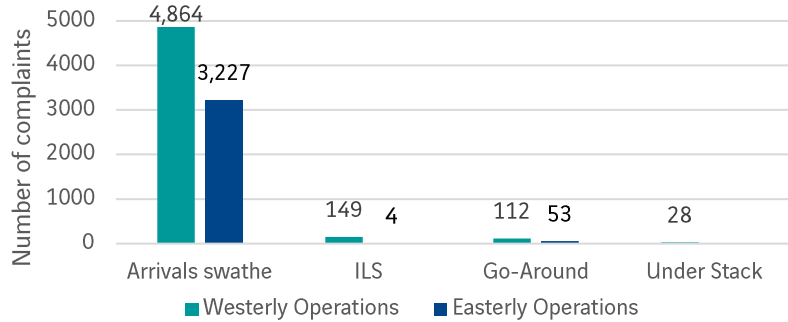


Figure 39: Complaint categories during arrival operations

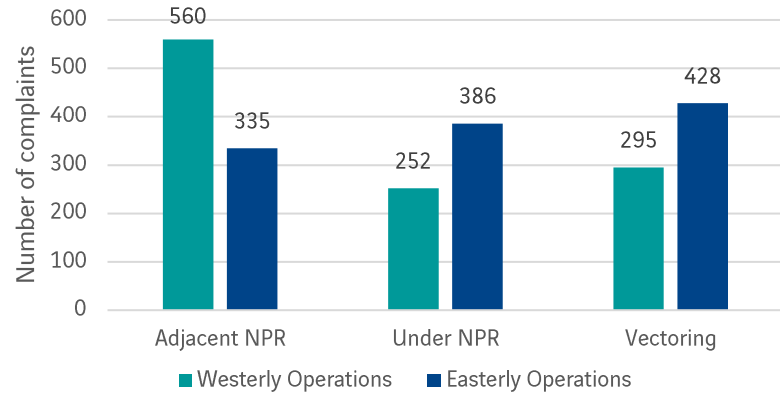


Figure 40: Complaint categories during departure operations

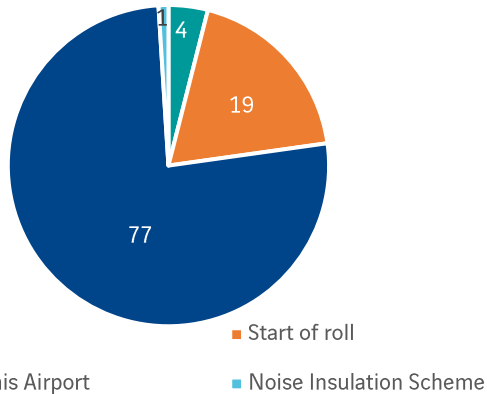


Figure 41: Other complaint categories

The Airspace Office have introduced further analysis on the types of complaints recorded since 1 January 2023. The largest proportion of complaints continue to be recorded from residents living under the arrivals swathe for both westerly and easterly operations as shown in Figure 39.

Figure 40 illustrates that the trend of more complaints being received during easterly departure operations continued into Q4 for 'Under NPR' and 'Vectoring'. Similarly to Q3, westerly 'Adjacent NPR' complaints exceeded easterly operations in the same category. A contributing factor for this was the predominant westerly operations this quarter that outweighed the normal 70% vs 30% (westerly/easterly) split.

Of the remaining other complaint categories, 'Not This Airport' complaints make up 76% of this total in Figure 41. These complainants are redirected to other airports for further information and to log a complaint directly with them. Start of roll complaints (19% of total) are categorised as complaints that have mentioned engine noise or runway take-off noise and who are not directly overflown and reside close to the airport.



# Complaints

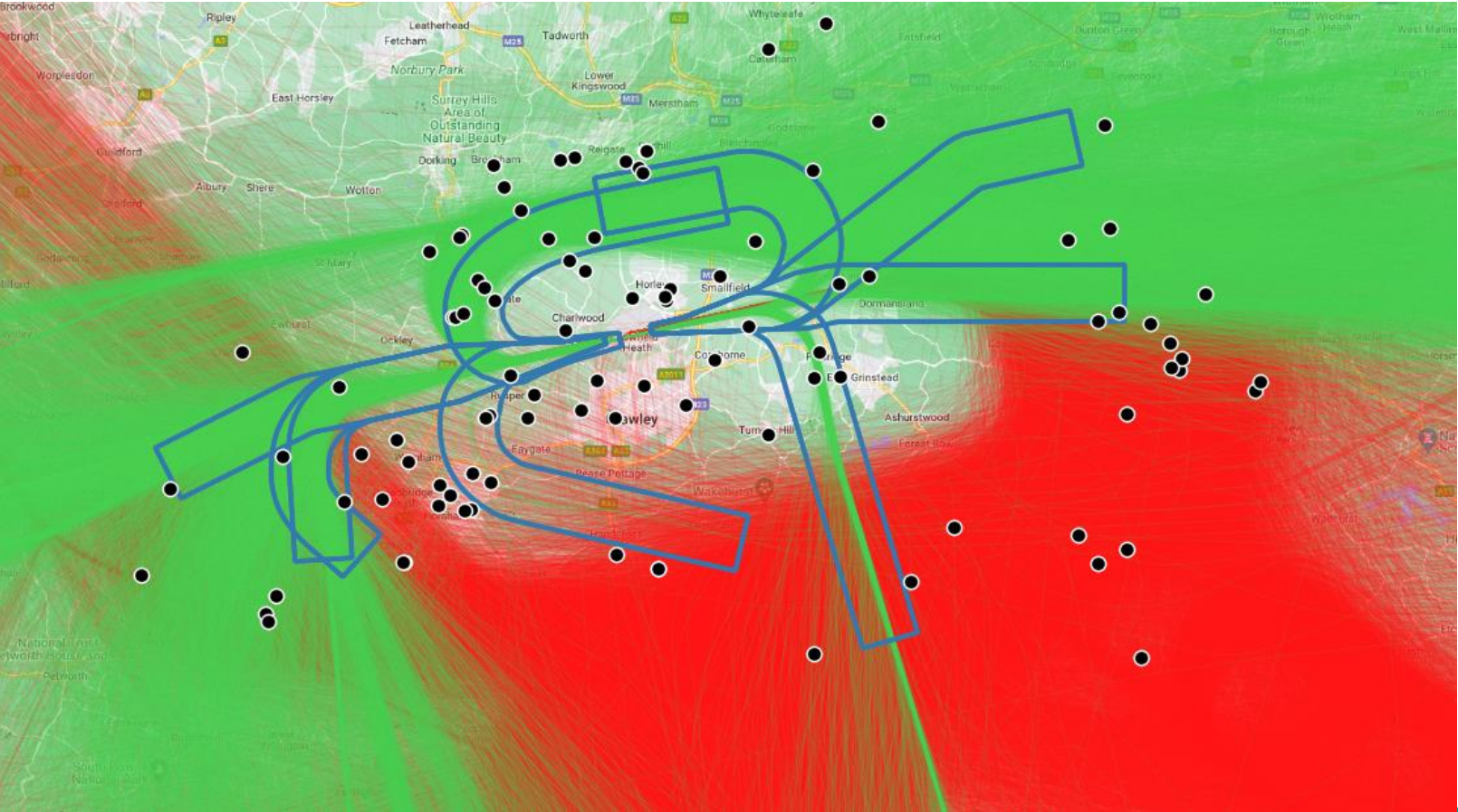


Figure 42 shows the distribution of individual complainants as well as the tracks of all movements in Q4 2023.

# Ground Noise

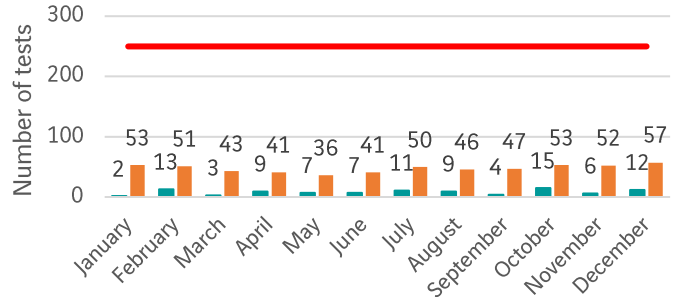


Figure 43: Engine runs

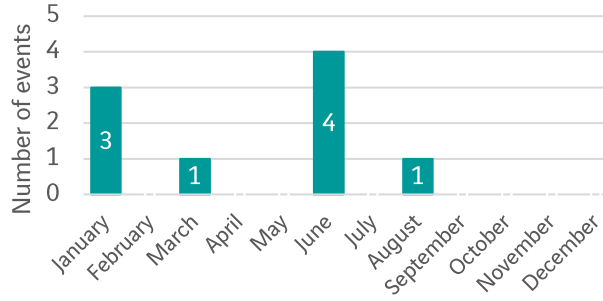


Figure 44: GPU usage

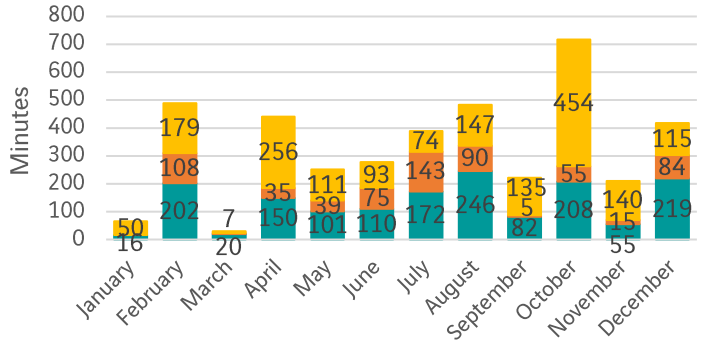


Figure 45: Cumulative minutes of engine tests

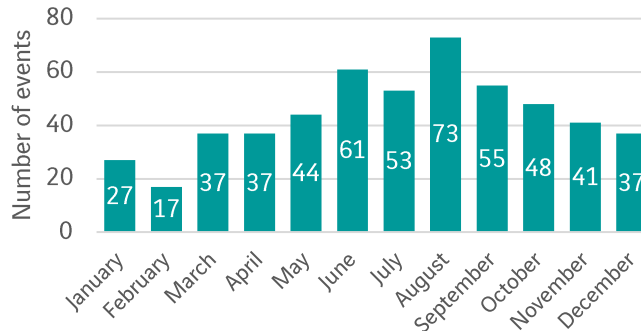


Figure 46: APU usage

Figure 43 shows that the number of engine tests conducted over the quarter remained fewer than the Section 106 legal limit of 250 in a six-month period.

There were no uses of Ground Power Units (GPU) in Q4 2023 as shown in Figure 44.

Figure 46 shows that in Q4 2023, there were no non-compliant Auxiliary Power Unit (APU) usages.

Further details on ground noise can be found in [Annex F](#).

# Annex A – Additional Statistics

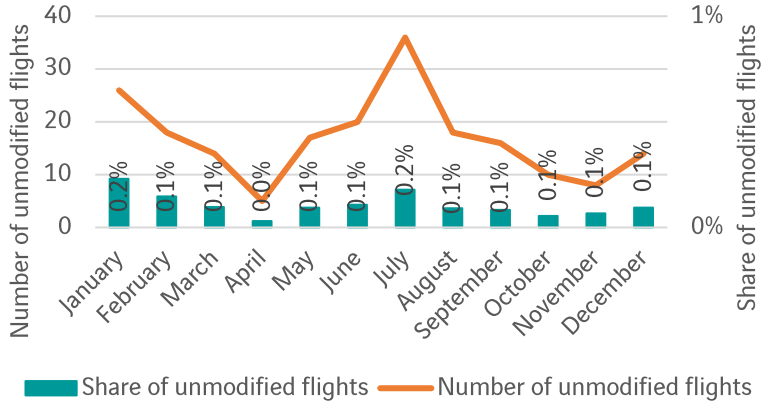


Figure A-1: Number and share of flights by unmodified A320 family aircraft

The number of flights operated by unmodified Airbus A320 family aircraft, which have not had Fuel Over-Pressure Protector modification (FOPP) installed, has been very low. The use of these aircraft has remained low during Q4 2023 as airlines have been utilising and leasing more aircraft that have been modified compared to the previous summer. The increase in December is driven by the increased demand over the holiday season.

Gatwick Airport has been applying an additional noise charge to unmodified A320 aircraft since the 1<sup>st</sup> January 2018. The number of these flights has been reduced by 95% since then and represents less than 0.1% of all A320 traffic in Q4 2023.

# Annex A – Additional Statistics

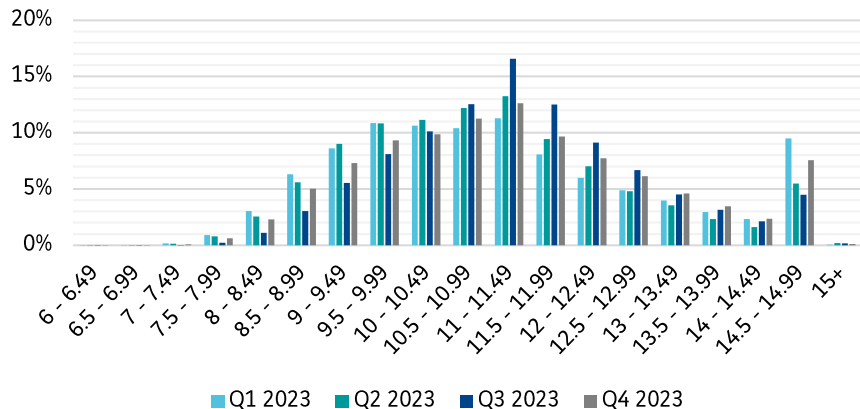


Figure A-2: Traffic Joining ILS per quarter – Runway 26 Only

Figure A-2 shows a high percentage of arrivals joining greater than 14NM which accounts for aircraft that arrive directly from the east.

In Q4 2023, 0.7% of aircraft joined the westerly ILS inside 8NM compared to 0.21% in Q3 2023. This can be attributed to weather avoidance and lower traffic levels in Q4 than in Q3.

This is monitored as a result of Recommendation Imm-10 of the 2016 Independent Arrivals Review (IAR). Please refer to [Annex C](#) for the full background and rationale for continuous monitoring.

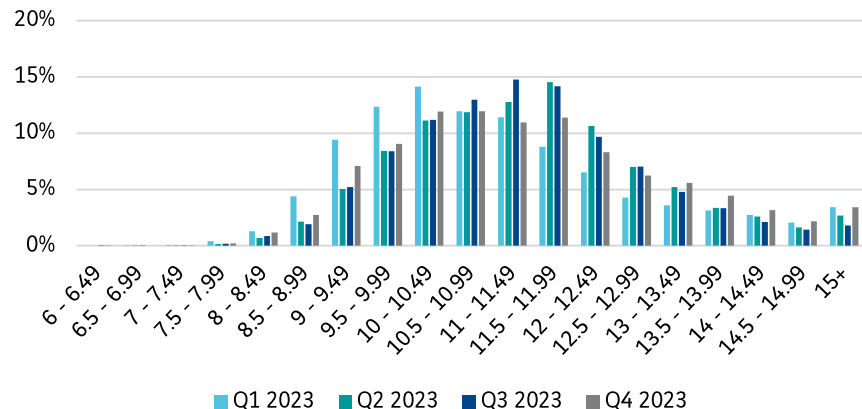


Figure A-3: Traffic Joining ILS per quarter – Runway 08 Only

Figure A-3 shows a slightly more even distribution of arrivals during easterly operations. In Q4 2023, 0.28% of aircraft joined ILS inside 8NM, from 0.24% in Q3 2023.

# Annex B

## Noise Abatement Procedures referred to by figures in this report

1 AIP, EGKK AD 2.21 NOISE ABATEMENT PROCEDURES, Sub-paragraph 10

*Where the aircraft is approaching the aerodrome to land it shall, commensurate with its ATC clearance, minimise noise disturbance by the use of continuous descent and low power, low drag operating procedures.*

2 AIP, EGKK AD 2.21 NOISE ABATEMENT PROCEDURES, Sub-paragraph 14

*Aircraft which land at Gatwick Airport - London between the hours of 2330 (2230) and 0600 (0500), whether or not making use of the ILS localiser and irrespective of weight or type of approach, shall not join the centre-line: below 3,000 FT or closer than 10 NM from touchdown.*

Note on altitude tolerances:

3,000ft (Gatwick QNH) – 202ft (airfield elevation) = 2,798ft

2,798 ft – 200ft ATC radar tolerance = 2,598ft

These values are used to assess conformance within the Airport's Noise & Track Keeping System.

3 AIP, EGKK AD 2.21 NOISE ABATEMENT PROCEDURES, Sub-paragraph 11

*Before landing at the aerodrome the aircraft shall maintain as high an altitude as practicable and shall not fly over the congested areas of Crawley, East Grinstead, Horley and Horsham at an altitude of less than 3000 FT (Gatwick QNH) nor over the congested area of Lingfield at an altitude of less than 2000 FT (Gatwick QNH).*

4 AIP, EGKK AD 2.21 NOISE ABATEMENT PROCEDURES, Sub-paragraph 9

*After taking off the aircraft shall avoid flying over the congested areas of Horley and Crawley.*

## 5 AIP, EGKK AD 2.21 NOISE ABATEMENT PROCEDURES, Sub-paragraph 1

*After take-off the aircraft shall be operated in such a way that it is at a height of not less than 1,000 FT AAL at 6.5 KM from start of roll as measured along the departure track of that aircraft.*

## 6 AIP, EGKK AD 2.21 NOISE ABATEMENT PROCEDURES, Section 3 and section 4

*Any aircraft shall, after take-off, be operated in such a way that it will not cause more than 94 dBA Lmax by day (from 0700 (0600) to 2300 (2200) hours) as measured at any noise monitoring terminal at any of the sites referred to in sub-paragraph (2).*

*Any aircraft shall, after take-off, be operated in such a way that it will not cause more than 89 dBA Lmax by night (from 2300 (2200) to 0700 (0600) hours) and that it will not cause more than 87 dBA Lmax during the night quota period (from 2330 (2230) to 0600 (0500) hours) as measured at any noise monitoring terminal at any of the sites referred to in sub-paragraph (2).*

7 Agreement in relation to Gatwick Airport Under Section 106 of the Town and Country Planning Act 1990 and other powers

Full version: <https://www.gatwickairport.com/business-community/about-gatwick/company-information/engagement-and-governance/s106/>

## 8 AIP, EGKK AD 2.20 LOCAL AERODROME REGULATIONS, 1 AIRPORT REGULATIONS, Sub-paragraph I

*Fixed Electrical Ground Power must be used when available and serviceable. Use of aircraft Auxiliary Power Units (APUs) and Ground Power Units (GPUs) are strictly controlled to minimise environmental impact. APUs must be shut down after arrival and only restarted before departure according to the timescales described in detail in published Gatwick Airport Instructions and Directives. Regular audits take place to ensure compliance with the regulations.*

# Annex C

## ILS Joining Point – Background and Rationale for Monitoring

### Background

Joining point data is monitored as a result of Recommendation Imm-10 of the 2016 Independent Arrivals Review (IAR). The recommendation proposed to alter a safety feature – the ILS minimum joining point – applied by air traffic controllers to help pilots ensure a fully stabilised final approach to the runway. The objective was to safely increase geographical dispersal of arrivals to more closely emulate the operations prior to a change in 2013 when the ILS minimum joining point had been increased from 7NM to 10NM. Specifically, the recommendation proposed extending the arrival swathe by reducing the ILS minimum joining point from 10NM to 8NM from touchdown. Hence the arrival swathe would extend from a minimum of 8NM to 14NM, with aircraft joining on a straight in approach when traffic permits.

Following the publication of the Action Plan, GAL working closely with NATS, progressed the implementation of the recommendation into an operational evaluation supported by detailed analysis. The evaluation commenced on the 15 August 2016. GAL & NATS have closely monitored use of the ILS since the implementation of the evaluation. In early January 2017, in anticipation of the need to conduct a thorough assessment of the results from the evaluation period and in order to avoid a temporary reversion to the pre-August 2016 minimum joining point, GAL made a request to CAA for a 3-month extension of the use of the reduced ILS minimum joining point.

Over the entire evaluation period the joining points between 8NM to 10NM was used by, on average, almost 20% of arrivals. As the evaluation progressed,

the number of aircraft making use of joining points between 8NM and 10NM increased, reaching a peak of 31% in January 2017. The increased use of these joining points closer to touch down had increased the geographical dispersal of the arrivals swathe. With the agreement of the CAA and NATS at Noise Management Board (NMB) 5 it was decided that the 8NM minimum ILS joining point would be transitioned to a permanent procedure on the 15 May 2017.

### Rationale for continuous monitoring

Following the adoption of the change as a permanent procedure, reporting continued to the NMB on a regular basis to provide transparency of the traffic dispersal achieved. The reporting and monitoring function was subsequently transferred to NaTMAG, as reporting became part of routine operational monitoring. In Q4 2020, ILS joining point distance statistics were absorbed into the new Airspace Office Quarterly and Annual reporting.

Communities continue to express concerns regarding flights that join the ILS inside 8NM during the day due to their noise impact. When the proportion of such flights becomes noticeably higher than the long-term average, the Airspace Office informs NATS (providing supporting data) and refers this to Gatwick's Flight Operations Performance and Safety Committee (FLOPSC) for further investigation. Whilst it is understood that vectoring practice by air traffic controllers has noise impacts, the rationale for taking action through FLOPSC – instead of NaTMAG – is that the 8NM ILS minimum joining point is a safety procedure, rather than a noise abatement procedure, relating to the stabilised approach of aircraft to the runway. FLOPSC is the competent safety body.



# Annex D

## Roles and Responsibilities

### Gatwick Airport Limited

GAL is the licensed operator of Gatwick Airport. It is not directly responsible for aircraft operations but is responsible for the control of ground noise at the airport and the implementation and monitoring of DfT policy.

### Airspace Office

Gatwick's Airspace Office is responsible for recording, investigating and responding to aircraft noise enquiries as well as to monitor and report airline conformance to noise mitigation measures as detailed in the UK AIP. The Airspace Office can also, if requested, provide information regarding flight paths and arrival routes, for example to prospective homebuyers. The Airspace Office also manages the airport Noise and Track Keeping system 'ANOMS' and a number of fixed and mobile noise monitors within the local area. They are regularly relocated, the data analysed, and the findings reported.

### Air Traffic Control

NATS is the main Air Navigation Service Provider in the United Kingdom and provide guidance to flights in the vicinity of Gatwick Airport. NATS' en-route business is regulated and operated under licence from the Civil Aviation Authority (CAA). The terms of the licence require NATS to be capable of meeting on a continuous basis any reasonable level of overall demand. They are charged with permitting access to airspace on the part of all users, whilst making the most efficient overall use of airspace.

The Gatwick Airport air traffic control is operated by NATS, who oversee the runway and ground operations.

### NATS

NATS is responsible for aerodrome air traffic control at Gatwick Airport from when the aircraft leaves its stand to when it reaches 4,000ft in the air. NATS also manages air traffic engineering services, emergency and alerting services, and meteorological services.

### Department for Transport

The DfT is responsible for the formulation of noise abatement policy, the location of Noise Preferential Routes (NPRs) for departing aircraft and night flight regulations.

### Civil Aviation Authority

As the UK's independent specialist aviation regulator, the CAA has responsibility for regulating airspace over the UK. This includes the new and established air traffic routes and areas which commercial aircraft use to fly into and out of airports, and the airspace used by military and General Aviation flights.

An organisation proposing a change to the design of UK airspace must follow the CAA's airspace change process. The CAA has a duty to consider a range of factors set out by government in deciding whether or not to approve the change. One set of factors is the environmental objectives set for the CAA by the Secretary of State – including consideration of noise impacts.



# Annex E

## 17-year KPI table

Parameter	12 Month Performance																	
	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Track keeping conformance (% on track)	91.17%	97.36%	98.20%	98.49%	98.42%	98.08%	98.06%	98.56%	99.71%	99.28%	98.04%	97.63%	97.42%	96.98%	96.82%	98.45%	98.62%	98.17%
24hr CDO (% achievement)	88.83%	88.61%	90.89%	89.59%	89.58%	90.74%	90.48%	88.58%	89.75%	92.61%	91.36%	88.56%	90.49%	89.73%	87.92%	83.53%	81.00%	80.79%
Day/Shoulder CDO (% achievement)	89.04%	89.19%	90.94%	89.79%	89.70%	90.80%	90.56%	88.18%	89.21%	92.43%	91.13%	88.72%	90.19%	89.31%	87.69%	82.98%	80.25%	79.9%
Core night CDO (% achievement)	87.11%	83.83%	90.07%	85.74%	88.27%	90.03%	89.60%	92.90%	95.32%	95.25%	94.04%	85.27%	93.96%	93.94%	91.75%	89.65%	89.04%	89.6%
1000ft Infringements (No.)	1	0	0	0	0	0	0	0	0	0	0	2	3	6	22	11	26	11
1000ft Infringements (No. below 900ft)	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	4	14	6
Departure Noise Infringements (Day)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	13	10
Departure Noise Infringements (Night/Shoulder)	0	0	0	0	0	0	2	1	0	0	0	0	4	0	1	2	2	2
Individual Complainants	544	664	254	313	698	836	997	2,324	1,746	3,366	533	414	343	411	473	432	672	587
Total Noise Complaints Received	10,794	16,431	5,068	6,628	25,593	24,447	24,658	17,715	15,189	21,712	2,296	1,952	2,673	5,033	2,254	6,281	5,288	4,791
Enquiry Response Performance Target is 95% Within 8 Days	97.70%	99.10%	99.98%	99.49%	77.63%	99.98%	99.89%	46.55%	93.89%	73.39%	99.24%	98.42%	95.65%	99.25%	84.10%	97.50%	94.90%	97.20%
Ground Noise Complaints received	19	5	3	10	0	0	0	0	2	0	5	3	4	2	1	8		
Number of Fixed and Mobile Noise Monitors	22	22	22	23	23	12	11	11	12	12	12	10	10	11	11	11	10	10
Northern/Standby Runway Movements	6,919	9,616	532	1,042	2,842	3,534	3,722	2,567	2,498	1,496	4,473	14,836	2,444	1,012	904	1,008	1,286	1,458
West/East Runway Split (%)	70/30	66/34	68/32	83/17	68/32	62/38	78/22	67/33	70/30	67/33	63/37	71/29	67/33	64/36	70/30	70/30	67/33	68/32
% of Arrivals performing go-arounds	0.52%	0.55%	0.30%	0.49%	0.58%	0.49%	0.43%	0.46%	0.39%	0.39%	0.38%	0.42%	0.31%	0.30%	0.36%	0.27%	0.33%	0.31%
Percentage of Chapter 4 (or equivalent) aircraft %	99%	99%	99%	99%	98%	99%	99%	99%	99.70%	99%	99%	99%	96%	98%				
Percentage of Chapter 14 aircraft %	63%	62%	58%	66%	62%	56%	55%											
Unmodified A320 Family Aircraft (% total ATM's)	0.08%	0.74%	0.32%	0.61%	0.73%	1.5%	0.4%											
Total Aircraft Movements	256,831	217,524	55,225	79,310	284,736	283,926	286,271	280,089	267,777	259,974	250,527	246,792	251,019	240,462	251,714	263,716	266,540	263,371
Total Passengers	40,895,000	32,838,015	6,254,549	10,166,916	46,573,796	46,075,410	45,561,700	43,130,800	40,267,938	38,127,700	35,447,009	34,222,461	33,660,146	31,353,547	32,370,000	34,100,000	35,200,000	34,384,000

# Annex F

## Ground Noise Tables

	Engine Tests						FEGP Availability	
	Number of Engine Tests	6 month rolling average	6 month totals	Ground Idle	Flight Idle	Above Flight Idle	NT	ST
Jan-23	2	9	53	16	0	50	99.73%	99.90%
Feb-23	13	9	51	202	108	179	99.93%	99.95%
Mar-23	3	7	43	20	3	7	99.88%	99.96%
Apr-23	9	7	41	150	35	256	99.96%	99.92%
May-23	7	6	36	101	39	111	99.97%	99.96%
Jun-23	7	7	41	110	75	93	99.89%	99.88%
Jul-23	11	8	50	172	143	74	99.90%	99.90%
Aug-23	9	8	46	246	90	147	99.97%	99.94%
Sep-23	4	8	47	82	5	135	99.95%	99.93%
Oct-23	15	9	53	208	55	454	99.94%	99.89%
Nov-23	6	9	52	55	15	140	99.83%	99.88%
Dec-23	12	10	57	219	84	115	99.92%	99.87%

<sup>1</sup> FEGP – Fixed Electrical Ground Power (power supplied to aircraft from the electrical grid).

# Annex F

## Ground Noise Tables

	APU's						GPU's		
	Number of aircraft running APU's which were compliant	Non-compliances <sup>1</sup> Number of aircraft running APU's which were not compliant	Number of aircraft parked but not running APU's	Total number of aircraft on the airfield	Number of APU checks undertaken (Target 3)	Operations Duty Team audits <sup>2</sup>	Operations Duty Team non-compliances	Used With Dispensation	Used Without Dispensation
Jan-23	27	0	146	173	3	49	0	3	0
Feb-23	17	0	127	144	3	53	0	0	0
Mar-23	37	0	141	178	3	53	0	1	0
Apr-23	37	0	102	139	3	58	0	0	0
May-23	44	0	86	130	3	58	0	0	0
Jun-23	61	0	73	134	3	64	0	4	0
Jul-23	53	0	80	133	3	65	0	0	0
Aug-23	73	0	85	158	3	59	0	1	0
Sep-23	55	0	63	118	3	55	0	0	0
Oct-23	48	0	93	141	3	53	0	0	0
Nov-23	41	0	134	175	3	52	0	0	0
Dec-23	37	0	102	139	3	49	0	0	0

<sup>1</sup> The operation of aircraft Auxiliary Power Units (APU) is restricted and their operation permitted only in certain circumstances.

<sup>2</sup> This includes monitoring of aircraft auxiliary power unit usage.

<sup>3</sup> The operation of Ground Power Units (GPU) is only permitted in certain circumstances.

# Glossary of Terms (1)

<b>AAL</b>	Above Aerodrome Level	The height of an aircraft above the elevation of the referenced aerodrome, usually the one from which they departed or which they are approaching.
<b>AIP</b>	Aeronautical Information Publication	Essential air navigation information published by NATS on behalf of the CAA, detailing regulations applicable to the operation of aircraft, e.g. at specific aerodromes.
<b>ANPT</b>	Airline Noise Performance Table	A programme that ranks airlines flying into and from Gatwick Airport in relation to their overall noise performance.
<b>APU</b>	Auxiliary Power Unit	A small combustion engine on an aircraft that provides energy for functions like lighting or heating/cooling when the main engines are switched off.
<b>ATC</b>	Air Traffic Control	An entity responsible for a safe and expedite air traffic flow. To this end they monitor aircraft and issue instructions to the flight crew, either from the airport control tower or from a radar centre.
<b>ATM</b>	Air Traffic Movement	An aircraft operation on the airport's runway, i.e. either a departure or an arrival.
<b>CAA</b>	Civil Aviation Authority	The UK independent civil aviation regulator.
<b>CDO</b>	Continuous Descent Operations	An optimised descent profile utilised to reduce noise impact and fuel consumption by avoiding prolonged periods of level flight below 7,000ft. 'For monitoring purposes, a descent will be deemed to have been continuous provided that no segment of level flight longer than 2.5 Nautical Miles (NM) occurs below 7,000ft QNH and 'level flight' is interpreted as any segment of flight having a height change of not more than 50ft over a track distance of 2nm or more, as recorded in the airport Noise and Track Keeping system.'
<b>DfT</b>	Department for Transport	The government department providing policy & guidance for air traffic through their work with airlines, airports, the Civil Aviation Authority and NATS.

## Glossary of Terms (2)

<b>DME</b>	Distance Measuring Equipment	A fixed radio beacon which provides information to aircraft about their distance from its position. "1 DME" denotes 1 nautical mile from the selected ground station measured as a slant range.
<b>EGKK</b>	(ICAO-code for Gatwick Airport)	These four-letter airport codes are used in the AIP and other aeronautical documents. This code is unique to Gatwick airport.
<b>EPNdB</b>	Effective Perceived Noise in decibels	A noise metric aimed to measure the relative noisiness of an individual aircraft flying by. It is relevant for the quota count classification can be calculated from the certified noise levels.
<b>FLOPSC</b>	Flight Operations Performance & Safety Committee	An engagement committee at Gatwick Airport ensuring the development of best practice by airline operators using Gatwick. It is made up of representatives of Gatwick Airport, the DfT, ATC service providers and airlines operating at the airport.
<b>GACT</b>	Gatwick Airport Community Trust	An independent charity which awards grants annually to local community schemes which benefit parts of East and West Sussex, Surrey and Kent.
<b>GAL</b>	Gatwick Airport Limited	-
<b>GNMG</b>	Gatwick Noise Monitoring Group	The GNMG consists of Environmental Health Officers and associated noise professionals. It evaluates and discusses the data from all noise monitors surrounding Gatwick Airport.
<b>GPU</b>	Ground Power Unit	An either fixed or mobile unit (usually a diesel powered generator) which can supply electrical power to the electrical system of an aircraft while on the ground.
<b>IAR</b>	Independent Arrivals Review	Gatwick commissioned an independent review of air traffic around the airport in. The final report has been published in 2016. More information can be found <a href="#">on our website</a> .
<b>ILS</b>	Instrument Landing System	Is a precision runway approach aid based on two radio beams which together provide pilots with both vertical and horizontal guidance during an approach to land.
<b>IRVR</b>	Instrumented Runway Visual Range	An IRVR system automatically measures the approximate distance over which an aircraft pilot can see the runway surface markings and lights.

# Glossary of Terms (3)

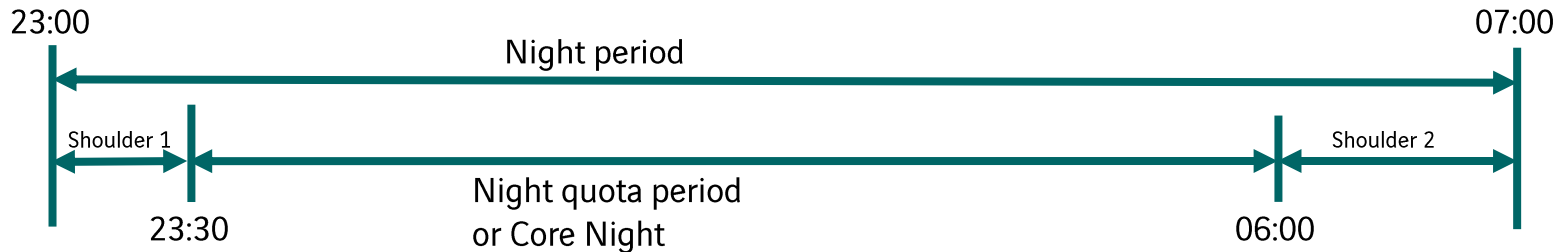
<b>KPI</b>	Key Performance Indicator	A set of metrics or values by which performance is measured and monitored.
<b>LTA</b>	Long Term Average	Values of a metric averaged over a relatively long period – typically one year.
<b>MTOW</b>	Maximum Take-Off Weight	The certified maximum total weight of an aircraft during take-off.
<b>NaTMAG</b>	Noise and Track Monitoring Advisory Group	NaTMAG brings together representatives from the DfT, NATS, airlines, Gatwick Airport and local authorities. The group discusses a wide range of noise and track-keeping issues.
<b>NATS</b>	National Air Traffic Service	NATS is the main Air Navigation Service Provider in the United Kingdom.
<b>NMB</b>	Noise Management Board	The Noise Management Board (NMB) is a unique body, bringing together representatives from all stakeholders in the management and mitigation of aircraft noise.
<b>NPR</b>	Noise Preferential Route	Departure flight paths that avoid densely populated areas and therefore reduce the noise.
<b>PAPI</b>	Precision Approach Path Indicator	PAPI lights provide a visual indication of the aircraft's position in relation to the glide path. The system consists of four lights placed next to the runway abeam the touch down zone.
<b>QC</b>	Quota Count	The QC is the noise quota assigned to an aircraft and is calculated on the basis of the EPNdB of that aircraft on take-off or landing. The QC is used for night flight restrictions at Gatwick, for which there is a set quota limit each season in addition to the movement limit.
<b>QNH</b>	(no acronym)	When its barometric pressure is set to QNH an altimeter reads the altitude above mean sea level.
<b>RAG</b>	Red-Amber-Green	A tier system used to rate and categorise performance.
<b>S106</b>	Section 106	Refers to Section 106 the Town and Country Planning Act 1990.
<b>TK</b>	Track Keeping	A departure is defined as on-track if it does not deviate from the used NPR conformance monitoring swathe before reaching the applicable minimum altitude.

# Glossary of Terms – Night Flight Restrictions

For the purposes of the night flight restrictions, the hours of the day have been categorised into four periods. These are also used for some noise abatement procedures such as CDO (see page 10).

The periods are called Day, Shoulder 1, Night and Shoulder 2. However, the night flight restrictions differentiate between the night period (Night + Shoulder 1 + Shoulder 2) and the night quota period (Night only). The latter is referred to as Core Night in the context of CDO.

The graphic below depicts the different periods and their boundaries. The Day period runs from 07:00:00 to 22:59:59. All times are local times.



*Figure G-1: Definition of time periods referred to in this report*

# Glossary of Terms – Chapter Noise Standards

Aircraft noise (“noise at source”) has been controlled since the 1970s by the setting of noise limits for aircraft in the form of Standards and Recommended Practices contained in Annex 16 to the Convention on International Civil Aviation.

The latest amendment to Annex 16, Volume 1 adopted the Chapter 14 noise standard for aeroplanes in 2014, which involved an increased threshold of 7 EPNdB (cumulative) on the then latest standard, Chapter 4.

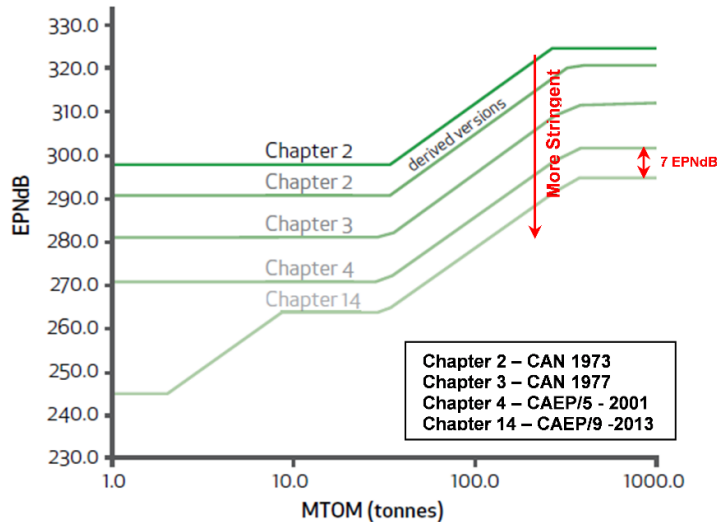


Figure G-2: The progression of the ICAO Noise Standards for aeroplanes (Source: ICAO)

A list of typical aircraft types commonly certified under each chapter standard is included below:

Chapter 14 Minus: A320neo family, B737MAX, A350, B787, A380, A220

Chapter 14 Base: A319ceo, B777

Chapter 14 High: A320ceo, A330

Chapter 4: B737-800

Chapter 3 and below: A321ceo, FOPP-unmodified A320ceo





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