Community Noise Report

Flamstead and Cheverell's Green

June – October 2022

London Luton Airport

Version 1.0

Introduction

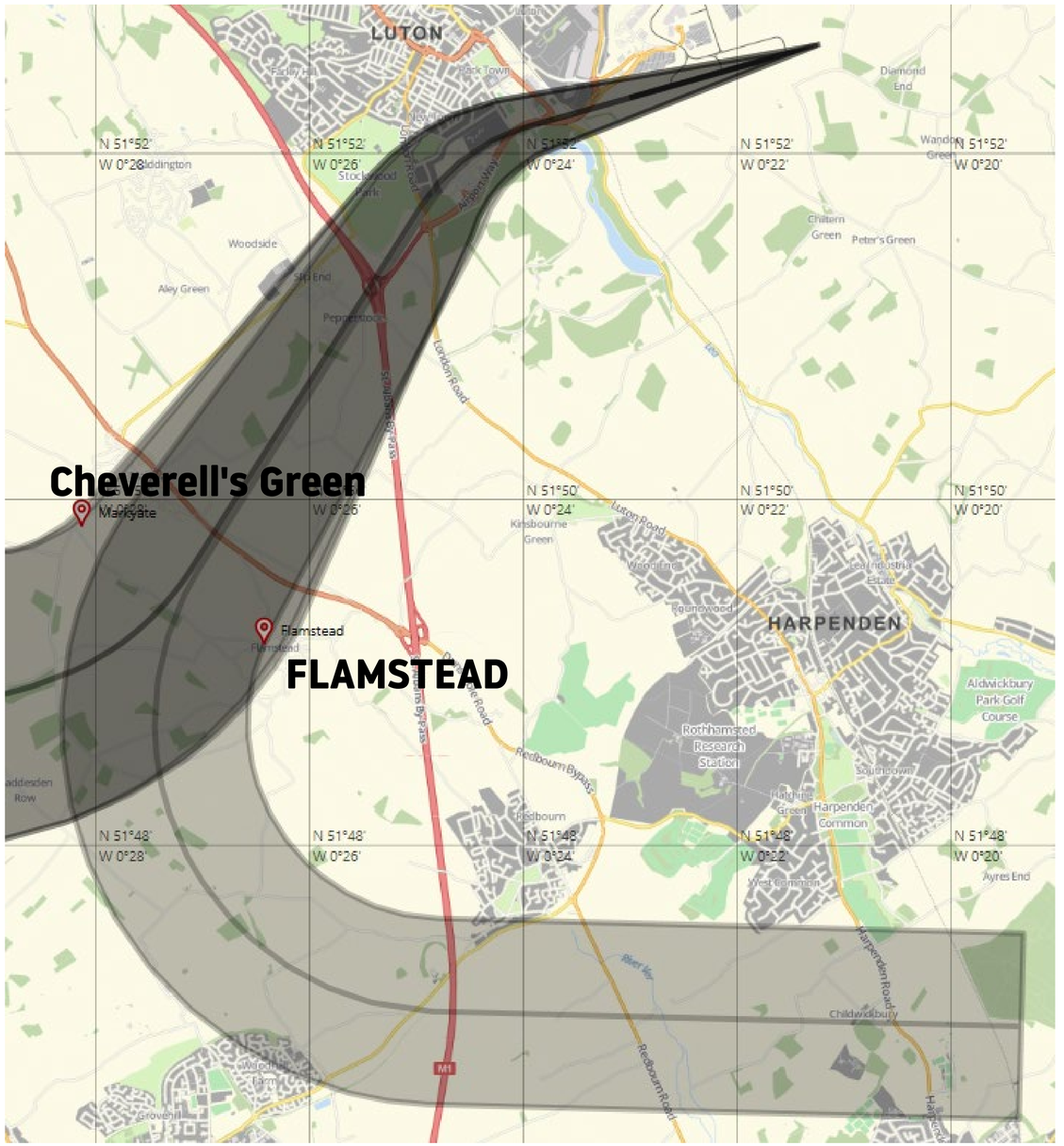
As part of the ongoing noise monitoring programme and the NADP trial*, London Luton Airport deployed portable noise monitoring terminals in Flamstead and Cheverell's Green.

The purpose of the monitoring programme is to understand the typical noise levels created in the local community. For Flamstead and Cheverell's Green, it specifically related to westerly departures. The Standard Instrument Departures (SIDs) or Noise Preferential Routes (NPRs) are shown on the map.

The monitors' location were on the edge of the main westerly departure corridors approximately 7km from the Luton runway at an altitude of approximately 486-545 feet above sea level. The red pinpoints on the map show the locations of the noise monitor in Flamstead and Cheverell's Green.

The noise monitors were in place between 24th June and 13th October 2022.

Aircraft noise and tracks recorded were extracted from LLA's noise and track-keeping system. This document evaluates the lateral and vertical positioning of aircraft near the monitor as well as the noise recorded at ground level.



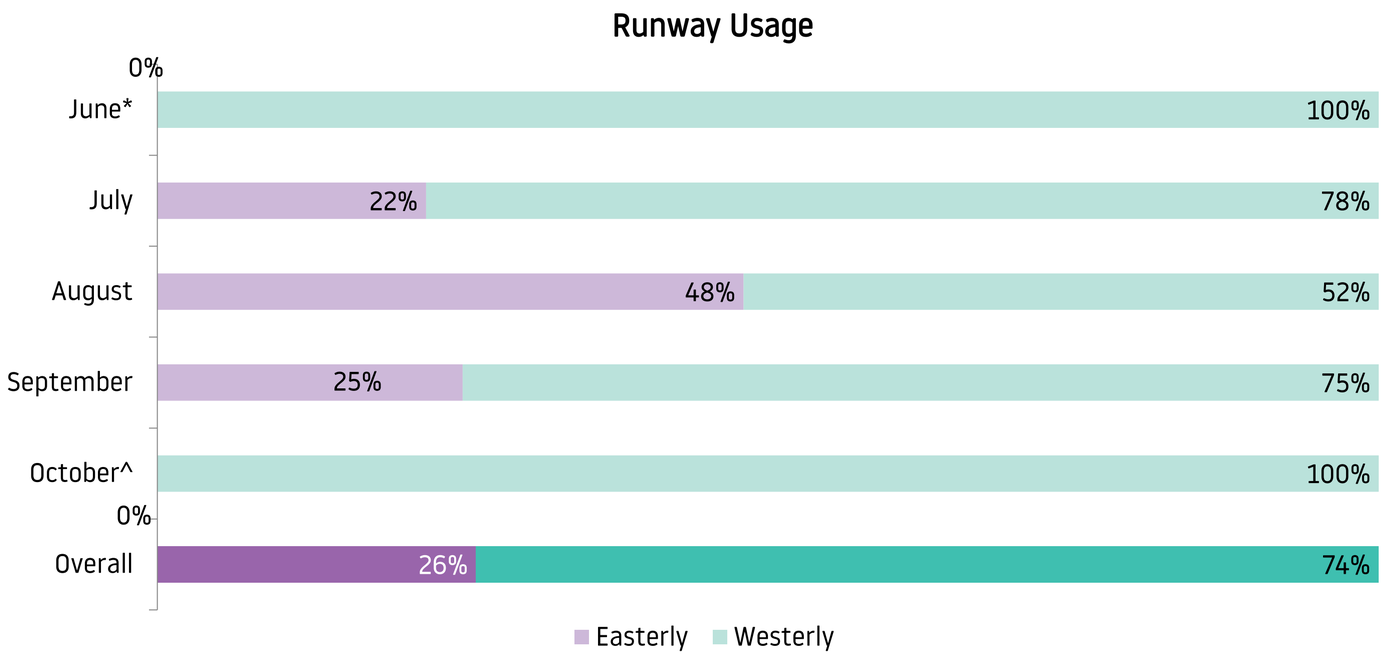
*See glossary

LLA Operations

There are two directions of operation, depending on the wind direction as aircraft are required to take off and land into the wind for safety reasons. These are known as easterly operations and westerly operations and can change the aircraft tracks nearby specific areas. The split in operating direction varies from year to year and month to month. The amount of time that the runway operates in one direction depends on the weather.

During the period of monitoring, the direction of operation was 26% Easterly and 74% Westerly. The five-year average for this time of year is 27% Easterly vs 73% Westerly.

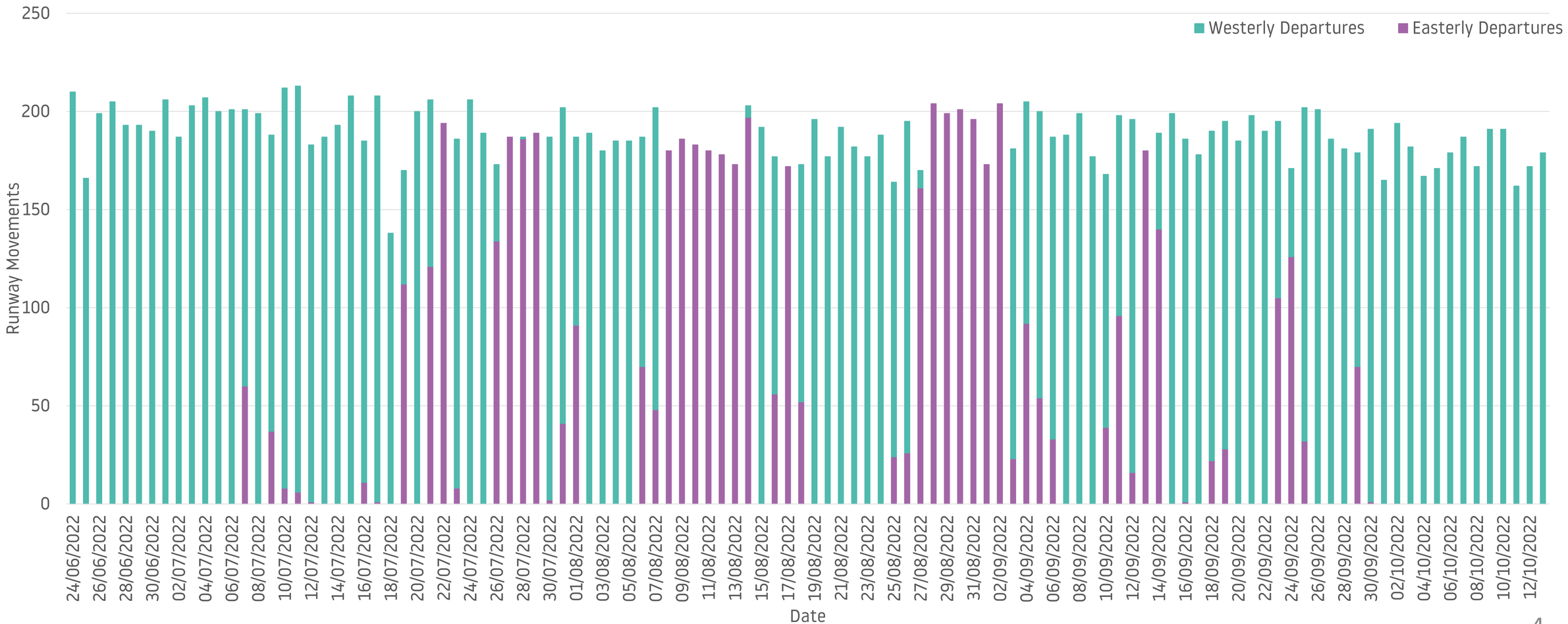
15,578 aircraft departed on westerly SIDs operated from the airport whilst the monitors were located in Flamstead and Cheverell's Green.



*24th – 30th June 2022
^1st – 13th October 2022

Daily Movements

The chart below shows the number of daily departures that passed the noise monitor. Due to the location of Flamstead and Cheverell's Green, all flights that departed on our Standard Instrument Departure (SID) routes during westerly operations would have flown passed the monitors. During the monitoring period there were 17 full days of easterly operations and therefore no flight passed near the monitor on those days.



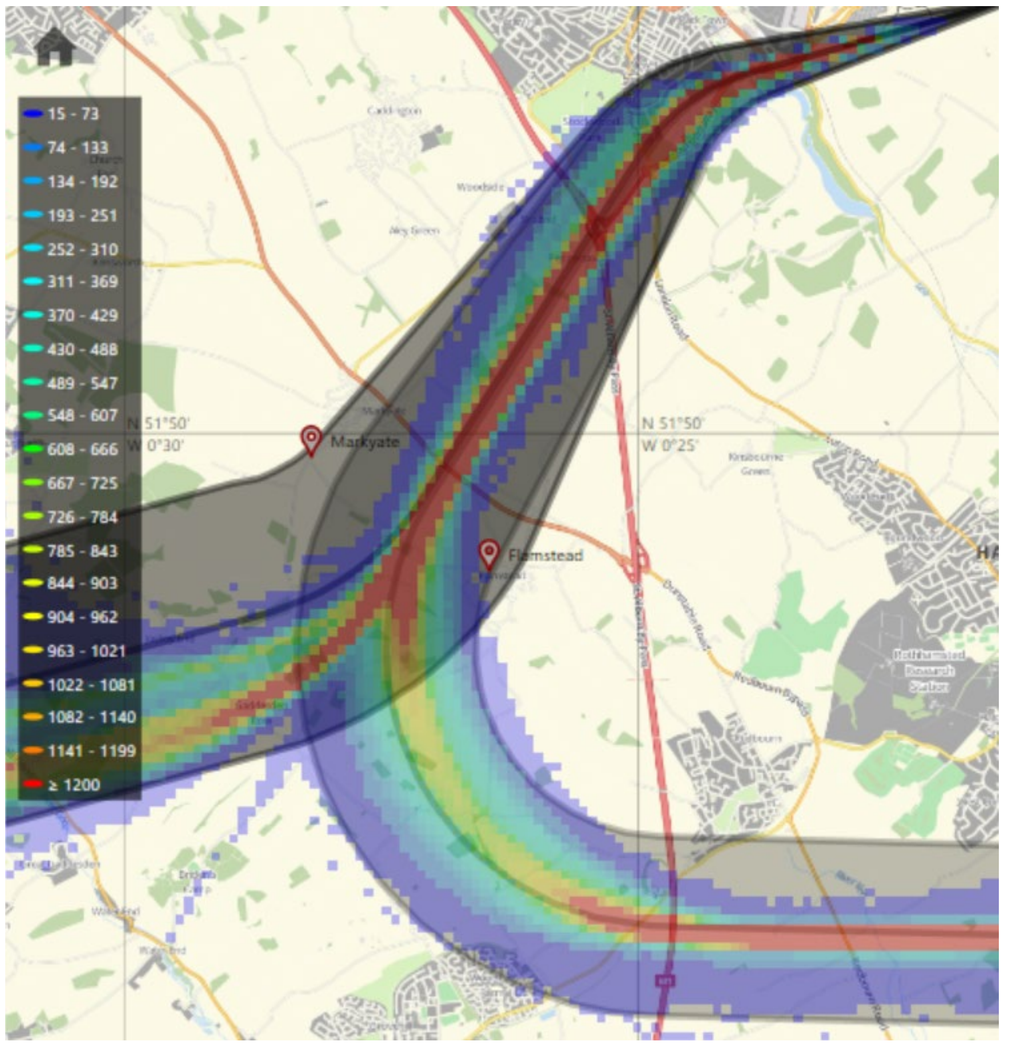
Hours of Operations

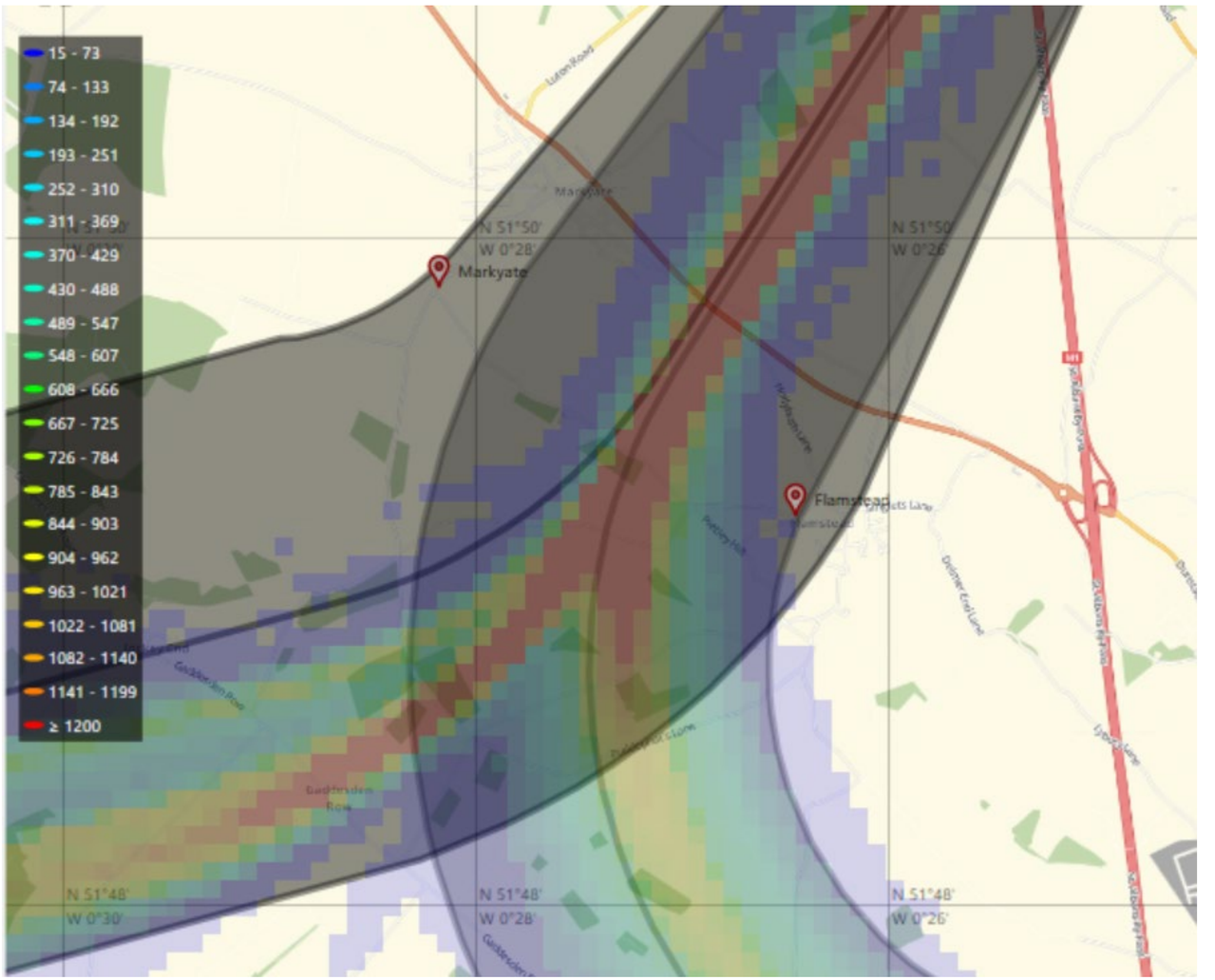
The graph below represents the average number of departures during the monitoring period. During the peak period, generally in the morning, local residents of Flamstead and Cheverell's Green may notice more aircraft flying near or above the towns. These are the early morning departures, up to 15 departures per hour during the monitoring period.

During the night period of 23:00 – 06:00, there were average of 10 departures compared to 9 departures in 2019. This shows an increase in night time operations during the monitoring period.

Aircraft Tracks

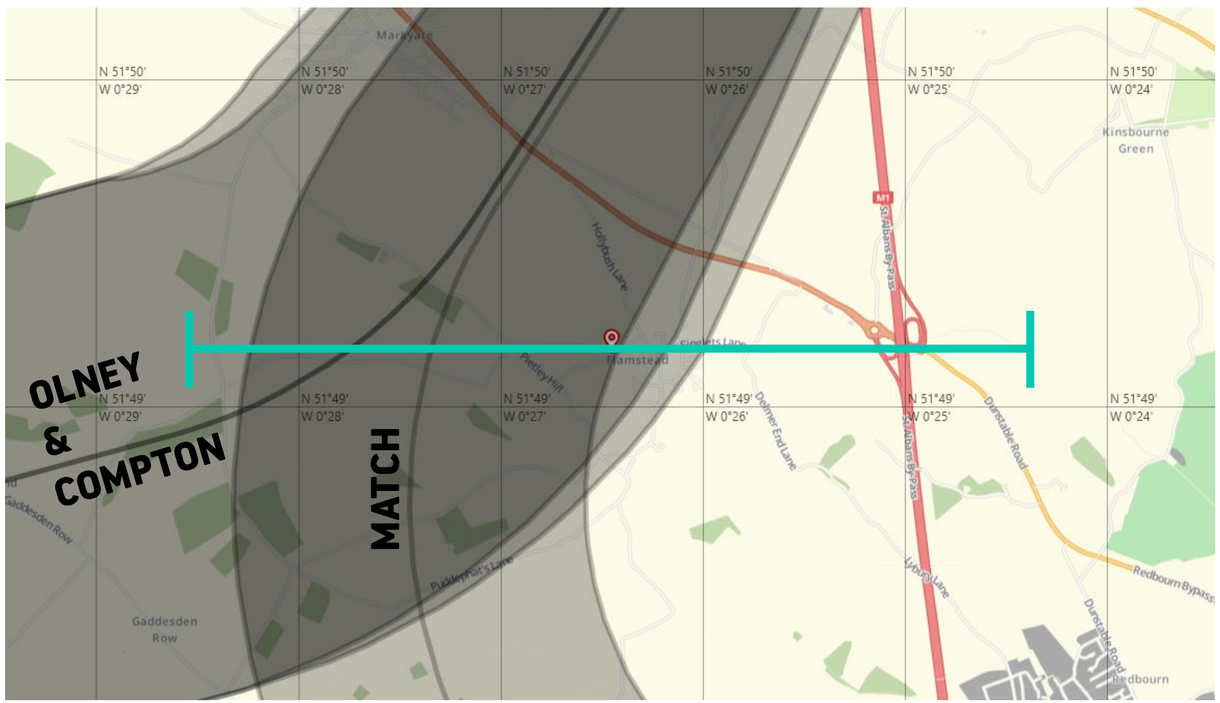
The heat maps below show the representative flight tracks that passed near the noise monitor terminals during the monitoring period. The red pinpoints indicate the locations of the noise monitors in Flamstead and Cheverell's Green.

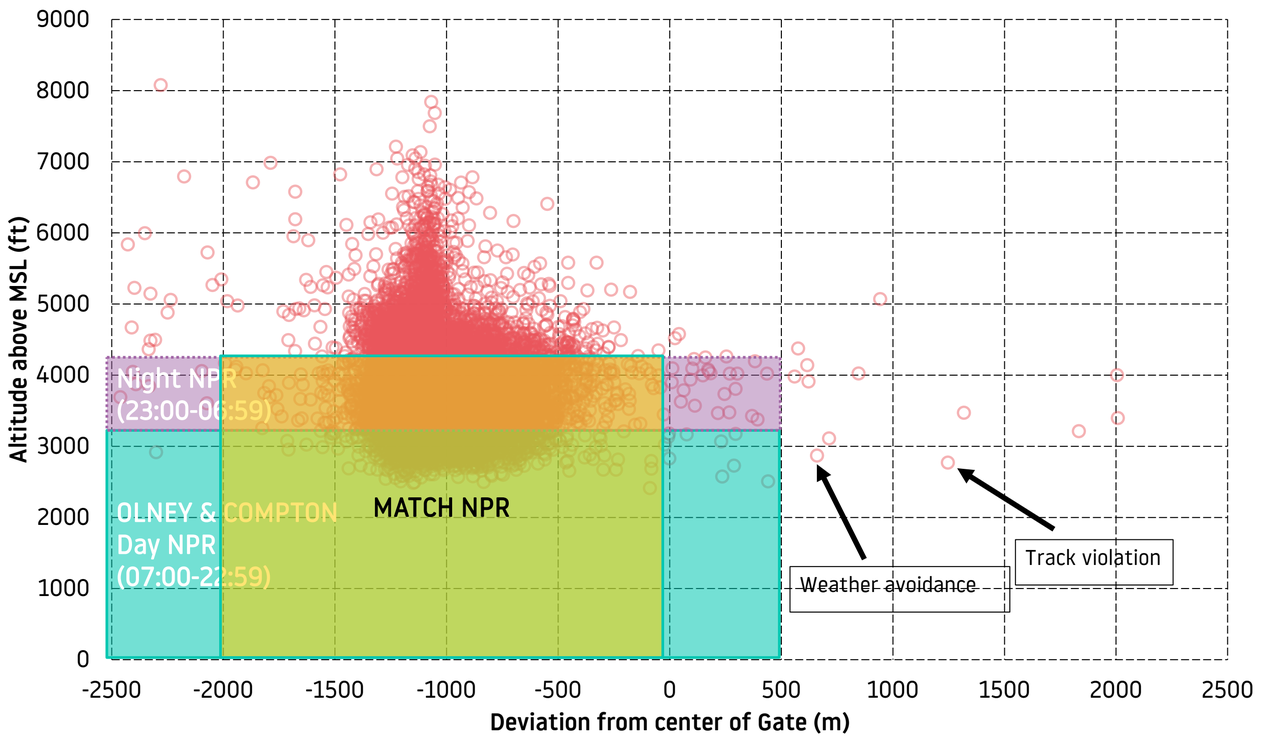




Altitude Gate Analysis - Flamstead

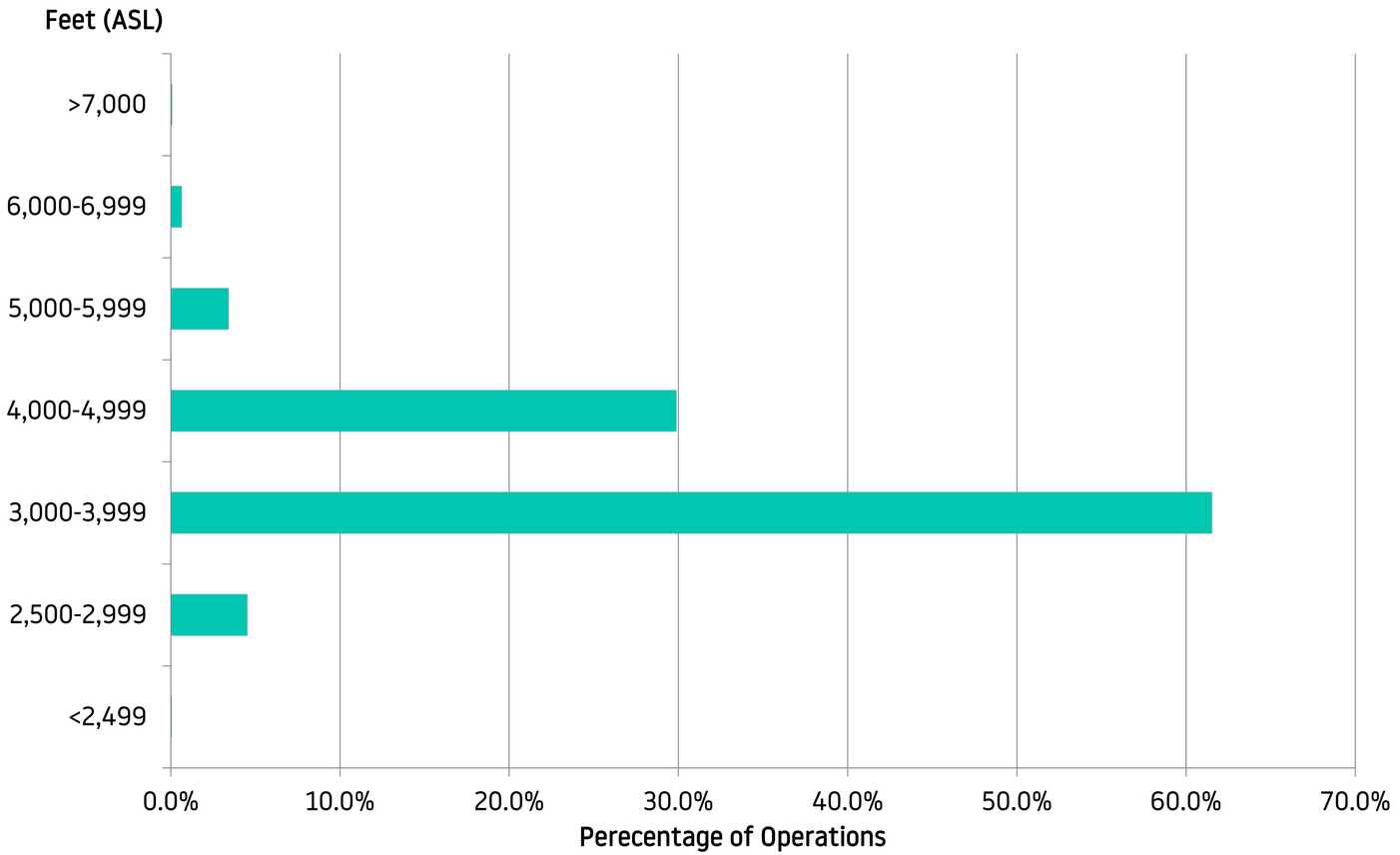
The altitude analysis for Flamstead shows the vertical and lateral dispersion of aircraft 2.5km either side of the noise monitor. The map below shows the 5km gate which is drawn across from west to east and will gather information about every aircraft passing through the gate area. The scatter graph below shows the distance and altitude of aircraft from the noise monitor during the monitoring period. The noise preferential routes (NPRs) are displayed by the shaded area. Departing aircraft must remain within the NPR until reaching release altitude of 3,000ft during the day or 4,000ft at night (4,000ft at all times for Match route). Most aircraft were within or above the NPR corridor when they reached near Flamstead. Therefore, local residents may see aircraft directly overflying or near Flamstead. On the scatter chart below, there were two flights which flew approx. 650m and 1,250m to the east of Flamstead at low altitude below 3,000ft, outside the NPR corridor. These were investigated and found that one flight was vectored by air traffic controller to avoid bad weather and the other was a track violation. This flight was fined as per the track violation scheme.





Altitude Gate Analysis - Flamstead

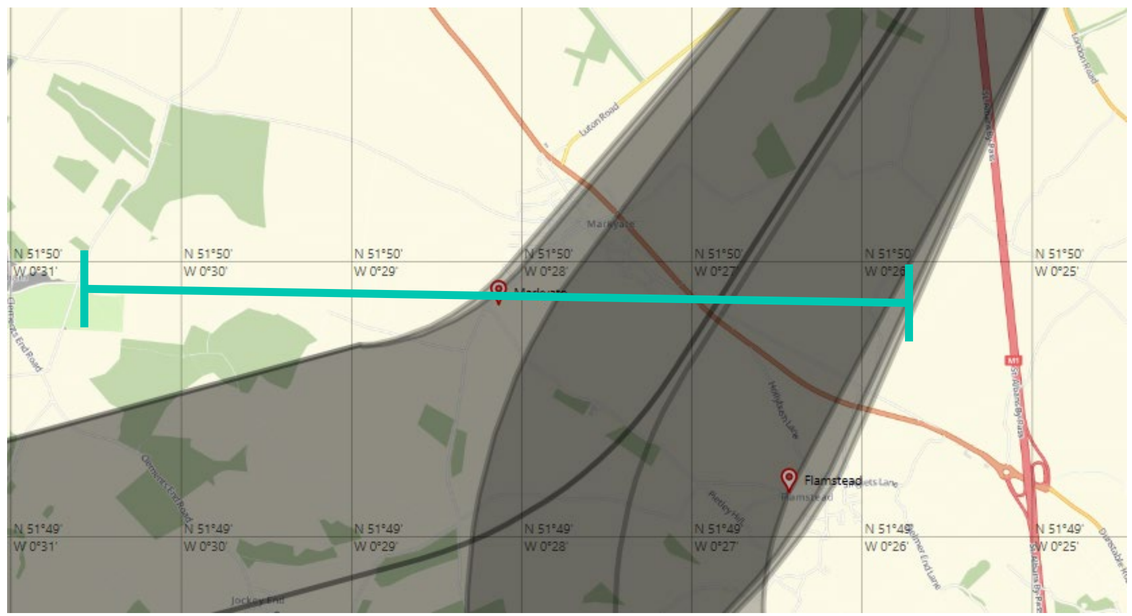
The average altitude of aircraft in Flamstead was 3,842 feet ASL (3,356 feet above ground level). Although the altitude of the standard departure routes are set at 3,000ft and 4,000ft due to the London airspace structure and conflicting routes with other London airports but air traffic control give clearance to aircraft to climb higher when the airspace is quiet or no conflicting traffic in the airspace. The bar chart shows that 30% of flights were between 4,000-4,999 feet above sea level (ASL) and 96% and 34% of the flights were above 3,000 and 4,000 feet ASL respectively. Aircraft were flying lower than the traffic at COVID pandemic period as we monitored at the same location in 2020 (see previous Community Noise Report). This is because aircraft were given clearance to climb higher sooner when traffic volume was low during the pandemic. Nevertheless, the climb profile was slightly higher than traffic we monitored at the same location in 2019.

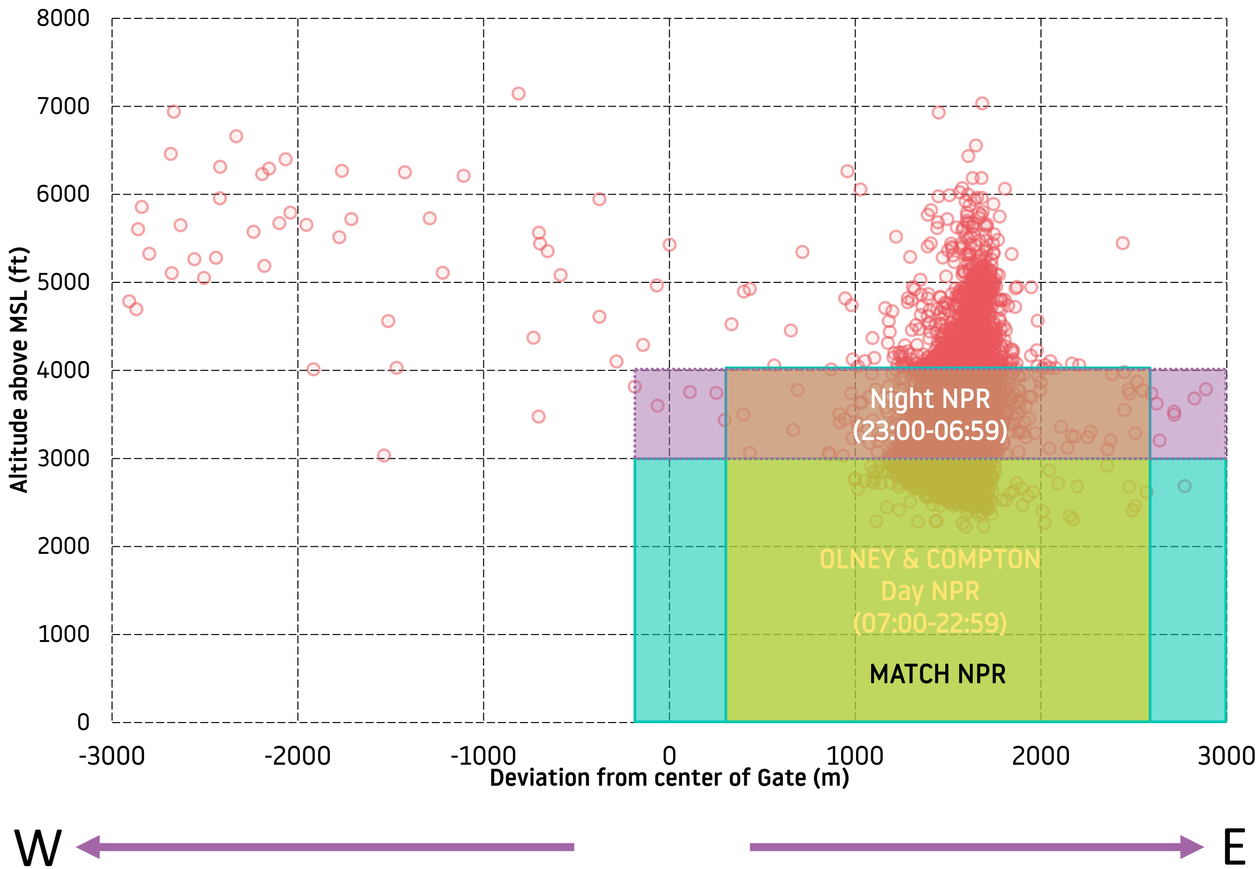


Aircraft Type	Number of movements	Average Altitude (AMSL in ft)
A306	123	3,974
A319	2,013	3,742
A320 CEO	3,179	3,460
A320 NEO (A20N)	1,343	3,913
A321 CEO	1,694	3,607
A321 NEO (A21N)	1,148	3,619
B737-800 NG (B738)	1,908	3,890
B737 Max 8 (B38M)	137	3,647
Global Express (GLEX)	507	4,225
Cessna 560X (C56X)	308	4,448
Gulfstream G560 (GLF6)	203	4,303
All	15,371	3,842

Altitude Gate Analysis - Cheverell's Green

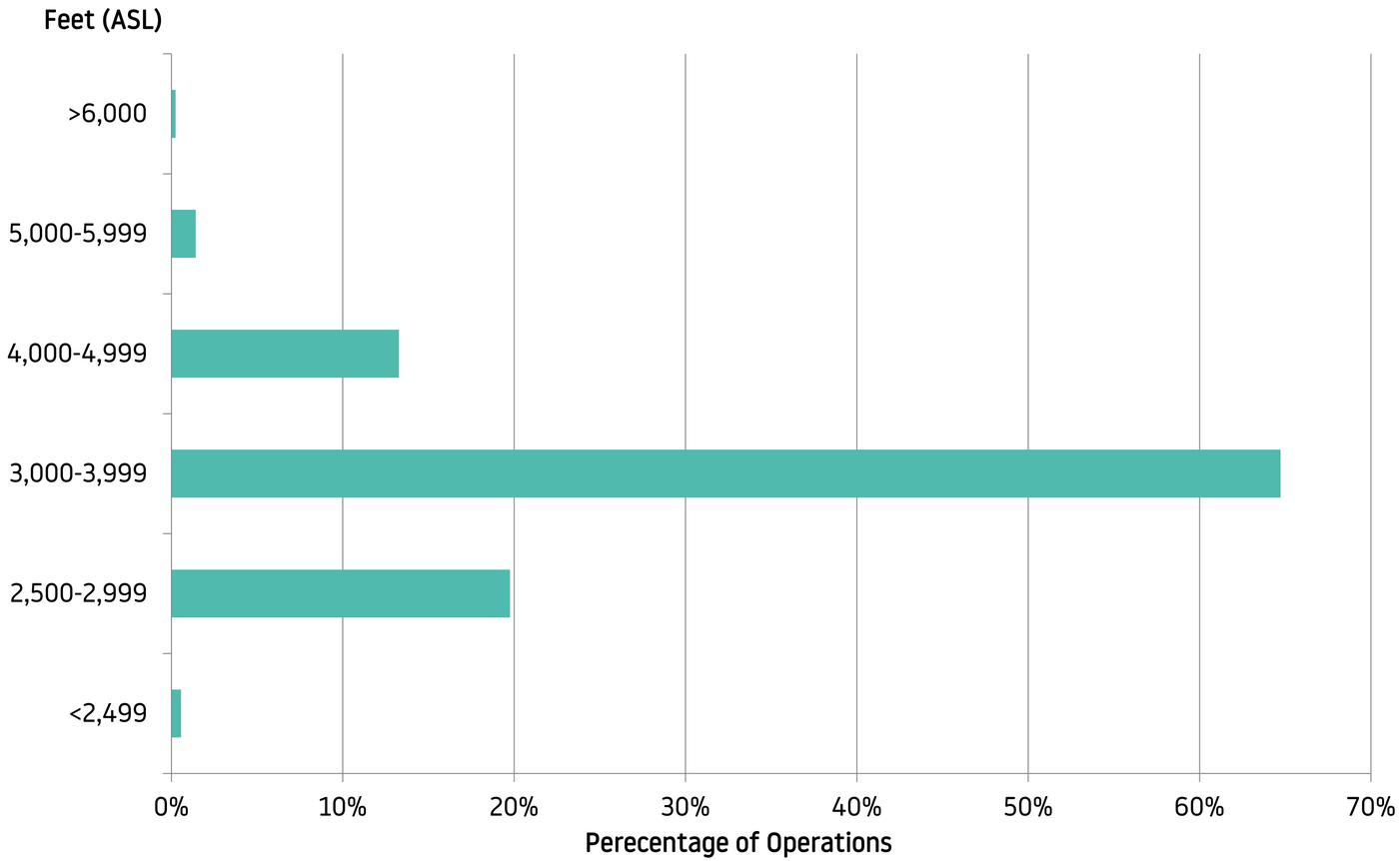
The altitude analysis for Cheverell's Green shows the vertical and lateral dispersion of aircraft 3km either side of the noise monitor. The map below shows the 6km gate which is drawn across from west to east and will gather information about every aircraft passing through the gate area. The scatter graph below shows the distance and altitude of aircraft from the noise monitor during the monitoring period. The noise preferential routes (NPRs) are displayed by the shaded area. Departing aircraft must remain within the NPR until reaching release altitude of 3,000ft during the day or 4,000ft at night (4,000ft at all times for Match route). Most aircraft were within or above the NPR corridor when they reached near Cheverell's Green. At this noise monitor location, the majority of aircraft are within 1 km to 2km to the east, where the NPR centrelines are aligned. This can be seen by the concentration of red dots on the scatter chart below. Almost all westerly departure fly near Cheverell's Green. There was no aircraft which flew outside the NPR corridor below the required altitude.





Altitude Gate Analysis - Cheverell's Green

The average altitude of aircraft in this area was 3,456 feet ASL (2,911 feet above ground level). The bar chart shows that over half of the flights were between 3,000-3,999 feet above sea level (ASL) and 80% of flights were above 3,000 feet ASL.



Aircraft Type	Number of movements	Average Altitude (AMSL in ft)
A306	122	3,654
A319	2,016	3,313
A320 CEO	3,182	3,122
A320 NEO (A20N)	1,346	3,525
A321 CEO	1,695	3,254
A321 NEO (A21N)	1,147	3,252
B737-800 NG (B738)	1,908	3,383
B737 Max 8 (B38M)	138	3,269
Global Express (GLEX)	526	3,866
Cessna 560X (C56X)	328	4,130
Gulfstream G560 (GLF6)	208	3,945
All	15,503	3,456

How Do We Analyse the Noise Data

Following the noise monitoring period, we collate the data taken from our Noise and Track Keeping system and analyse the noise reading samples. When analysing the samples, the first thing we do is to ensure that there is no unusual noise event present which might not be caused by aircraft (i.e. vehicles or wildlife).

The weather also plays a big part in the data recorded and in periods of extreme weather i.e (very strong winds) the equipment can record noise incorrectly so we exclude samples from the analysis during these weather conditions.

During the monitoring period in Flamstead, the noise monitoring terminal collected readings from 10,727 aircraft. During the period, there were total of 15,578 westerly departures. Of those departures, 15,371 flights flew within 2.5km of Flamstead as shown on the previous page (15,281 within 1.5km; 5,414 within 1km).

For Cheverell's Green, the noise monitoring terminal collected readings from 9,974 aircraft. During the period, 15,503 flights flew within 3km of Cheverell's Green as shown on the previous page (15,387 within 2km; 63 within 1km).

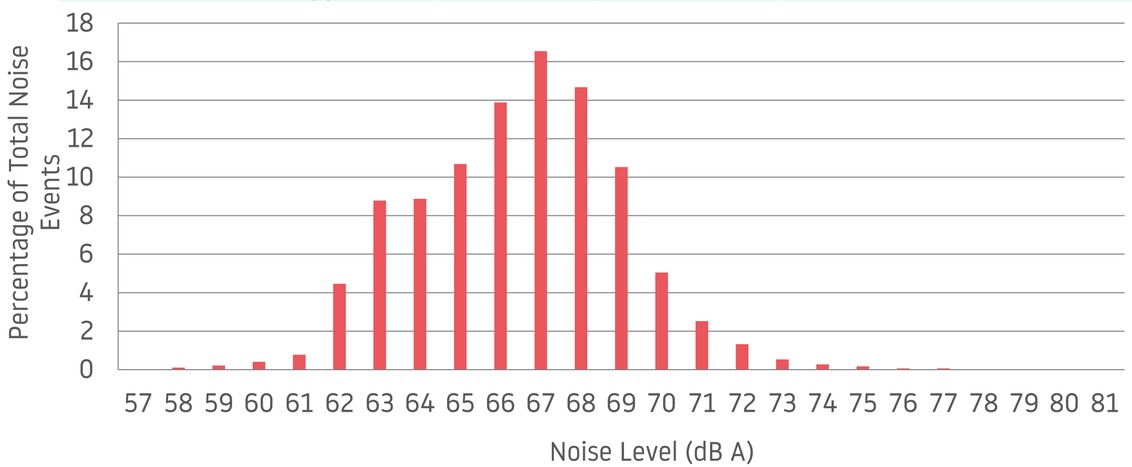
It is noteworthy that the noise monitor may not be able to record every aircraft noise event if the aircraft noise level is below ambient background noise. Therefore, there may be a difference between the number of actual air transport movements and number of aircraft noise events collected during the monitoring period.

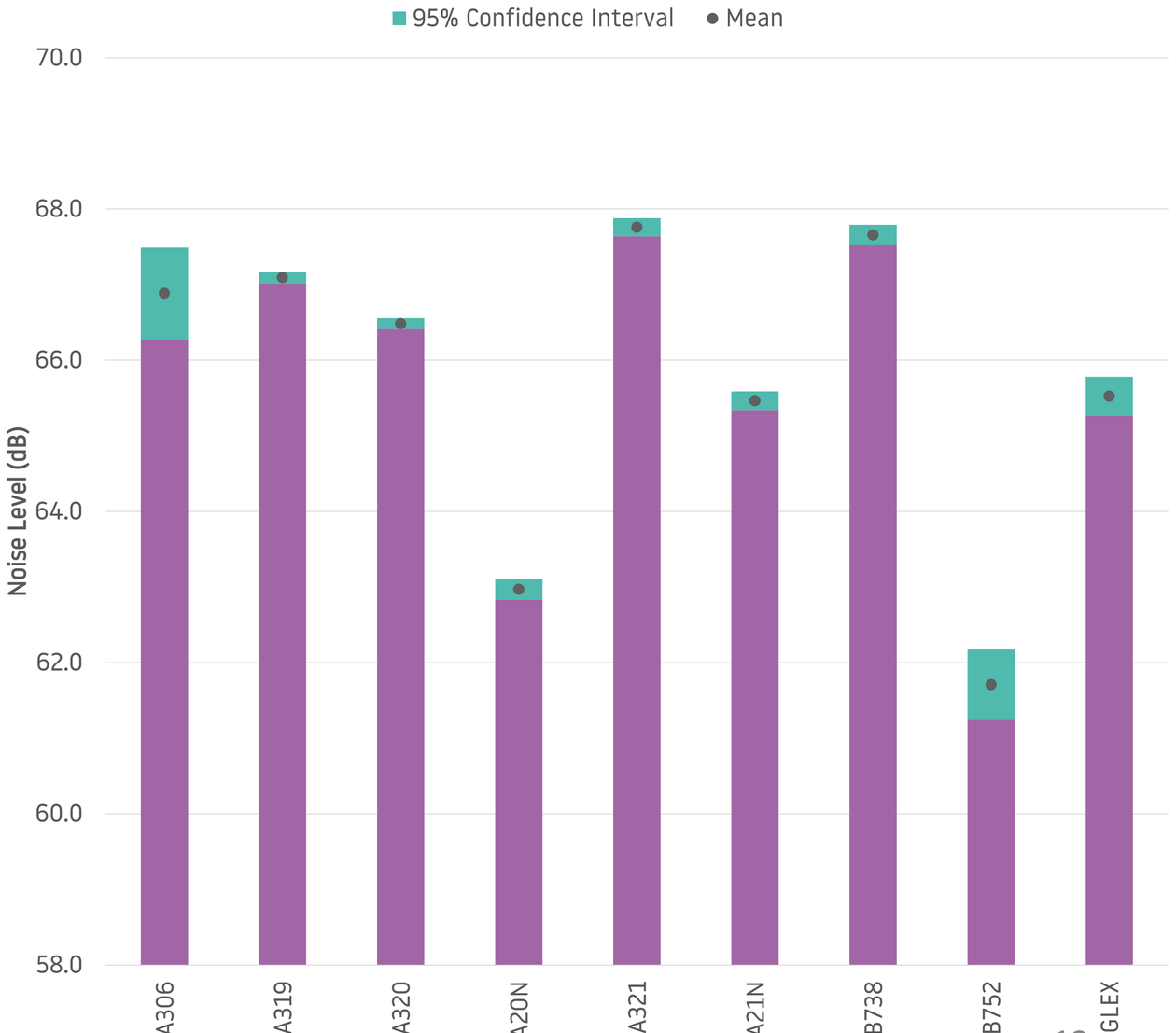
During the monitoring period, LLA conducted a NADP trial on the westerly Match departure route. This may change the noise effect on the ground at Flamstead and Cheverell's Green, and other areas along the departure route. A more in-depth analysis and results will be published in the NADP report which can be found on the LLA Noise webpage once published.

Noise Results - Flamstead

During the monitoring period, noise recording samples were gathered from the most popular aircraft types at London Luton Airport*. The summary of the results are shown on this page and next page.

Aircraft Type	Number of movements	Average Noise (dB)
A306	100	66.9
A319	1,794	67.1
A320 CEO	2,734	66.5
A20N (A320 NEO)	655	63.0
A321 CEO	1,333	67.8
A21N (A321 NEO)	970	65.5
B738	1,674	67.7
B752	74	61.7
GLEX (Global Express)	310	65.5
All Aircraft Types	10,727	66.4





*The noise results shown in the analysis are only for those aircraft types that recorded more than 100 events per aircraft (B752 included for comparison).

Noise Results - Flamstead

- The average aircraft noise level in Flamstead is 66.4dB, based on a sample size of 10,727.

- The table shows the average noise level for each aircraft type and the green bar on the chart shows the uncertainty caused by the spread in readings and the sample size (95% confidence interval).

- From the results, Luton's most popular aircraft Airbus A320 CEO has an average noise of 66.5dB in Flamstead.

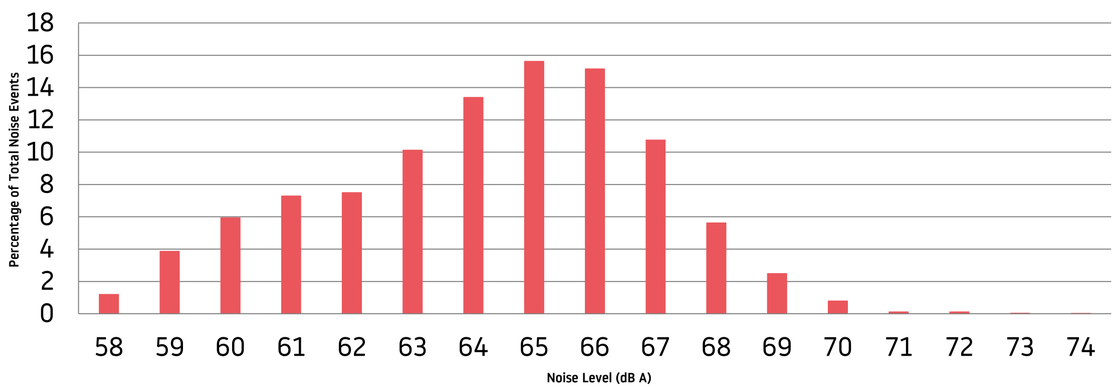
- The newer generation aircraft types, A320 NEO and A321 NEO, produced less noise than A320 and A321 CEOs. 16% of the movements were NEO type aircraft during the monitoring period. Operators are increasing the utilisation of these quieter and more fuel-efficient aircraft. Comparing to previous years, the NEO typed aircraft accounted for 6% and 18% of all air transport movements in 2020 and 2021 respectively.

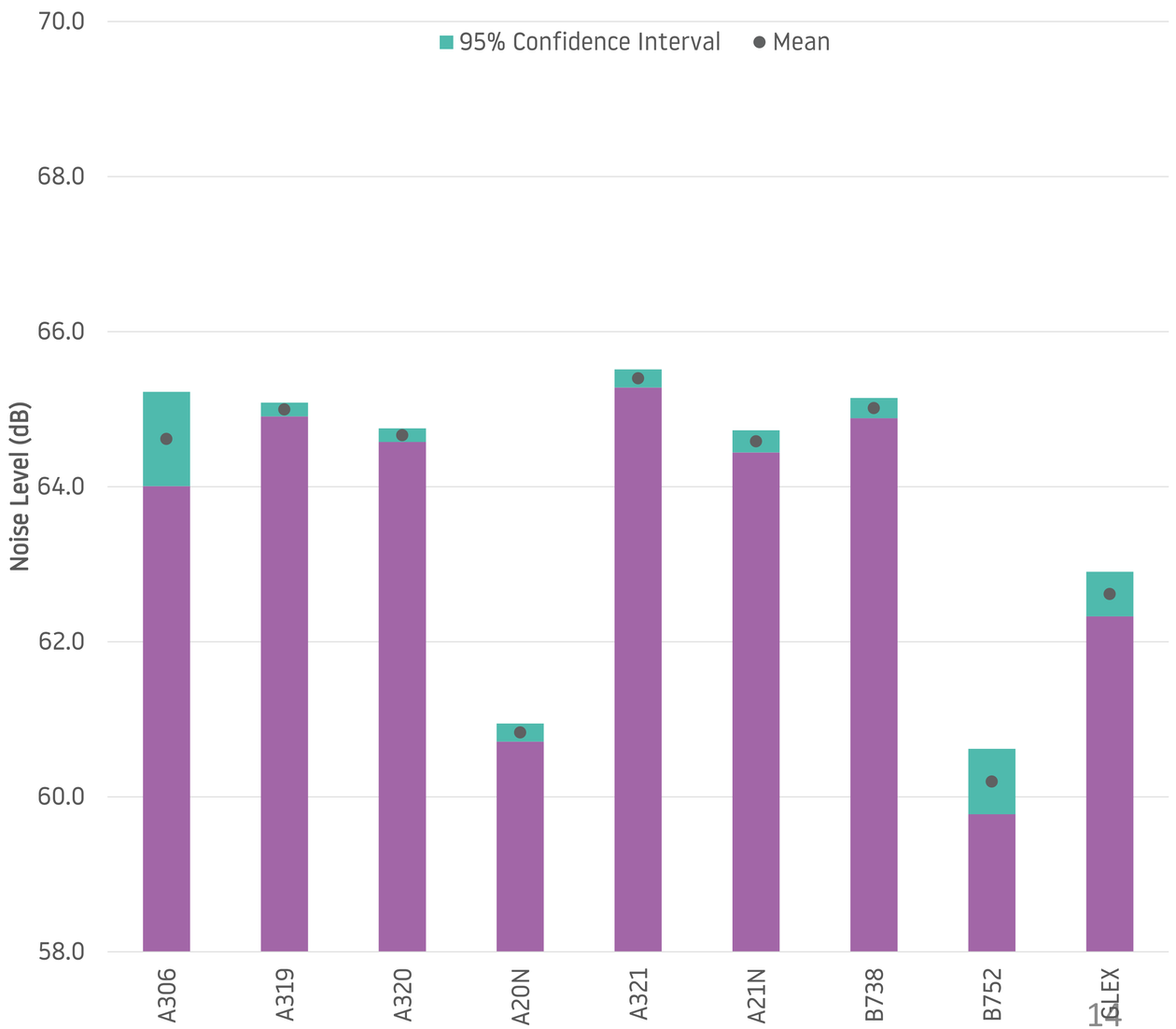
- The Airbus A321 CEO was noisiest aircraft type at Flamstead during the monitoring period. They recorded an average noise of 67.8dB, slightly nosier than the air freight aircraft A306, which had always been the nosiest aircraft type in the past in Luton. From the altitude data, the A306 flew approximately 400ft higher than the A321 CEO when reaching Flamstead whereas the difference in altitude was only 200-300ft in previous year when Flamstead had the noise monitor.

Noise Results - Cheverell's Green

During the monitoring period, noise recording samples were gathered from the most popular aircraft types at London Luton Airport*. The summary of the results are shown on this page and next page.

Aircraft Type	Number of movements	Average Noise (dB)
A306	92	64.6
A319	1,545	65.0
A320 CEO	2,525	64.7
A20N (A320 NEO)	858	60.8
A321 CEO	1,298	65.4
A21N (A321 NEO)	916	64.6
B738	1,435	65.0
B752	61	60.2
GLEX (Global Express)	297	62.6
All Aircraft Types	9,974	64.2





*The noise results shown in the analysis are only for those aircraft types that recorded more than 100 events per aircraft (A306 and B752 included for comparison).

Noise Results - Cheverell's Green

- The average aircraft noise level in Cheverell's Green is 64.2dB, based on a sample size of 9,974.
- The table shows the average noise for each aircraft type and the green bar on the chart shows the uncertainty caused by the spread in readings and the sample size (95% confidence interval).
- From the results, Luton's most popular aircraft Airbus A320 CEO has an average noise of 64.7dB in Cheverell's Green. Similar to Flamstead, the A320 NEO produced less noise than A320 CEO at Cheverell's Green.
- At Cheverell's Green this year, the Airbus A321 CEO aircraft was the noisiest aircraft type during the monitoring period. It recorded an average of 65.4dB. This is also slightly nosier than the air freight aircraft A306, in line with the comparison we conducted at Flamstead.
- It was expected that the average noise level at Cheverell's Green would be slightly higher than Flamstead, due to the track miles from the runway. Aircraft would be at a lower altitude when reaching Cheverell's Green. However, the data shows that the average noise level was lower than Flamstead during the monitoring period.
- It was thought to be the different NADP procedures used in the NADP trial between July and September 2022 that had caused the aircraft noise redistributed to another area, but the data does not support that.*
- The SID usage are similar in 2019 and 2022. When compared with tracks over the ground in 2019, the concentration of the radar tracks on the westerly departures have shifted to the east, further away from Cheverell's Green in 2022. There were less flights vector off the SIDs/NPRs over Cheverell's Green. This explains the differences in noise level at Cheverell's Green over the years and has a lower noise level than Flamstead.

*More in-depth of the NADP analysis will be published in the NADP report and can be found on the LLA Noise webpage once published.

Conclusion

- During the monitoring period, the airport was using westerly operations for 74% of the time.
- The average altitude of aircraft in Flamstead is 3,842 feet above sea level, and as Flamstead is already approximately 486 feet above sea level, aircraft will typically be 3,356 feet above ground level in this area. Aircraft were flying lower than the traffic at COVID pandemic period as we monitored at the same location in 2020 (see previous Community Noise Report). This is because aircraft were given clearance to climb higher sooner when traffic volume was low during the pandemic. Nevertheless, the climb profile was slightly higher than traffic we monitored at the same location in 2019.
- For Cheverell's Green, the average altitude of aircraft is 3,456 feet above sea level, and as Cheverell's Green is already approximately 545 feet above sea level, aircraft will typically be 2,911 feet above ground level in this area.
- Most aircraft flew above 2,500ft when the aircraft has reached Flamstead and Cheverell's Green. Aircraft are typically between 3,000-3,999 feet. This accounted for approximately 60% of all aircraft in Flamstead and Cheverell's Green. We also saw 96% and 80% of aircraft achieve altitudes above 3,000 feet in Flamstead and Cheverell's Green respectively. Flights are capped at 4,000ft on the MATCH SID due to the proximity to other London airports' routes above Luton.
- Most westerly departure aircraft shown in the altitude analysis flew within or above the NPR corridor.
- During the monitoring period, 94 departures (both westerly and easterly) were investigated as part of the Noise and Track violation scheme. 21 flights were fined, all fines generated by this scheme go directly into the community trust fund, more information on the community trust fund can be found on https://www.london-luton.co.uk/corporate/community/community-trust-fund
- The main aircraft type operating at London Luton Airport are the A320 CEO, which produced an average noise of 66.5dB and 64.7dB in Flamstead and Cheverell's Green respectively. Approximately 16%-18% of the noise events recorded in Flamstead and Cheverell's Green were created by the newer generation aircraft, A320 NEO and A321 NEO, registering difference in average noise level of between 0.8dB and 3.9dB, quieter than the CEO fleet.
- Comparing to previous years, the NEO typed aircraft accounted for 6% and 18% of all air transport movements in 2020 and 2021 respectively. In future years, operators are increasing the utilisation of these quieter and more fuel-efficient aircraft in Luton.
- The average noise level at Cheverell's Green was slightly lower than Flamstead even though Cheverell's Green is closer to the airport in terms of track miles. They both registered average noise level of 64.2 dB and 66.4 dB respectively. This is due to less flights being vectored off the SID above the NPR altitude which fly over Cheverell's Green and the concentration of the radar tracks have slightly shifted. The noise had been redistributed elsewhere.
- LLA publish other monitoring reports on a regular basis. These reports can be viewed and downloaded from the Noise webpage on the LLA website – https://www.London-luton.co.uk/corporate/community/noise.

Glossary of Terms

NADP Trial: At London Luton Airport, operators use a mix of Noise Abatement Departure Procedures. These are known as Noise Abatement Departure Procedure 1 (NADP1) and Noise Abatement Departure Procedure 2 (NADP2). These procedures are designed to distribute the noise from an aircraft in different ways. LLA conducted a NADP Trial in 2022 to understand how each NADP affect aircraft noise on the ground. For more details, please read the NADP Project Plan which is available on the LLA Noise webage.

Westerly Operations: As aircraft take off and land into the wind, westerly operations refers to the time when the wind is blowing from the west and aircraft follow the departure route in the direction of Flamstead and Cheverell's Green.

Standard Instrument Departure (SID): Published route that an aircraft must follow on departure.

Noise Preferential Route: All aircraft except propeller aircraft leaving London Luton Airport should follow flight paths known as Noise Preferential Routes (NPRs) up to an altitude of 3,000 feet or 4,000 feet depending on the route. They lead from the runway to the main UK air traffic routes, and form the first part of the Standard Instrument Departure routes (SIDs).

Aircraft Movement: A single aircraft departing or arriving at the airport.

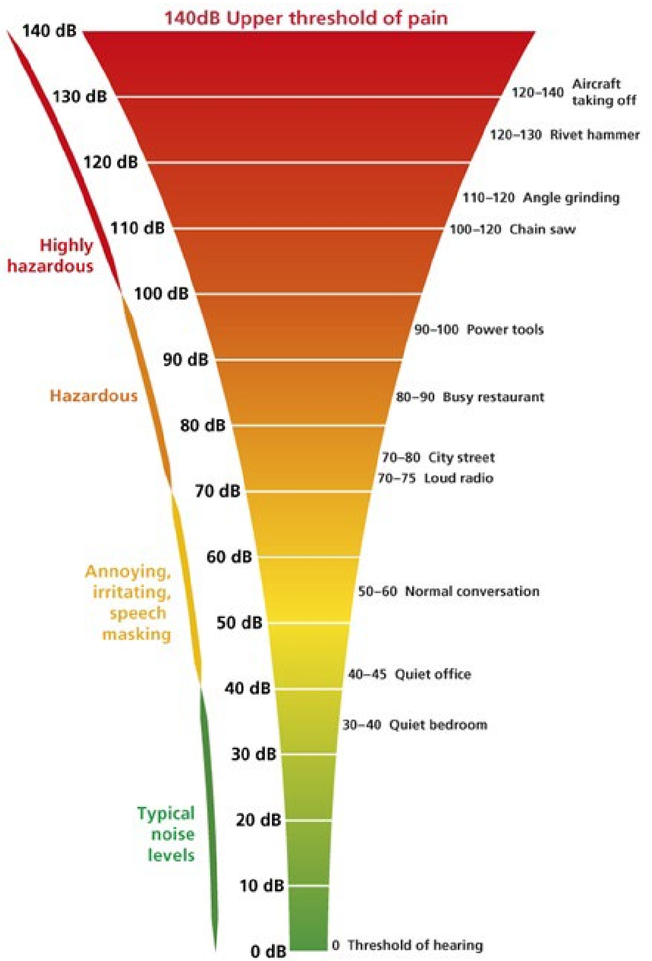
Gate Analysis: A gate which is drawn across an area and will gather information about every aircraft passing through the gate area.

Noise Event: A single event is the period from when an aircraft approaches the monitor until when the aircraft is leaving the area.

Decibel (dB): The unit used to measure noise (typically 50-60dB is equivalent to a normal conversation level).

LasMax: A unit of measure and is the maximum noise level from a single aircraft passing over the noise monitor.

95% Confidence Interval: A range of values that you can be 95% certain contains the population mean.



Source: iosh.co.uk