



With flights to more than 140 destinations worldwide and a workforce of around 8,500 people, Birmingham is the UK's 7<sup>th</sup> largest airport and an economic powerhouse, contributing millions of pounds to the Midlands economy every year. However, these benefits have to be balanced against the Airport's impact on nearby communities. Focussing on Barston, this guide aims to explain operational procedures at Birmingham and how they affect your neighbourhood.

## The Basics: where do aircraft fly and why?

*This section introduces some of the basic principles behind the operation at Birmingham Airport.*

### Controlled Airspace

Barston lies within the Control Zone for Birmingham Airport, an area of Controlled Airspace extending from ground level up to a height of 4,500 feet. In turn, the Control Zone is part of a wider system of airspace controlled by Air Traffic Control (ATC) to ensure the safety of aircraft operating in and out of the Airport. All aircraft operating within Controlled Airspace are under control of ATC and while the majority of movements follow the well-established procedures we will describe here, there are occasions when ATC will route aircraft away from the usual flight paths. So, while residents will become familiar with the 'normal' routes aircraft follow, there are occasions when they may be seen in locations where they do not normally appear. This does not mean that they have 'broken the rules' or are flying 'illegally'. On occasion, aircraft may be seen *anywhere* within controlled airspace, though the Airport, the airlines and ATC all work closely together to make sure that these occasions are kept to an absolute minimum. See the section on 'other factors' later in this guide for more information.

### The Runway

Birmingham Airport has one runway, which aircraft use in either of two directions, known as Runway 15 and Runway 33. The numbers refer to the runway's heading, in degrees. Runway 15 is aligned on a heading of 150°, approximately South southeast, while Runway 33 lies on a heading of 330°, or North northwest. The runway only operates in one direction at any time.



This means that at any given point in time, residents of Barston may be affected by either arrivals or by departures. It is meteorological conditions – primarily the direction of the wind – which determines this because, where possible, aircraft will usually take off and land heading into the wind.

However, where winds are below five knots, arriving aircraft will generally be directed onto Runway 33. This is designed to minimise the risk of wake vortex strikes. Wake vortices are rotating columns of air generated at the wingtip of an aircraft as it passes through the air. In calm conditions they can cause damage to roofs of properties to the north of the airport underneath the path of arriving aircraft. Although less than 0.005% of flights cause vortex damage at Birmingham, the Preferential Runway Policy aims to limit the risk. Taken together, weather conditions and the Preferential Runway policy mean that averaged out over the course of a year, 60% of operations typically use R33 with 40% using R15.

### What happens when aircraft are coming in to land at Birmingham?

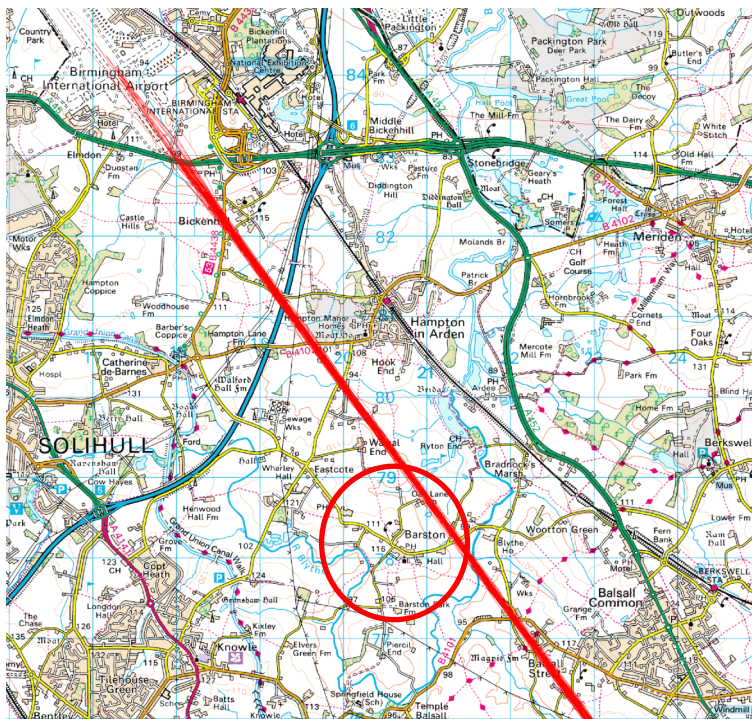
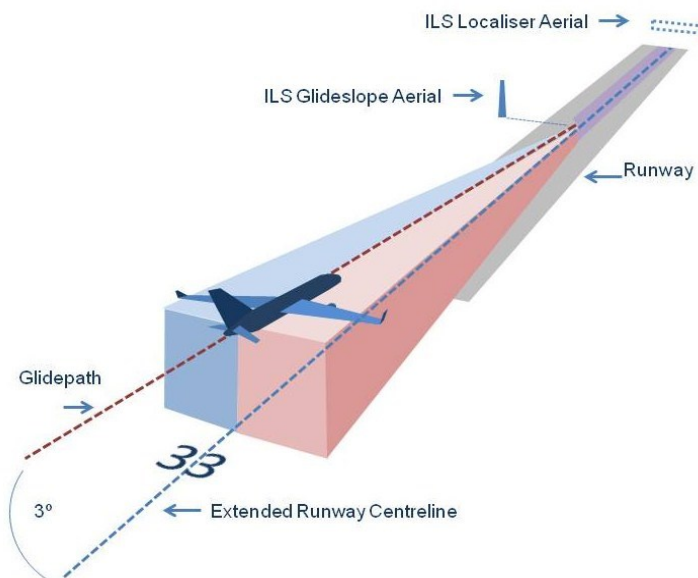
When Runway 33 is operating, you will notice aircraft passing over Barston as they descend into Birmingham Airport. By the time they pass the village, these aircraft will be established on the Instrument Landing System (ILS), which is used by the majority of aircraft arriving at Birmingham.

The ILS is a highly accurate system that enables aircraft to land safely on the runway, including at night and in poor visibility. It consists of two radio signals transmitted from the airfield.

The *localiser* establishes the centreline of the runway and defines a straight line approach path which extends out from the Airport for around twenty miles.

The *glide slope* beam defines the *glidepath*, the angle at which the aircraft descends, enabling it to fly along the localiser beam in a controlled descent, clearing all obstacles along the way, until it touches down safely on the runway. The angle of the glide slope is 3°, which means the aircraft will descend approximately 300 feet for every mile it travels.

Air Traffic Control (ATC) will direct arriving aircraft to join the ILS from a number of different directions, so there will be some variation in the point at which aircraft turn to begin their final approach. However, by the time they are passing Barston, they will already be established on the ILS and you will notice them consistently flying the same fixed path.

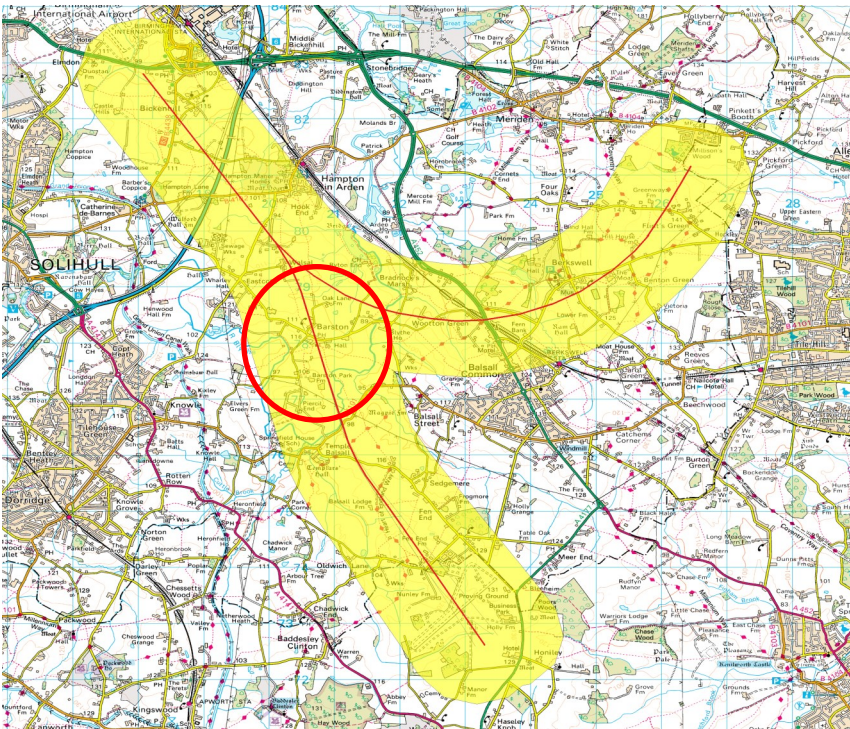


Aircraft tracks for arrivals on to Runway 33, showing how aircraft are concentrated once established on the ILS.

Residents sometimes report large aircraft, such as the easily-recognised A380 operated by Emirates, are arriving, they appear to be flying lower than other types. However, once an aircraft is established on the ILS, at any given point along the glide slope it will be at approximately the same height as all other aircraft passing that same point.

What we see is an optical illusion, caused by the size of these aircraft, which operate only a few times each day, compared to the smaller types with which people are more familiar. Because all aircraft are established on the same ILS glide slope, there is very little actual variation in height.

### What happens when aircraft are taking off?



Runway 15 NPRs showing the centreline of the SIDs in red.

When Runway 15 is in operation, in Barston you will notice aircraft taking off and climbing away to the south.

Departing aircraft are required to follow Standard Instrument Departure (SID) routes. A SID is a set of instructions that pilots will refer to when departing from a particular airport.

They are intended to strike a balance between the need to avoid terrain and obstacles, noise abatement and considerations relating to the management of the wider airspace beyond the immediate locality of the airport.

Barston Residents will notice departing aircraft following one of two SIDs, one for aircraft heading south and another for aircraft heading to destinations north of Birmingham.

SIDs are shown as lines on maps but, recognising that aircraft fly in three dimensions, they actually operate within a corridor known as a Noise Preferential Route (NPR) of which the SID forms the centreline.

A number of factors, including the type of navigation aid in use, the aircraft type and load, as well as weather conditions, will all affect its ability to fly within these routes. Aircraft departing from Runway 15 are required to remain within the NPRs until they have climbed to a height of 4,000 feet. This was raised from 3,000 as part of the process which saw the introduction of satellite-based navigation in 2016 (see page 4).

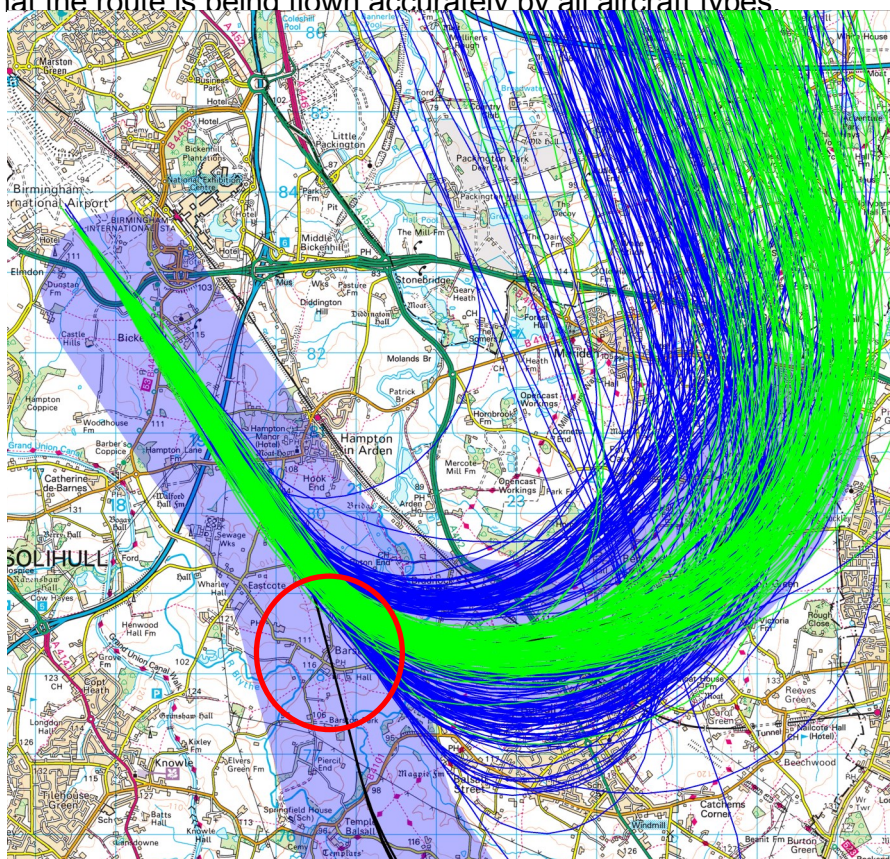
Once they have achieved this height, aircraft may be routed outside the NPR by ATC onward to their destination, so you may notice some dispersion.

## The Northbound Turn

The majority of aircraft departing from Birmingham are flying to destinations in Europe and follow the southern routeing shown in the image on the previous page. However, Barston residents will often see departing aircraft making a sweeping turn left (as the aircraft flies), taking them just to the east of the village. These are aircraft departing south on Runway 15 owing to the meteorological conditions at the time, but whose destination might be in Scotland or across the Atlantic, requiring them to turn to head north. These movements make up around 30% of departures from Runway 15.

The departure procedures introduced in 2016 make use of RNAV, a system based on satellite navigation rather than on traditional ground-based radio beacons. RNAV allows aircraft to fly within NPRs more accurately than before and meant that we were able to reduce the width of the NPRs to the south of the airfield from 3kms to 2kms.

However, soon after these procedures were introduced, it became clear that there was an issue with aircraft flying the northbound turn. Monitoring of the actual tracks flown by aircraft using the ANOMS system (see page 6) highlighted differences in tracks flown by different aircraft types. Jet aircraft flew much closer to the centreline of the turn, whereas turbo-prop aircraft, mostly the Q400 Dash 8 type, tended to fly further south and subsequently closer to Barston. In May 2019 a redesigned RNAV SID became operational, bringing the turbo-props into line with the jets. Barston residents may have noticed this improvement as monitoring now shows that the route is being flown accurately by all aircraft types.



*The amount of dispersion prior to May 2019 is shown in blue while the much better concentration achieved by all aircraft types after the introduction of the redesigned SID shown in green.*

## Night Flying

Some residents believe that Birmingham Airport closes at night, or that night flying is banned. Neither is true. Birmingham is a 24-hour operation and has been for many years. However, there is widespread recognition that night flying is one of the main impacts that Airports have on local communities and it is an issue that we take very seriously. In fact, we have one of the most stringent Night Flying Policies of any UK airport, with an annual limit on night movements, a ban on the noisiest aircraft operating during the night period and a night noise limit of 83dB (A). If a departing aircraft registers a noise level above this at our noise monitors, then the airline is surcharged an amount equivalent to a full runway charge. All funds from night noise violations are placed into the Community Trust Fund, which makes grants to small, community based organisations in areas affected by our operations, including Barston. You can find out more about the Community Trust Fund on the Airport's Website at <https://birminghamairport.co.uk/about-us/community-and-environment/community-investment/>

## Other operational procedures

The majority of aircraft you see flying close to Barston will be arriving on the ILS or departing using the SIDs. However, there are occasions when other operational procedures are used and these may result in you seeing aircraft where you are not used to seeing them.

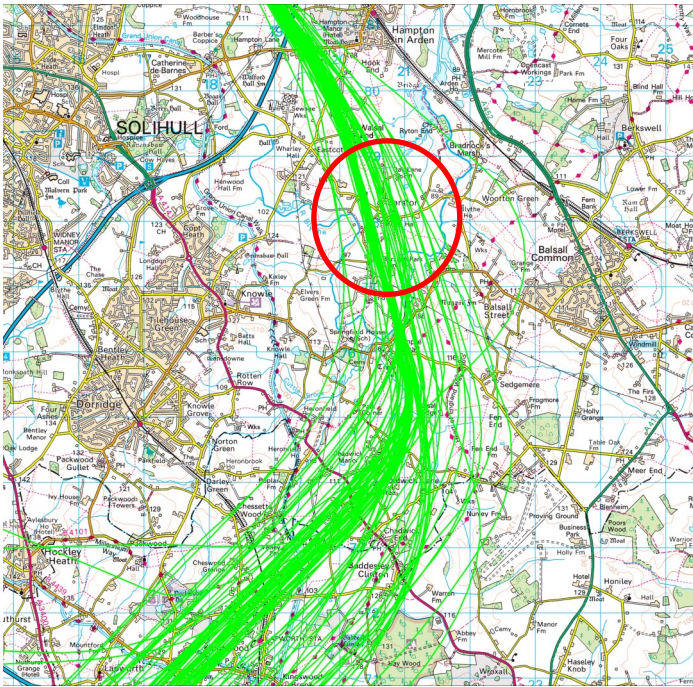
**Weather**, in particular, wind direction, is the main factor that determines the direction that the runway at Birmingham is used and therefore whether Barston is affected by arrivals or departures. However, there are other weather-related factors that can have an impact.

Something that we notice is that there will often be a spike in complaints when changes in runway direction are implemented after a prolonged period of settled weather. Sometimes the runway is used in the same direction for period of days, even weeks. When the weather shifts and the runway direction is reversed, some residents become very aware of aircraft and believe we have changed flight paths. In Barston, this usually occurs after Runway 33 (bringing arrivals) has been in use for some time, followed by a change to Runway 15, which feeds the more noticeable departures to the south. In reality, there has been no change in flight paths, just a reversion to operating procedures that have not been used for some time.

Bad weather may also be the cause of aircraft deviating from the usual flight paths. Pilots are sometimes instructed by ATC to take a non-standard route shortly after taking off to avoid thunderstorms, which can cause severe turbulence. Often the storm cell involved may be some miles away from Barston and its presence is not apparent to anyone on the ground in the village. Although relatively uncommon, these 'weather avoidance' procedures may mean you sometimes see aircraft where you are not used to seeing them.

**Visual Approaches** are where a pilot will land without using the ILS. They are authorised by ATC and take place in clear weather when the runway can be kept in sight at all times. Visual approaches are also an essential part of pilot training and from time to time they will therefore make a request to ATC to be permitted to make a visual approach.

'**MOSUN**' is a non-standard departure route used by aircraft flying to destinations such as southern Ireland, Portugal and the Canaries. It is used to provide a more direct routing to these destinations and avoids London airspace, which is often congested. Along the route, Birmingham departures enter a section of airspace which is also used by military traffic and it is therefore only open to civilian traffic at specific times. These are overnight— between the hours of 1700 and 1000—on weekdays and at all times during weekends. During the bulk of weekday daytime hours therefore, MOSUN is not used.



MOSUN departures June 2019, illustrating where you may see aircraft flying this routing.

When departing from runway 15 the procedure for MOSUN departures aims to replicate the track flown by RNAV departures until the aircraft is 4 nautical miles from the runway, when it will then make a right turn. The illustration on the left illustrates where you are likely to see aircraft flying this procedure, which is typically utilised by approximately 5% of all departures from the Airport.

### Keeping track

As near neighbours of Birmingham Airport, residents of Barston will always be affected by aircraft operations. It is our job to ensure that we keep that impact to a minimum and one of the most important ways we can achieve this is by monitoring how well our policies and procedures are working.

To do so we operate a sophisticated system known as ANOMS – the Airport Noise and Operations Monitoring System. ANOMS uses radar data to record details of the height, speed and position of every aircraft operating into and out of Birmingham. ANOMS allows us to record and replay actual tracks over the ground and when matched against noise data from our six community noise monitors, we have a set of highly accurate data with which we can measure the impact of aircraft activity.

One example of how we use ANOMS is to record Track-Keeping Performance, which refers to the ability of aircraft to fly within the NPRs until they reach the required altitude of either 3,000 or 4,000 feet, depending on which route they are. Each NPR is monitored and analysed by the system and any aircraft leaving the NPR below the required altitude is recorded as ‘off track’.

We can use this information to work with the airlines to improve track-keeping and we report our statistics through the Airport Consultative Committee and Solihull Metropolitan Borough Council, which monitors the Airports compliance with its Section 106 Planning Agreement with the Council. We also use ANOMS to investigate individual complaints, where it provides us with the accurate information we need to discuss residents concerns in more detail.

### And finally....

We hope you find this guide to how airport operations affect Barston useful. We hope too that it has answered some of the questions you may have had. If not, the Sustainability Team is always happy to discuss your individual concerns. You can contact us by completing the form on our web site at: <https://www.birminghamairport.co.uk/community-complaint>

