

Community Noise Report

Leighton Buzzard (Eggington)

October – December 2019



Version 1.0

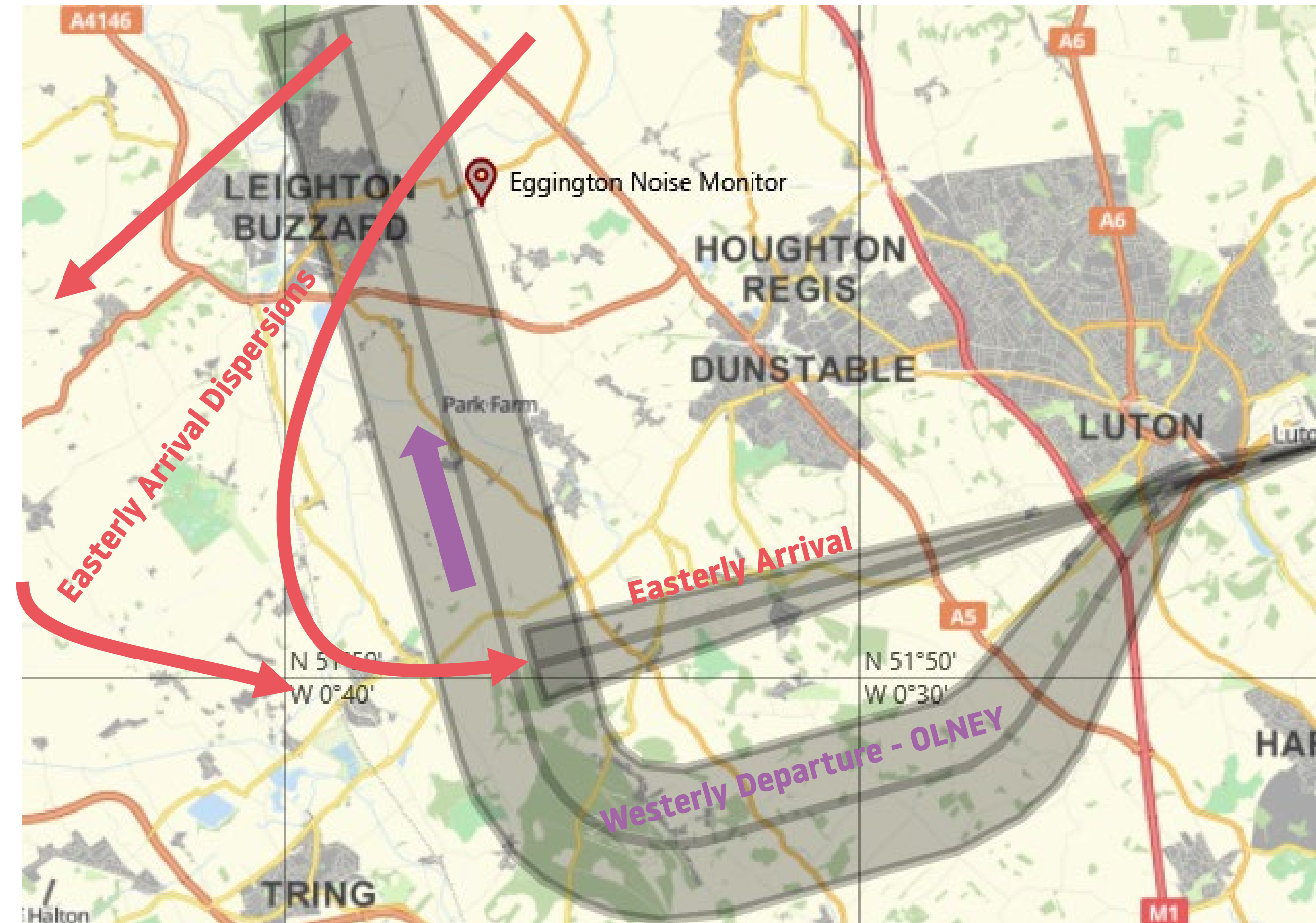
Introduction

As part of the ongoing noise monitoring programme, London Luton Airport deployed a portable noise monitoring terminal in Leighton Buzzard (Eggington).

The purpose of the monitoring programme is to understand the typical noise levels created in the local community. For Leighton Buzzard, it specifically related to the easterly arrivals. The westerly OLNEY is also being looked at for comparison in this report. The Noise Preferential Routes (NPRs) and typical arrival route are both shown on the map. The red arrows show the majority of aircraft are being vectored by air traffic controllers to avoid the populated area of Leighton Buzzard.

The noise monitor was located at a property at Eggington in Leighton Buzzard, underneath the easterly arrival route and close to the edge of the westerly Olney departure route, at an altitude of approximately 112 feet above sea level. The red pinpoint on the map shows the location of the noise monitor.

The noise monitor in Leighton Buzzard was in place between 31st October and 17th December 2019. 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.

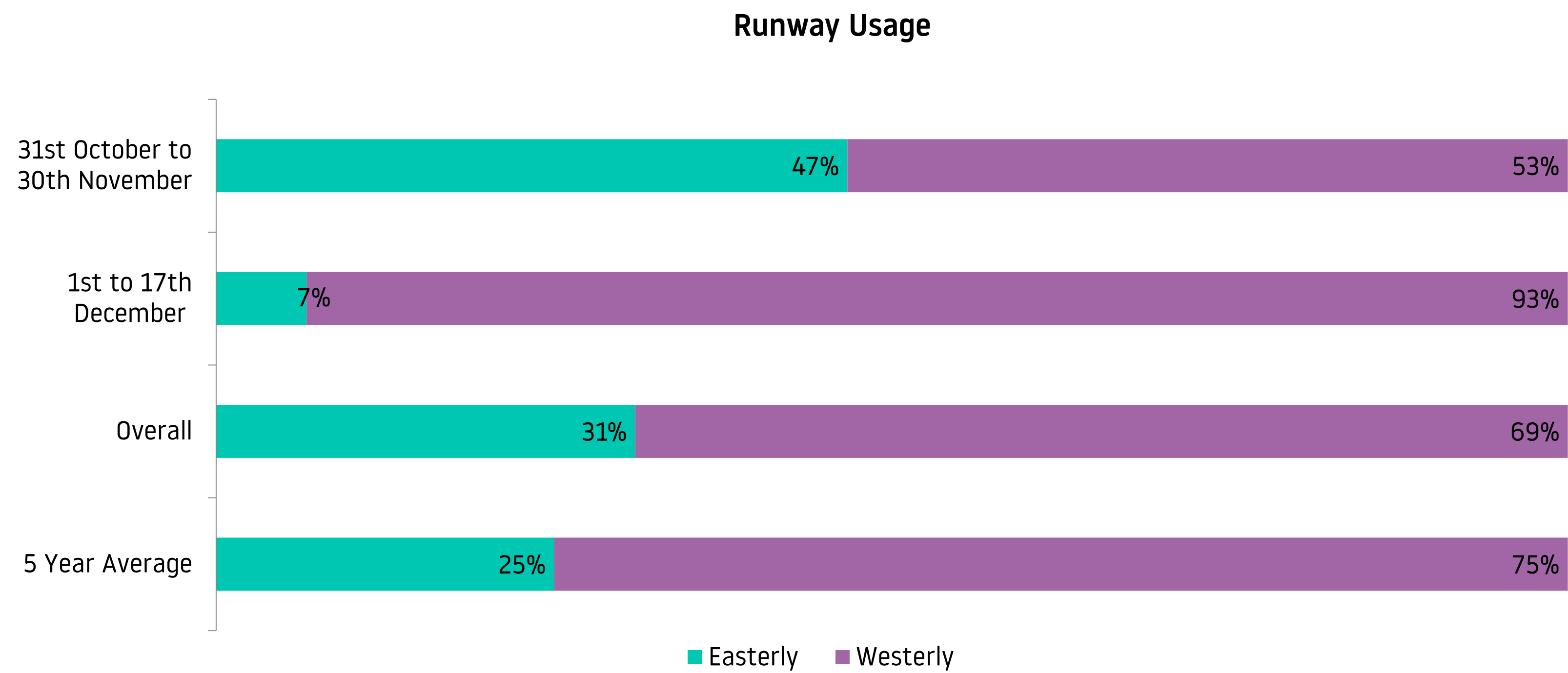


LLA Operations During the Monitoring

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 monitoring period, the direction of operation was 31% easterly and 69% westerly. The 5 year average for this time of year is 25% easterly vs 75% westerly.

There were 2,479 aircraft landed on Runway 08 (easterly operation) and 788 aircraft departed on westerly Olney route whilst the noise monitor was located in Leighton Buzzard.



Daily Movements During Monitoring Period

The chart below shows the number of daily easterly arrivals and westerly departures at LLA. Due to the location of Leighton Buzzard, some flights that landed on Runway 08 (easterly operation) or departed on westerly Olney routes would have flown near the monitor. As explained in the last section, LLA operated in easterly operation for 31% of the monitoring period. The green and purple bars show the easterly and westerly movements respectively. Although LLA operated in westerly for 69% of the time, only 14% of westerly departures flew the Olney route (destination for Scotland, Ireland, Iceland etc). Residents in Leighton Buzzard may not have seen as many Olney departures compared to the arrivals.



Operations During the Monitoring Period

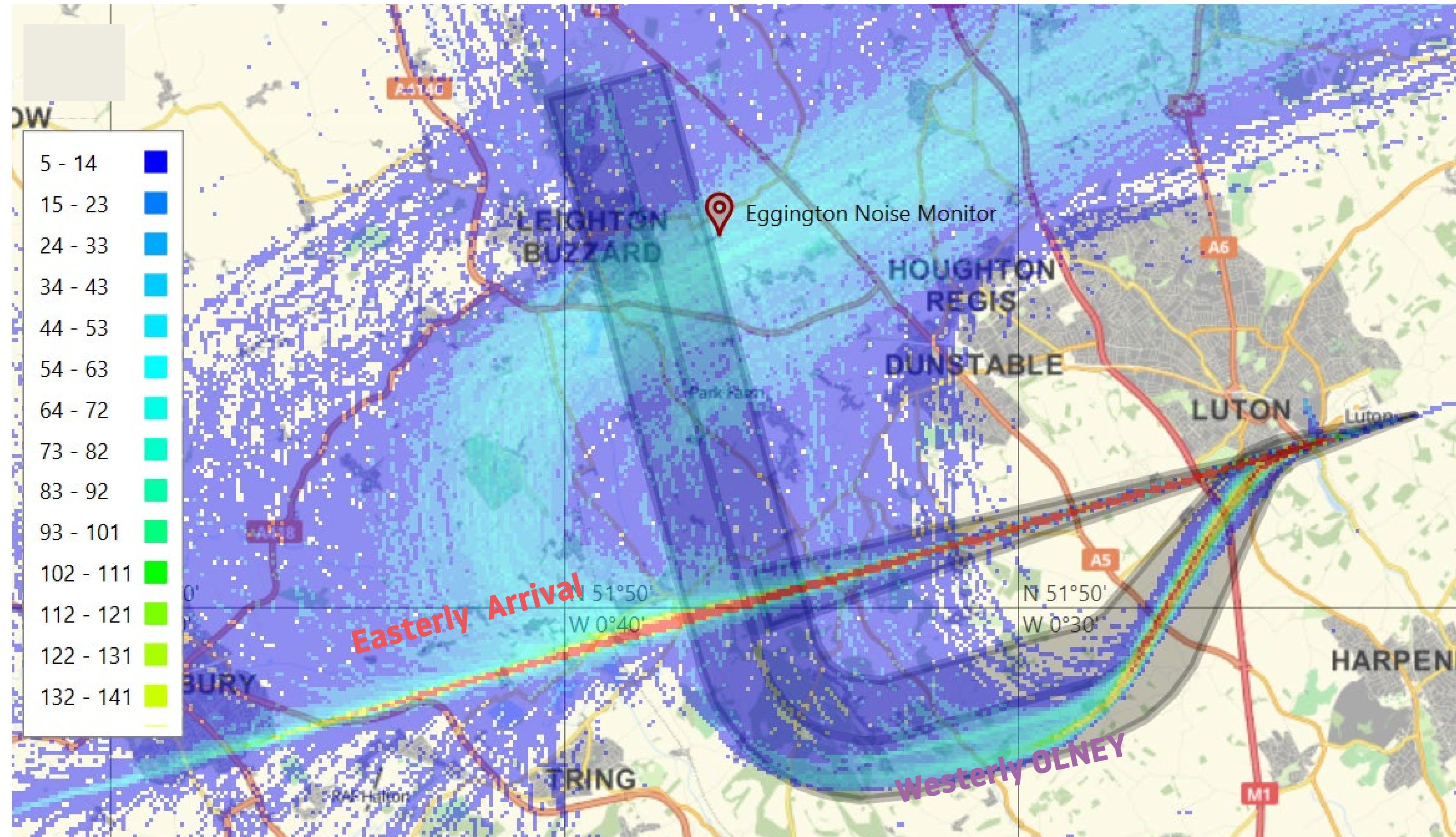
The graph below represents the average number of air transport movements during the monitoring period. Depending the operating direction on the day, residents in Leighton Buzzard may experience different flight patterns. During the peak periods on a day of easterly operations, local residents of Leighton Buzzard may notice more frequent aircraft movements. In general, the morning arrival peak is between 0700-0800. The afternoon peak is generally between 1400-1500, 1700-1800 and 2000-2200. Residents may notice more aircraft flying around south or north of Leighton Buzzard. On a day of westerly operation, resident may notice less aircraft as only 14% of departing aircraft fly the Olney route. The purple line shows all LLA’s departures movements. Residents experience less movements than the number on the graph.

During the night period of 23:00 – 06:00 in the monitoring period, there was an average of 23 total air transport movements, same as the previous year. For arrivals, it has increased from 16 to 17 movements.



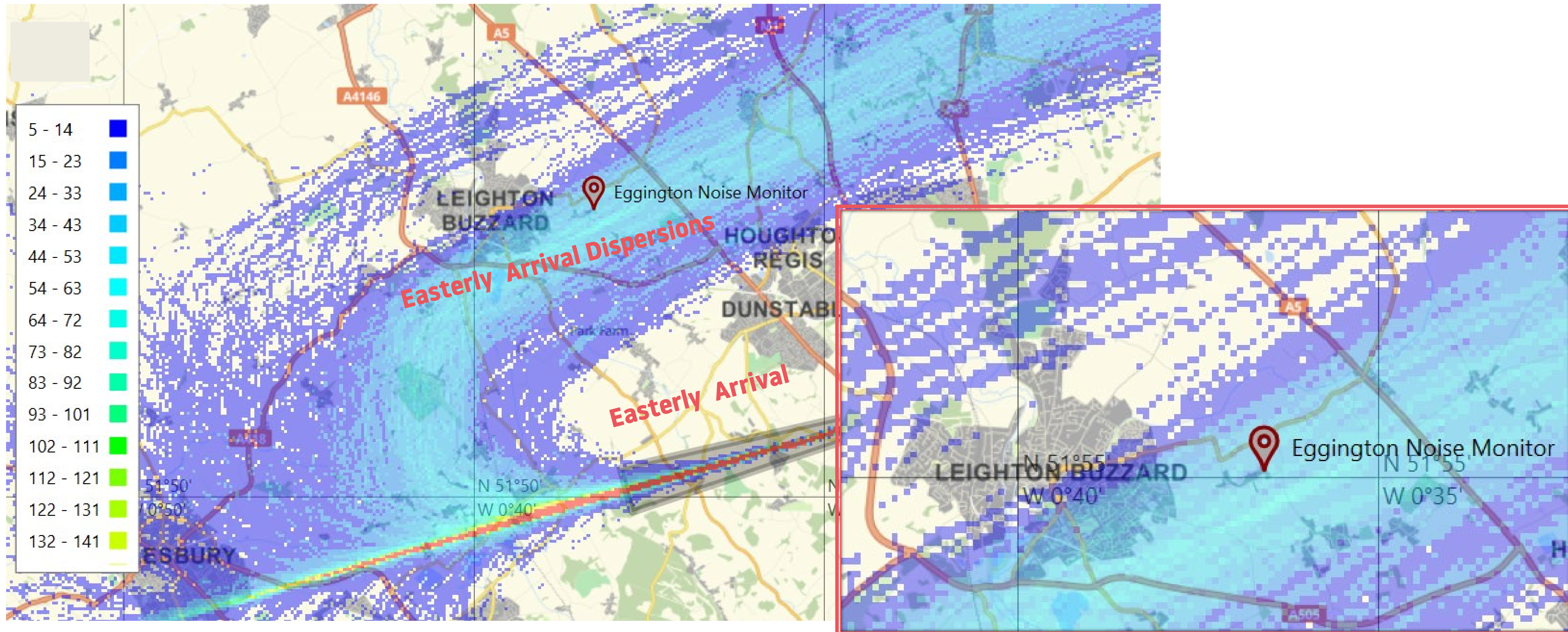
Aircraft Tracks During the Monitoring Period

The heat map below shows the representative flight tracks (both easterly arrival and westerly Olney departure) that passed near Leighton Buzzard and the noise monitor terminal during the monitoring period. The red pinpoint indicates the location of the noise monitor in Leighton Buzzard. The legend shows the density of air transport movements by colours.



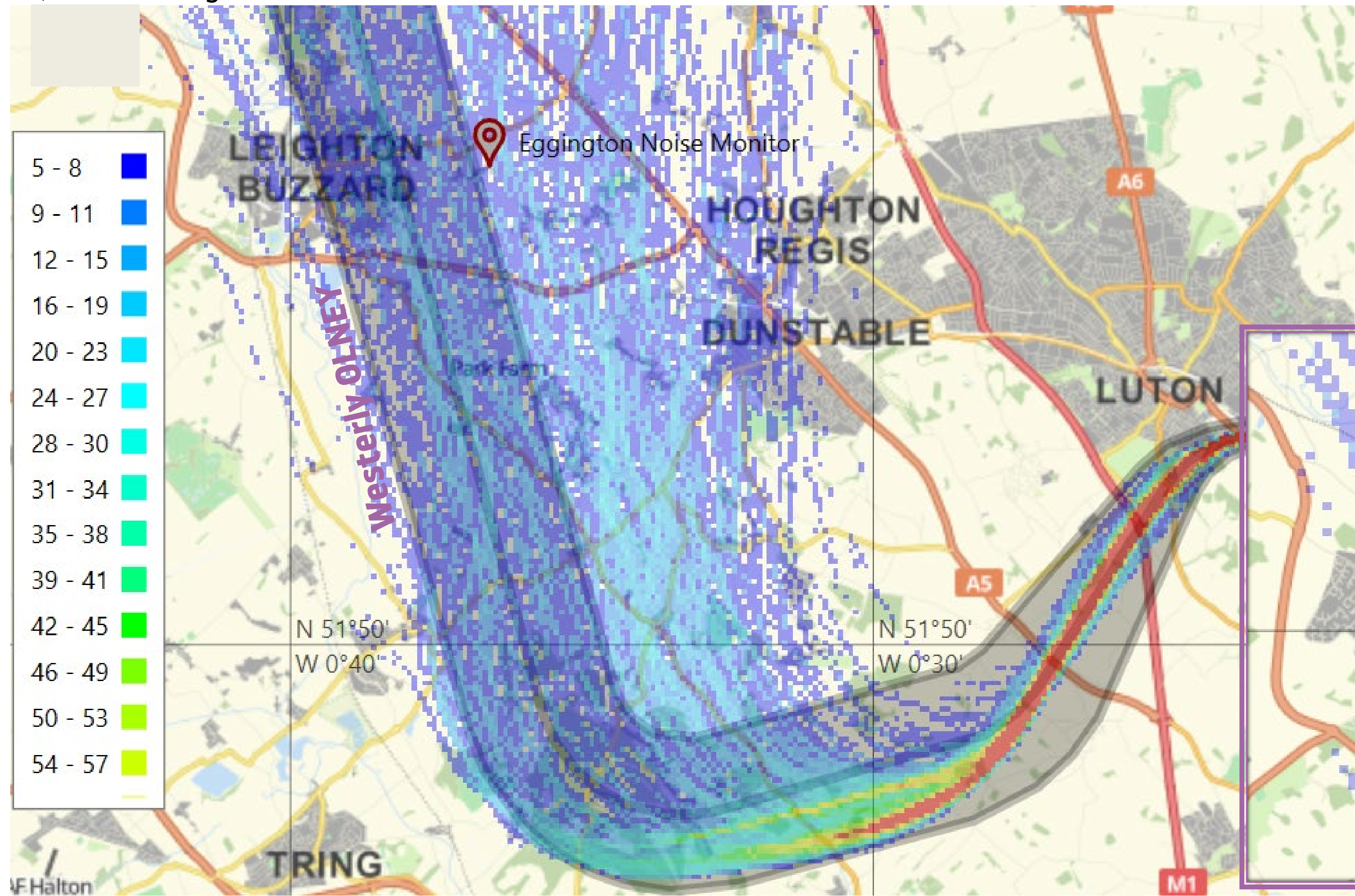
Aircraft Tracks During the Monitoring Period

On the easterly arrival, air traffic controllers vector aircraft around north or south of Leighton Buzzard to avoid populated area – Leighton Buzzard. This creates dispersions along the approach route before the aircraft line up to the runway on final approach. The heat maps show that most aircraft is vectored to the north and south of Leighton Buzzard. There are more aircraft vectored to the south, reducing track miles and carbon emissions.

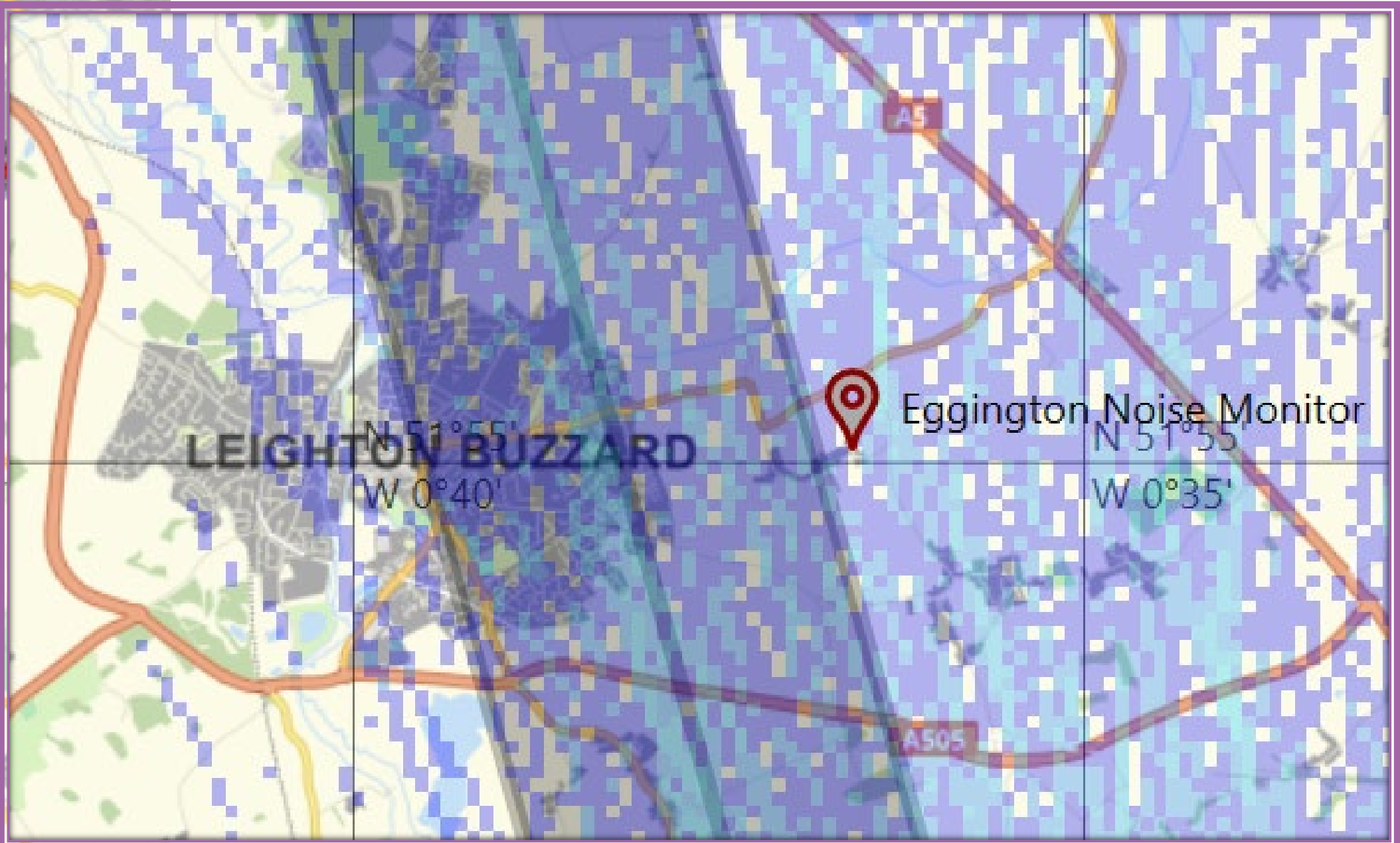


Aircraft Tracks During the Monitoring Period

This heat map shows the density of the westerly Olney departures over the monitoring period. The noise preferential route (NPR) is 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.

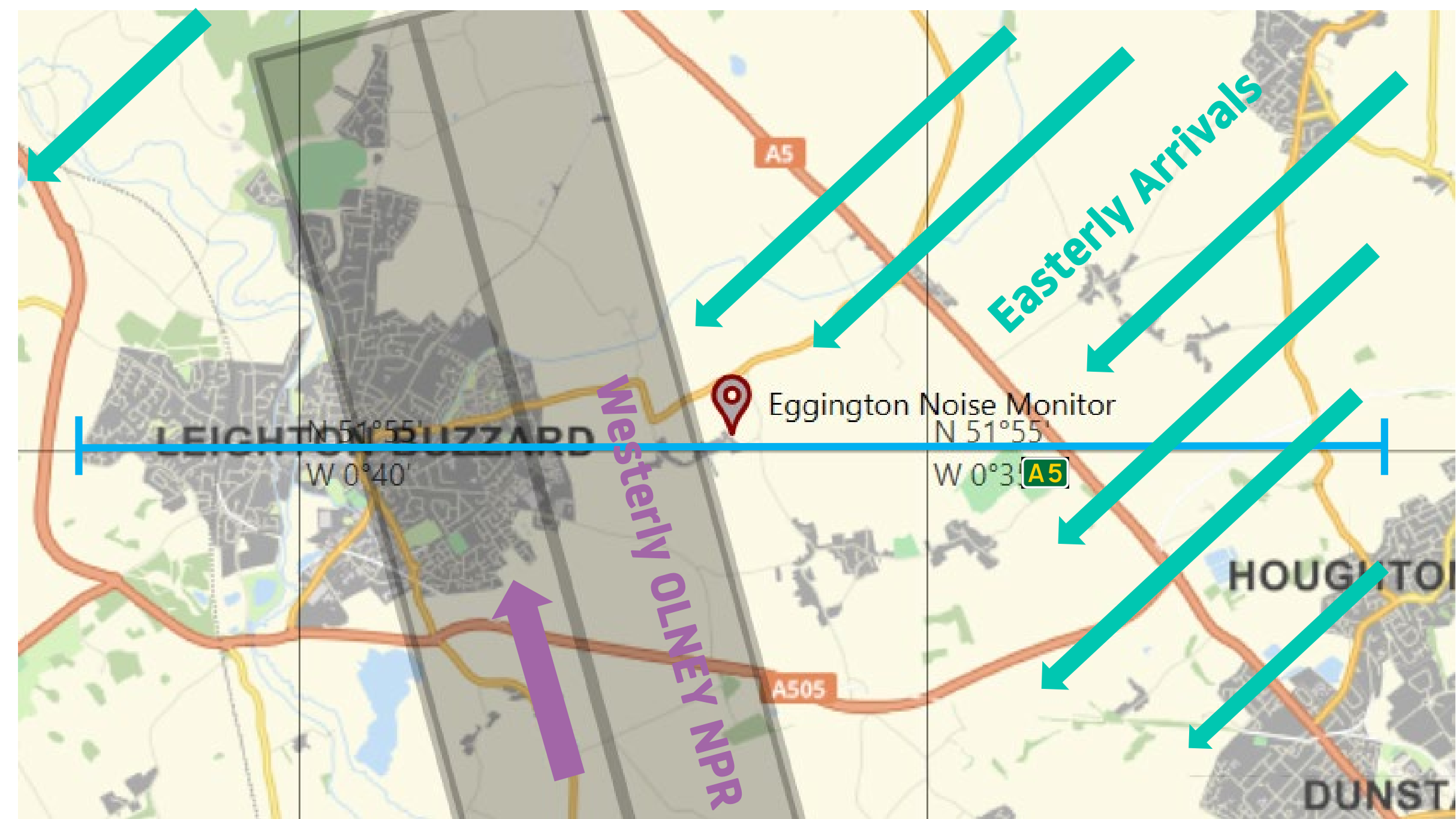


On the westerly Olney departure, there is large dispersion to the east of Leighton Buzzard. Aircraft are highly likely to be at above 4,000 feet when they reach Leighton Buzzard. Aircraft that are departing at night may have a higher climb gradient due to less traffic from other London airports in the airspace.

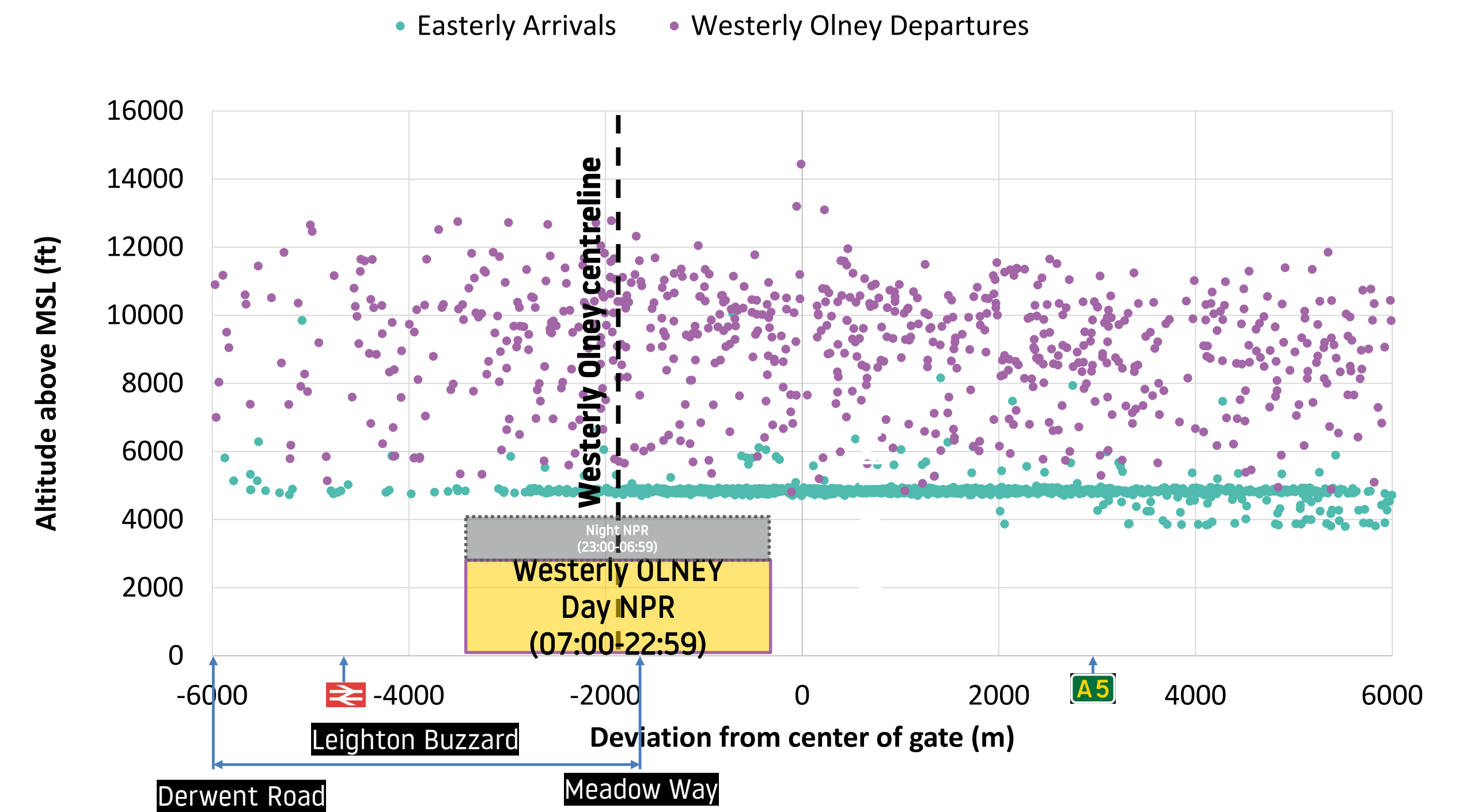


Altitude Analysis During Monitoring Period

In this report, altitude analysis was conducted for Eggington and Leighton Buzzard. The altitude analysis shows the vertical and lateral dispersion of aircraft 6km either side of the noise monitor. The map shows the 12km gate which is drawn from west to east and will gather information of every aircraft passing through the gate area. The gate has been extended to include Leighton Buzzard outskirts in the analysis and to show aircraft dispersion in this area as shown from the last section. The scatter chart shows the distance and altitude of aircraft from the noise monitor during the monitoring period. The easterly arrival route and the westerly Match noise preferential route (NPR) are labelled and displayed by the shaded area and coloured arrows. Departing aircraft must remain within the NPR until reaching release altitude of 3,000ft during the day or 4,000ft at night. There is aircraft dispersion in the area because all departing aircraft reached above 4,000ft before reaching Leighton Buzzard or Eggington – see scatter plot. For the arrivals, as mentioned before, aircraft is vectored by ATC to either south or north Leighton Buzzard, avoiding populated area, at a desired altitude of 5,000ft. Thus, a consistent line of green plots is shown on the chart, spread over the area.

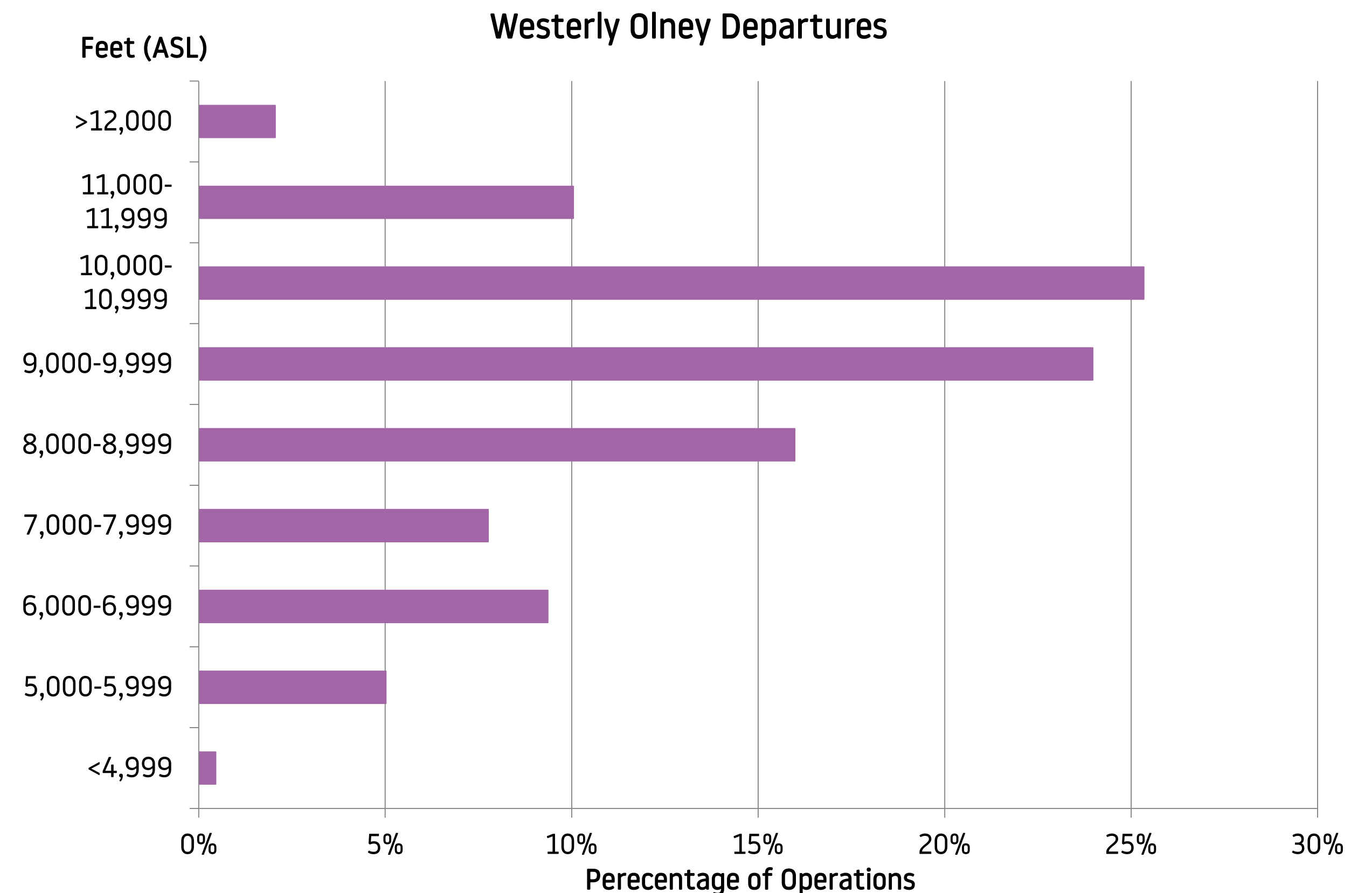
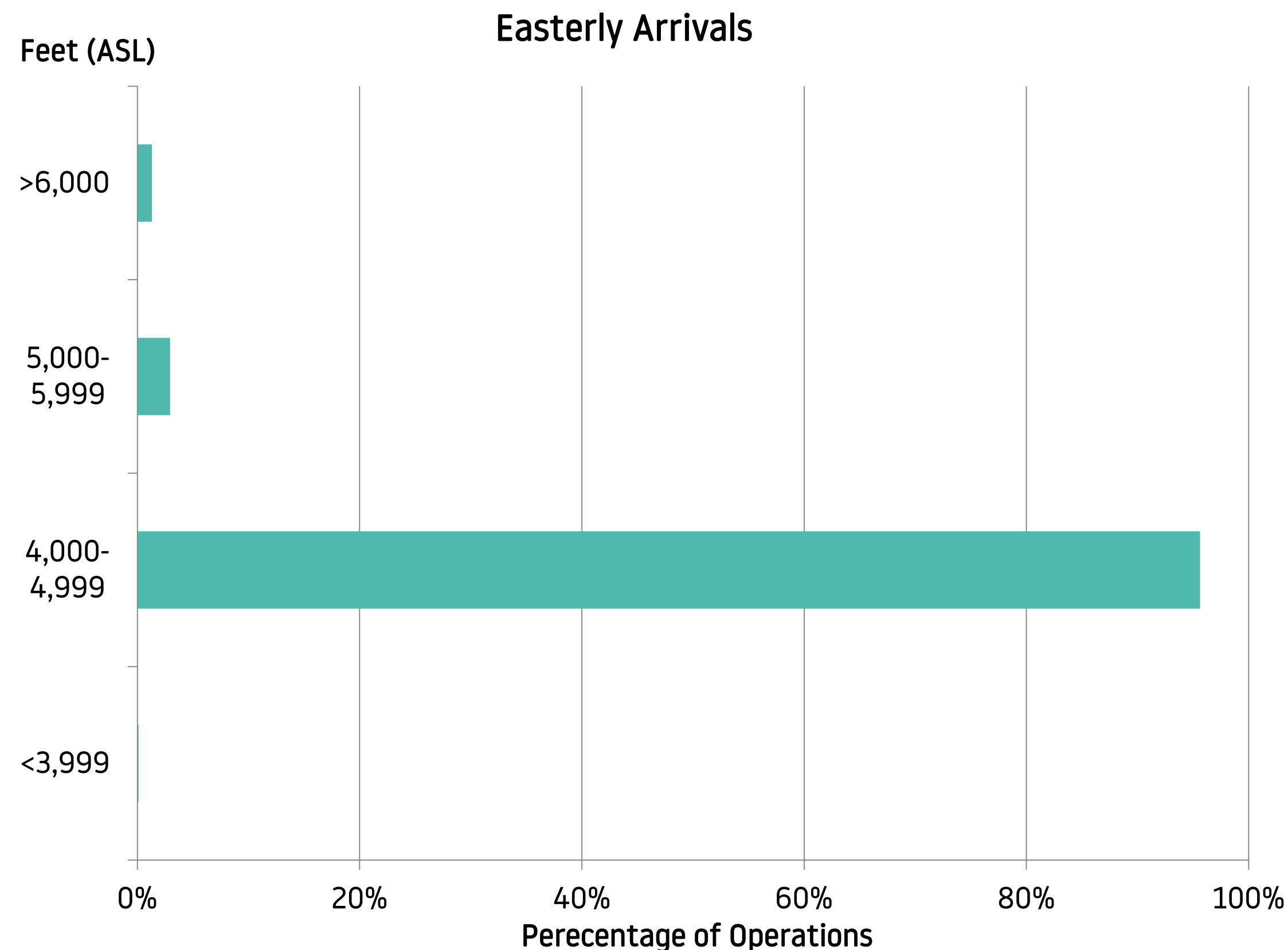


Westerly Olney Departures in purple
Easterly arrivals in green



Altitude Analysis During Monitoring Period

The altitude analysis is split into two parts in this sub-section – easterly arrivals and westerly Olney departures. The bar charts show the altitude spread when aircraft reach the noise monitor in Eggington and Leighton Buzzard. For easterly arrivals, the average altitude of aircraft in this area was 4,858 feet above sea level (ASL) (4,746 feet above ground level [AGL]). The green bar chart shows the majority of the arrivals passed through the gate at between 4,000ft and 4,999ft ASL. For westerly Olney departures, aircraft tend to be at higher altitude when they reach the gate in Eggington and Leighton Buzzard. The average altitude of aircraft in this area was 9,088 feet ASL (8,976 feet AGL). That would have a less noise impact to the local area.



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.

During the monitoring period in Leighton Buzzard, the noise monitoring terminal collected readings from 665 easterly arriving and 104 westerly Olney departing aircraft. During the period, there were total of 2,479 easterly arrivals and 788 westerly Olney departures.

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.

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. 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). During the monitoring period, no recordings need to be excluded from the analysis for weather reason.

The purpose of the monitoring programme is to understand the typical noise levels created in the local community. For Leighton Buzzard, it specifically related to easterly arrivals and westerly Olney departures. For this reason, the noise data analysis is split into two parts – easterly arrivals and westerly Olney departures.

Easterly Arrivals - Noise Results During Monitoring Period

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

Aircraft Type	Number of movements	Average Noise (dB)
A306	35	63.3
A319	66	58.9
A320 CEO	210	59.7
A20N (A320 NEO)	30	58.4
A321 CEO	176	58.7
A21N (A321 NEO)	21	59.2
B738	72	59.4

The average easterly arrival noise in Eggington is 59.4dB, based on a sample size of 665. The table shows the average noise for each aircraft type and the purple 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 and A321 CEO have an average noise of 59.7dB and 58.7dB respectively in Eggington. Although the departure noise from A320 NEOs produced less noise than A320 CEOs but we found that the A321 NEOs produced more noise than A321 CEOs. That is due to the higher landing weight of the aircraft which means higher flap angle is needed to maintain a safe approach speed. That in turn increases the aerodynamic noise. From our Quarterly Report Q4 2019, the A321 NEO accounted for 1% of all air transport movements. The A306 was the noisiest aircraft type at Leighton Buzzard on days of easterly operation during the monitoring period.

*The noise results shown in the analysis are only for those aircraft types that recorded more than 20 events per aircraft.



The noise monitor could not record every aircraft noise event if the aircraft noise level is below ambient background noise (≤ 54 dB).

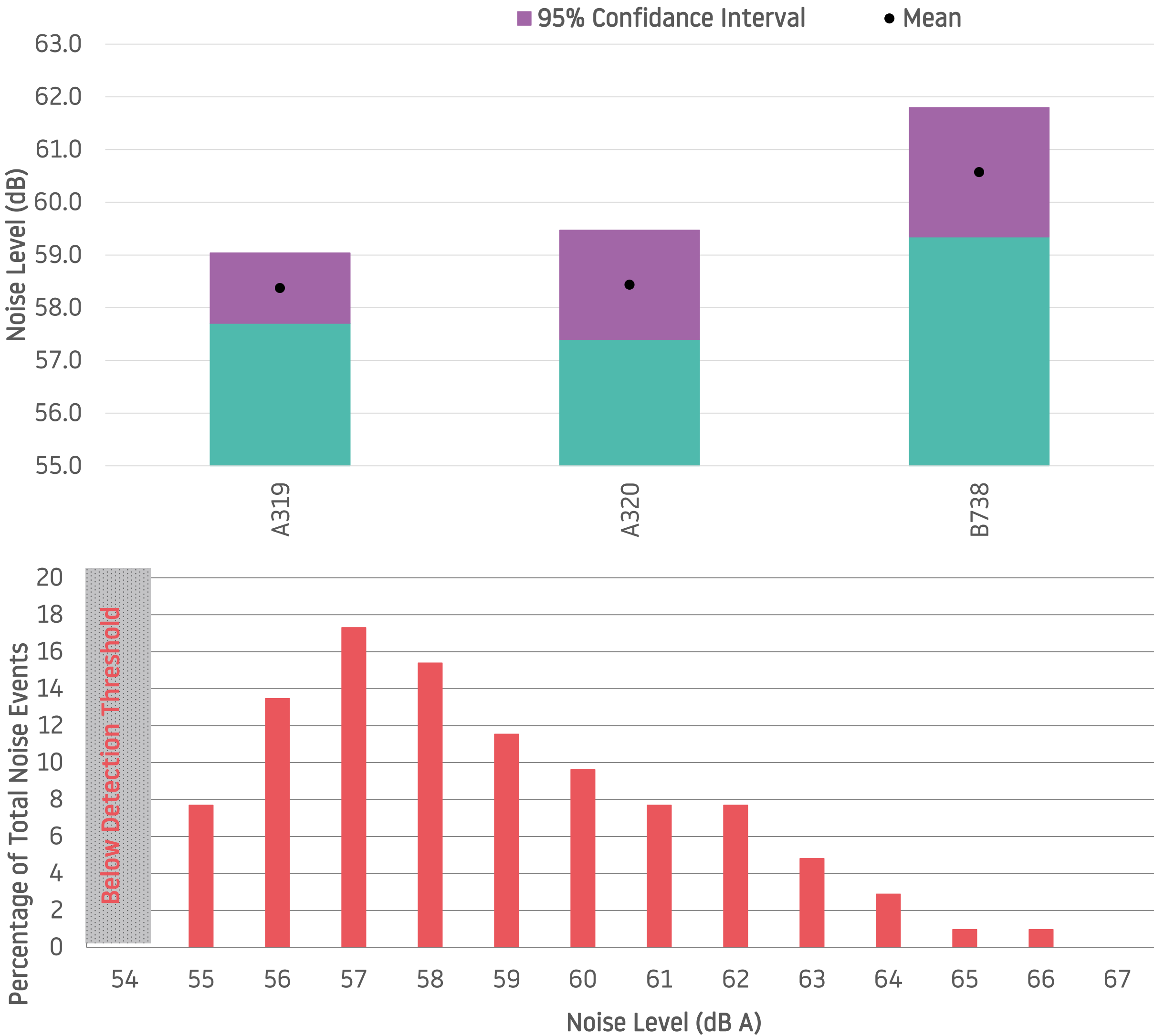
Westerly Departures - Noise Results During Monitoring Period

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

Aircraft Type	Number of movements	Average Noise (dB)
A319	34	58.4
A320 CEO	23	58.4
B738	21	60.6

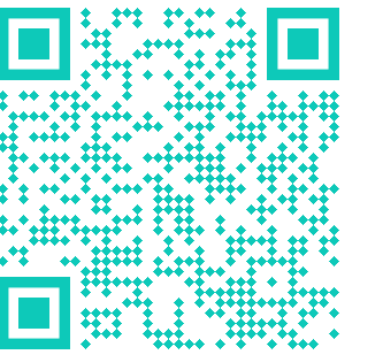
The average westerly departure noise in Eggington is 58.7dB, based on a sample size of 104. As expected, the noise monitor did not capture a lot of noise events and it has a lower noise level than the easterly arrivals due to the further horizontal and vertical distance to the noise monitor from westerly departing aircraft. The table shows the average noise for each aircraft type and the purple bar on the chart shows the uncertainty caused by the spread in readings and the sample size (95% confidence interval).

Only a small amount of westerly departure noise data was collected at this noise monitor in Eggington. The noise monitor could not record every aircraft noise event if the aircraft noise level is below ambient background noise (≤ 54 dB). Therefore, the true average aircraft noise level for westerly operation may not be reflected at this location.

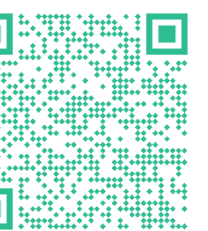


*The noise results shown in the analysis are only for those aircraft types that recorded more than 20 events per aircraft.

Conclusion



- For Leighton Buzzard, the noise from aircraft is specifically related to easterly arrivals. The westerly Olney departures was also included in this report for comparison. During the monitoring period, the airport was using easterly operations for 31% of the time, this is more than the five year average of this time period. On a day of westerly operation, resident may notice less aircraft as only 14% of flight fly the Olney route.
- The average altitude of easterly arriving aircraft in Eggington is 4,858 feet above sea level (ASL), and as Eggington is already approximately 112 feet ASL, aircraft will typically be 4,746 feet above ground level (AGL) in this area. For westerly Olney departures, the average altitude is a lot higher at 9,088 feet AGL (8,976 feet AGL). Majority of arrival aircraft flew between 4,000 and 4,999ft when reaching Leighton Buzzard. The departing flight can climb higher on the Olney route.
- All aircraft shown in the altitude analysis flew within or above the NPR corridor.
- The main aircraft type operating at London Luton Airport is the Airbus A320 CEO and A321 CEO which produced an average noise of 59.7dB and 58.7dB respectively in Leighton Buzzard on a day of easterly operation. 7.7% of the noise events recorded in Leighton Buzzard were created by the newer generation aircraft, A320 NEO and A321 NEO, registering average departing noise events of 58.4dB and 59.2dB respectively. The A321 NEOs produced more noise than A321 CEOs, due to the higher landing weight of the aircraft which means higher flap angle is needed to maintain a safe approach speed. That in turn increases the aerodynamic noise. On the other hand, only a small amount of westerly noise data were collected in Leighton Buzzard due to the higher altitude of departing aircraft when reaching Leighton Buzzard. The noise monitor could not record every aircraft noise event if the aircraft noise level is below ambient background noise. Therefore, the true average aircraft noise level for westerly operation may not be reflected in Leighton Buzzard.
- In Q4 2019, 57 aircraft (both westerly and easterly) were investigated as part of the Noise and Track violation scheme. 11 aircraft 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>
- We are looking at new ways to make our community noise reports easier for the local communities to understand as well as including the right information. If you have any suggestions about how we can make these reports better, please don't hesitate to let us know by emailing noise.enquiries@ltn.aero.



Glossary of Terms

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 Leighton Buzzard.

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.

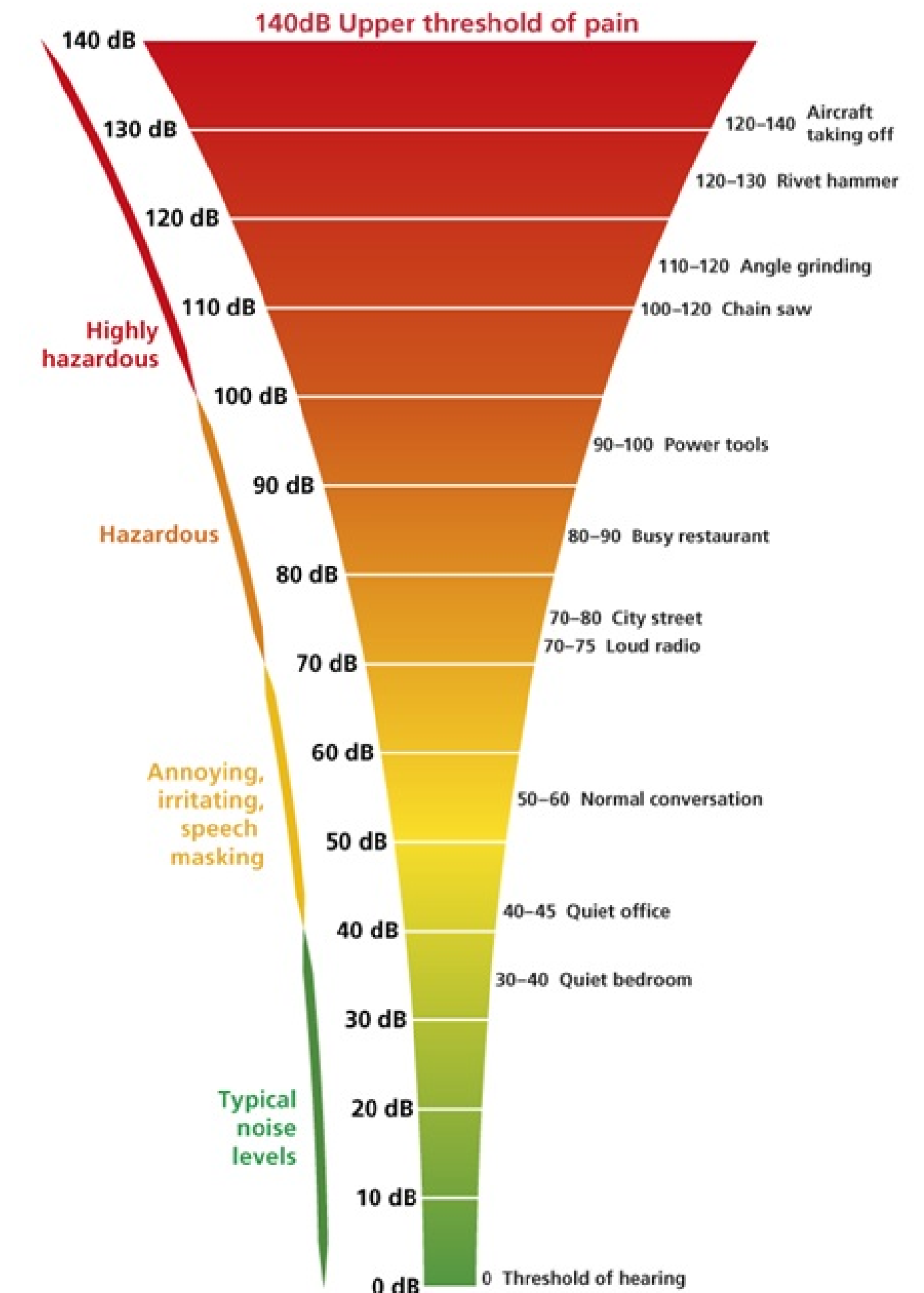
Gate Analysis: A gate which is drawn across an area and will gather information about every aircraft passing through the gate area.

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

Aircraft Types

Airbus A306 Freighter: Cargo aircraft with payload up to 54 tonnes
Main operator at LLA: DHL



Airbus A319: Short range single aisle jet with maximum 156 seats onboard
Main operator at LLA: easyJet



Airbus A320 CEO: Short to medium range single aisle jet, longer fuselage than A319, with around 180 seats.
Main operator at LLA: easyJet and Wizz Air



Airbus A320 NEO: Improved design of the A320 CEO, with more fuel efficient and quieter engines, known as NEO aircraft
Main operator at LLA: easyJet



Airbus A321 CEO: Stretched fuselage version of A320, providing more seats, up to 221.
Main operator at LLA: Wizz Air



Aircraft Types - Continued

Airbus A321 NEO: Improved design of the A321 CEO, with more fuel efficient and quieter engines, known as NEO aircraft.

Main operator at LLA: Wizz Air



Boeing B737: Medium range single aisle passenger jet with 189 seats

Main operator at LLA: Ryanair and TUI Airways



Boeing B757: Medium range single aisle passenger jet with up to 228 seats. The freighter version can provide payload up to 27 tonnes

Main operator at LLA: DHL (Freighter) and TUI Airways



Bombardier Global Express: Small long range private jet

Main operator at LLA: Private

