LEEDS BRADFORD AIRPORT
FASI-S AIRSPACE CHANGE PROPOSAL

ACP-2021-066

Stage 2

Stage 2A Submission Document– Options Development

January 2026

Version	Date	
1.0	5 January 2026	New document prepared for Stage 2 submission January 2026

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1. INTRODUCTION

1.1 The UK's Airspace Modernisation Strategy

1.1.1 In 2017 the Secretary of State tasked the Civil Aviation Authority (CAA) with preparing and maintaining a coordinated strategy for the use of UK airspace up to 2040.

1.1.2 The first Airspace Modernisation Strategy (AMS) was published in 2018 and set out the 'ends, ways, and means', of modernising airspace through a series of 'delivery elements' that will update its design, technology, and operations.

1.1.3 The AMS was updated in 2023 and is split into 3 parts, published separately. Part 1 (Strategic objectives and enablers) explains the strategy's objectives, a high-level overview of what will enable those objectives to be fulfilled, and governance for overseeing delivery. Part 2 (Delivery elements) and Part 3 (Deployment) describe the short-term ambition and explain how the strategy is being delivered.

1.1.4 The AMS vision is to deliver quicker, quieter, and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. The AMS does not propose specific airspace changes, but a key deliverable is a masterplan of airspace changes that will be necessary for modernisation.

1.2 Airspace Change Organising Group & the Masterplan

1.2.1 Following the publication of the AMS, the aviation industry is working together to deliver airspace modernisation through a coordinated programme. More than 20 UK airports and NATS EN-route Ltd (NERL) are involved in the delivery of this national programme of airspace change, which is being coordinated by the Airspace Change Organising Group (ACOG).

1.2.2 Airports are responsible for designing the arrival and departure routes that support their operations from the ground to approximately 7000ft. They also take responsibility for the way the airspace is used and developed in this lower portion of airspace.

1.2.3 NERL are responsible for re-designing the airspace above 7000ft. They take responsibility for the route network, and for the way the airspace is used and developed above 7000ft.

1.2.4 ACOG are responsible for developing the Masterplan, a single coordinated implementation plan for airspace changes in the UK up to 2040. The Masterplan is being produced by ACOG in stages, with more detail added with each iteration. Across all iterations, the masterplan will:

- Identify where and when airspace change proposals are needed, with proposed timelines for implementation;
- Describe how these proposals relate to each other, and highlight potential conflicts between their designs;
- Explain how trade-off decisions to resolve these conflicts have been made;
- Demonstrate the anticipated cumulative impact of all the airspace change proposals.

1.2.5 Iteration 1 was published in 2020 and Iteration 2[1] was published in January 2022, with an addendum in October 2022, which detailed both the joining and departure of some airports to the programme.

1.2.6 From Iteration 3 onwards the Masterplan is being developed separately for each region. This will allow designs brought forward by each cluster, once approved, to be deployed and the benefits realised, without waiting for all the ACPs to complete the airspace change process.

1.2.7 Leeds Bradford Airport (LBA) is part of the MTMA (Manchester Terminal Manoeuvring Area) cluster which includes, Manchester, Liverpool. East Midlands, Birmingham and NERL.

LBA's Potential Interdependencies

1.2.8 CAP2312B identifies the potential interdependencies between LBA and other airports in the MTMA cluster.

1.2.9 The analysis undertaken by ACOG in the MTMA airspace below 7000ft identifies potential interdependencies between LBA and Manchester Airport. In addition, LBA will need to ensure ongoing co-ordination with the NATS NERL ACP regarding the airspace above 7000ft.

1.3 The Airspace Change Process

1.3.1 CAP1616 lays out the regulatory process for changing flight paths, including the community engagement requirements. Proposals for changes to flight paths are submitted to, assessed, and approved by the CAA following the guidance set out in CAP1616.

1.3.2 CAP1616 consists of seven-stages which provide a framework for changing airspace. The process places significant importance on engaging a wide range of stakeholders, including potentially affected communities.

1.3.3 In early 2023 the CAA conducted a consultation on proposed changes to the CAP1616 process and in October 2023 published Edition 5 of the document. Following discussion with the CAA it was agreed that as Stage 2 work had already commenced, LBA would continue Stage 2 in accordance with Edition 4 (March 2021) of CAP1616.

[1] ACOG Masterplan Iteration 2 (CAP2312B)

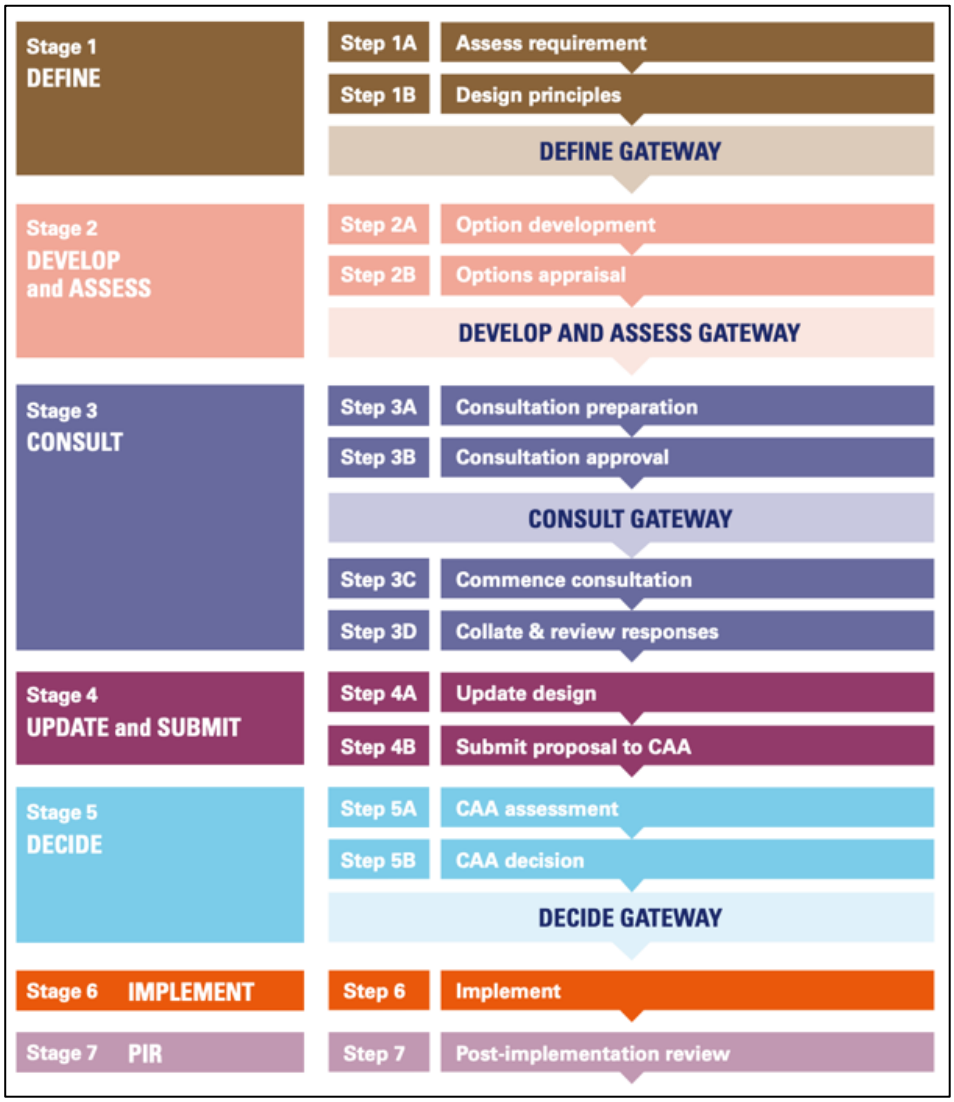

Figure 1: CAP1616 (Edition 4) 7-Stages

1.4 Airspace Modernisation at LBA

1.4.1 **Error! Reference source not found.** below summarises the CAP1616 stages already undertaken for this ACP, providing links to submission documents for those previous stages. All information submitted to the CAA for this ACP is available on the CAA's Airspace Change Portal.

Airspace Change Stage	Summary	Link to Documents
Stage 1 **Step 1A**	In Aug 2021, LBA submitted a Statement of Need (SoN) to the CAA.	Statement of Need
	In Sep 2021, LBA had an assessment meeting with the CAA, as part of Step 1A of the CAP1616 process. The purpose of the assessment meeting is for the change sponsor to present and discuss its SoN and to enable to the CAA to consider whether the proposal falls within the scope of the formal airspace change process.	Assessment Meeting Presentation Assessment Meeting Minutes
Stage 1 **Step 1B**	At Step 1B, LBA carried out engagement with stakeholder representatives to develop a set of Design Principles for this airspace change. The aim of the Design Principles is to provide the objectives that the change sponsor seeks to achieve through the airspace change and help the airspace change designers to create and compare different flight paths and design options. The CAA carried out the regulatory assessment to ensure that the Stage 1 requirements were followed, and LBA passed the Stage 1 Gateway in March 2022.	Design Principle Submission Document V3
Stage 2 **Step 2A**	At Step 2A, LBA developed options for the airspace change proposal, and evaluated how those options responded to the Design Principles created in Stage 1. These options were shared with the stakeholder representatives who were previously engaged with at Stage 1. Feedback from this engagement was then used to generate further information on existing options to aid engagement. The final part of Step 2A was to qualitatively, and where possible, quantitively assess the options against the Design Principles to produce a Design Principle Evaluation.	This document

Table 1: Summary of CAP1616 work to date

The Design Principles were set following engagement with stakeholders. More information can be found in our Stage 1 Submission Document, linked in **Error! Reference source not found.**.

1.4.2 LBA's Design Principles are shown in **Error! Reference source not found.**. Other than design principle 1, these are not in a priority order.

	Final Design Principles
1	**Importance of Safety** – The Airspace design and its operation must maintain or where possible, enhance current levels of safety.
2	**Noise** - The Design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.
3	**Tranquillity** - Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural or historic assets, tranquil or rural areas, sites of care or education and AONBs.
4	**Emissions and Air Quality** – The Proposed design should minimise CO2 emissions per flight.
5	**Airspace Dimensions** – The Volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users.
6	**Airspace Complexity** – The Airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.
7	**Technical Requirements** – The Design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.
8	**Systemisation** – The New procedures will integrate with the en-route network, as per the FASI-N programme. If required, the arrival transitions shall integrate with the IAPs, deconflict with the departure procedures, reducing the requirement for tactical coordination.
9	**Operational Cost** – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.
10	**AMS Realisation** – This ACP must serve to further, and not conflict with, the realisation of the AMS.
11	**PBN** – The New procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.

Table 2: Final Design Principles

1.5 CAP1616 Step 2A Requirements

1.5.1 Stage 2 of the CAP1616 (Edition 4) process is split into two steps, Step 2A – Options Development and Step 2B – Options Appraisal. This document describes the work undertaken at Step 2A.

1.5.2 Paragraph 125 of CAP1616 sets out that in Step 2A the change sponsor is required to "develop a comprehensive list of options – to the extent that a list is possible - that address the Statement of Need and that align with the design principles from Stage 1"[2].

1.5.3 This list should be preliminarily tested with the same stakeholders it engaged with in Step 1B, to ensure they are satisfied that the design options are aligned with the design principles and that the change sponsor has properly understood and accounted for stakeholder concerns, specifically related to the design options.

[2] CAP1616 Edition 4, Page 39, Paragraph 125

1.5.4 The change sponsor then produces a design principle evaluation (DPE) that sets out how its design options have responded to the design principles.

2. EXISTING AIRSPACE ARRANGEMENTS (BASELINE)

2.1 Runways and Local Geography

2.1.1 LBA is in Yeadon, 7 miles (11 km) northwest of Leeds City Centre, and about 9 miles (14 km) northeast of Bradford City Centre. It serves Leeds, Bradford and the wider Yorkshire region which include York, Harrogate, and Wakefield, and is the largest airport in Yorkshire. LBA is situated in an elevated position, 208 metres above mean sea level, making it the highest in England.

2.1.2 The airport operates flights to domestic and European destinations catering for over 4 million passengers in 2024.

2.1.3 LBA is surrounded by several areas of dense population; this includes Leeds, Guiseley, Otley, Yeadon, Ilkley, Shipley, Pudsey, Bradford, Bingley, Morley and Rothwell.

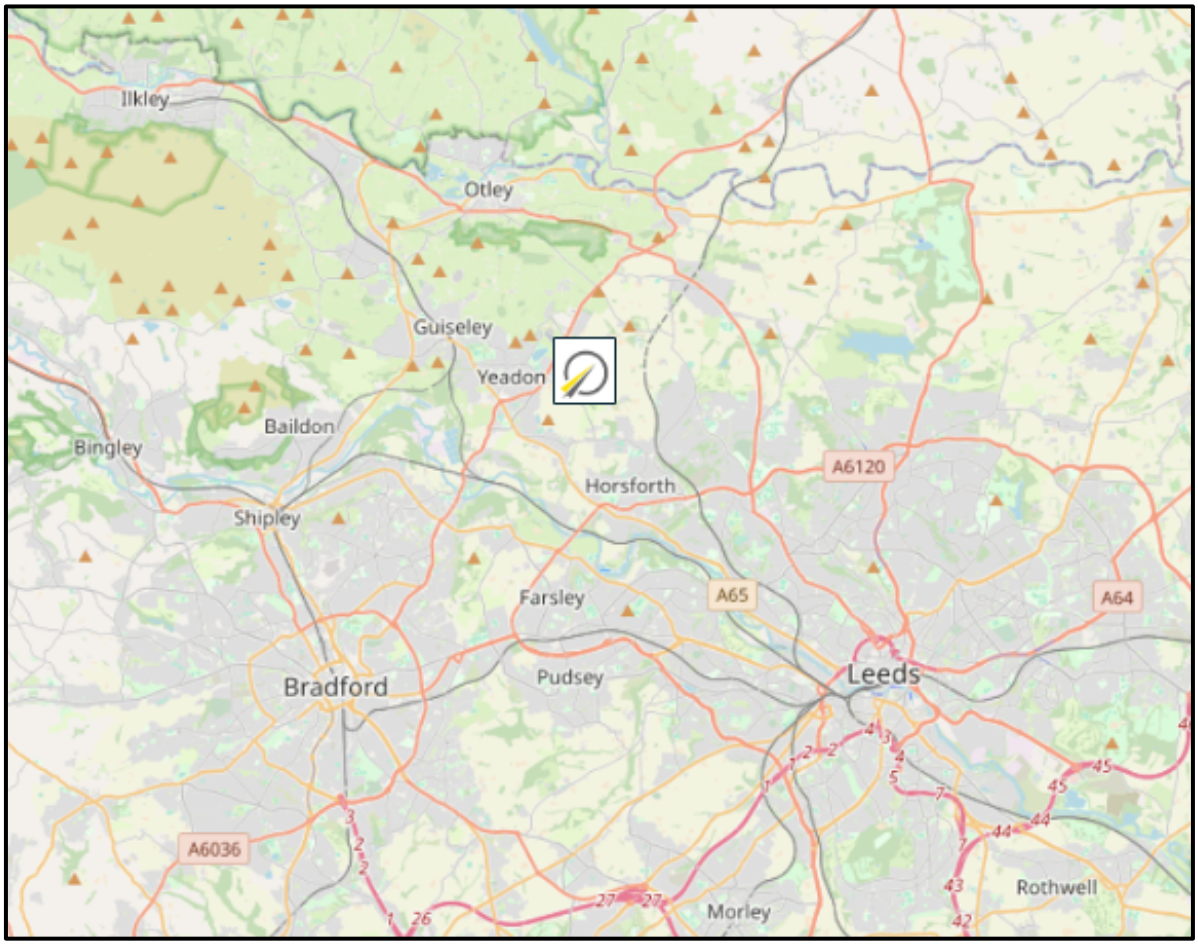

Figure2: Local Populations

2.1.4 To the north of LBA is the Nidderdale AONB and Yorkshire Dales National Park. Further to the northwest is the Forest of Bowland AONB and to the southwest is the Peak District National Park. These are illustrated in Figure 3.

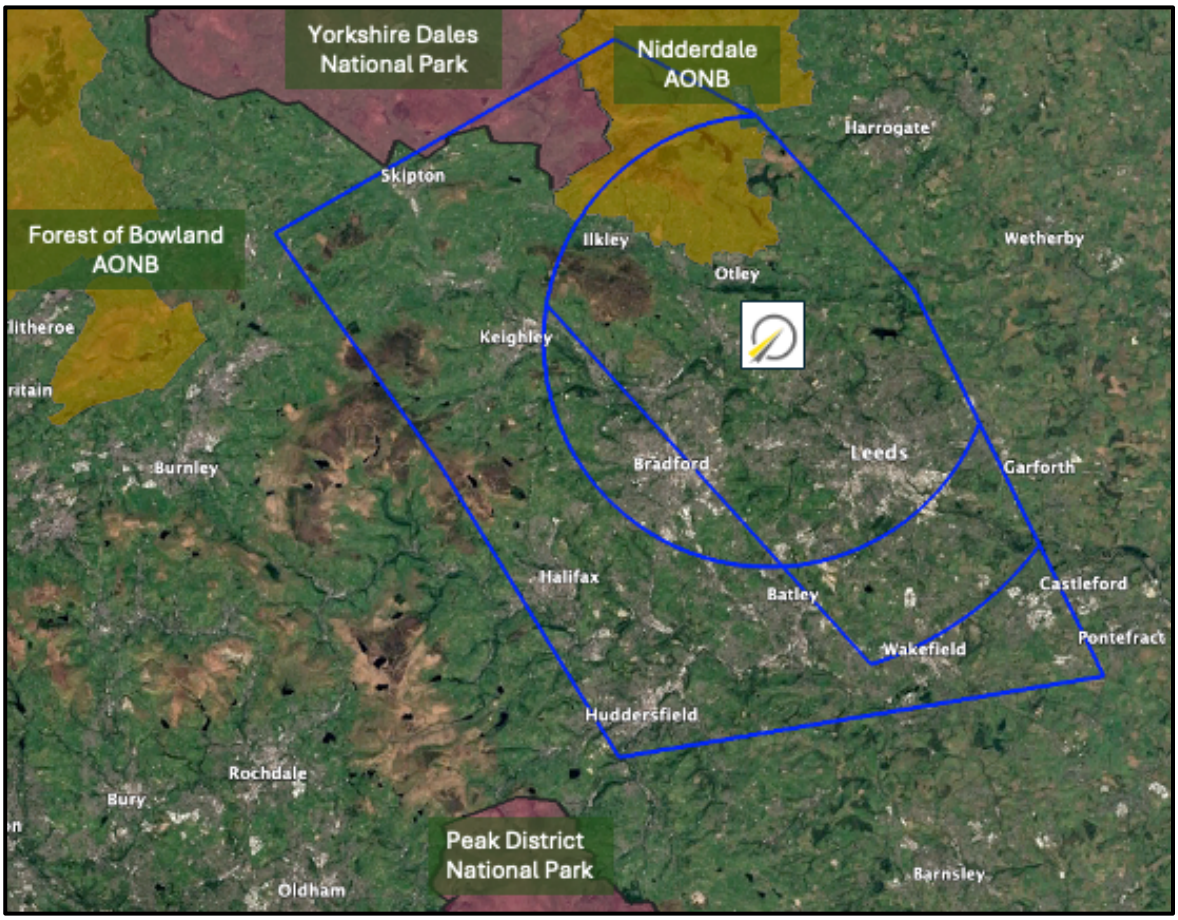

Figure 3: AONBs and National Parks. LBA's Controlled Airspace boundaries in blue

2.1.5 LBA has a single runway. Runways are given a numerical designation based on their compass bearing. The position of the runways at LBA means their runways are designated Runway 14 and Runway 32.

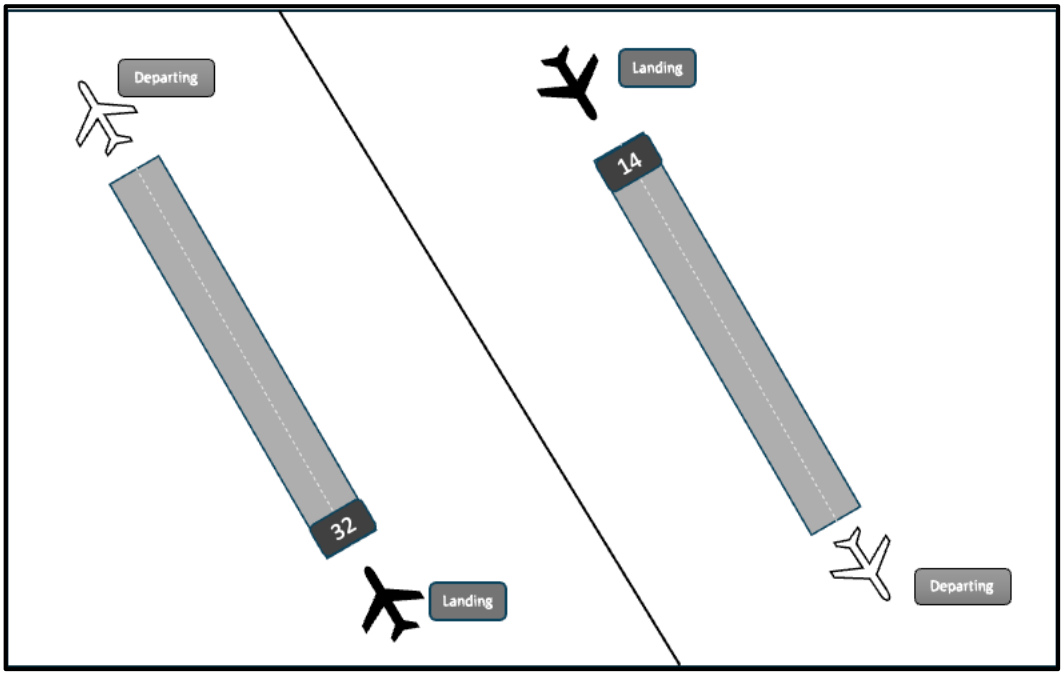

Figure 4: LBA Runway directions

2.1.6 The direction aircraft arrive and depart depends on the direction of the wind. For both safety and performance reasons, aircraft typically take off and land into the wind.

2.1.7 Due to aircraft normally taking off and landing into the wind, the wind direction at the time of an aircraft approach or departure usually determines which runway is chosen. The prevailing wind direction in the UK is from the southwest, therefore crosswinds are routinely a factor, and neither runway is often favoured by the wind. There is a selective runway procedure in place as part of the Section 106 agreement with the Local Planning Authority. This procedure is intended to mitigate the noise impact on the more densely populated area to the southeast of the Airport. *'Aircraft will use runway 14 for landing and runway 32 for take-off, whenever this is possible, having regard to wind, cloud base, approach aid limitations and aircraft performance and requirements.'* The S106 agreement is outside of the scope of the CAP1616 process. There are no plans to request changes to it as part of this process, except that it may be necessary to modify the description of the NPRs which are also a matter for the Local Planning Authority, in the event that they cannot adequately contain the preferred routes following the next stage of the process.

2.1.8 The average modal split, based on a 5-year period from 2013-2018, was 23% RWY 14 and 77% RWY 32 during the day[3]. At night[4] it was 17% RWY 14 and 83% RWY 32.

2.2 Controlled Airspace

2.2.1 LBA has a Control Zone (CTR) that extends from the surface to Flight Level (FL) 85 (c.8,500ft). It has three associated Control Areas (CTAs), and all are classified as Class D controlled airspace (CAS).

- CTA 1 extends from 2,500ft to FL85 (south of the Airport);
- CTA 2 (due west of the Airport) has the same vertical extent as CTA 1; and
- CTA 3 which surrounds the Airport from the South, through West to the North, extends from 3,000ft to FL85.

[3] 0700-2300
[4] 2300-0700

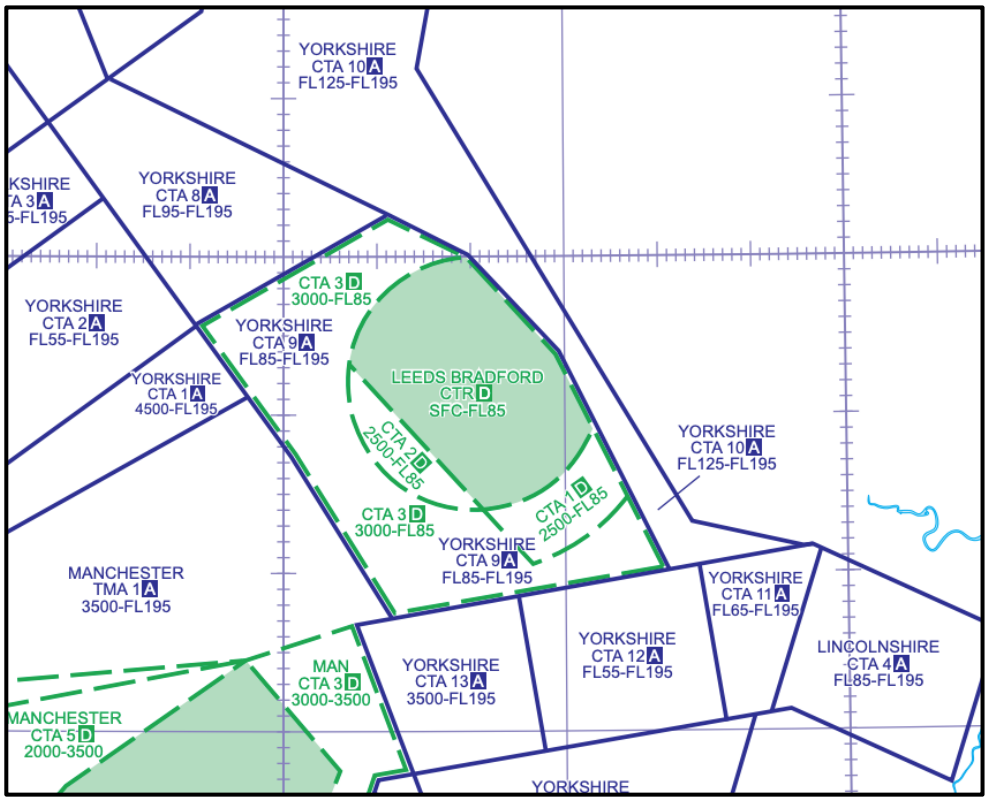

Figure 5: Controlled Airspace Structures

2.2.2 LBA's CTR/CTAs are adjacent to the Yorkshire CTAs (Class A), Manchester TMA (Class A) and Manchester CTA (Class D).

2.2.3 The Airspace immediately east of the LBA CTR consists of uncontrolled airspace (Class G) from the surface up to FL125 (12,500ft), where the Yorkshire CTA10 (Class A airspace) then extends from FL125 to FL195. This absence of CAS to the east of LBA at the lower levels is problematic as it gives the Air Traffic Controllers (ATCOs) very little room for manoeuvre in order to keep LBA arriving aircraft from straying into uncontrolled airspace.

Other airspace users in the area

2.2.4 The Class G airspace over the Vale of York is relatively busy and contains the activities of multiple GA airfields and gliding/paragliding centres, RAF Leeming and Teesside International Airport along with military fast jets and helicopters from Lincolnshire and further south.

2.2.5 RAF Leeming is 26nm to the northeast of LBA with Teesside Airport a further 14nm in the same direction. To the southeast of RAF Leeming is RAF Topcliffe, home to No. 645 Volunteer Gliding Squadron.

2.2.6 Leeds East Airport is approximately 16nm to the east within Class G airspace but has published Instrument Approach Procedures available. Leeds East has an Instrument Approach Procedure to their runway 06, which is partly inside LBA's CTA, and which is in confliction with LBA inbounds from the south, descending to 3000 feet to join the runway 32 ILS.

2.2.7 Just to the south of Leeds East is Sherburn-in-Elmet, also in Class G airspace but also with published Instrument Approach Procedures although these are contained underneath the LBA CTA.

2.2.8 Sandtoft Airport is 34nm to the southeast with the site of Doncaster Sheffield Airport (DSA) adjacent to Sandtoft.

2.2.9 When the Design Options were first being developed for this ACP, Doncaster Sheffield Airport (DSA) was still an ongoing concern, hence the DOs that were developed assumed LBA would need to deconflict their activities with those of DSA. By the time the second round of DO conception was underway, DSA had closed and as such, consideration was given to some options that might utilise some airspace adjacent to airspace previously used by DSA.

2.2.10 LBA used to utilise some of DSA's delegated airspace for some arrivals into LBA as part of a local agreement between the two airports. Following DSA's closure, the suspension of this airspace resulted in changes to how LBA manages the descent of the inbounds from the east, but it has had no significant impact on LBA's operation.

2.2.11 In September 2025, all DSA's CAS and associated procedures were removed from the UK Aeronautical Information Publication (AIP). At the time of writing, DSA have commenced an ACP to re-establish Controlled Airspace in support of their future operation.

2.2.12 Manchester Airport lies 38nm to the southwest of LBA.

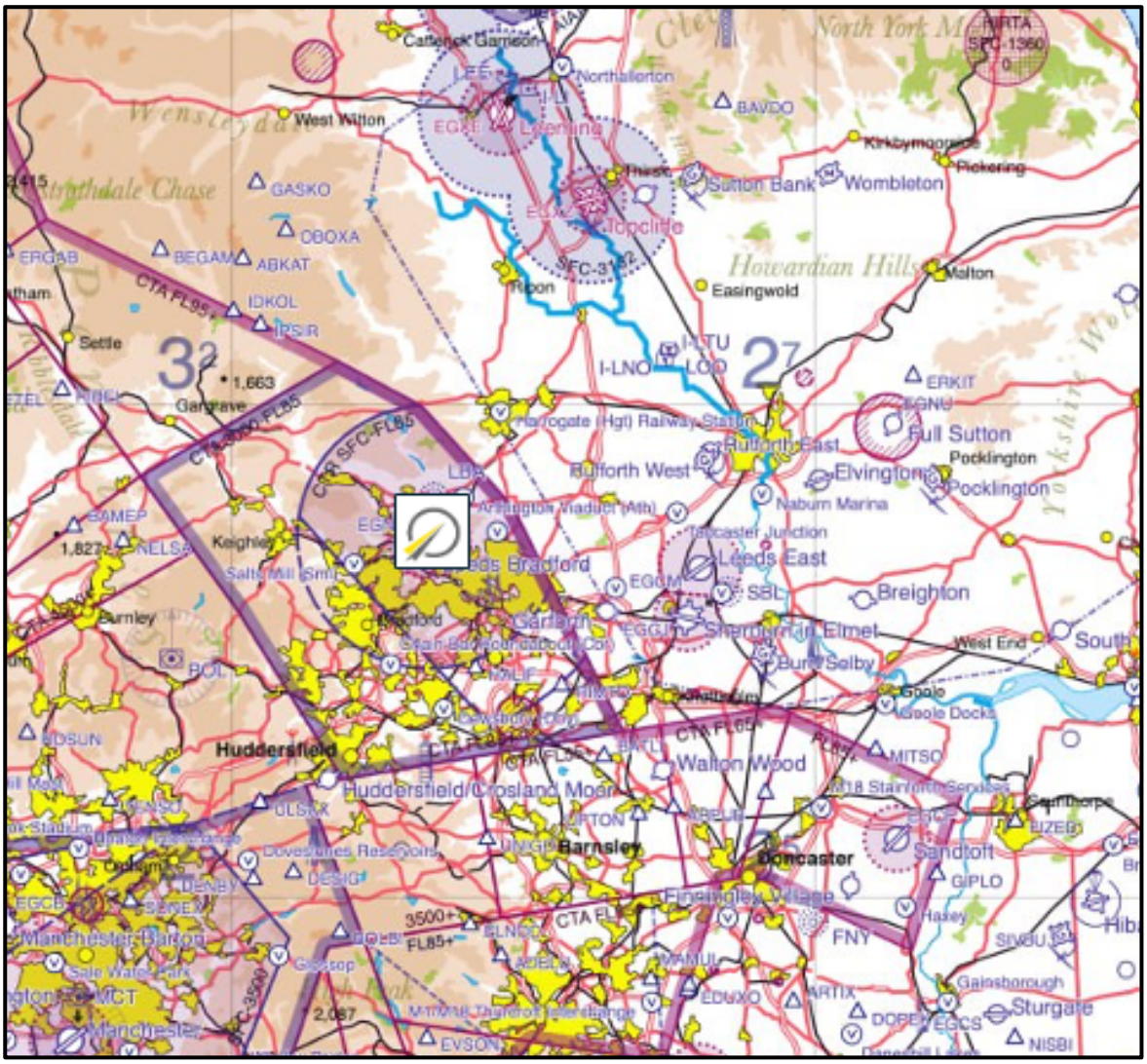

Figure 6: Local airspace geography

2.2.13 There are multiple GA airfields and landing sites located within or under the Leeds CTA. These include Coney Park Heliport, Carr Gate Heliport which is the base of the West Yorkshire Police Air Service, Nostell Priory Heliport, which is base to the Yorkshire Air Ambulance Service, Huddersfield Crossland Moor, a small fixed-wing airstrip and Oxenhope is another small airstrip.

2.3 LBA's Published Standard Instrument Departures and Noise Preferential Routeings

2.3.1 LBA has three Standard Instrument Departures (SIDs) from each runway although 2 of the SIDs from each runway are identical, with one being slightly longer than the other. Each SID climbs procedurally to FL70 on departure. These are depicted in Figure 7 and Figure 8 and consist of the NELSA/POLEHILL (for West and South-Westbound traffic depending on runway in use) and the DOPEK/LAMIX (for South-East and Eastbound traffic).

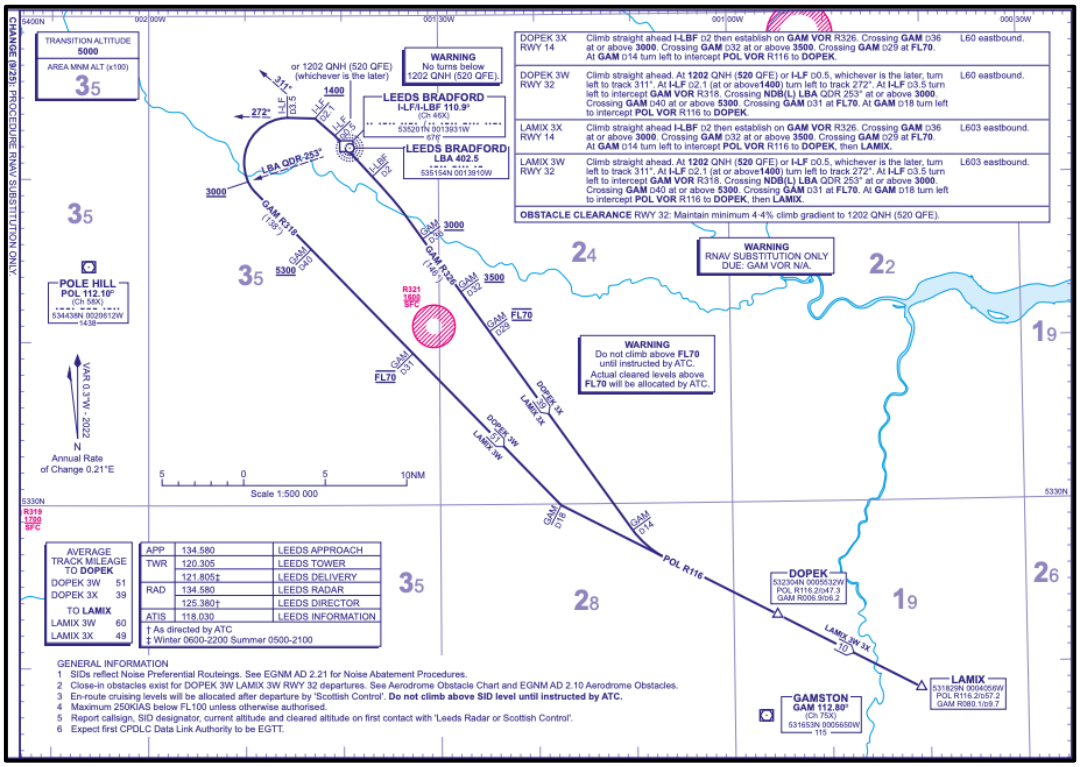

Figure 7: NELSA/POLEHILL SID

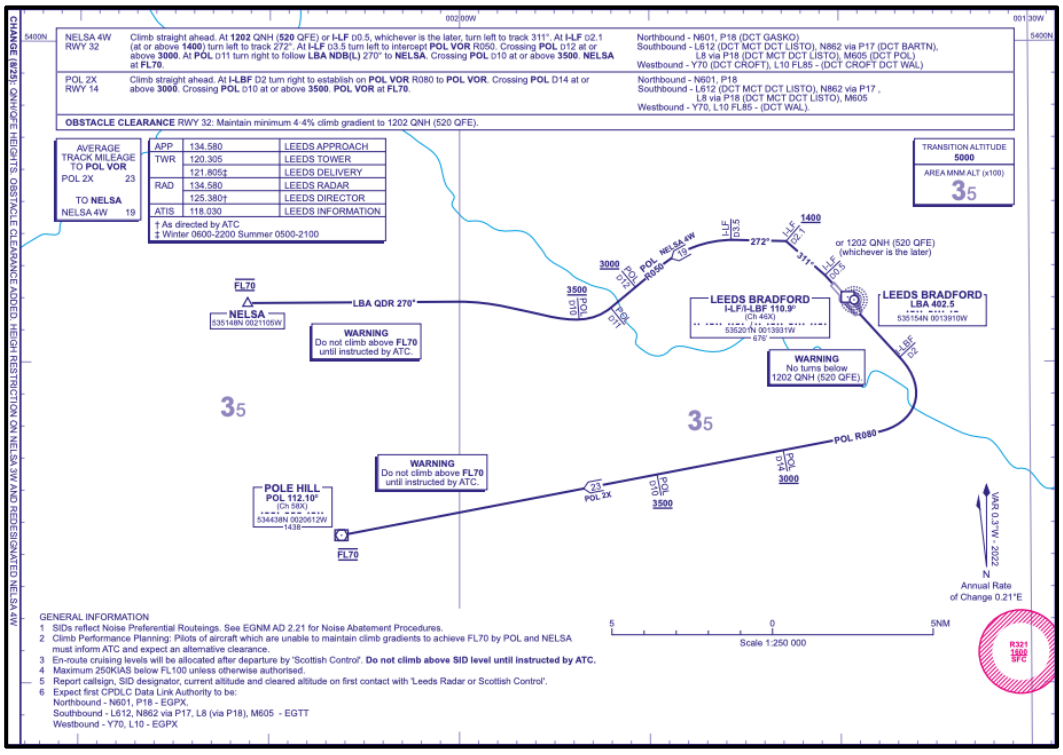

Figure 8: DOPEX/LAMIX SID

2.3.2 Figure 9 illustrates the SIDs centrelines geographically with dashed lines. The solid lines are LBA's existing CAS boundaries.

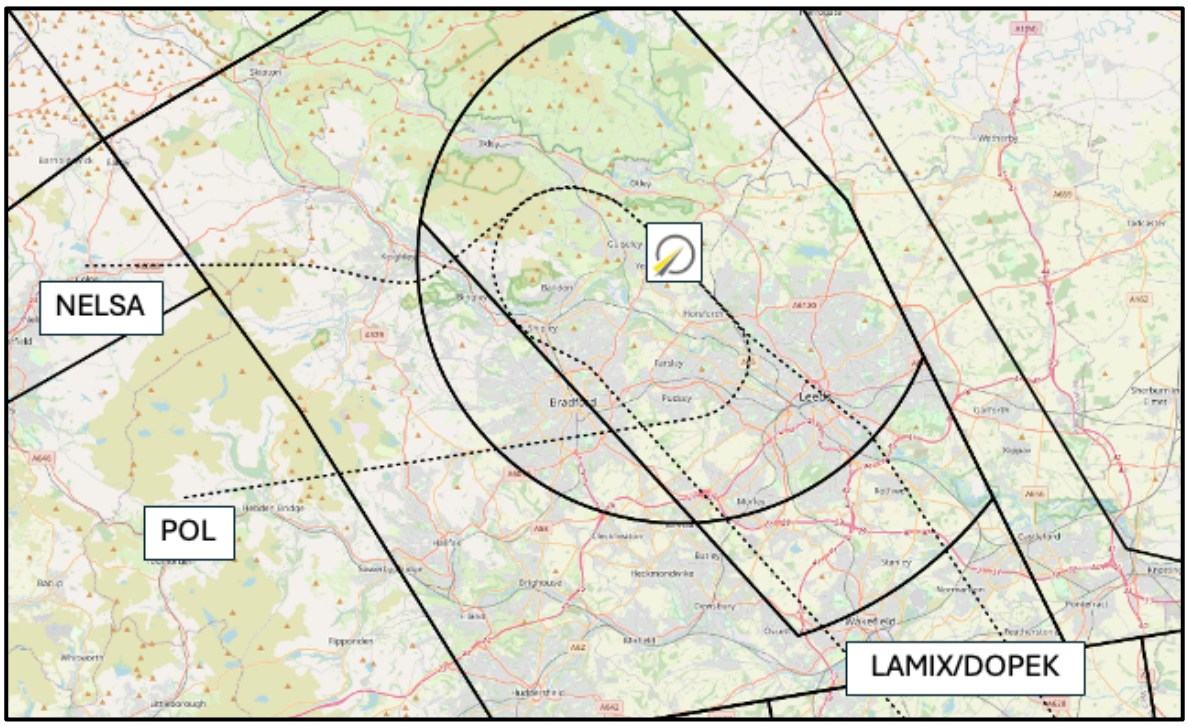

Figure 9: LBA SID centrelines/CAS boundaries

2.3.3 LBA has Noise Preferential Routings (NPRs) to supplement the selective runway procedure. The NPRs are in place for departing jet aircraft and were developed as a performance route to direct departing jet aircraft over the least populated areas. All departing jet aircraft are

required to follow the NPRs, however, sometimes this may not be possible due to weather conditions or conflicting traffic.

2.3.4 These NPRs are defined in the UK AIP as follows:

Departing Aircraft:

I. *Runway 14 – After take-off maintain runway heading to 'I LBF' DME 2 before setting course (or 'I LF' DME 2 when Runway 32 is being used for landing traffic).*

II. *Runway 32 – Climb straight ahead. At 1202 FT QNH (520 FT QFE) or I-LF D0.5, whichever is the later, turn left to track 311° MAG. At 'I LF' DME 2.1 *535340N 0014258W reduce to minimum safe power settings and turn left to make good a track of 272° MAG. Maintain this track until 'I LF' DME 3.5 *535405N 0014521W before setting course.*

III. *Turbo-prop: After take-off make good a track of 311° MAG and at DME 2.1 turn onto course.*

Note: The above routeings are compatible with normal ATC practice. In individual cases they may be varied owing to operational circumstances. The use of the Noise Preferential Routeings specified above is supplementary to the noise abatement take-off techniques as used by piston engined, turbo-prop and turbo-jet aircraft.

2.3.5 These NPRs are visualised in Figure 10. Four fixed noise monitors are in place; to measure the noise levels from aircraft and to ensure the airport is operating in compliance with the noise restrictions, these are represented by the green dots. LBA also have a number of mobile noise monitors which we can move around within the local community, these are represented by the yellow dots.

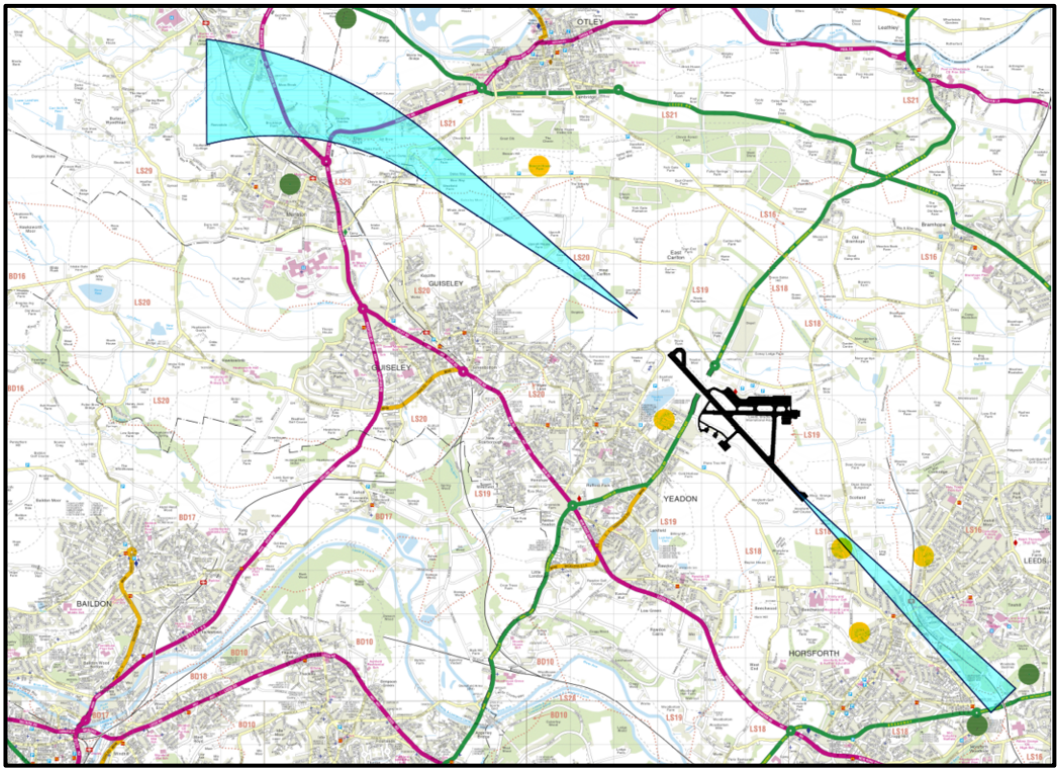

Figure 10: LBA's Noise Preferential Routeings

DVOR Withdrawal and RNAV Substitution

2.3.6 NATS are withdrawing numerous ground-based navigation aids across the country as part of the DVOR (Doppler VHF Omni-Directional Range) rationalisation programme. One of the DVOR identified in NATS' withdrawal plan affecting the LBA operation is the Gamston (GAM) DVOR.

2.3.7 LBA's LAMIX and DOPEK SIDs were reliant on the GAM and therefore a solution was required to enable NATS to withdrawal the GAM DVOR. The most effective, long-term solution was to introduce Performance-based Navigation SIDs, but this was already the subject of this ACP which will not be complete before these DVORs are decommissioned.

2.3.8 A more rapid, interim solution was required. This solution is known as RNAV substitution and is described in CAP 1781. It essentially relies on the continued use of airlines' flight management computer (FMC) coding to fly the procedures, as they are currently doing and have been doing for many years. Reliance on these coded overlays means that nothing changes, but the SIDs are no longer officially reliant on the DVORs and are instead reliant on the aircraft FMS coding instead.

2.3.9 This reliance has now been implemented for LBA's LAMIX and DOPEX SIDs. Once this ACP is implemented, LBA will have new SIDs that are designed to a PBN specification as the long-term solution. LBAs new SIDs could be very similar to today's or very different, that will be determined through this ACP.

2.4 LBA's Published Instrument Approach Procedures and Noise Abatement Procedures

2.4.1 LBA has a number of Instrument Approach Procedures (IAPs) available, predicated on different landing aids. The Instrument Landing System (ILS) procedures are, by far, the most common form of approach.

2.4.2 The ILS consists of two core elements, the glide path and the localiser. The glide path provides the descent angle towards the runway, and the localiser provides the lateral guidance, in a straight line, to the runway.

2.4.3 The runway 14 ILS has a glide slope of 3.5˚ which means it can only certified be for Category I approaches, whereas the runway 34 ILS, which has a glide slope of 3.0˚, is certified for Category II approaches. Category II approaches can be used in poorer visibility than Category I approaches meaning that runway 34 would be used for arrivals in such conditions.

2.4.4 In terms of arrivals coming from the en-route airspace, LBA does not have published Standard Arrival Routes (STARs) or Approach Transitions, which are procedures to connect the end of the STARs with the Instrument Approach Procedure. Instead of following STARs, inbound aircraft are issued tactical headings prior to transfer from NATS Scottish Control to LBA ATC, descending to an agreed level. Aircraft are then further manually directed (vectored) by LBA ATC onto final approach where they commence the ILS Instrument Approach Procedure.

2.4.5 LBA's Noise Abatement Procedure for arrivals states that *"Unless otherwise instructed by ATC, aircraft using the ILS shall not descend below 2000ft before intercepting the glidepath, nor thereafter fly below the glidepath. An aircraft approaching without assistance from ILS or*

radar shall follow a descent path which will not result in its being at any time lower than the approach path which would be followed by an aircraft using the ILS glidepath."

Holding of arrivals

2.4.6 LBA has a single arrival hold (also used as the Missed Approach Hold) associated with the Non-Directional Beacon (NDB) known as the LBA. It is situated overhead of the Airport.

2.4.7 The LBA hold is used very infrequently as an arrival hold and even less frequently as a Missed Approach Hold. Analysis of the radar data shown in the next suggestion demonstrates that the LBA hold was used for less than 20 flights in the 92-day summer period, 2022.

2.5 Existing Traffic Patterns

2.5.1 The combination of the absence of STARs, approach transitions and CAS constraints results in a highly tactical operation for ATC, generating a high-workload environment, with LBA's arrivals and departures spread over a wide area.

2.5.2 The images shown in this section are generated from radar data during the 92-day summer period 16th June to the 15th September inclusive, 2022. Across this period there were just under 12,000 ATMs at the airport.

Runway 32 Departures

2.5.3 Figure 11 shows the runway 32 SID centrelines illustrated with black dashed lines, the CAS boundaries in solid black lines and the tracks of all departures across the 92-day period are shown in blue. There is a greater concentration of flights at lower altitude before ATC instructs the departures to take more direct tracks to points along their flight planned route. Some departures are instructed to turn right on departure, but this is a much less frequent occurrence.

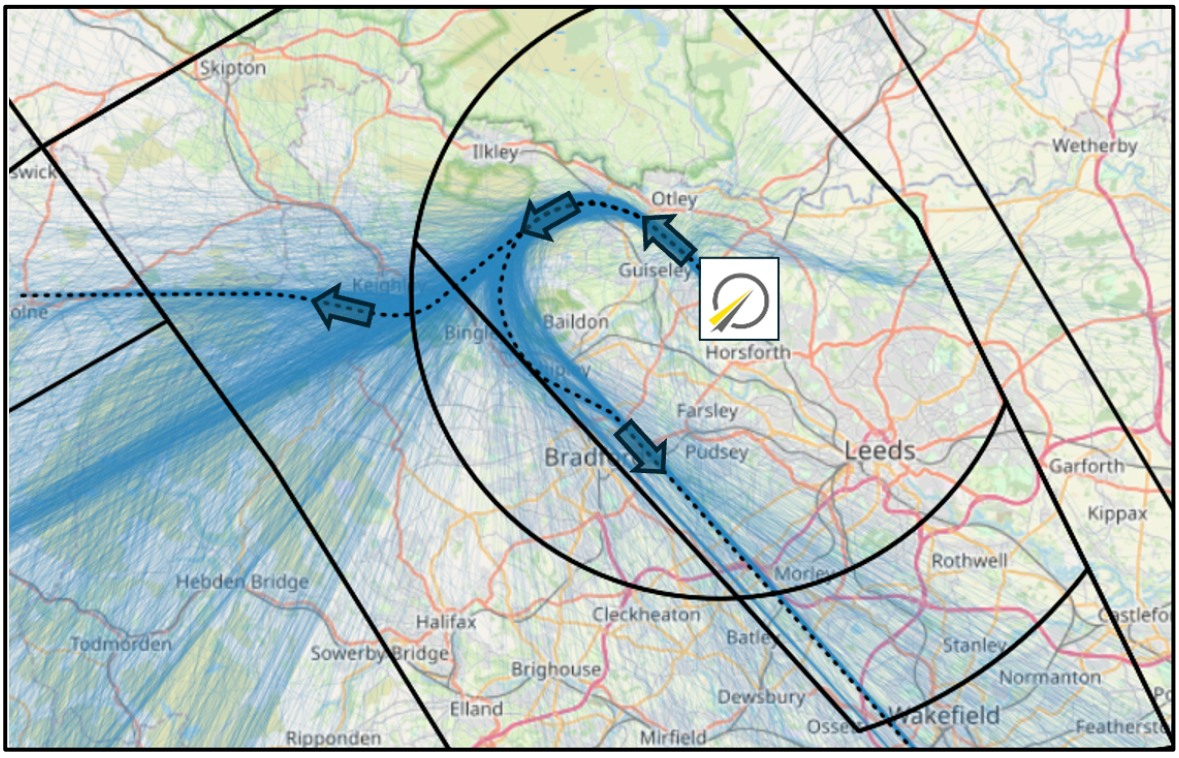

Figure 11: RWY32 SID centrelines with 92-day departure data

Runway 32 Arrivals

2.5.4 Figure 12 shows the CAS boundaries in solid black lines and the runway 32 arrival tracks of all arrivals across the 92-day period are shown in red. There is a greater concentration of flights at lower altitude, once aircraft are positioned onto the ILS, prior to this point all arrivals are vectored by ATC. Some arrivals to arrive from the north but the vast majority arrive from the southeast and southwest.

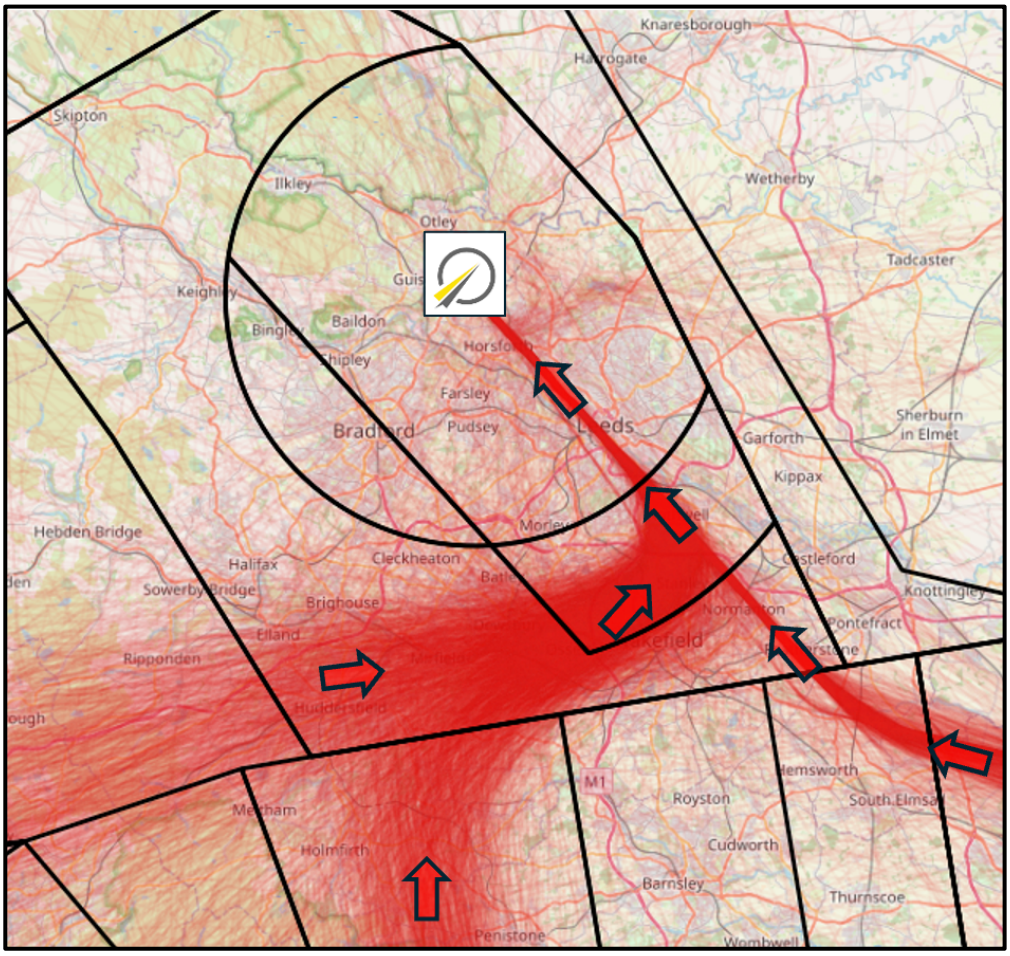

Figure 12: RWY32 92-day arrival tracks

Runway 32 Operations

2.5.5 Figure 13 illustrates typical Runway 32 operations with arrivals in red and departures in blue. In this runway configuration, the departures to the south would typically 'out climb' the arrivals, providing a more efficient traffic flow.

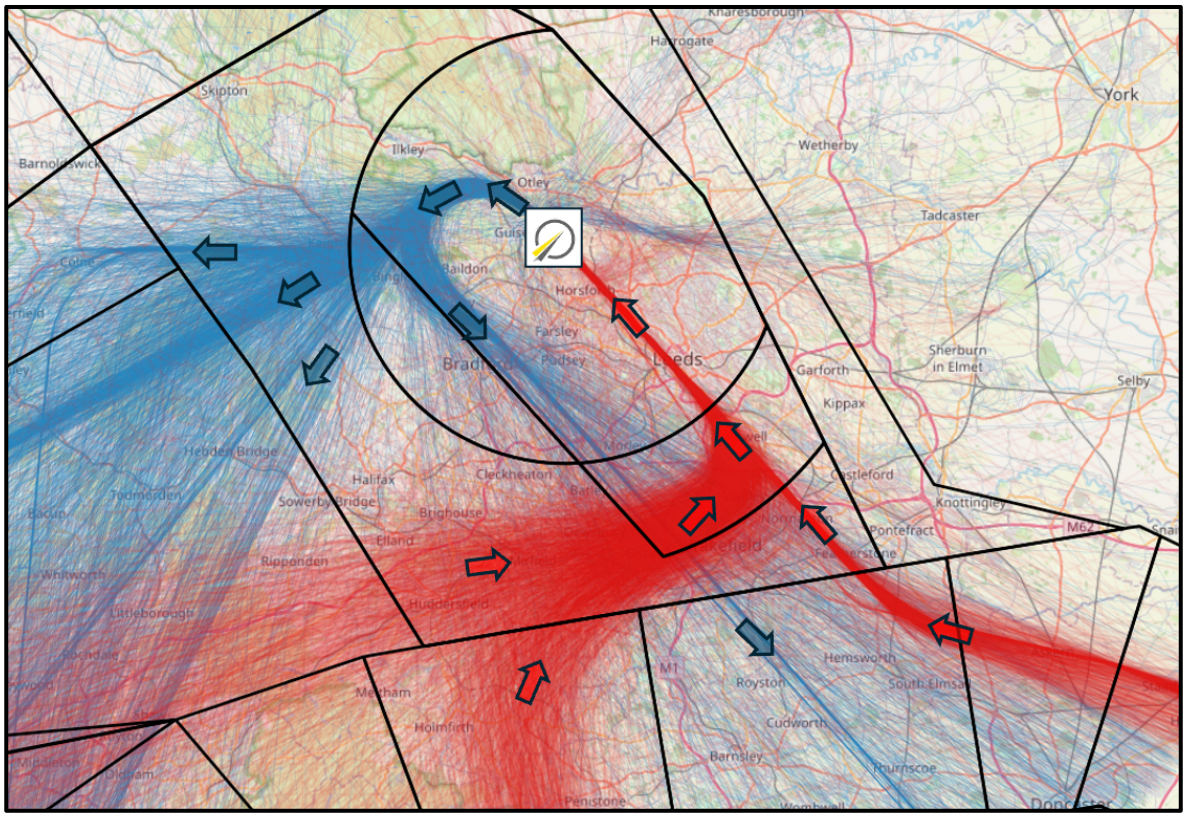

Figure 13: Typical RWY32 Operations

Runway 14 Departures

2.5.6 Figure 14 shows the runway 14 SID centrelines illustrated with black dashed lines, the CAS boundaries in solid black lines and the tracks of all departures across the 92-day period are shown in blue. There is a greater concentration of flights at lower altitude before ATC instructs the departures to take more direct tracks to points along their flight planned route. Some departures are instructed to turn left on departure, but this is a much less frequent occurrence.

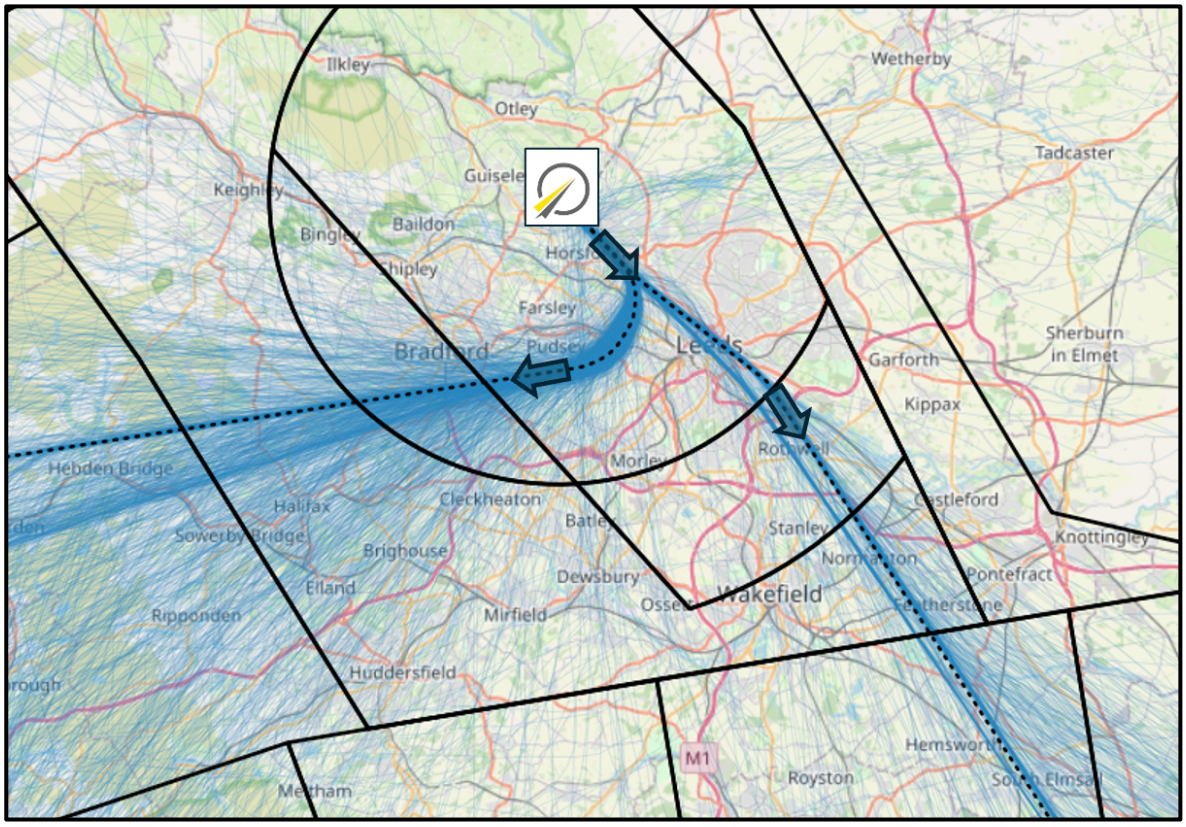

Figure 14: RWY14 SID centrelines with 92-day departure data

Runway 14 Arrivals

2.5.7 Figure 15 shows the CAS boundaries in solid black lines and the runway 14 arrival tracks of all arrivals across the 92-day period are shown in red. This traffic flow is slightly more complex because some arrivals are instructed to route to overhead the airport before fanning back out for the approach. The majority of arrivals join final approach from the west side over Skipton and Silsden than from the east side where the airspace is more restricted.

2.5.8 There is a greater concentration of flights at lower altitude, once aircraft are positioned onto the ILS, prior to this point all arrivals are vectored by ATC. Some arrivals to arrive from the north but the vast majority arrive from the southeast and southwest.

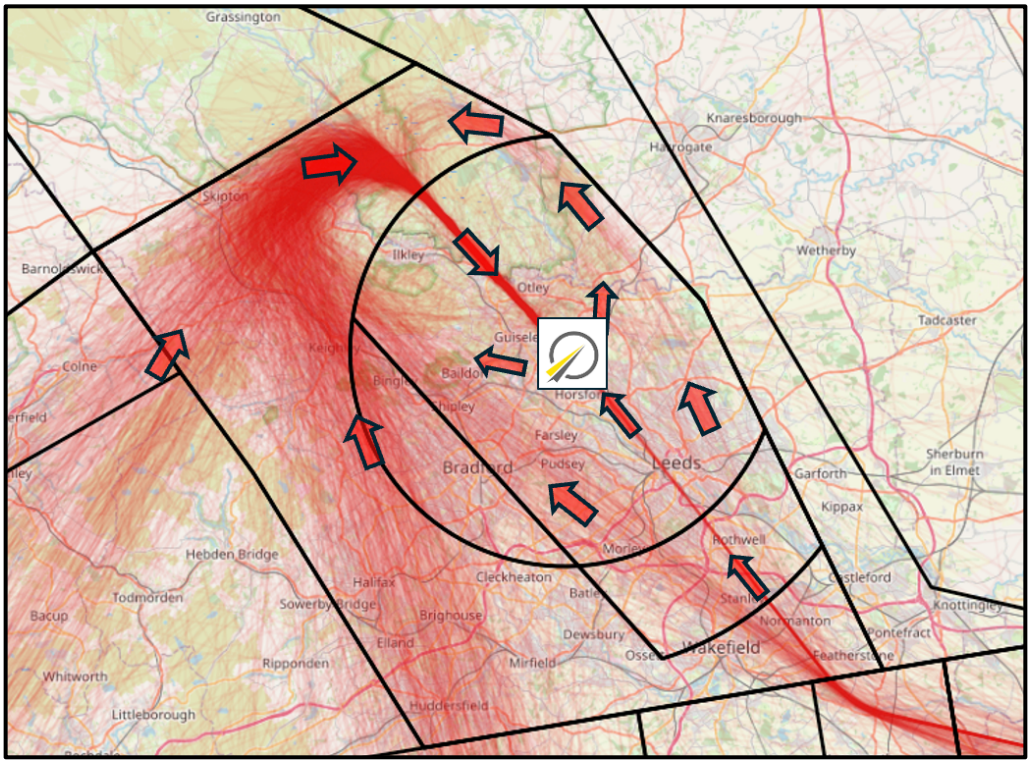

Figure 15: RWY14 92-day arrival tracks

Runway 14 Operations

2.5.9 Figure 16 illustrates typical Runway 14 operations with arrivals in red and departures in blue. In this runway configuration, the departures to the west would typically be 'held down' beneath the arrivals from the south, creating a less efficient traffic flow.

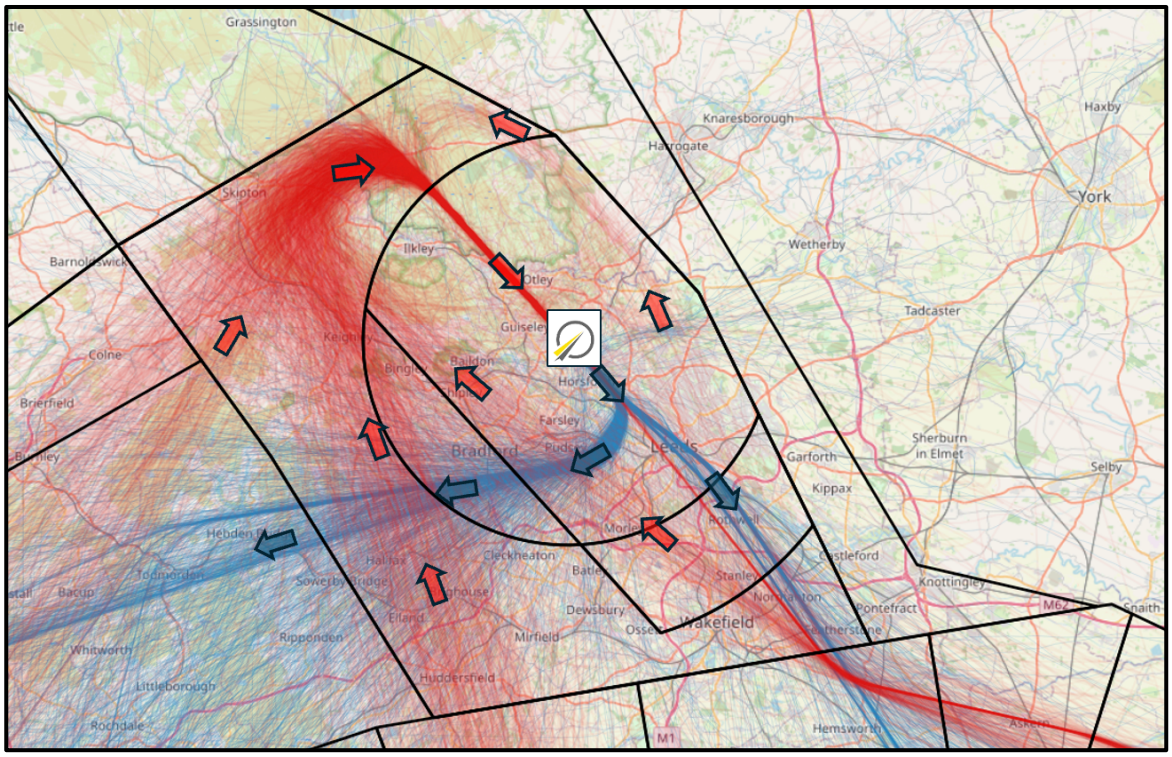

Figure 16: RWY14 typical operations

2.6 Existing Noise Environment

2.6.1 There are a range of metrics used to describe aircraft noise and to inform policy. The most common international measure of noise is the L_{Aeq} which means 'equivalent continuous noise level'.

2.6.2 In the UK, daytime aircraft noise is typically measured by calculating the average noise level in decibels (dB) over 16 hours (0700-2300) during the daytime summer period, and over 8 hours (2300-0700) during the nighttime summer period. The summer period is 16 June to 15 September inclusive. Noise primary impacts are defined by these L_{Aeq} contours, above 51dB L_{Aeq} for day and 45dB L_{Aeq} for night. These are known as the Lowest Observed Adverse Effect Level or LOAEL.

2.6.3 The LOAEL is defined as the point at which adverse effects of noise begin to be seen on a community basis. i.e. those communities within the LOAEL are considered to be those who are most adversely affected by aircraft noise

2.6.4 Airport Operators in the UK are obliged to review and revise (if necessary) their Noise Action Plan (NAP) every 5 years, or sooner where a major development occurs. The last NAP, with meaningful data and contours contained within it, was produced based upon data collected in 2016. Subsequent data collection in 2021 was affected by COVID-19 and its significant

impact on the number of aircraft movements. Accordingly, the 2022 NAP and the noise contours contained therein is not a helpful benchmark to use as a baseline[5].

2.6.5 As LBA also had noise contours developed in 2018 in support of a planning application, this 2018 data was seen to be more representative of the baseline for movements and fleet mix.

2.6.6 The noise modelling that was undertaken for these contours has been made compliant with CAP 2091 Category A minimum requirements, although Category C is the level which was deemed to be relevant to this ACP. This Category was determined by the guidance on population thresholds provided in CAP 2091 (namely that between 25,000 and 200,000 people would be exposed to 51dB $L_{Aeq16hr}$, average summer day, and 45dB L_{Aeq8hr}, average night), given that the estimated populations exposed are 21,300 and 45,950 respectively.

2.6.7 The following table shows the estimated number of people and dwellings experiencing average noise levels above 51 decibels (dB) during the average summer day in 2018; this is the average noise level produced by aircraft over the 16-hour daytime period (07:00 to 23:00) for the 92-day "summer" defined as 16 June to 15 Sept inclusive.

Noise Level (dB)	Number of People	Number of Dwellings
≥51 LOAEL	52000	21300
≥54	16400	7450
≥57	2800	1100
≥60	900	350
≥63	200	100
≥66	0	0
≥69	0	0

Table 3: Estimated total no. of people and dwelling above various noise levels, LAeq 16h in the vicinity of LBA, 2018

2.6.8 Figure 17 shows where these noise contours lie in relation to the Airport. The outer contour is the 51dB contour as referred to in Table 4.

[5] Note that 2022 data (vice 2018 data) has been used to depict the existing operation in terms of 'where' traffic goes, i.e. to determine the baseline swathes. 2018 data was however more representative to show noise contours, ATMs and fleet mix.

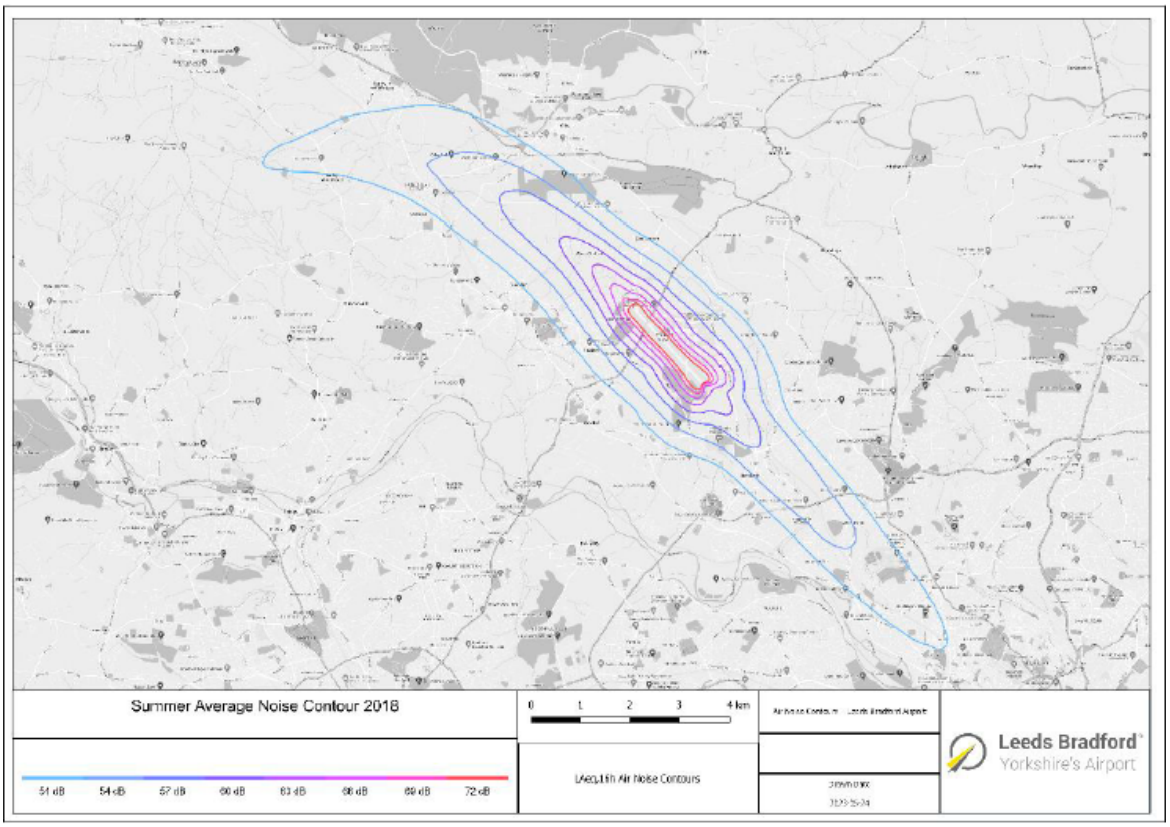

Figure 17: 2018 LBA Average Summer Day L_{Aeq} 16h

2.6.9 Table 4 shows the estimated number of people and dwellings experiencing average noise levels above 45 dB during the average summer night in 2018; this is the average noise level produced by aircraft over the 8-hour night-time period (23:00 to 07:00).

Noise Level (dB)	Number of People	Number of Dwellings
≥45 LOAEL	115200	45950
≥48	55900	21950
≥51	13400	6100
≥54	1500	600
≥55	1100	450
≥58	200	100
≥61	0	0

Table 4: Estimated total number of people/dwellings above various noise levels, LAeq 8h in the vicinity of LBA, 2018

2.6.10 Figure 18 shows where these noise contours lie in relation to the Airport. The outer contour is the 51dB contour as referred to in Table 4.

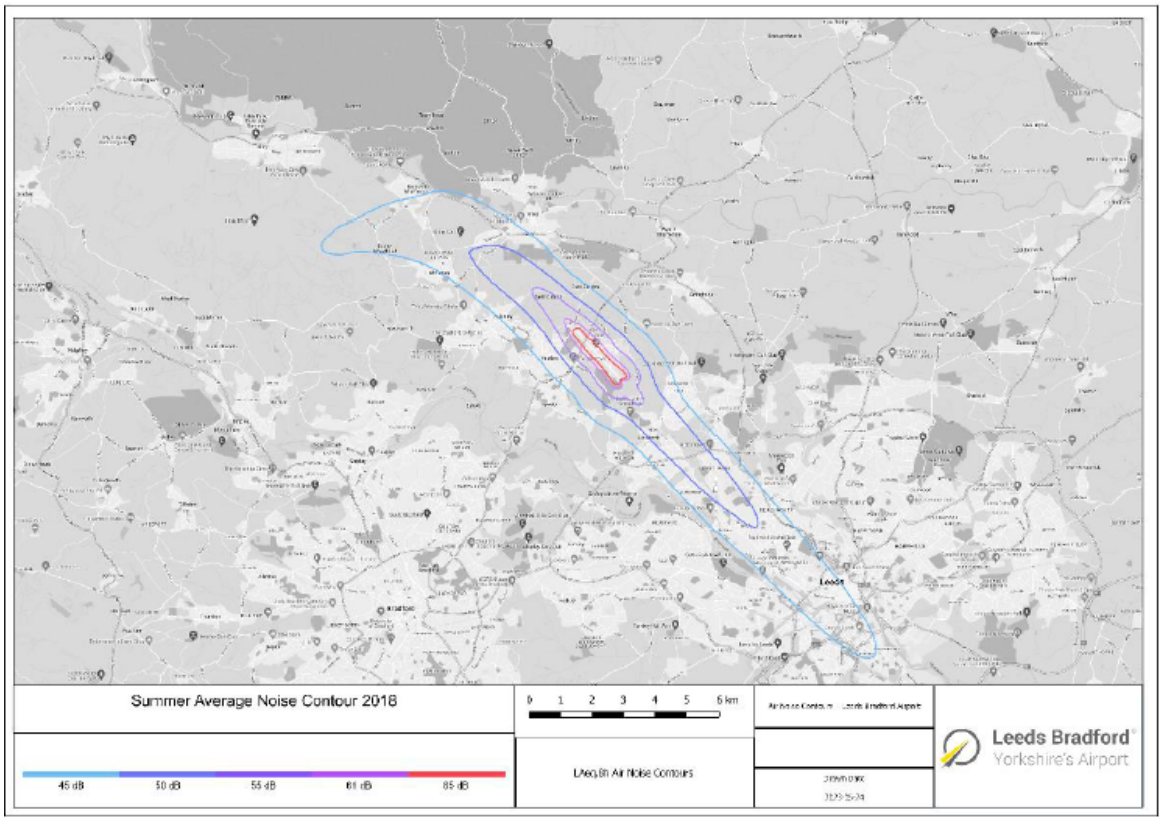

Fig 18: 2018 LBA Average Summer Night L_{Aeq} 8h

2.7 Existing ATM Numbers and Forecasts

2.7.1 The total annual aircraft movements in 2018 were used to develop the 2018 L_{Aeq} noise contours shown above. This is the latest noise modelling available to LBA at this stage of the process.

2.7.2 CAP1616 requires ACP sponsors to consider the forecast growth of their operation in terms of the forecast number of movements. This forecast should not only consider growth between now and implementation of the proposed changes, but it should also consider the potential growth to 10 years beyond the implementation date.

2.7.3 The expected year of implementation for the MTMA proposals is currently to be confirmed, however there is an assumption that there will be no changes any earlier than 2029. Based on this, the implementation year for LBA's Stage 2 work is 2029, with 10 years beyond this assessed as 2038.

2.7.4 LBA's current business plan anticipates that by 2030, LBA will be serving 7 million passengers per year. Growth beyond 7 million passengers will require a new planning application due to the constraints of the existing terminal building. This is outside the scope of the ACP. LBA have forecasted movement numbers out to 2038 on the basis of the current business plan. Because of this, between 2030 and 2038, the forecast movement numbers are consistent each year as shown in Table 5 below.

Year	2018 (Latest noise modelling available)	2022 Current year for Stage 2 assessments	2024 Latest full year data available	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Annual aircraft movements	38680	33912	36926	44461	45970	45970	45970	45970	45970	45970	45970	45970	45970

Table 5: LBA total annual movement forecast 2018-2036

2.8 Continuous Climb and Descent Performance

2.8.1 Continuous Climb and Descent Operations (CCOs and CDOs) are aircraft operating techniques enabled by airspace design, instrument procedure design and facilitated by ATC. CCO and CDO allow aircraft to follow a flexible, optimum flight path that delivers major environmental and economic benefits - reduced fuel burn, emissions, noise and fuel costs - without any adverse effect on safety.

2.8.2 CCO and CDO operations allow arriving or departing aircraft to descend or climb continuously, to the greatest extent possible. Aircraft conducting CCO employ optimum climb engine thrust and climb speeds until reaching their cruising levels. With CDO, aircraft employ the minimum engine thrust necessary, ideally from top of descent and in a low drag configuration, prior to the final approach. Employment of these techniques reduces the need for intermediate level-offs and results in increased time being spent at more fuel-efficient higher cruising levels, resulting in a significant reduction in fuel burn and lowering emissions and fuel costs. CDOs also result in a reduction of noise impact as there is less requirement to increase power to maintain an altitude.

2.8.3 LBA's ability to achieve continuous climb rests firmly on the traffic levels within the MTMA. Runway 32 departures perform better as they route further to the North however runway 14 departures can frequently be held underneath or in the vicinity of arrivals into Manchester.

2.8.4 Continuous descent is also frequently impacted by Manchester traffic. For example, LBA arrivals can be impeded by Manchester's traffic meaning that LBA arriving aircraft may then be high on the approach profile.

2.8.5 When DSA was operating, this used to affect LBA inbounds from the southeast resulting in a stepped descent from FL90, through FL70, FL60 then 3000ft.

2.9 Night Restrictions (see AIP)

2.9.1 The airport company is subject to planning requirements imposed during the night period 2300-0700. Such aircraft movements are permitted in the following circumstances:

- Delayed landings up to 0100 by aircraft scheduled to land between 0700-2300.

2.9.2 An emergency i.e. A flight where there is an immediate danger to life or health, whether human or animal.

3. DEVELOPMENT OF A COMPREHENSIVE LIST OF OPTIONS

3.1 Approach to Developing Options

3.1.1 In accordance with the CAP 1616 process, a comprehensive list of options was developed through internal workshops and targeted stakeholder engagement. The ACP team conceived unconstrained options i.e. a 'blank sheet of paper' approach was adopted. Whilst it was accepted that this may have resulted in unrealistic options, it was considered important to think as broadly as possible, at this stage, to identify a comprehensive range of options.

3.1.2 The first (Round 1) workshops were held on the 05th July 2022 which introduced the list of Design Options (DOs) to the stakeholders and our assessment of the Design Options against the Design Principles they helped us develop. Following these workshops, stakeholders were invited to take part in an online survey which ran from the 13th July 2022 to the 26th August 2022. It provided respondents an opportunity to comment on areas where they felt the DOs may not have been addressing the design principles. To help stakeholders provide feedback, LBA provided a preliminary initial design principle evaluation for comment.

3.1.3 An update was sent to stakeholders on 28th July 2022 to provide additional context to the DOs and address some of the questions raised.

3.1.4 In response to stakeholder feedback, a series of additional departure DOs were developed, along with a revised array of arrival system DOs. These were shared with the same set of stakeholders in a second round of engagement (Round 2) over the period 31st March 2023 to 28th April 2023 through a presentation sent out via email. The presentation was again accompanied by an online survey.

3.1.5 Subsequently, a submission of Stage 2 documents was made to the CAA, and this was assessed at the June 2023 Develop and Assess Gateway Meeting. The CAA found various weaknesses within the submission, and it was established that the Design Principle Evaluation conducted previously needed to be reviewed, as did the Initial Options Appraisal, to ensure a consistent application of criteria across the DOs. Additionally, based upon meetings between the Airport and the En-Route Air Traffic Service provider, it was deemed necessary to develop additional arrival DOs and the opportunity was taken to develop new Departure Options, focused on providing communities with respite or night-time noise relief.

3.1.6 These new DOs, and most of the previously shared DOs, were circulated for a third round of engagement (Round 3) with the same set of stakeholders engaged previously, over the period 22nd November 2023 to 20th December 2023 through a presentation sent out via email and an online survey. A briefing was held online on 5th December 2023 allowing stakeholders the opportunity to have concepts explained or have their questions answered.

3.1.7 Finally, an update (Round 4) was sent to all stakeholders in May 2025 to provide additional clarification and introduce an amendment to an arrival option.

3.1.8 More information on stakeholder engagement can be found in Section 4.

3.2 All options developed and considered

3.2.1 Over the course of 18 months and 4 rounds of engagement, many options were developed and some were discounted due to lack of operational viability along the way, especially as NERL's emerging network requirements for the MTMA matured. The MTMA design required departures to continue to route towards NELSA, POL but for southbound departures, towards an existing waypoint MAMUL, approximately 12nm, west of DOPEK.

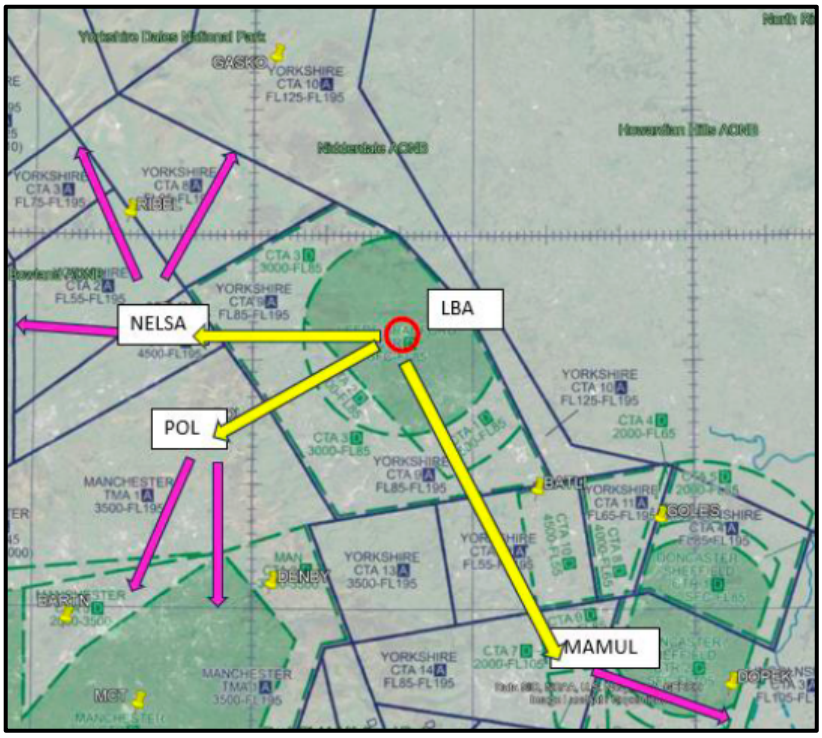

Figure 19: NERL's MTMA Departure requirements

3.2.2 This section shows all options developed during this period and when they were shared with stakeholders. More information on those options can be found in the associated engagement material in Appendix A.

3.2.3 We also explain which of those options were discounted ahead of the formal Design Principle Evaluation and why, and when stakeholders were informed of those decisions.

3.2.4 It's important to note that whilst an option's initial/preliminary performance against the design principles were shared with stakeholders throughout the engagement for feedback, options were only discounted ahead of the *formal* design principle evaluation within this document, on the basis of incompatibility with NERLs emerging MTMA network design.

3.3 Runway 32 Departures

Runway 32 Baseline Southeast and South & West (Do Nothing)

3.3.1 In the case of the departures, the Design Options (DOs) are depicted as swathes i.e. areas within which a final departure nominal track might ultimately be designed. In order to create a comparable baseline, we created swathes around the baseline radar tracks and have used these swathes to illustrate the baseline scenario.

3.3.2 This depiction of the baseline was shared with stakeholders in Round 3 of engagement Nov 2023.

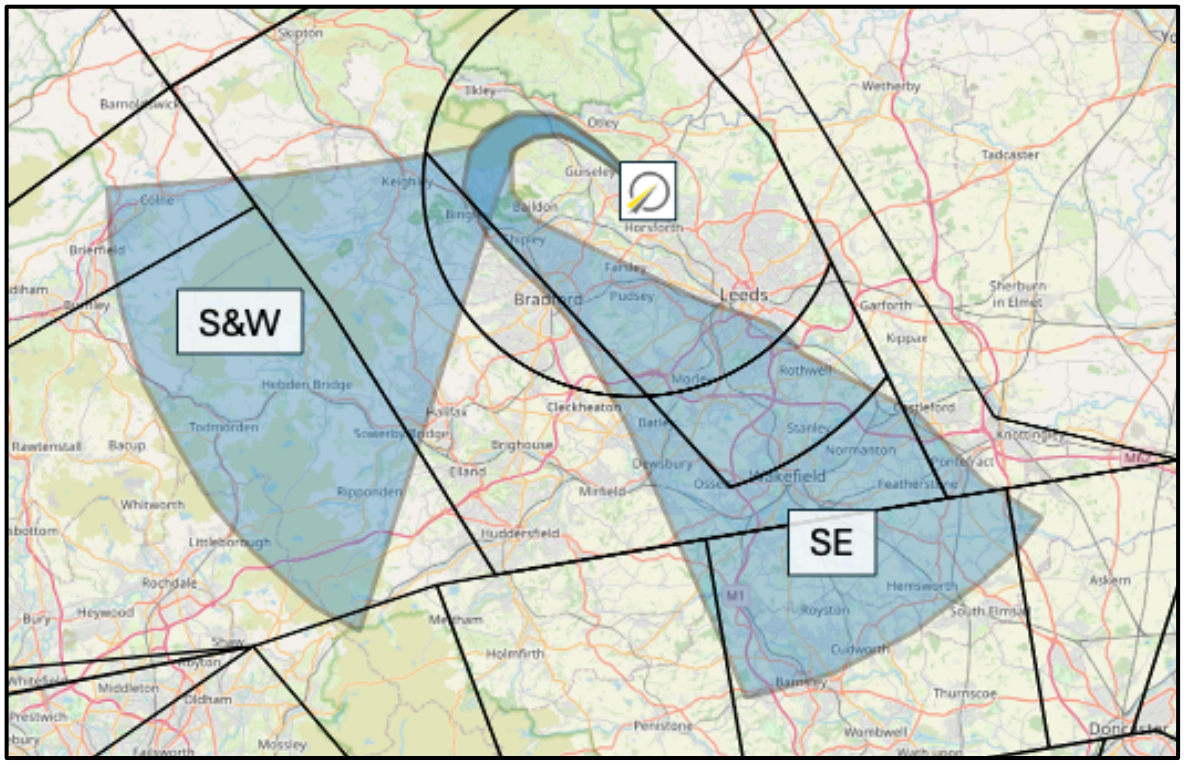

Figure 20: RWY32 Departure Baseline

Runway 32 North West A and B

3.3.3 Option A was shared with stakeholders in Round 1 of engagement July 2022.

3.3.4 Option B was generated as a result of feedback from the first round of engagement where stakeholders suggested flying straight ahead for longer over Weston Park before turning before turning to delay overflight of communities. This option was shared with stakeholders in Round 2 of engagement April 2023.

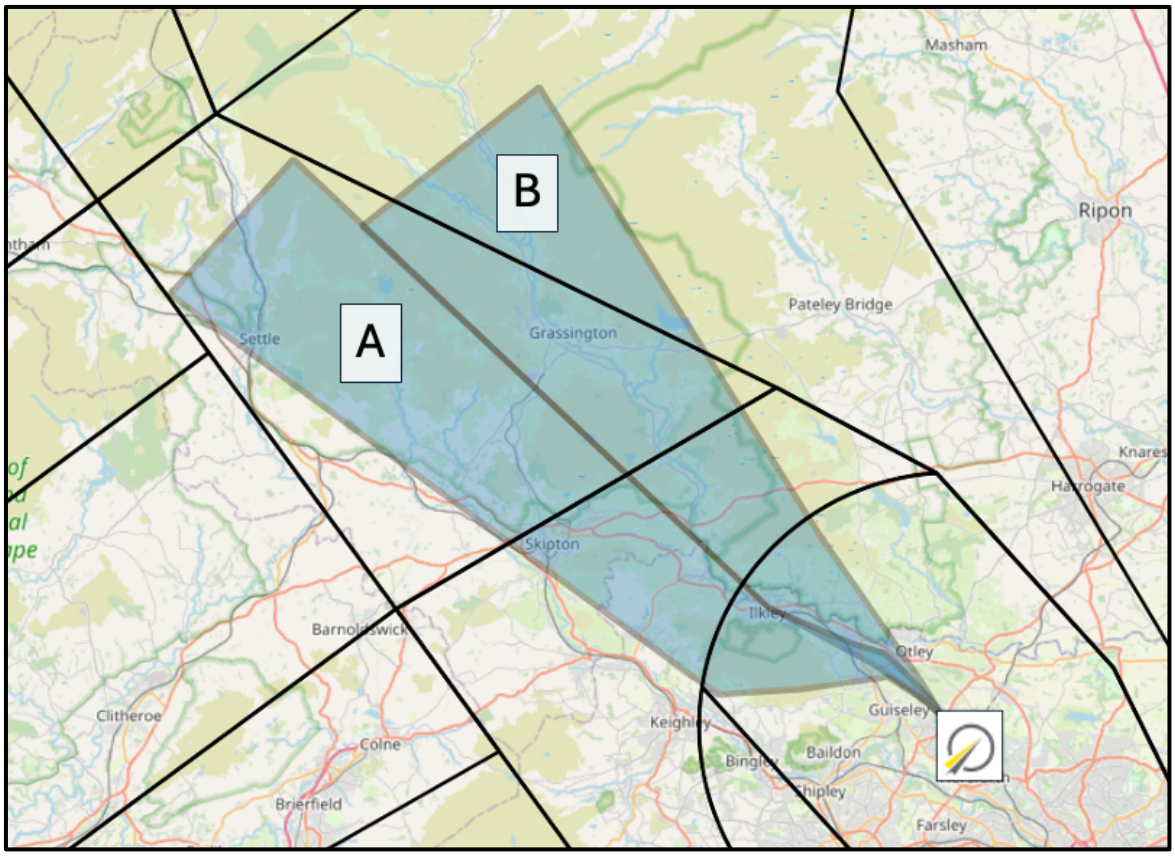

Figure 21: RWY32 North West Option A & B

3.3.5 Options A and B were subsequently both discounted owing to insufficient demand for a north-westerly SID from the airport. This decision was shared with stakeholders in Round 3 of engagement November 2023. These options will not form part of the design principle evaluation.

Runway 32 North East A to E

3.3.6 Options A to E were shared with stakeholders Round 1 of engagement July 2022.

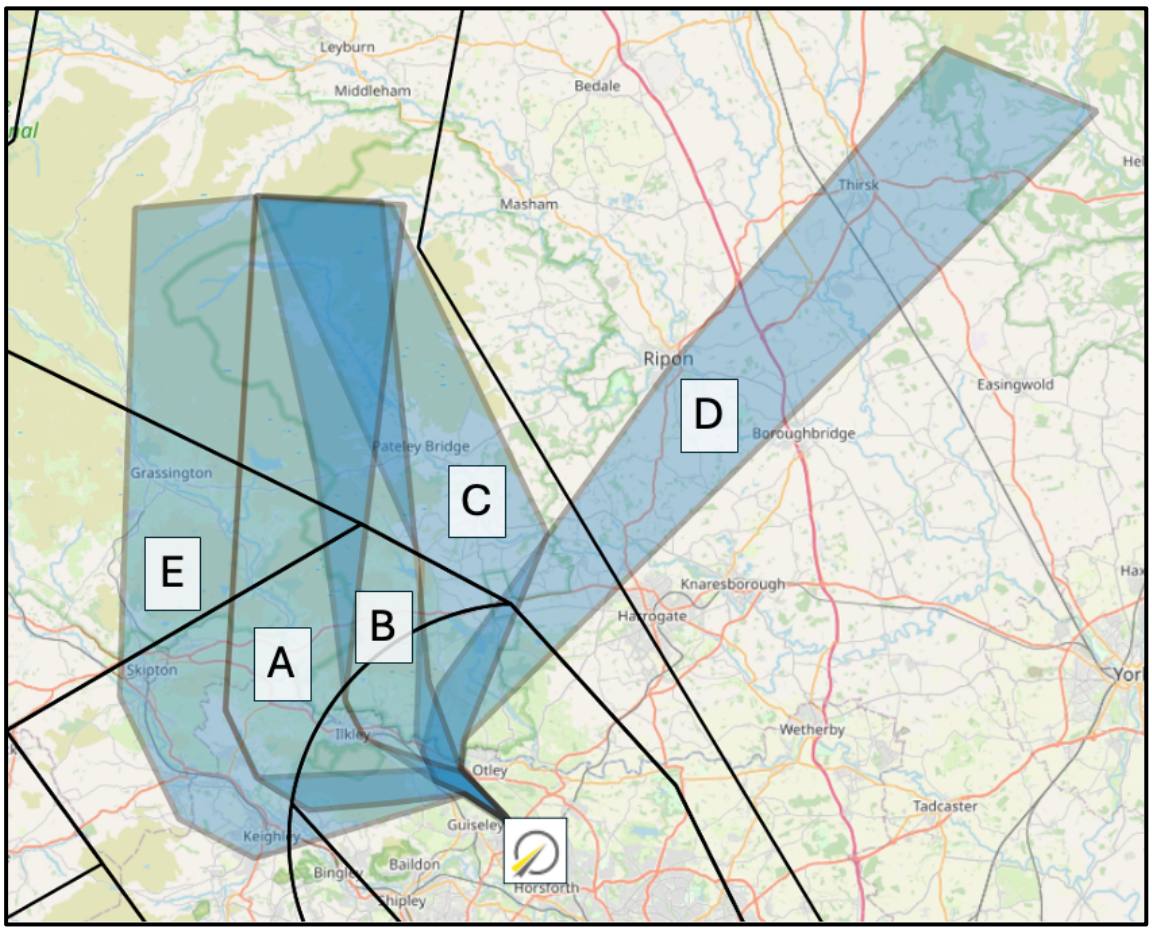

Figure 22: RWY32 North East Options A, B, C, D & E

3.3.7 Options A to E were subsequently all discounted owing to insufficient demand for a north-easterly SID from the airport. This decision was shared with stakeholders in Round 3 of engagement November 2023. These options will not form part of the design principle evaluation.

Runway 32 South East A to G

3.3.8 Options A to E were shared with stakeholders Round 1 of engagement July 2022.

3.3.9 Option F and G were generated as a result of feedback from the first round of engagement where stakeholders suggested flying straight ahead for longer over Weston Park before turning to delay overflight of communities. These options were shared with stakeholders shared with stakeholders in Round 2 of engagement April 2023.

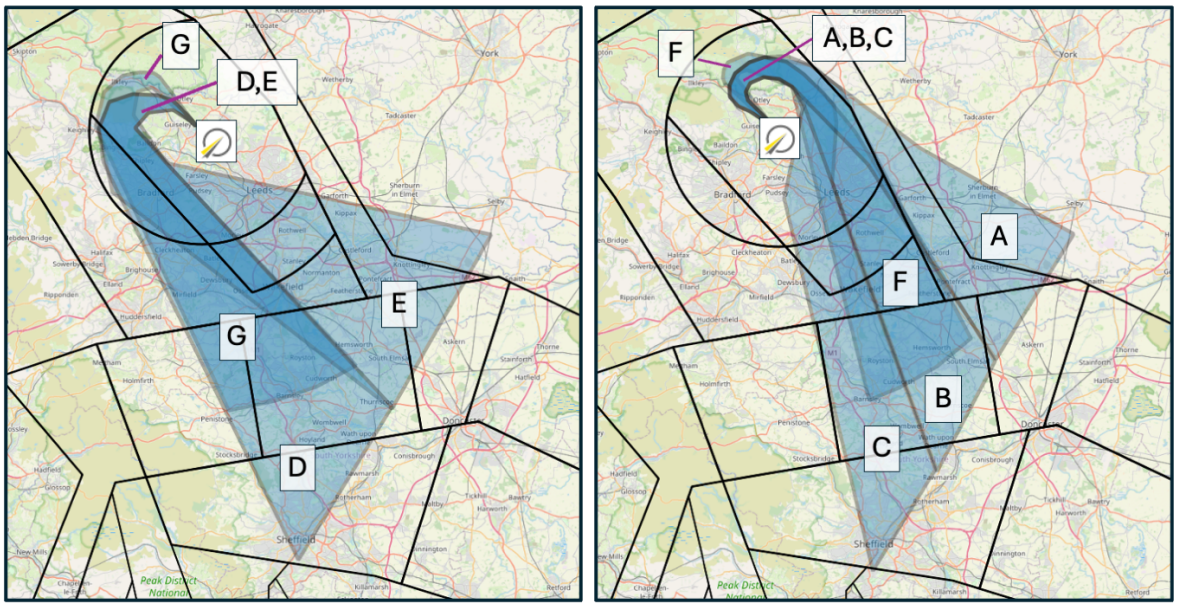

Figure 23: RWY32 Design Options A, B, C, D, E, F, G

3.3.10 Option A was subsequently discounted owing to incompatibility with the MTMA network design. This decision was shared with stakeholders in Round 3 of engagement November 2023. Option A will not form part of the design principle evaluation.

Runway 32 South and West A to H

3.3.11 Options A to E were shared with stakeholders in Round 1 of engagement July 2022.

3.3.12 Option F to H were generated as a result of feedback from the first round of engagement where stakeholders suggested flying straight ahead for longer over Weston Park before turning to delay overflight of communities. These options were shared with stakeholders shared with stakeholders in Round 2 of engagement, April 2023.

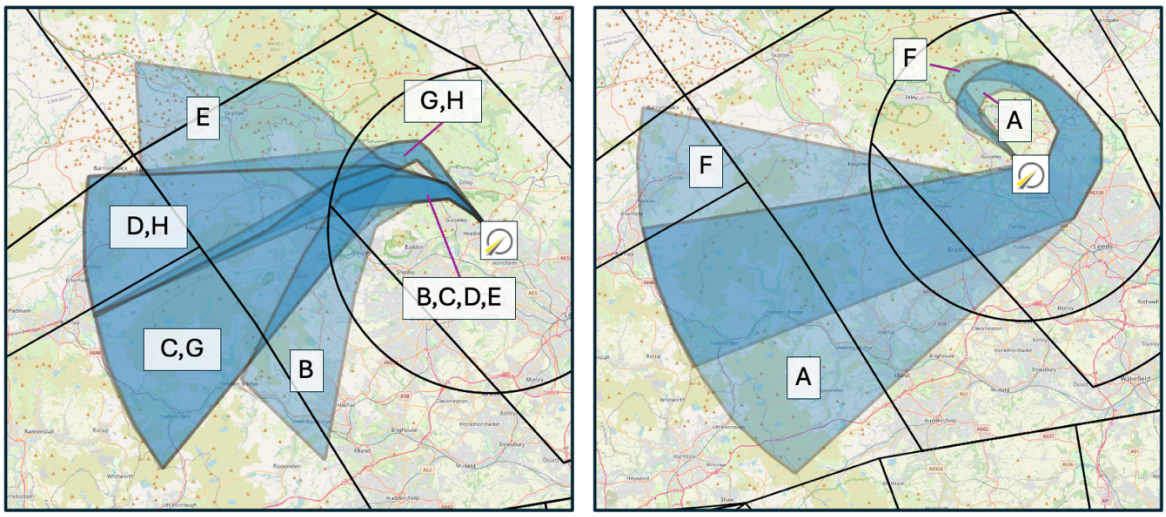

Figure 24: RWY32 South & West Design Options A, B, C, D, E, F, G & H

3.3.13 Options B and E were subsequently discounted owing to incompatibility with the MTMA network design. This decision was shared with stakeholders in in Round 3 of engagement November 2023. These options will not form part of the design principle evaluation.

Runway 32 New Options A to E

3.3.14 Options A to E were developed in response to stakeholder feedback stating that insufficient attention had been given to addressing the issues of early morning and late-night noise. These options were shared with stakeholders in in Round 3 of engagement Nov 2023.

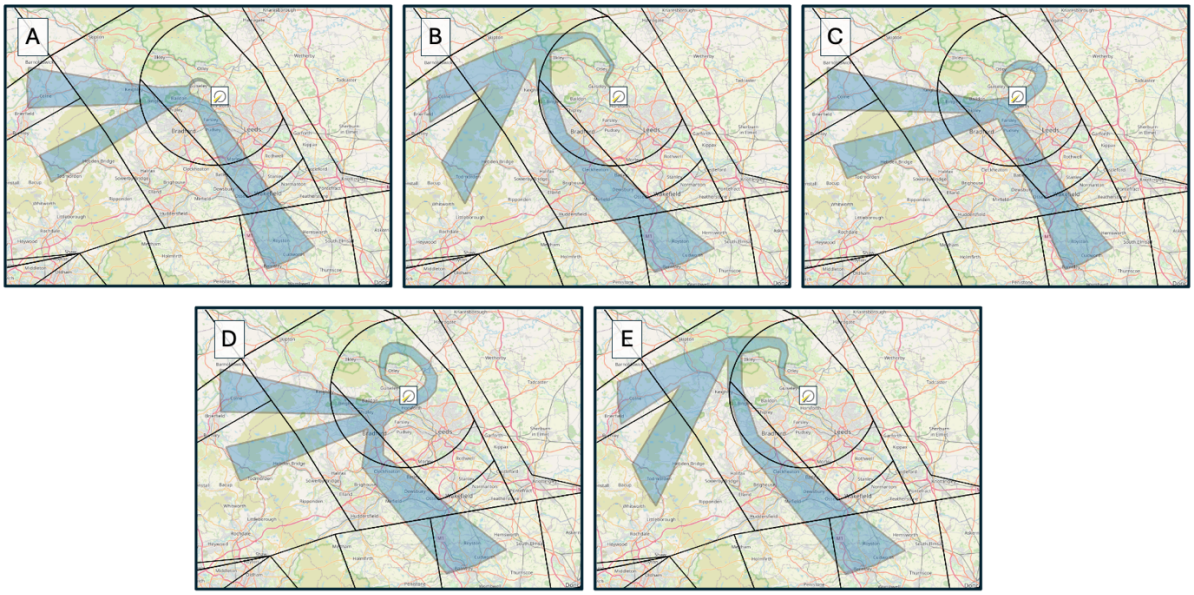

Figure 25: Runway 32 New Design Option A, B, C, D and E

3.4 Runway 14 Departures

Runway 14 Baseline Southeast and South & West (Do Nothing)

3.4.1 In the case of the departures, the Design Options (DOs) are depicted as swathes i.e. areas within which a final departure nominal track might ultimately be designed. In order to create a comparable baseline, we created swathes around the baseline radar tracks and have used these swathes to illustrate the baseline scenario.

3.4.2 This depiction of the baseline was shared with stakeholders in Round 3 of engagement Nov 2023.

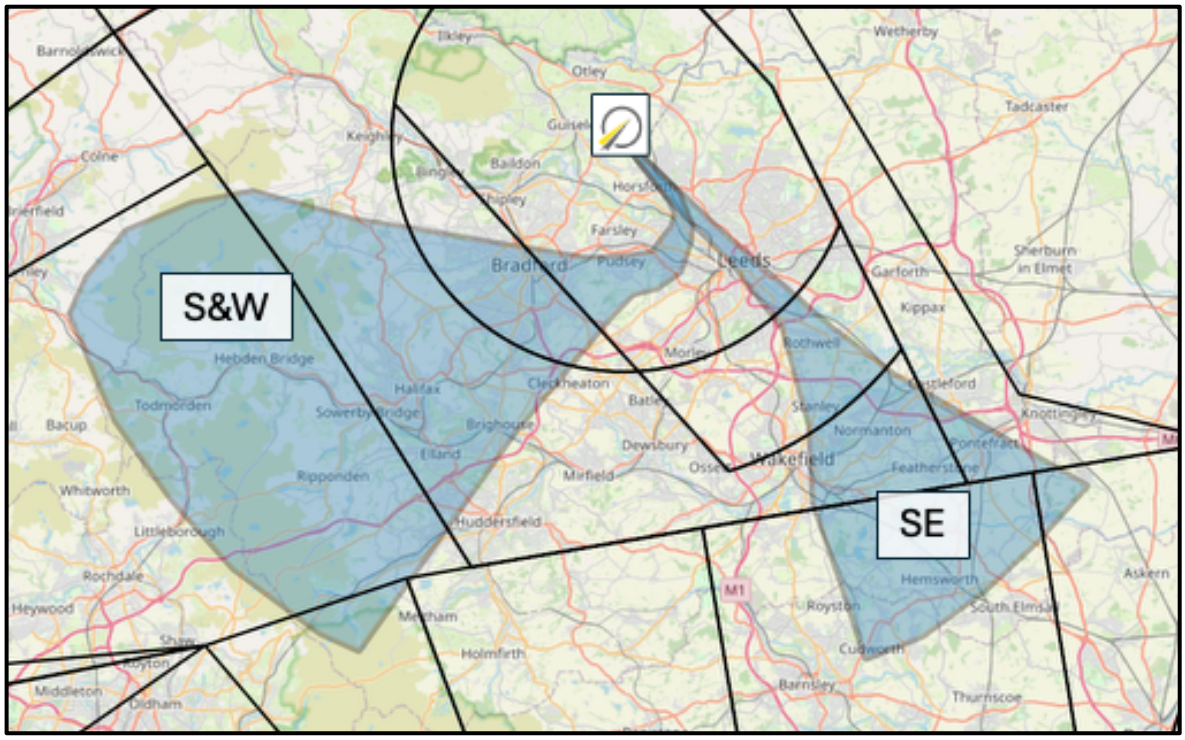

Figure 26: RWY14 Departure Baseline

Runway 14 North West A to D

3.4.3 Options A to D were shared with stakeholders in Round 1 of engagement July 2022.

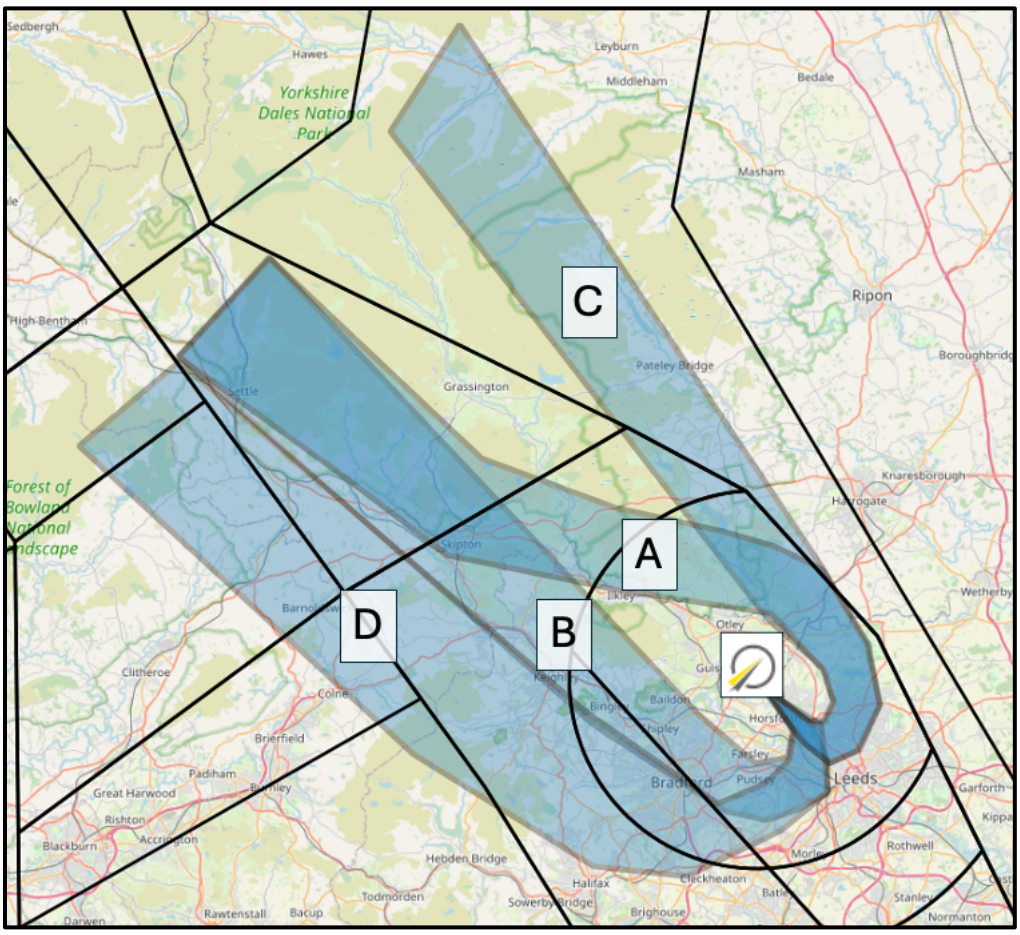

Figure 27: RWY14 North West Options A, B, C and D

3.4.4 Options A to D were subsequently all discounted owing to insufficient demand for a north-westerly SID from the airport. This decision was shared with stakeholders in in Round 3 of engagement November 2023. These options will not form part of the design principle evaluation.

Runway 14 North East A to E

3.4.5 Options A to E were shared with stakeholders in Round 1 of engagement July 2022.

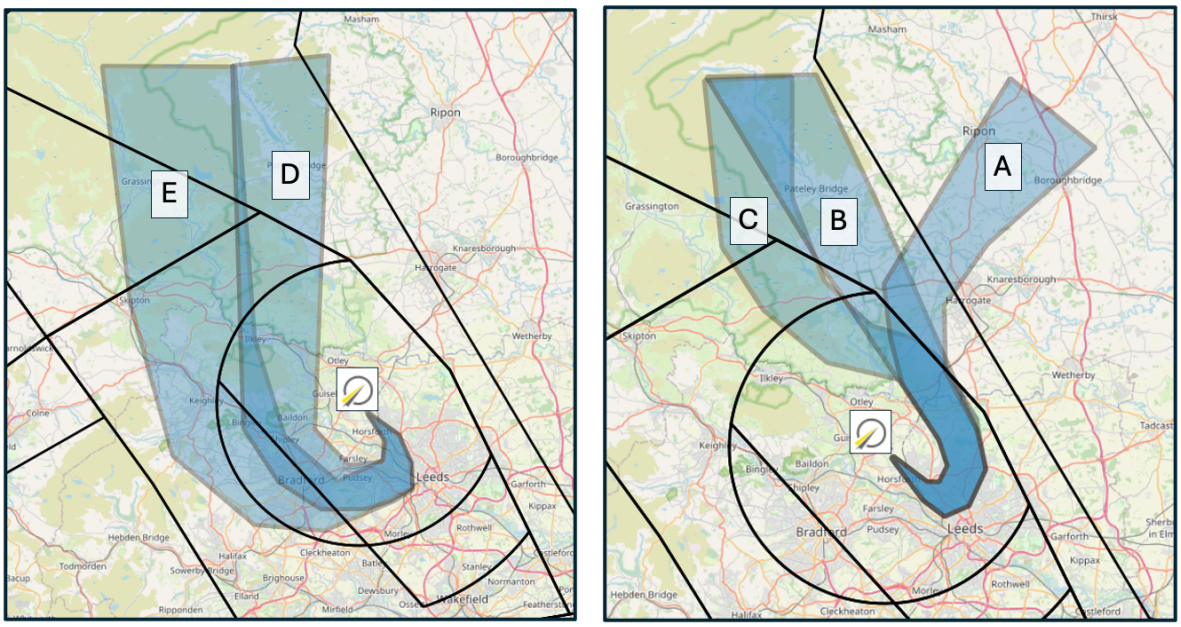

Figure 28: RWY14 North East Design Options A, B, C, D and E

3.4.6 Options A to E were subsequently all discounted owing to insufficient demand for a north-westerly SID from the airport. This decision was shared with stakeholders in in Round 3 of engagement November 2023. These options will not form part of the design principle evaluation.

Runway 14 South East A to D

3.4.7 Options A to D were shared with stakeholders in Round 1 of engagement July 2022.

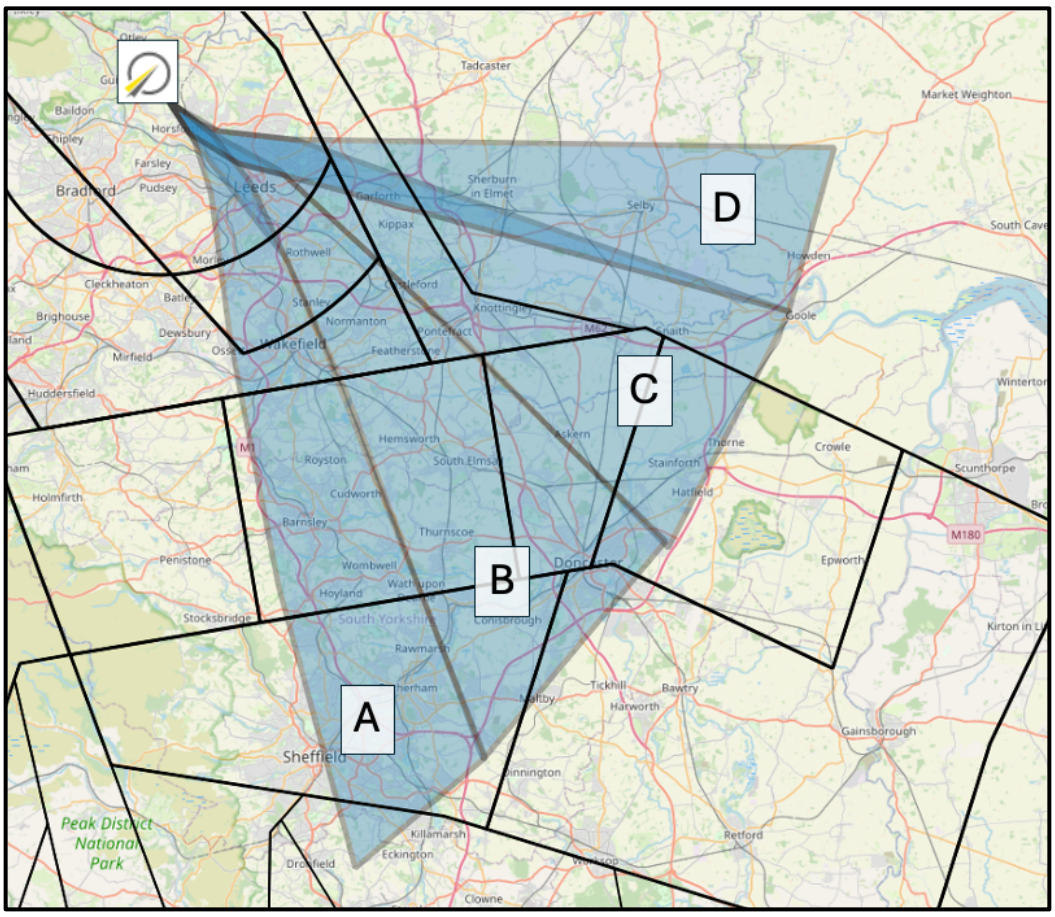

Figure 29: RWY14 Design Options A, B, C, and D

3.4.8 Options C and D were subsequently discounted owing to incompatibility with the MTMA network design. This decision was shared with stakeholders in in Round 3 of engagement November 2023. These options will not form part of the design principle evaluation.

Runway 14 South and West A to E

3.4.9 Options A to E were shared with stakeholders in Round 1 of engagement July 2022.

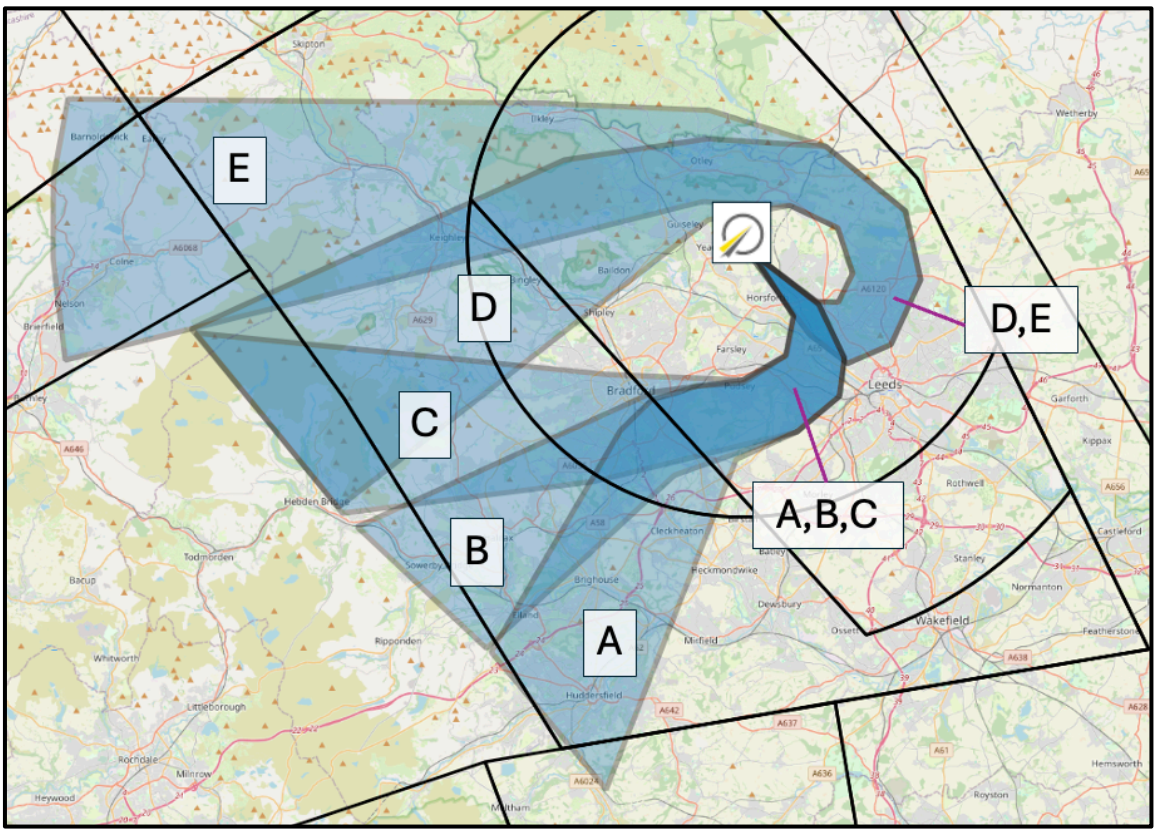

Figure 30: RWY14 South and West A, B, C, D and E

3.4.10 Options A and B were subsequently discounted owing to incompatibility with the MTMA network design. This decision was shared with stakeholders in Round 3 of engagement November 2023. These options will not form part of the design principle evaluation.

Runway 14 New Options A and B

3.4.11 Options A and B were developed in response to stakeholder feedback stating that insufficient attention had been given to addressing the issues of early morning and late-night noise. Whilst the specific comments were in relation to RWY 32 departures, these options were developed for RWY 14 departures and were shared with stakeholders in Round 3 of engagement Nov 2023.

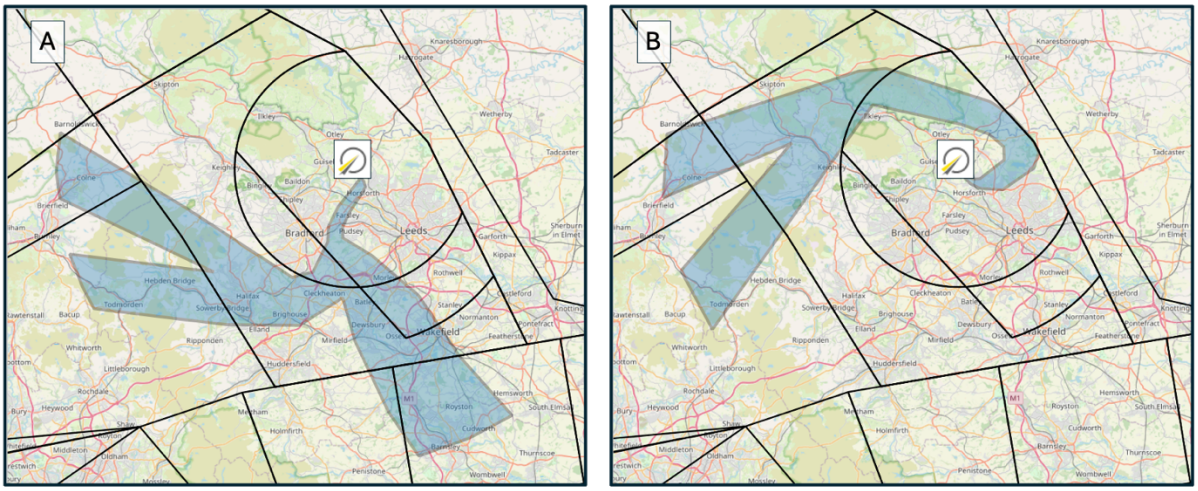

Figure 31: RWY14 New Departure Options A and B

3.5 Arrivals

Baseline (Do Nothing)

3.5.1 This depiction of the baseline was shared with stakeholders in Round 3 of engagement Nov 2023.

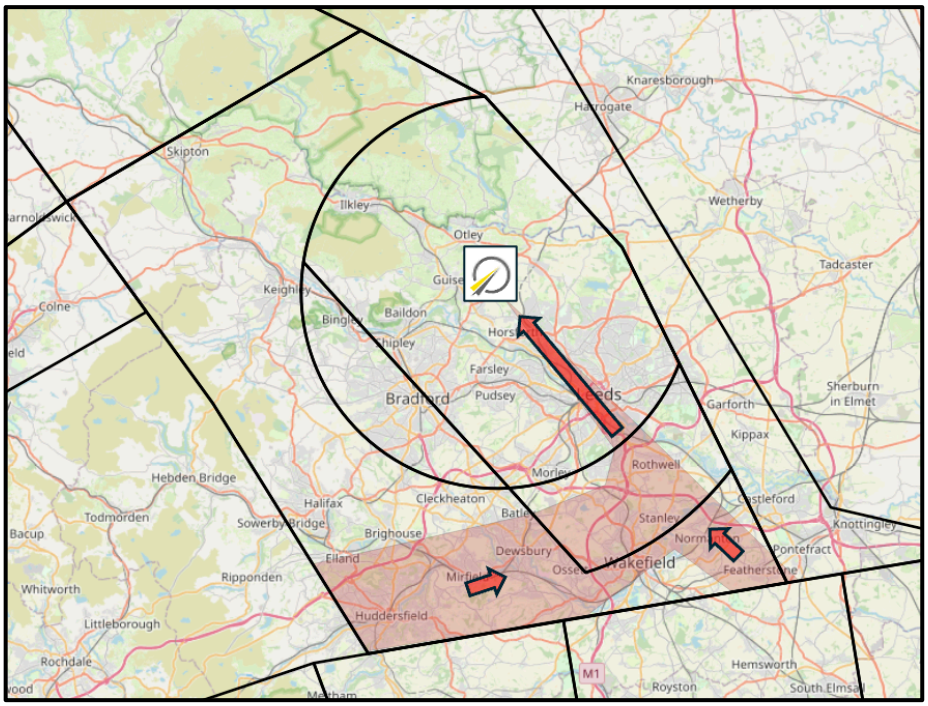

Figure 32: Runway 32 Arrivals Baseline Swathe

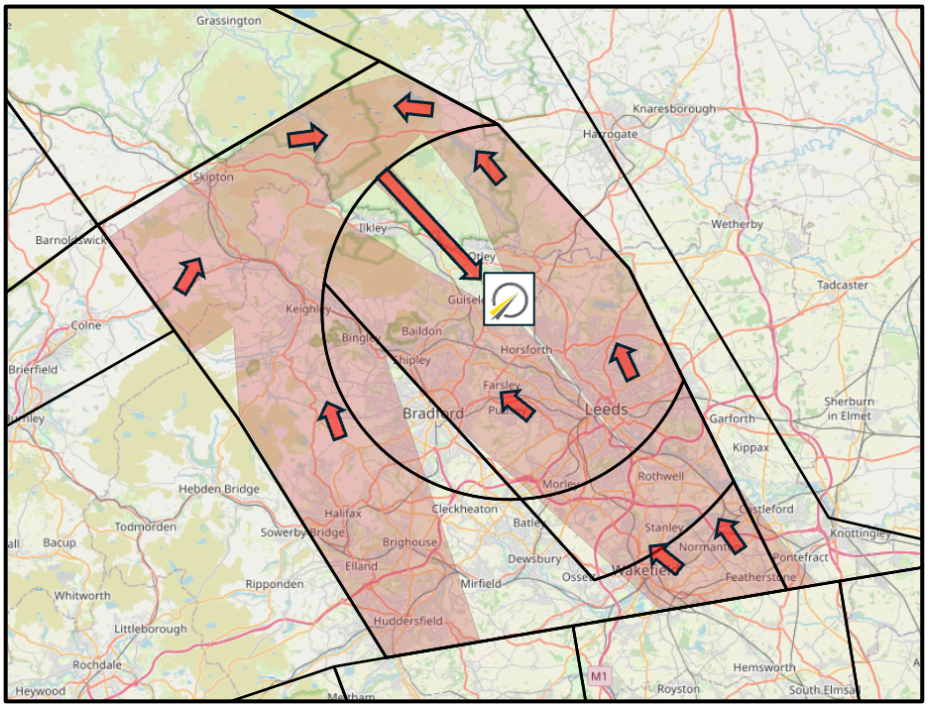

Figure 33: Runway 14 Arrivals Baseline Swathe

Arrival System 1 – One Hold

3.5.2 System 1 was first shared with stakeholders in Round 1 of engagement July 2022 but the option was evolved and shared again in Round 2 of engagement April 2023.

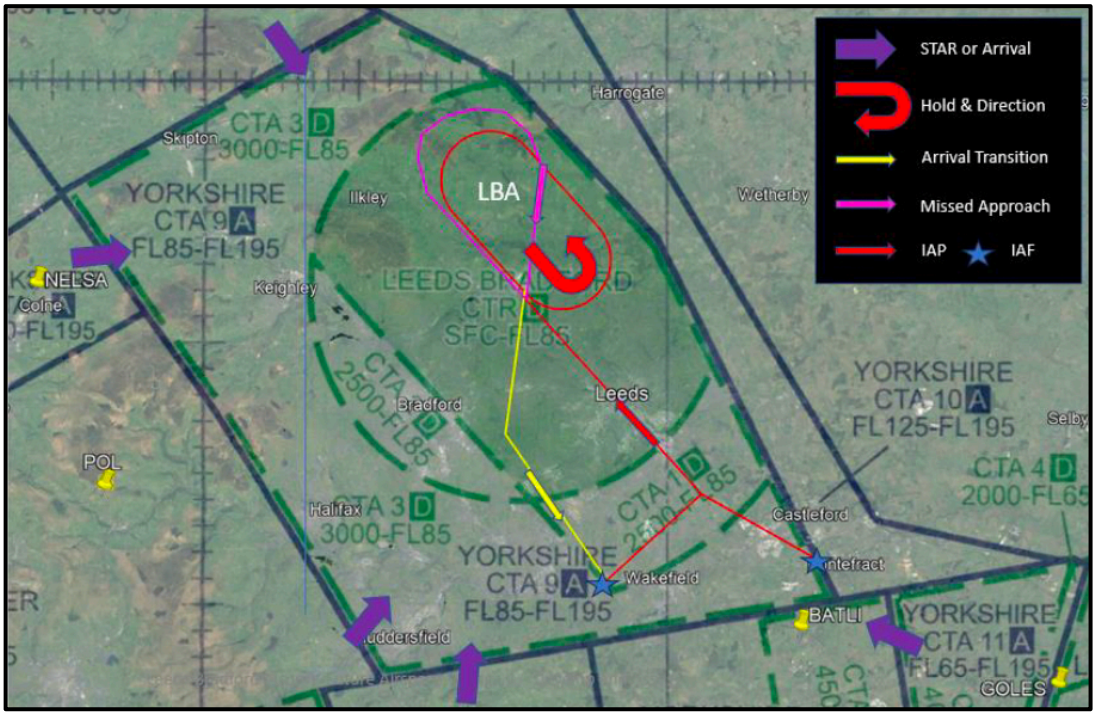

Figure 34: Runway 32 System 1

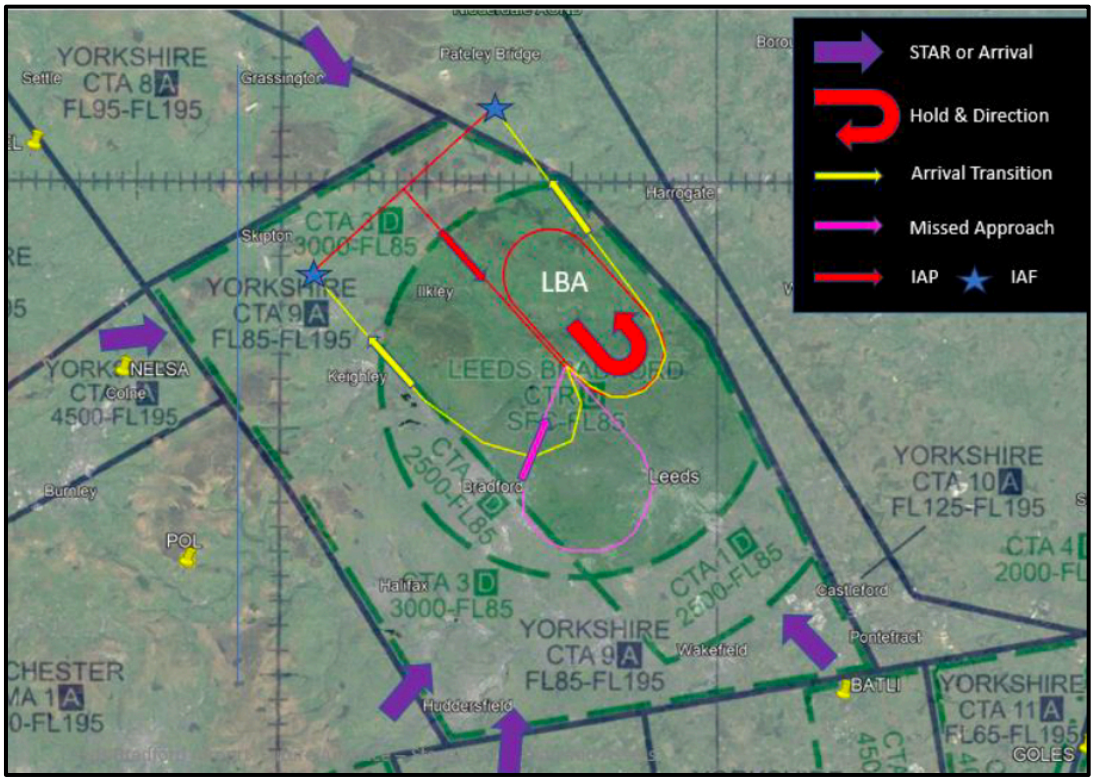

Figure 35: Runway 14 System 1

Arrival System 2 – Two holds NELSA/GOLES

3.5.3 System 2 was first shared with stakeholders in Round 1 of engagement July 2022 but the option was evolved and shared again in Round 2 of engagement April 2023.

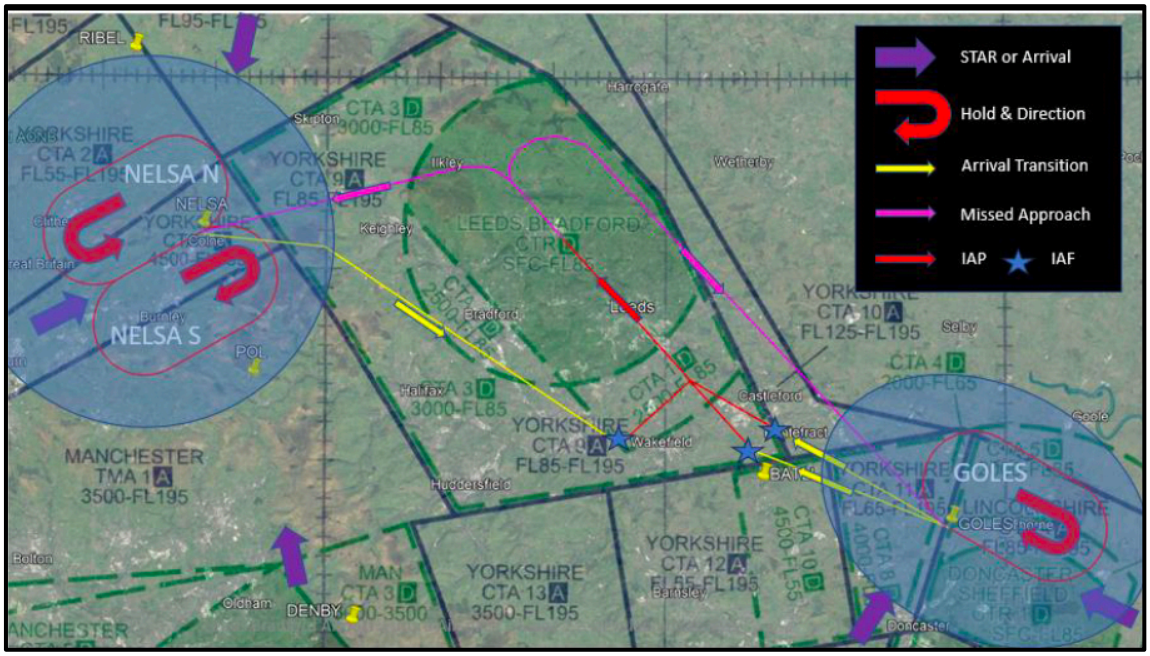

Figure 36: Runway 32 System 2

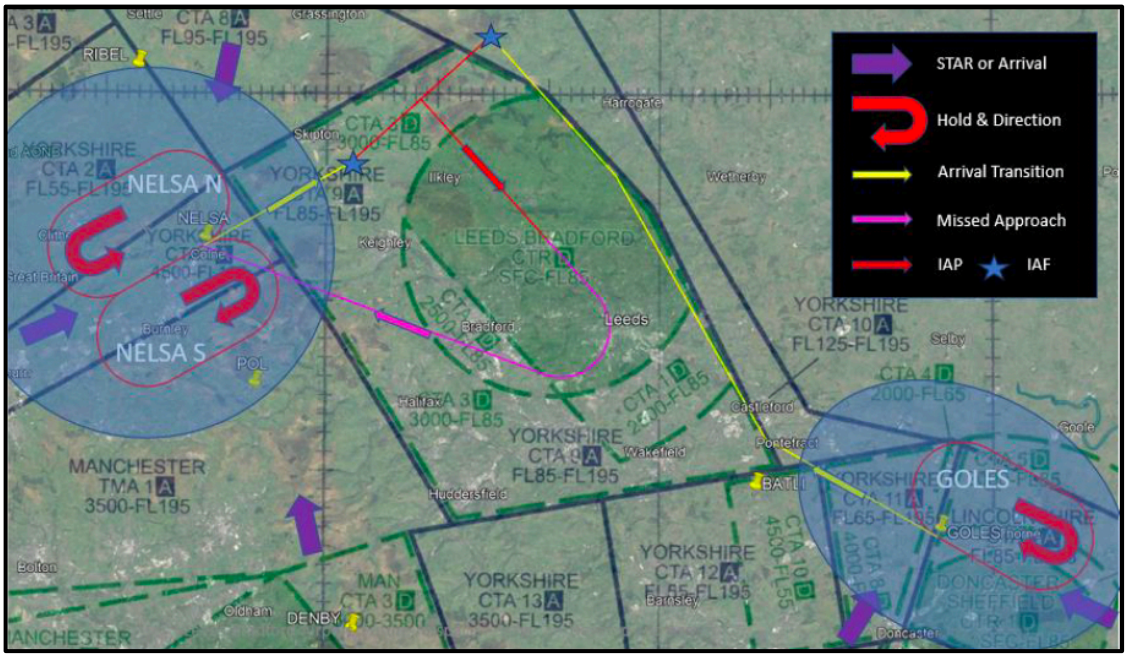

Figure 37: Runway 14 System 2

3.5.4 System 2 was subsequently discounted following discussions with NERL which concluded the option was not viable due to the NELSA hold being in the same place that departures were required to go. This decision was shared with stakeholders in Round 3 of engagement Nov 2023. This option will not form part of the design principle evaluation.

Arrival System 3 – Two holds AIREY/WORTH

3.5.5 System 3 was first shared with stakeholders in Round 1 of engagement July 2022 but the option was evolved and shared again in Round 2 of engagement April 2023.

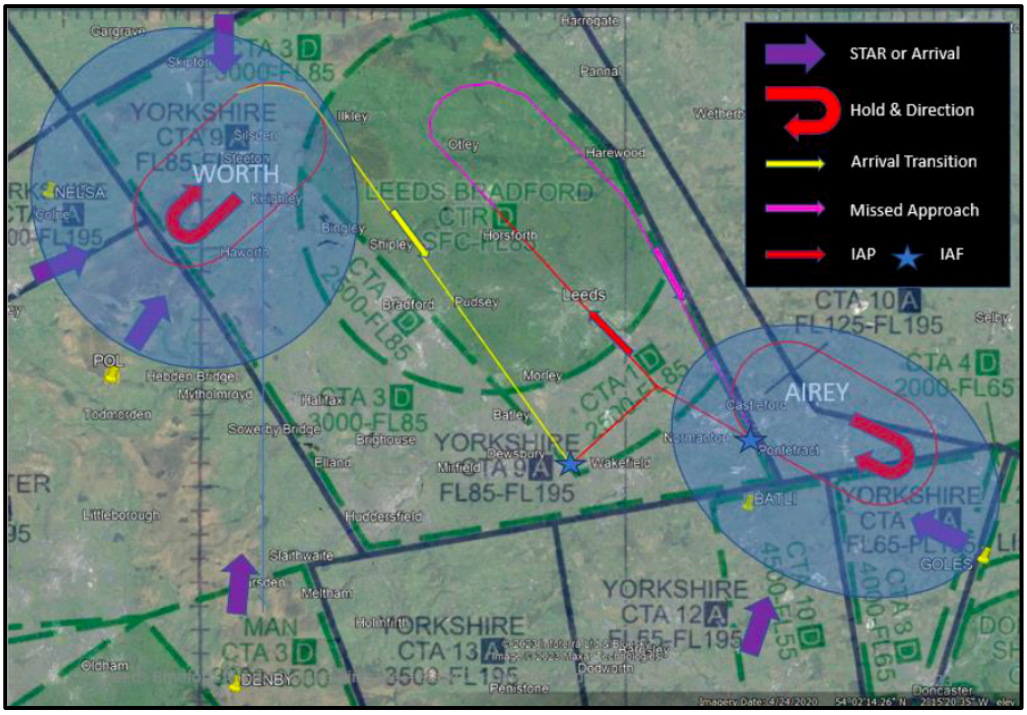

Figure 38: Runway 32 System 3

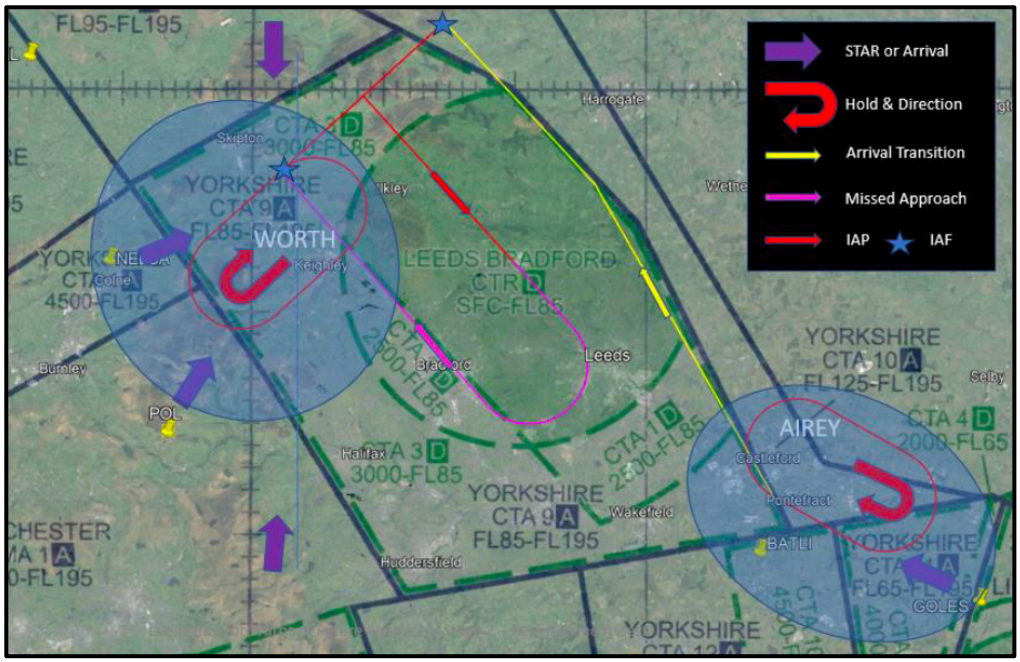

Figure 39: Runway 14 System 3

3.5.6 System 3 was subsequently discounted following discussions with NERL which concluded the option was not viable due to the WORTH hold being in the same place that departures were required to go and AIREY being too close for runway 32 arrivals to lose height. This decision was shared with stakeholders in Round 3 of engagement Nov 2023. This option will not form part of the design principle evaluation.

Arrival System 4 – Three holds LBA/AIREY/WORTH

3.5.7 System 4 was first shared with stakeholders in Round 1 of engagement July 2022 but the option was evolved and shared again in Round 2 of engagement April 2023.

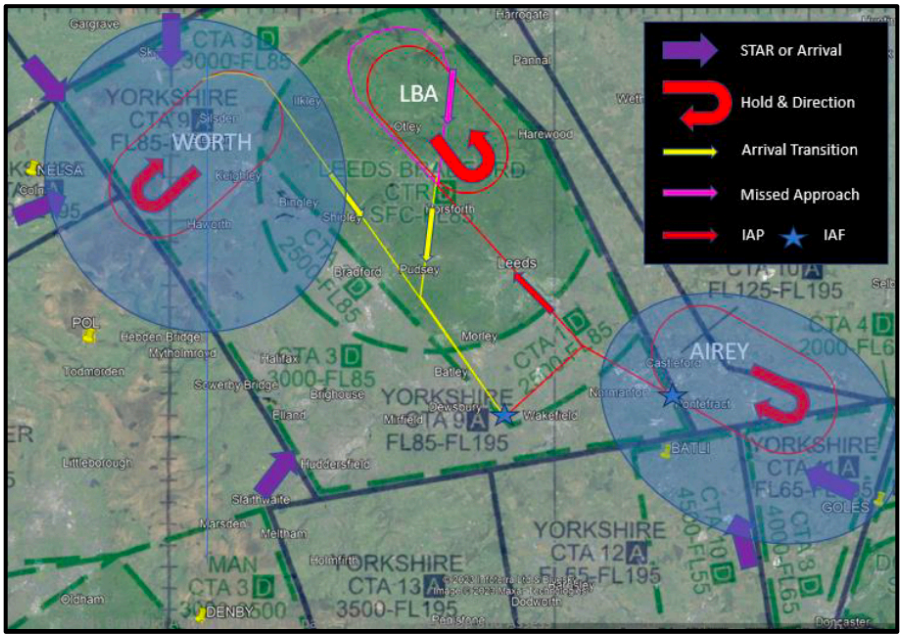

Figure 40: Runway 32 System 4

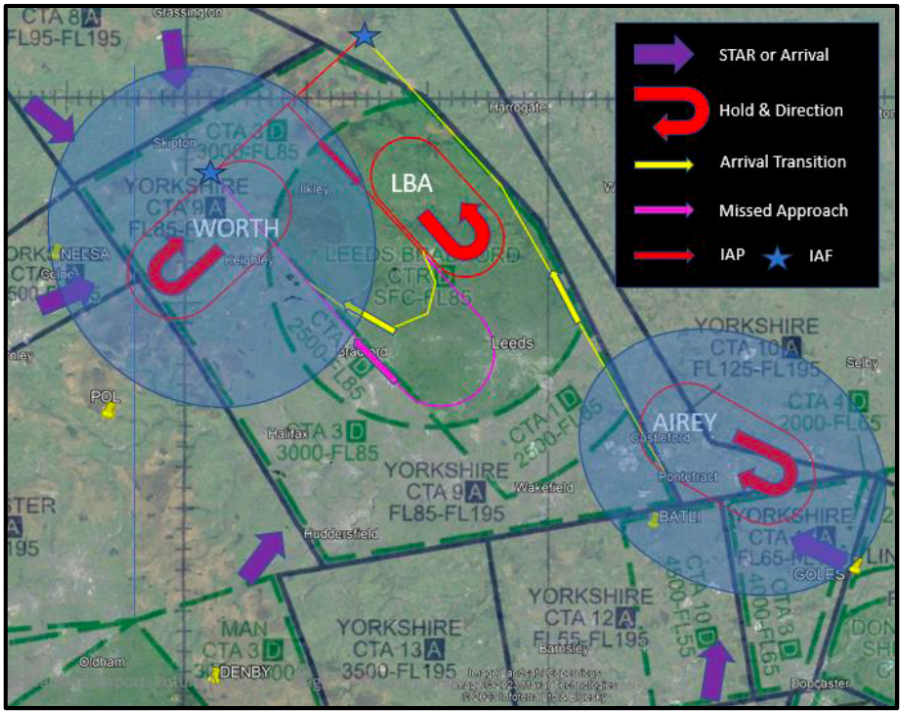

Figure 41: Runway 14 System 4

3.5.8 System 4 was subsequently discounted following discussions with NERL which concluded the option was not viable due to the WORTH hold being in the same place that departures were required to go and AIREY being too close for runway 32 arrivals to lose height. This decision was shared with stakeholders in Round 3 of engagement Nov 2023. This option will not form part of the design principle evaluation.

Arrival System 5 – Three holds NELSA/UDDER/GOLES

3.5.9 System 5 was first shared with stakeholders in Round 1 of engagement July 2022 but the option was evolved and shared again in Round 2 of engagement April 2023.

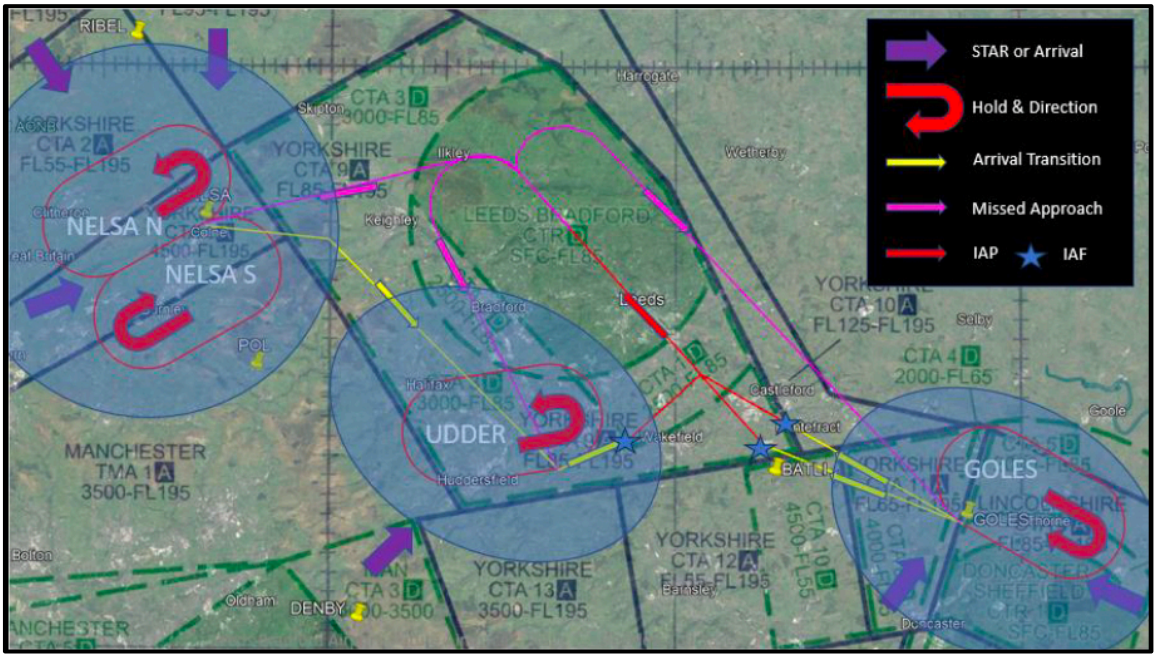

Figure 42: Runway 32 System 5

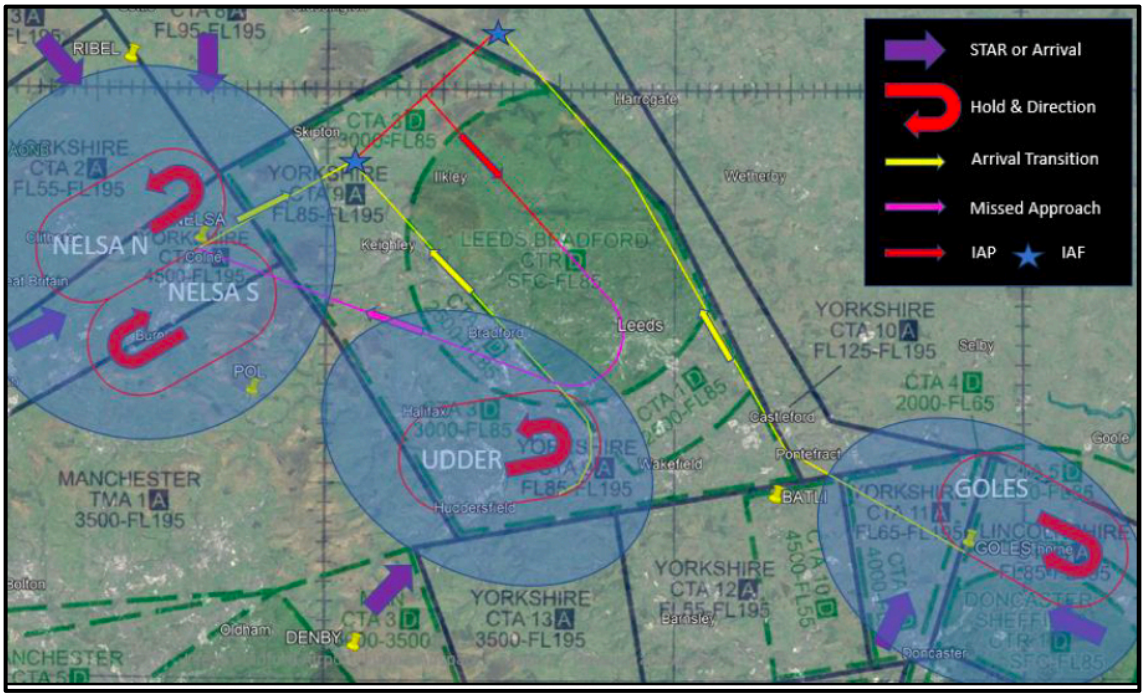

Figure 43: Runway 14 System 5

3.5.10 System 5 was subsequently discounted following discussions with NERL which concluded the option was not viable due to the NELSA N and S holds being in the same place that departures were required to go. This decision was shared with stakeholders in Round 3 of engagement Nov 2023. This option will not form part of the design principle evaluation.

Arrival System 6 – Two holds LBA/GOLES

3.5.11 System 6 was developed following engagement with NERL which had ruled Arrival Systems 2-5 as unviable. This option was shared with stakeholders in Round 3 of engagement Nov 2023.

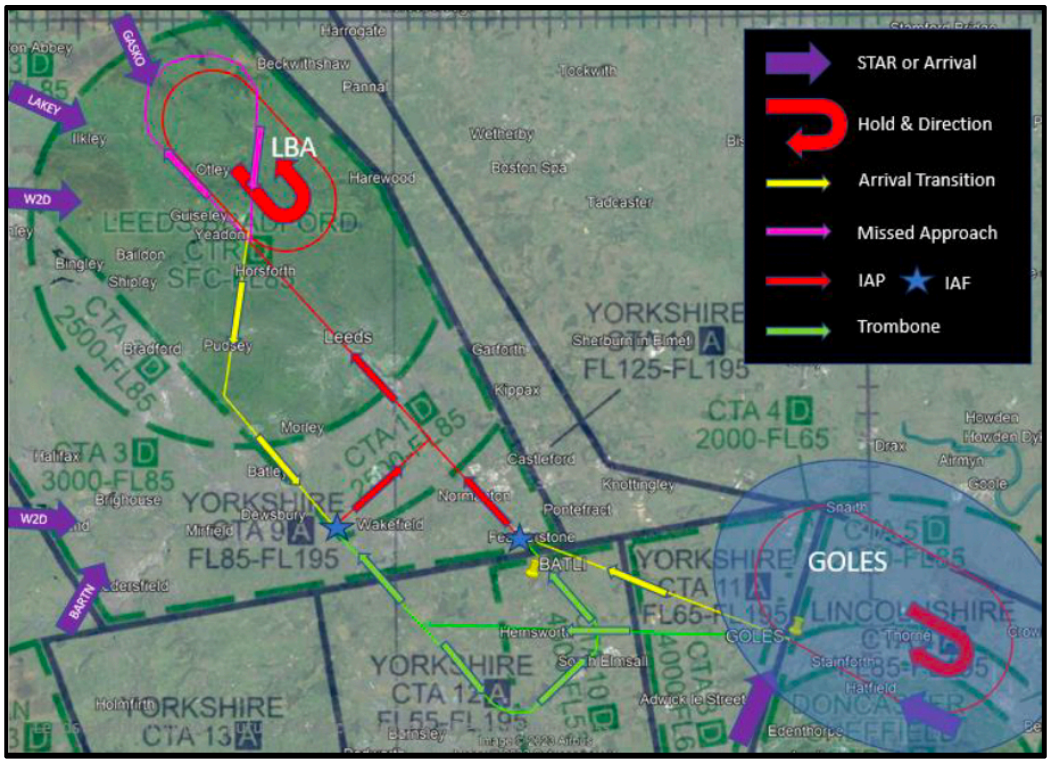

Figure 44: Runway 32 System 6

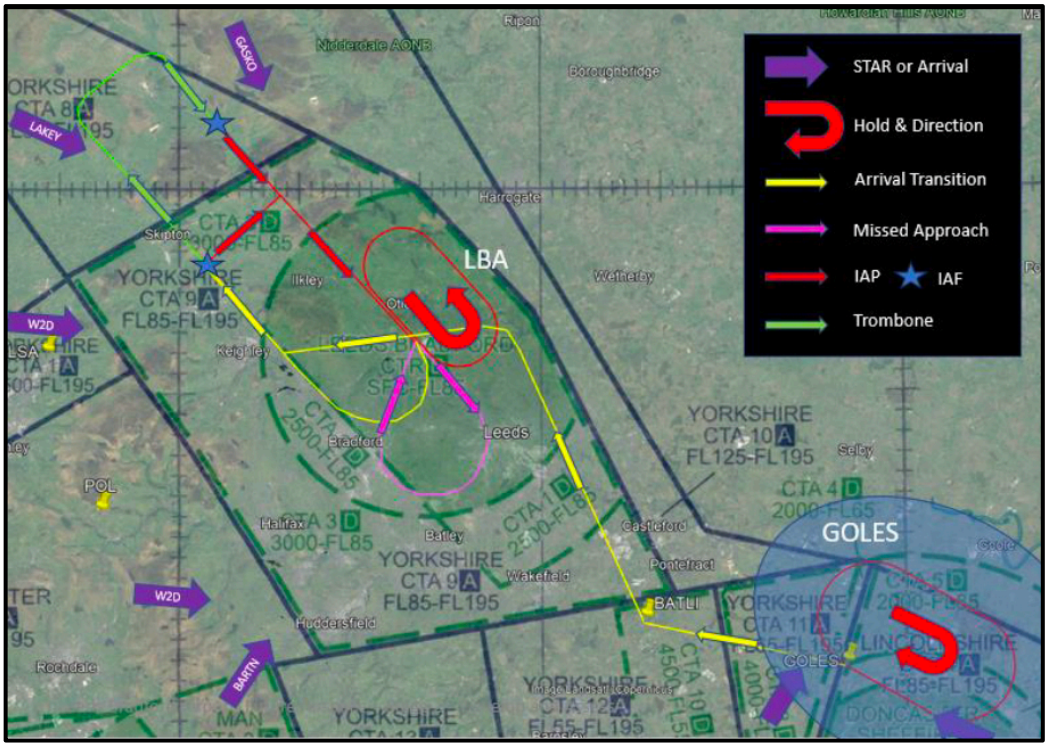

Figure 45: Runway 14 System 6

Arrival System 7 – Three holds NW/LBA/GOLES

3.5.12 System 7 was developed following engagement with NERL which had ruled Arrival Systems 2-5 as unviable. This option was shared with stakeholders in Round 3 of engagement Nov 2023.

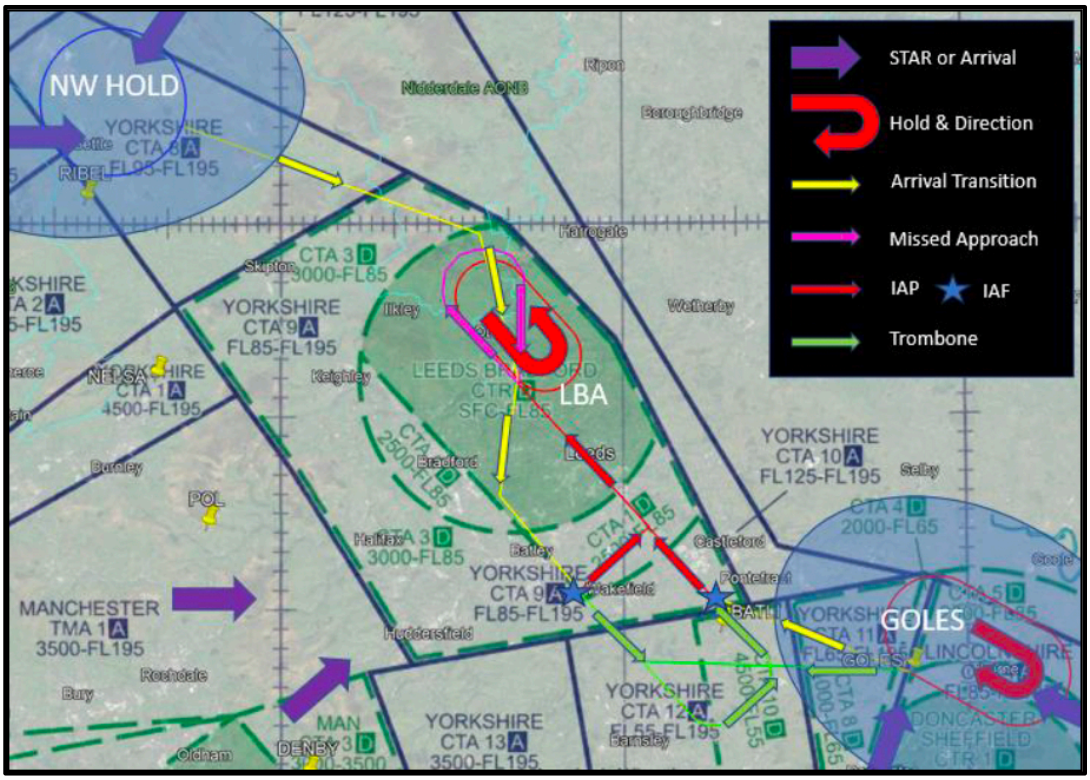

Figure 46: Runway 32 System 7

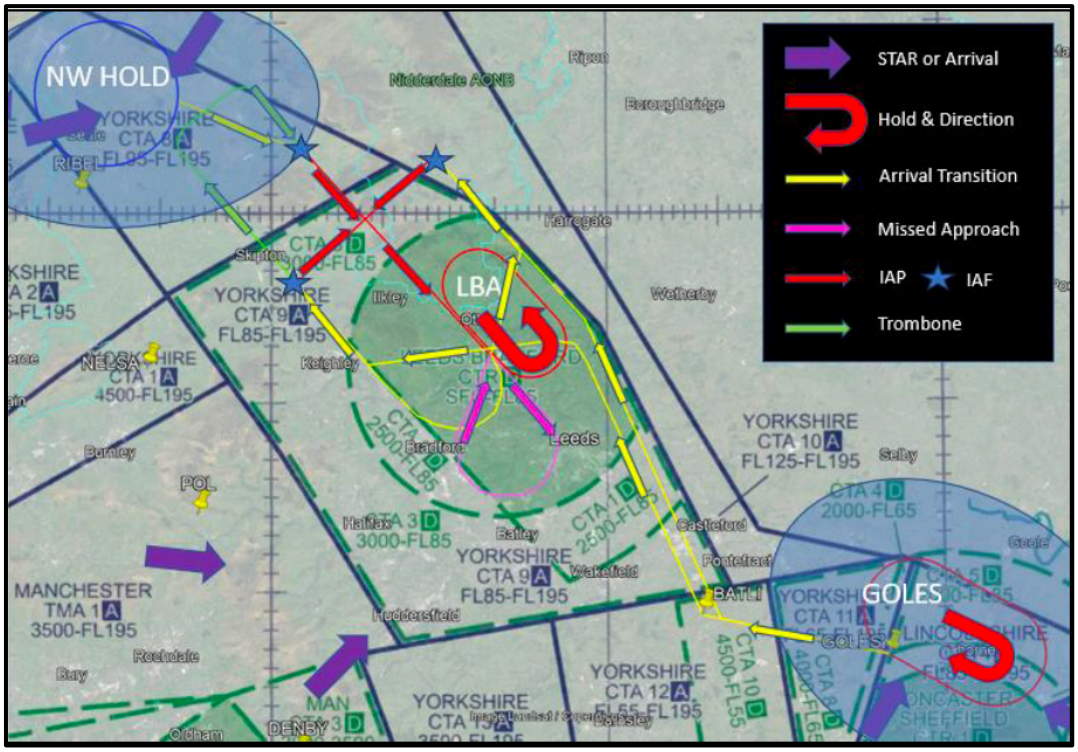

Figure 47: Runway 14 System 7

Arrival System 8 – Two holds NW/GOLES

3.5.13 System 8 was developed following engagement with NERL which had ruled Arrival Systems 2-5 as unviable. This option was shared with stakeholders Round 3 of engagement Nov 2023.

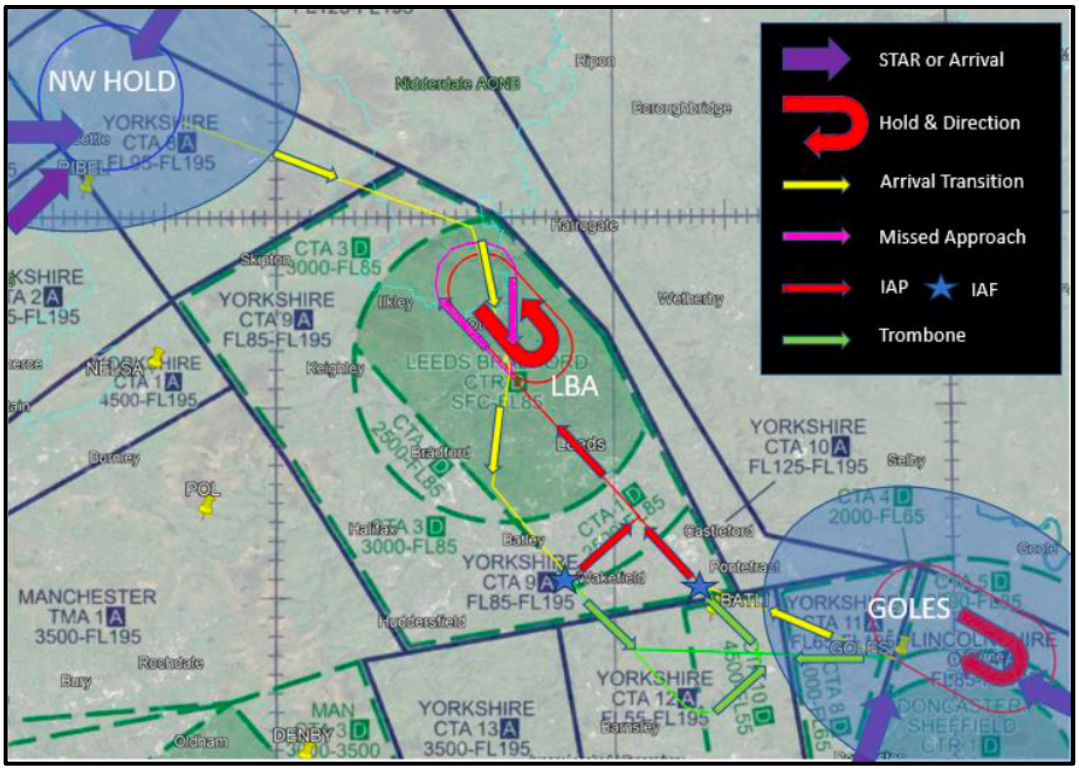

Figure 48: Runway 32 System 8

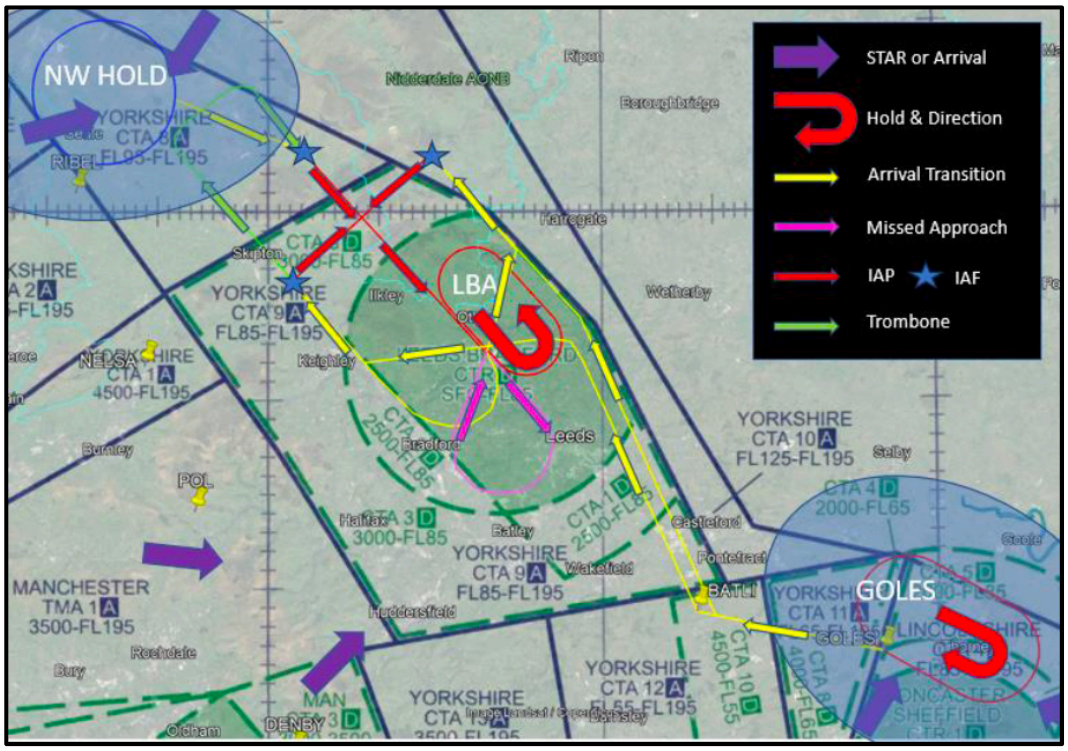

Figure 49: Runway 14 System 8

Arrival System 9 – Two Holds UDDER/GOLES

3.5.14 System 9 was developed following engagement with NERL which had ruled Arrival Systems 2-5 as unviable. This option was shared with stakeholders in Round 3 of engagement Nov 2023.

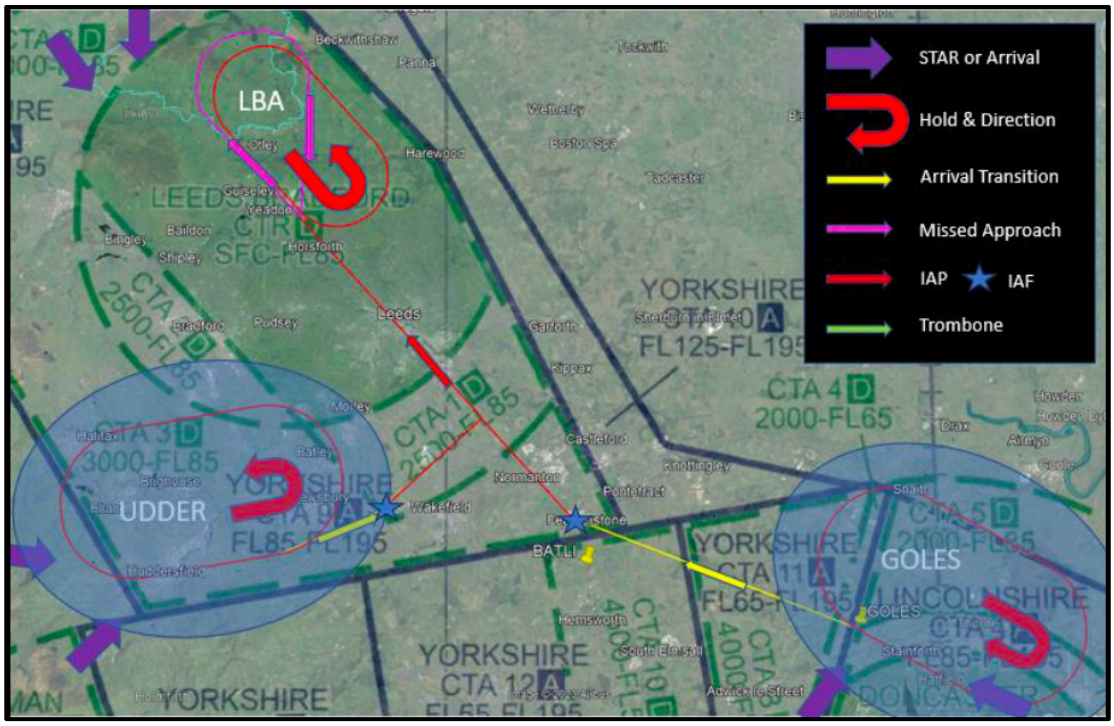

Figure 50: Runway 32 System 9

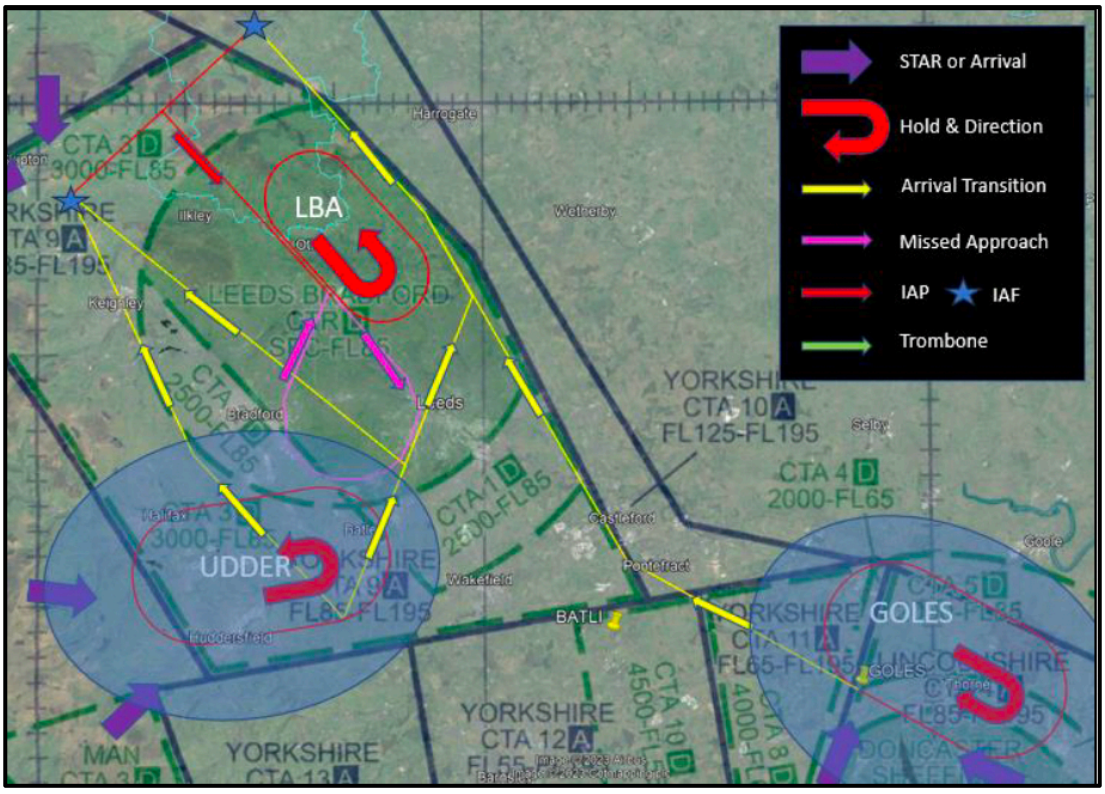

Figure 51: Runway 14 System 9

Arrival System 10 – One hold GOLES for arrivals from the South and east only

3.5.15 System 10 was developed following engagement with NERL which had ruled Arrival Systems 2-5 as unviable. This option was shared with stakeholders in Round 3 of engagement Nov 2023.

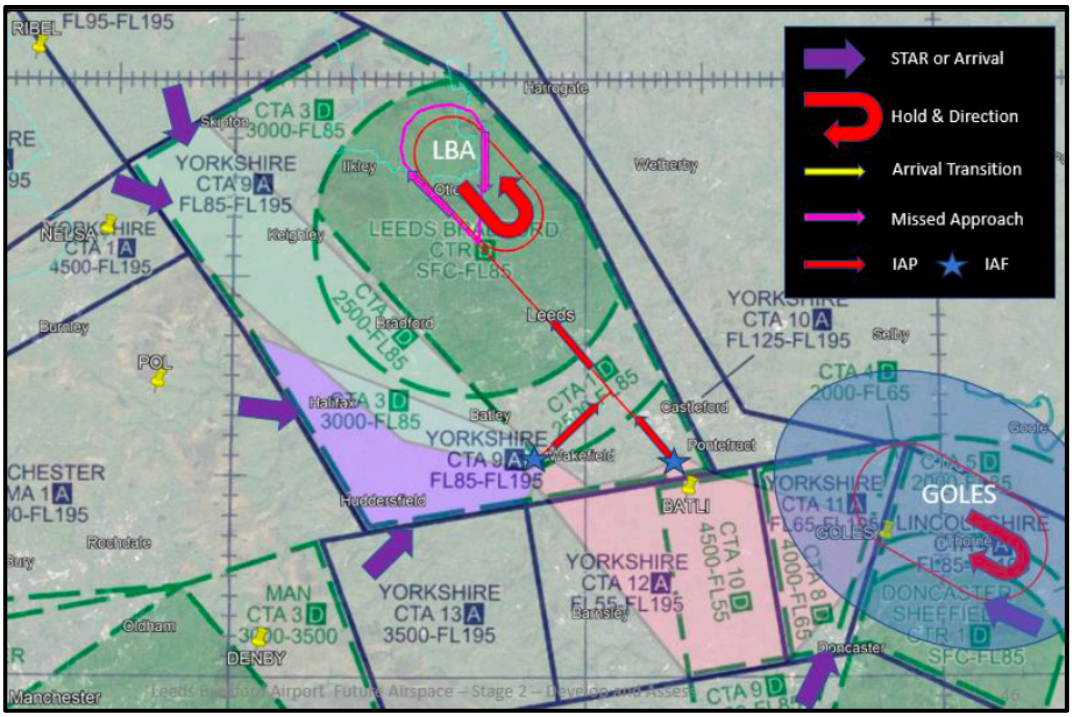

Figure 52: Runway 32 System 10

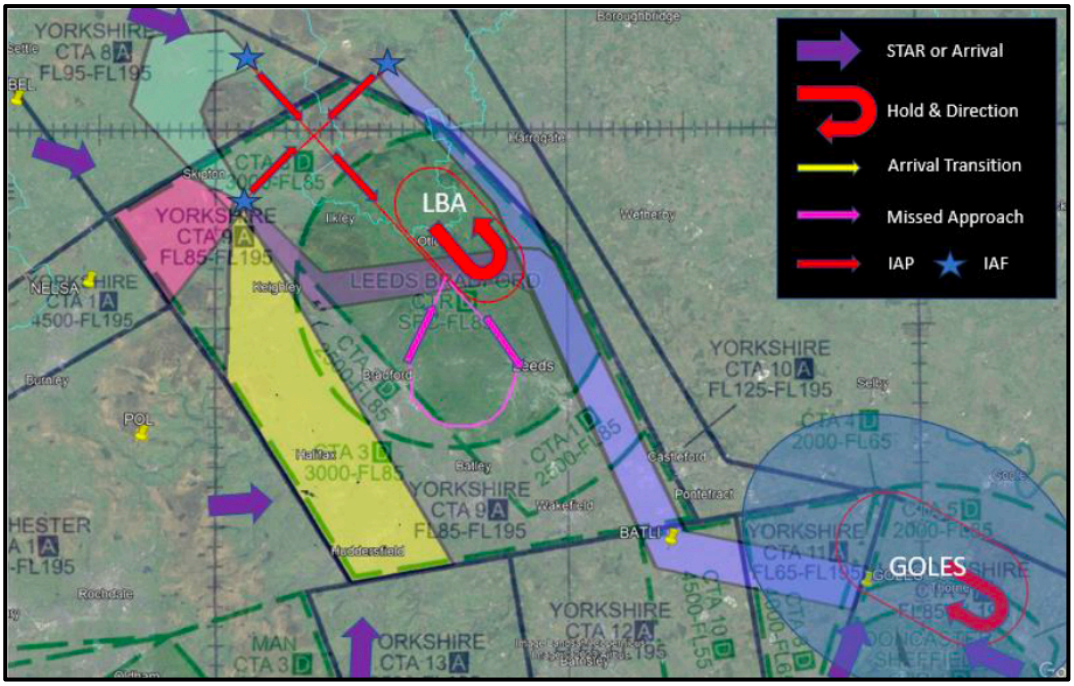

Figure 53: Runway 14 System 10

Arrival System 11 – Two holds NW/GOLES

3.5.16 System 11 was shared with stakeholders in Round 4 of Stakeholder Engagement with an update in May 2025 following further engagement with NERL. It is very similar to System 8 except that Runway 32 arrivals from the NW stack would have the option to travel downwind right hand.

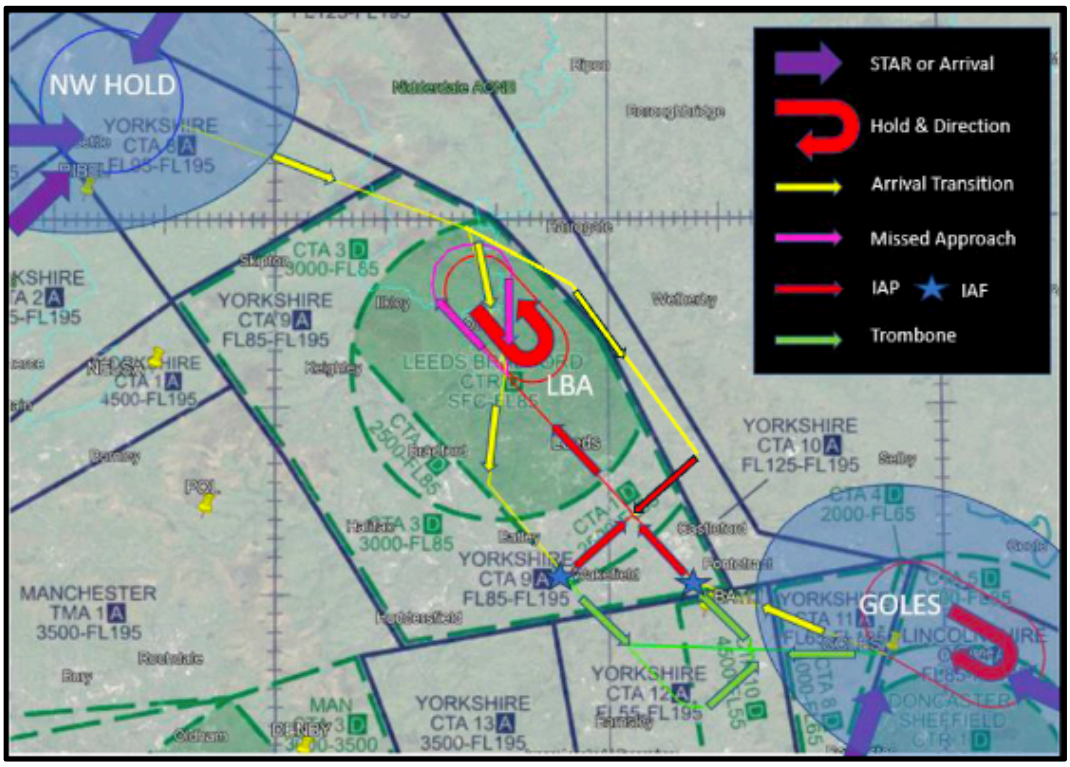

Figure 54: Runway 32 System 11

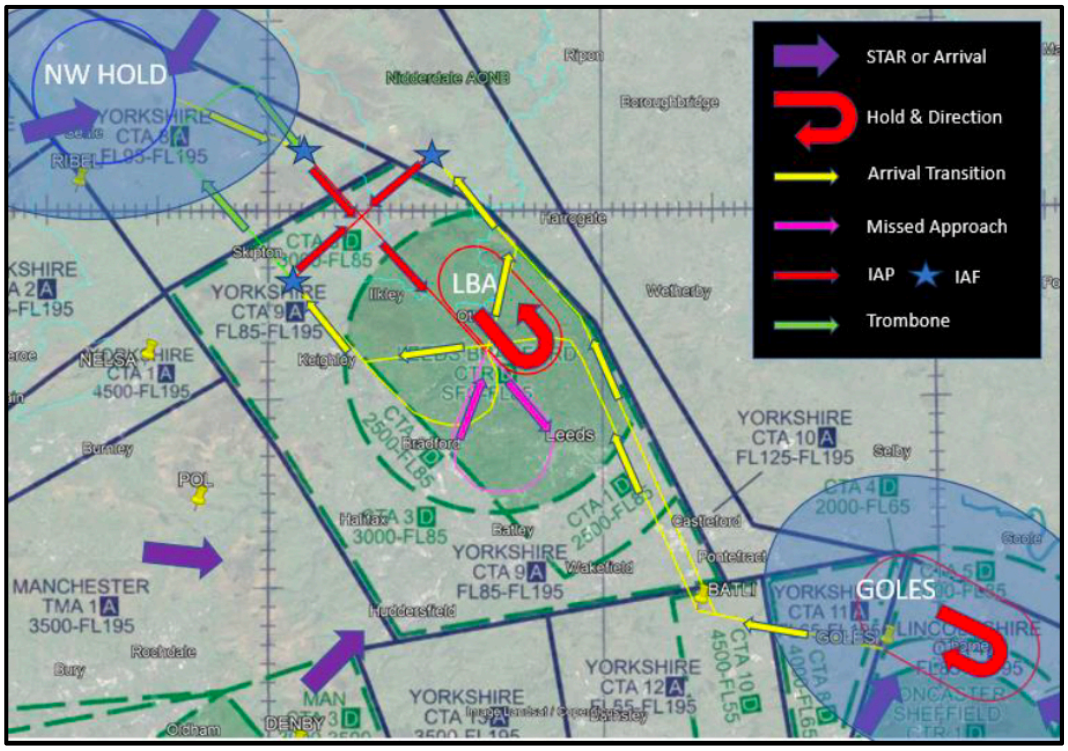

Figure 55: Runway 14 System 11

RNPAR – RWY 14 and RWY 32

3.5.17 RNPAR RWY 14 and RWY 32 were developed following stakeholder feedback to avoid certain communities and also to future proof the design, as more aircraft may be expected to be RNPAR capable from 2030 onwards. These options were shared with stakeholders in Round 3 of engagement Nov 2023.

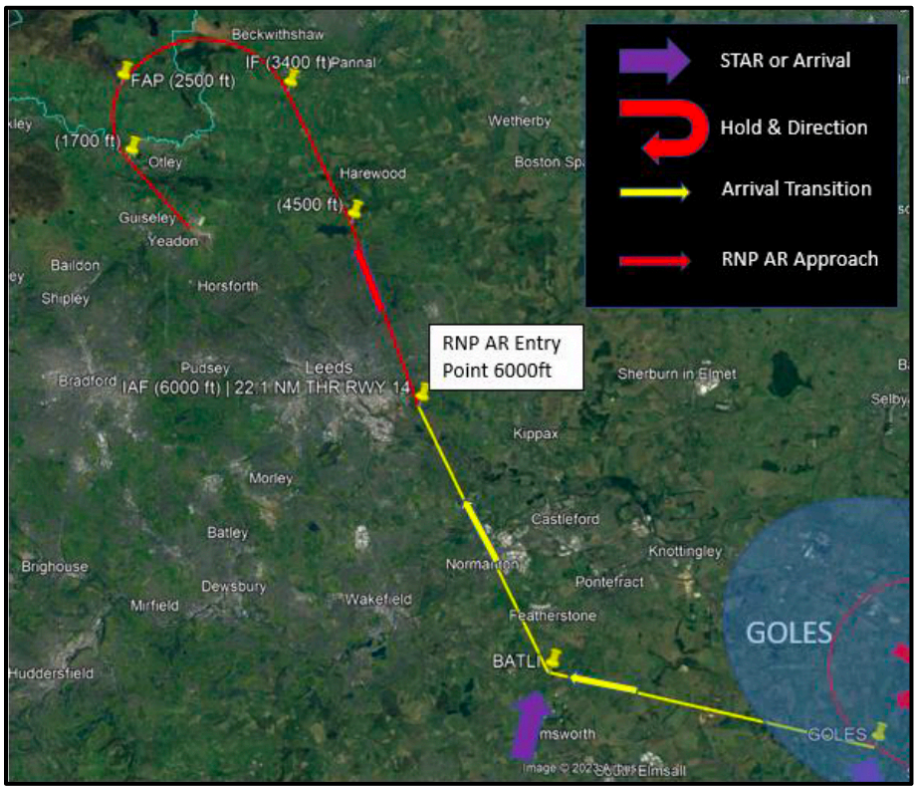

Figure 56: Runway 14 RNPAR

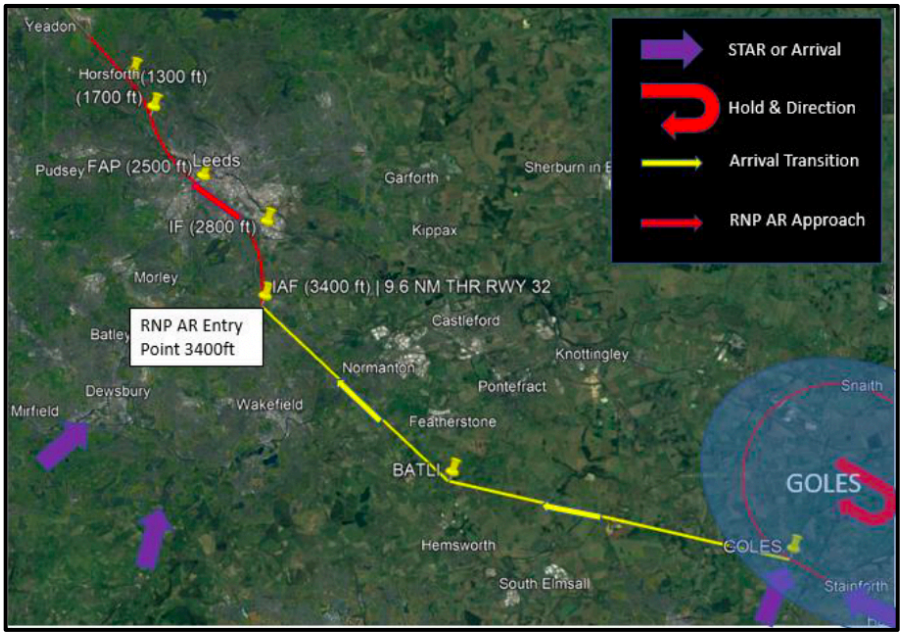

Figure 57: Runway 32 RNPAR

Point Merge

3.5.18 Three arrival options using a concept called Point Merge were originally developed and shared with stakeholders in Round 1 of engagement July 2022.

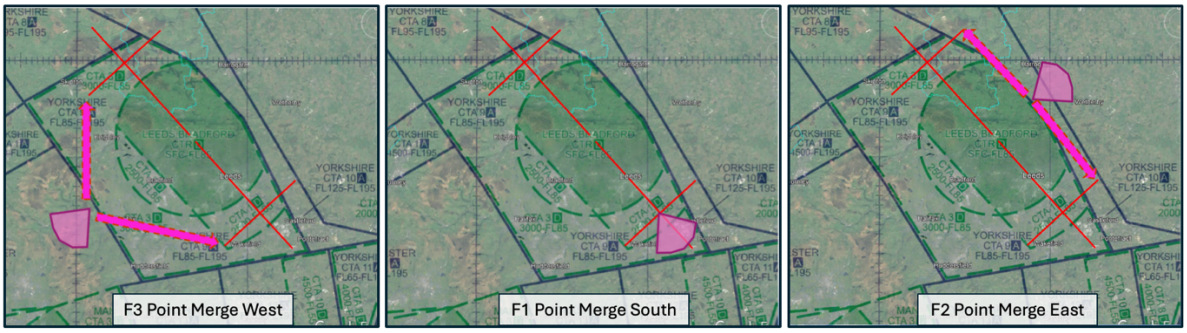

Figure 58: Point Merge Arrival Option F3, F1 and F2

3.5.19 Point Merge was subsequently discounted following discussions with NERL which concluded the option was not viable and did not form part of the re-developed arrival options shared in the Round 3 of engagement Nov 2023. These options will not form part of the design principle evaluation.

3.6 Options for Design Principle Evaluation

3.6.1 Table 6 describes the options that were taken into the design principle evaluation.

Option	Description	Abbreviation
DEPARTURES		
RWY32 Baseline		32DEPBASE
RWY 32 Southeast B	RH turn north of Otley and over East Leeds towards BATLI/MAMUL	32SEB
RWY 32 Southeast C	RH turn north of Otley and over West Leeds and west of BATLI/MAMUL	32SEC
RWY 32 Southeast D	LH turn between Menston and Burley in Wharfedale and then towards MAMUL	32SED
RWY 32 Southeast E	LH turn between Menston and Burley in Wharfedale but then turning more easterly towards BATLI/GOLES then MAMUL	32SEE
RWY 32 Southeast F	Straight ahead to 4.5nm before RH turn over Leeds towards BATLI/MAMUL	32SEF
RWY 32 Southeast G	Straight ahead to 4.5nm before LH turn over Bradford towards MAMUL	32SEG
RWY 32 South & West A	RH wrap-around turn north of Otley then over Bradford towards POL and/or NELSA	32S&WA
RWY 32 South & West C	LH turn between Menston and Burley in Wharfedale then direct POL	32S&WC
RWY 32 South & West D	LH turn between Menston and Burley in Wharfedale then direct NELSA	32S&WD
RWY 32 South & West F	Straight ahead to 4.5nm before RH wrap-around turn north of Otley then over Shipley towards POL and/or NELSA	32S&WF
RWY 32 South & West G	Straight ahead to 4.5nm before LH turn over Ilkley towards POL	32S&WG
RWY 32 South & West H	Straight ahead to 4.5nm before LH turn over Ilkley towards NELSA	32S&WH
RWY 32 New Option A Potential Respite Route	Tight LH turn between North Guiseley and South Menston then POL/NELSA/LAMIX	RWY32NEWA
RWY 32 New Option B Potential Night Route	Early RH turn to avoid Otley, Menston and Burley in Wharfedale then LH turn over Askwith Moor then POL/NELSA/LAMIX	RWY32NEWB
RWY 32 New Option C Potential Respite or Night Route	Early RH turn south of Otley then a wrap-around before splitting in the Calverley area for POL/NELSA/LAMIX	RWY32NEWC
RWY 32 New Option D Potential Night Route	Straight ahead then RH turn well north of Otley then a wrap-around before splitting in the Greengates area for POL/NELSA/LAMIX	RWY32NEWD
RWY 32 New Option E Potential Night Route	Early LH deviation before a RH turn west of Otley and a LH turn over Askwith Moor then splitting POL/NELSA/LAMIX	RWY32NEWE

RWY14 Baseline		14DEPBASE
RWY 14 Southeast A	RH turnover Central Leeds to position west of BATLI towards MAMUL	14SEA
RWY 14 Southeast B	Straight ahead towards BATLI then MAMUL	14SEB
RWY 14 South and West C	RH turn over Bradford towards POL and/or NELSA	14S&WC
RWY 14 South & West D	LH turn over Alwoodley and Otley towards POL	14S&WD
RWY 14 South & West E	LH turn over Alwoodley and Otley towards NELSA	14S&WE
RWY 14 New Option A Potential Respite or Permanent Route	Early RH turn towards Pudsey then splitting in the Birkenshaw area for POL/NELSA/LAMIX	RWY14NEWA
RWY 14 New Option B Potential Night Route	Early LH turn over Adel and Eccup before wrap-around north of Otley before splitting POL/NELSA	RWY14NEWB
ARRIVALS		
Arrivals System Baseline RWY 14 and 32		ARRVBASE
Option 1	One hold LBA	A1
Option 6	Two holds LBA/GOLES	A6
Option 7	Three holds NW/LBA/GOLES	A7
Option 8	Two holds NW/GOLES	A8
Option 9	Two Holds UDDER/GOLES	A9
Option 10	One hold GOLES for arrivals from the South and east only	A10
Option 11	Two holds NW/GOLES RWY 32 DWRH	A11
RNPAR RWY 14	Downwind left with early turn to intercept the centreline about 3.5nm final	AR14
RNPAR RWY 32	Offset approach intended to avoid central Leeds residential districts, Headingly and Hyde Park Districts	AR32

Table 6 Options for design principle evaluation

4. STAKEHOLDER ENGAGEMENT

4.1 CAP1616 Requirements

4.1.1 CAP1616 Step 2A requires sponsors to undertake stakeholder engagement following the development of the Comprehensive List of Options (CLoO).

4.1.2 CAP1616 paragraph 125 states that the purpose of the engagement is for the sponsor to preliminarily test the CLoO with the same stakeholders it engaged with in Step 1B; this is to ensure that they are satisfied that the design options are aligned with the design principles and that the change sponsor has properly understood and accounted for stakeholder concerns, specifically related to the design options[6].

4.1.3 However, throughout Stage 2, some stakeholders forwarded invitations and associated materials on to other organisations as well as some individuals within potentially affected communities who represented only their own interests, without permission from LBA. LBA felt that exclusion of such stakeholders could cause upset. This explains for the addition of some stakeholders in Stage 2.

4.1.4 Leeds Bradford Airport (LBA) carried out 4 rounds of stakeholder engagement on the CLoO:

- Round 1 was from 05 July 2022 to 26 August 2022 and engaged on the original 39 design options.
- Round 2 was from 31 March 2023 to 28 April 2023.
- Round 3 was from 22 November 2023 to 20 December 2023
- An update (Round 4) was sent to stakeholders in May 2025.

4.2 Identification of Stakeholders

Leeds Bradford Airport engaged with all the stakeholders who were engaged with at Stage 1. The stakeholders were separated into the following categories:

- Local Councils.
- LBA Airport Consultative Committee.
- Environmental Bodies.
- Technical Stakeholders.
- Local Aviation Representatives.
- NATMAC (National ATM Advisory Committee) members; and
- Other interested parties.

Councils/Authorities

4.2.1 Leeds Bradford Airport identified 12 Borough Councils, Authorities and County Councils within the potentially affected area, some of these organisations are already represented on the Leeds Bradford Airport Consultative Committee, however all those listed in Table 7 were invited to participate in the CLoO engagement.

4.2.2 Table 7 shows the councils and authorities who were invited to participate:

[6] CAP1616 Edition 4 Page 39 para 125

Borough/County Councils & Authorities	
Barnsley Council	Kirklees Council
Bradford Council	Leeds City Council
Calderdale Council	Mayor of West Yorkshire
Craven District Council	Pendle Borough Council
Doncaster Council	Selby District Council
Harrogate Borough Council	Wakefield Council

Table 7: Councils/Authority Stakeholders

Industry Stakeholders

4.2.3 This is a wide range of groups which include, local airports and airfields, aviation operators from Leeds Bradford Airport, the National Air Traffic Management Committee (NATMAC), the military and GA organisations.

4.2.4 The National Air Traffic Management Advisory Committee (NATMAC) is a non-statutory advisory body chaired by the CAA. The Committee is consulted for advice and views on any major matter concerned with airspace management and strategy matters.

4.2.5 Table 8 lists the NATMAC organisations engaged with.

NATMAC Members	
ACOG	British Microlight Aircraft Association (BMAA)/ General Aviation Safety Council (GASCO)
Aircraft Owners and Pilots Association (AOPA)	British Parachute Association (BPA)
Airfield Operators Group (AOG)	General Aviation Alliance (GAA)
Airlines UK	Helicopter Club of Great Britain (HCGB)
Airspace4All	Honourable Club of Great Britain (HCAP)
Aviation Environment Federation (AEF)	Light Aircraft Association (LAA)
BAE Systems	Low Fare Airlines
British Airline Pilots Association (BALPA)	Military Aviation Authority (MAA)
British Airways (BA)	Ministry of Defence- Defence Airspace and Air Traffic Management (MoD DAATM)
British Balloon and Airship Club	NATS/NERL
British Hang gliding and Paragliding Association (BHPA)	PPL/IR (Europe)
British Gliding Association (BGA)	UK Airprox Board (UKAB)
British Helicopter Association (BHA)	UK Flight Safety Committee (UKFSC)

Table 8: NATMAC Members

4.2.6 Table 9 shows the local airfields and airports who were invited to participate.

Local Airports/Airfields	
Bagby	Leeds East Airport
Breighton Aerodrome	Netherthorpe Airfield
City Airport and Heliport	Pocklington Airfield
Crossland Moor Airfield	Retford Gamston Airport
Doncaster Sheffield Airport[7]	Sandtoft Airfield
Eddisfield Airfield	Sutton Bank Airfield
Full Sutton Airfield	Teesside International Airport
Warton Aerodrome	York Rufforth Airfield

Table 9: List of Airfield/Airport Stakeholders

4.2.7 Table 10 presents LBA's airline operator stakeholders engaged with for this stage of the process.

LBA Operators	
Aurigny	Jet2
British Airways (BA CityFlyer)	KLM
Eastern Airways[8]	Multiflight
EasyJet	Ryanair

Table 10: List of LBA Airline Operators

4.2.8 Table 11 presents a wide range of industry related groups/organisations including small local airfields, local gliding clubs and other airspace users who were invited to participate in this stage of the process.

Additional Aviation Stakeholders	
Burn Gliding Club	Cleveland Flying School
Dales Hang gliding and Paragliding Club	Derbyshire Soaring Club
Doncaster Sheffield Flight Training*	Flight Academy Manchester
Heli-Jet Aviation	Hields Aviation
Humber Flying Club	Humberside Airport Flying School
Humberside POM Flying Club	LAC Flight School
National Police Air Service (NPAS)	Pennine Soaring Club
Regional Soaring Airspace Group (RSAG)	Sheffield Aero Club
Sherburn Aero Club	Skyhigh Skydiving
Yorkshire Gliding Club	West Yorkshire Police
Yorkshire Aero Club	Yorkshire Air Ambulance

Table 11: Additional Aviation Stakeholders

[7] Doncaster Sheffield Airport ceased operations in November 2022
[8] No longer in operation as of Q4 2025 however DSA have since commenced an ACP to re-establish Controlled Airspace in support of their future operation

Community Stakeholders

4.2.9 This group was represented by the LBA Consultative Committee, which was established to develop an understanding between Leeds Bradford Airport and the neighbouring community, local authorities and special interest groups on the operation and use of Leeds Bradford Airport. It operates in an independent advisory capacity, and its members are representatives from the following:

LBA Consultative Committee	
ACC Chair	North Yorkshire County Council
Aireborough Neighbourhood Forum	Otley Town Council
Baildon Town Council	Pool in Wharfdale Parish Council
Bramhope & Carlton Parish Council	Rawdon Parish Council
Burley in Wharfdale Parish Council	Trade Union Congress- Yorkshire & The Humber
Calderdale Council	Transdev
City of Bradford MDC	Vale of Yorkshire Gliding Clubs
Harrogate District Chamber of Commerce	Wakefield Council
Horsforth Town Council	Inner North West Community Committee
LBA Support Group	Welcome to Yorkshire
Leeds City Council (CON)	Yorkshire Local Councils Association- Leeds Branch 1 of 2
Leeds City Council (LAB)	Yorkshire Local Councils Association- Leeds Brand 2 of 2
Local Resident Rep- Horsforth End of Runway	Menston Parish Council
Local Resident Rep- Yeadon	

Table 12: LBA Consultative Committee members/representatives

Environmental Organisations/Groups

4.2.10 Leeds Bradford Airport identified the following environmental organisations/representatives who were invited to participate in this stage of the process.

Environmental Organisations/Representatives	
Climate Action Menston	Peak District National Park Authority
National Trust	Yorkshire Dales National Park Authority
Natural England	

Table 13: List of Environmental Organisations/Representatives

4.3 Stakeholder Engagement Chronology

4.3.1 Throughout their engagement, Leeds Bradford Airport created and removed multiple design options after receiving stakeholder feedback. There was also feedback from the CAA after failing to pass the CAP1616 Stage 2 gateway that resulted in further engagement.

4.3.2 Therefore, it was necessary to re-engage with stakeholders, resulting in 4 rounds of engagement through a series of online workshops followed by information presentations

provided over email. Those who were unable to attend the online workshops were still provided with all material for comment.

4.3.3 The list of attendees of each workshop, including the full list of invited stakeholders is detailed in Appendix B – *Stakeholder Engagement Log*. The material shared with all stakeholders is available in Appendix A – *LBA Stakeholder Engagement Materials*. The written feedback received is detailed in Appendix C – *Stakeholder Feedback Report*.

First Round of Engagement

4.3.4 Leeds Bradford initially held 2 workshops. These workshops were held during their first round of engagement, one for technical stakeholders and another for non-technical stakeholders, with each of these occurring on the 5th July 2022.

4.3.5 The workshops engaged stakeholders on the original 34 departure design options and 5 arrival design options. The aim of the workshops was to ensure stakeholders understood both the objectives of Airspace Modernisation and the designs being presented. It also allowed for a collaborative discussion between Leeds Bradford and stakeholders.

4.3.6 The presentation provided by Leeds Bradford Airport at the workshop covered the following topics:

- Design Principles
- Methodology
- Departures
- Arrivals
- Q&A

4.3.7 The presentation was distributed via email to all stakeholders following the workshops, including those who were unable to attend the workshops. It was then followed by a further 'clarification update' presentation, which included slides detailing the AMS process and any additional information stakeholders may need. The aim of this second presentation was to answer frequent questions occurring in the workshops.

4.3.8 Alongside these presentations, engaged stakeholders received a survey which enquired whether they believed the design principles had been initially evaluated adequately to the design options. Stakeholders were asked to respond to the following question:

Do you think we have correctly applied the Design Principles to swathe **name of DO? If no, please provide the Design Principle number and reason in the free text box.**

4.3.9 Stakeholders were asked this question for all 39 original designs. Stakeholders were also encouraged during the workshops to ask any questions, or they could email the bespoke ACP email address. The deadline for feedback was 26th August 2022, giving all stakeholders over 8 weeks to provide comments.

4.3.10 In response to stakeholder feedback, a series of additional departure DOs were developed, along with a revised array of arrival system DOs.

Second Round of Engagement

4.3.11 The second round of engagement (31st March 23 – 29th April 23) consisted of a presentation distributed to stakeholders via email. The presentation detailed the revised list of Design Options as well as a second online survey and also introduced stakeholders to the potential

for departure options to the north west and north east not being required. The presentation was split in two, one for departures and one for arrivals.

4.3.12 LBA decided to engage via email format during round 2 as the engagement built detail upon ideas and concepts previously explained to stakeholders, as part of round 1.

Third Round of Engagement

4.3.13 Following an unsuccessful Stage 2 gateway attempt in June 2023, a third round of stakeholder engagement took place, running from the 22nd November 2023 to the 20th December 2023. Stakeholders received an overview via email alongside a presentation and online survey, explaining the need to re-engage following the unsuccessful gateway, in addition to the further introduction of new design options.

4.3.14 LBA decided to re-engage via workshops at this point to re-familiarise stakeholders with the overall proposal and account for the time elapsed since the previous briefing. It also allowed the process to remain collaborative, as it provided stakeholders the opportunity to ask any new questions or have options explained in more depth.

Fourth Round of Engagement

4.3.15 The final round of engagement for LBA was held following the unsuccessful May 2024 CAP1616 Stage 2 assessment. The CAA requested that LBA re-engage with their stakeholders, to provide more information to stakeholders on areas that lacked clarity. This was distributed via email communications due to it being purely for clarification purposes. This document introduced a new arrival option, clarified the existing options, provided rationale for retention of DOs and detailed changes to another preliminary DPE.

4.3.16 LBA received three responses relevant to the ACP which came from the following organisations and individuals and can be found in Appendix C – *Stakeholder Feedback Report.*

- Dales Hang gliding and Paragliding Club
- AOPA
- Private Correspondence

4.4 Summary of Feedback that influenced Design Options

4.4.1 Across all 4 rounds of engagement, Leeds Bradford Airport received a total of 58 feedback responses via surveys and emails feedback from stakeholders. There are split as follows:

- Round 1- 12 Responses
- Round 2- 27 Responses
- Round 3- 15 Responses
- Round 4- 3 Responses

4.4.2 Stakeholder feedback directly influenced Leeds Bradford's development of design options.

4.4.3 Feedback on departures from the first round of stakeholder engagement influenced the designs by highlighting the desire for RWY 32 departures to climb straight ahead over Weston Park before turning to reduce overflight of population at low altitude. Whilst this suggestion was in specific reference to RWY 32 left turn departures, it was equally applied

to right turn departures. The result was a suite of options that climbed straight ahead to circa 4.5nm on Runway 32 for each direction of travel.

4.4.4 A second option (32NWB) was introduced routing more Westerly than 32NWA to reduce overflight of Yorkshire Dales National Park, an area multiple stakeholders mentioned should be avoided. Relevant feedback that influenced the options development is presented in Table 14.

Stakeholder	Feedback
North West Leeds Transport Forum	It is unclear why there were no other options identified for departures to NW from RW32. For example, why not have a swathe turning North to head over Weston Park before turning NW (this would be more compliant with principle 2 because it would reduce overflying of south Burley in Wharfedale and north Menston - although it might require a larger controlled area).
Peak District National Park Authority	Whilst the swathe may meet most principles, it does not include overflight of a noise sensitive location, namely the Yorkshire Dales National Park. This includes Malham & Malham Cove.
Dales Hang gliding and Paragliding Club	Potential conflict with YDNP.

Table 14: Round 1 Stakeholder Feedback with influence on DOs

4.4.5 Stakeholder feedback from the 2nd round of engagement also influenced the design options which were then shared in round 3.

4.4.6 Seven new departure designs (five for runway 32 and two for runway 14) and a new RNP-AR arrival to each runway end were created to try and avoid some of the communities in close proximity to the airport, with many of them created to provide communities with respite. The feedback that helped to further influence the development of the options is presented in Table 15.

Stakeholder	Feedback
Otley Resident	There has been insufficient volume and quality of consultation with Otley residents or their elected officials (key stakeholders) to access the optimum way forward: in particular addressing the existing problems of early morning and late-night noise which could be exacerbated by some of the options. My view is that this deficiency means that the Options appraisal should not be permitted to pass the next gateway.
North West Leeds Transport Forum	Regarding 32SEF, DP2 should be RED (because residents of North West Leeds would be subject to the noise and disturbance of aircraft departing to the Southeast regardless of which runway had been used. This would removed any semblance of respite. Also this path would be wholly contrary to the spirit of the local planning condition which, in order to reduce noise disturbance in the main built up area, requires departures to use RW32 whenever it is safe to do so.
Member of the Public	Design principle no 2. I am a member of the public and am posting this here as I don't know where else to make my opinion known. The document is not the easiest for a lay person to decipher but option B of the north westerly departures seems to push the extent of the flight path further over to Otley, such that it crosses Burras Lane and Ilkley Road somewhere near the

	Fleece public house. This would not only affect people directly under the flight path but many more people living in Otley than is current. In or around 2020 you nudged the flight path over towards Otley and away from Menston so that planes now cross over Bradford Road between Otley and Menston. This probably is a good balance for the peoples of both communities so any proposals to shift any of the flight paths further towards Otley are plain wrong. I can't comment on how many more or less people will be affected by this option but with Otley being nearer to the airport it means that the people here are affected more so than the people further up the valley in Ilkley. So even if less people in total are affected by option B you need to take into account the level of interference that would be inflicted on the number of people living in Otley.
Individual	32NW Noise. The proposed routing covers larger areas of Otley, which would expose a larger number of people to increased noise levels. Occasional Military training flights use similar routings, and the noise levels from these are significant, however they are infrequent and not at antisocial hours. Regular use of these routings would cause nuisance. Pollution in these areas would also increase. adding to the already significant road traffic pollution.
Bramhope and Carlton Parish Council	It seems clear that RNP-AR should be the strategic direction for Airspace Change even though this would make LBA a pioneer. It provides for much more precise routing enabling greater mitigation of the environmental impacts.

Table 15: Round 2 Stakeholder Feedback with Influence on DOs

4.4.7 In between Rounds 2 and 3, NERL confirmed there was insufficient demand/justification for SIDs to the NW and NE and also advised that SIDs not routing towards NELSA, POL or MAMUL would be incompatible with the MTMA design and that SIDs routing underneath stacks or towards arrivals is not desirable from an enhanced safety or increased systemisation perspective.

4.4.8 LBA and NERL held a series of collaborative design workshops to investigate the options, at which NERL articulated issues regarding potential holds at NELSA/WORTH/AIREY/UDDER. These were all in direct confliction with LBA's departures, restricting continuous climb, increasing controller workload and in opposition to NATS' safety by design principles. The AIREY hold was too close to Leeds for aircraft to be able to lose height to Runway 32.

4.4.9 Therefore, arrivals systems 2, 3, 4, and 5 were all discounted. Whilst the UDDER hold (arrival system 9) also conflicted with departures, this was retained as a potential option owing to options for RWY 32 right turn departures or small adjustments to the stack location to enable RWY 14 departures. As a result of these options being discounted, five new arrival system options 6-10 were created with more suitable LBA stack locations at GOLES and a hold to the NW and/or overhead the airport. It should be noted that as the stacks are at 7000ft and above, their location falls under NERL's ACP. At this time, all SIDs to the Northwest and Northeast were discontinued as well as RWY 32 Southeast A, South and West B&E, RWY 14 Southeast C&D and South and West A&B.

4.4.10 The written stakeholder feedback can be found in *Appendix C – Stakeholder Feedback Report*.

5. DESIGN PRINCIPLE EVALUATION

5.1 CAP1616 Requirements

5.1.1 As part of the Airspace Change Process at Step 1B, LBA developed a set of Design Principles with identified stakeholders. The aim of the Design Principles is to provide high-level criteria that the proposed airspace design options should meet. They also provide a means of analysing the impact of different design options and a framework for choosing between or prioritising options.

5.1.2 The Design Principle Evaluation (DPE) involves taking all the options developed and qualitatively evaluating them against the Design Principles to understand how well they are aligned.

5.2 Stakeholder feedback on Design Principle Evaluations

5.2.1 Throughout the rounds of engagement, LBA surveyed stakeholders as to their views on how well they considered options reacted to the design principles. This was achieved by sharing a preliminary Design Principle Evaluation with stakeholders for their comment.

5.2.2 Whilst stakeholder feedback in this engagement and surveys directly influenced the development of the options and helped to illustrate to our stakeholders the often contradictory nature of the principles, we recognise that using feedback to include in the formal design principle evaluation does not lead to a consistent evaluation, especially in the absence of a clear and transparent methodology at the time of that engagement.

5.2.3 The formal design principle evaluation in this section therefore sets out the consistent methodology applied by Subject Matter Experts from the LBA airspace change team together with the results.

5.3 Airspace Modernisation Strategy Criteria

5.3.1 The CAA has requested evidence that the DPE includes an assessment of how the different design options respond to the relevant AMS objectives:

"Subject to the overriding design principle of maintaining a high standard of safety, the highest priority principle of this airspace change that cannot be discounted is that it accords with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it".

5.3.2 LBA has incorporated this AMS objective in Design Principle 10 AMS Realisation.

5.3.3 There are four objectives of the Airspace Modernisation Strategy (AMS), as detailed in CAP1711. The table below sets out which parts of the DPE assess each of the four AMS objectives.

AMS objective	LBA's Design Principle(s) which evaluated this objective
Safety: Maintaining and, where possible, improving the UK's high levels of aviation safety has priority over all other 'ends' to be achieved by airspace modernisation.	DP1 Importance of Safety The airspace design and its operation must maintain or where possible enhance current levels of safety
Integration of diverse users: Airspace modernisation should wherever possible satisfy the requirements of operators and owners of all classes of aircraft, including the accommodation of existing users (such as commercial, General Aviation, military, taking into account interests of national security) and new or rapidly developing users (such as remotely piloted aircraft systems, advanced air mobility, spacecraft, high-altitude platform systems).	DP5 Airspace Dimensions The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users DP6 Airspace Complexity The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.
Simplification, reducing complexity and improving efficiency: Consistent with the safe operation of aircraft, airspace modernisation should wherever possible secure the most efficient use of airspace and the expeditious flow of traffic, accommodating new demand and improving system resilience to the benefit of airspace users, thus improving choice and value for money for consumers.	DP6 Airspace Complexity The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements. DP8 Systemisation The new procedures will integrate with the en-route network, as per the FASI-N programme. If required, the arrival transitions shall integrate with the IAPs, deconflict with the departure procedures, reducing the requirement for tactical coordination.
Environmental sustainability: Environmental sustainability will be an overarching principle applied through all airspace modernisation activities. Modernisation should deliver the Government's key environmental objectives with respect to air navigation as set out in the Government's Air Navigation Guidance and, in doing so, will take account of the interests of all stakeholders affected by the use of airspace.	DP2 Noise The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered. DP3 Tranquillity Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural and historical assets, tranquil or rural areas, sites of care or education and AONBs.

	DP4 Emissions and Air Quality The proposed design should minimise CO2 emissions per flight.

Table 16: AMS objectives & LBA's Design Principles

5.4 Design Principle Evaluation Methodology

Limitations of swathe-based designs and purely qualitative assessment

5.4.1 Without route centrelines, Controlled Airspace dimensions, associated overflight cones or any quantitative assessments, the design principle evaluation is a purely qualitative assessment only and based on Subject Matter Expert (SME) opinion only.

5.4.2 To evaluate each option in a fair and transparent way, the methodologies set out in Table 17 have been followed when evaluating against each Design Principle.

5.4.3 Within our DPE, we have chosen to break some Design Principles into components in order to fairly and transparently evaluate different aspects of the Design Principle. For example, the assessment of Design Principle 2 *'The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered'* has been broken down into three components to qualitatively assess this against numbers of people overflown, the adverse impacts of noise and whether respite was considered. In this circumstance, where evaluation of all the groups of illustrative tracks within an option have the same result (Met, Partially Met or Not Met), the Option will receive that evaluation outcome for that principle. Where there are different results depending on the different groups of illustrative tracks, that DP will be marked as Partly Met for the option.

5.5 DPE methodology

DP#	DP Statement	DP Component	APPROACH TO EVALUATION	MEETS	PARTIALLY MEETS	DOES NOT MEET
DP1	**Importance of Safety-** The airspace design and its operation must maintain or where possible enhance current levels of safety	N/A	A qualitative assessment undertaken by SME as to whether the option is expected to maintain or improve safety, whether further, achievable safety assurances will be required or whether there are issues identified which are unlikely to be able to be mitigated	Maintains existing level of safety, or improves on it	Issues identified that will require further safety assurances which seem achievable at this stage	Issues identified that would be unlikely to be able to be mitigated
DP2	**Noise**- The design should limit, and where practicable reduce, the number of people overflown, the impact of noise to stakeholders on the ground and where possible periods of built-in respite should be considered.	**Number of people overflown**	A qualitative assessment of whether the option is expected to enable routes to laterally avoid population densities which would therefore lead to a reduction in population numbers affected by noise	Expected to enable routes to laterally avoid population densities	No Change expected or similar magnitude of impacts	Like to result in worse vertical profiles or likely to overfly more densley populated areas
		Impact of Noise	ANG states that the Lowest Observed Adverse Effect Level (LOAEL) is regarded as the point at which adverse effects begin to be seen on a community basis. This qualitative assessment considers whether there are any aspects of each option which may affect the position and size of the LOAEL and if so, whether it could be expected to increase or decrease population numbers within it. This is performed using the extent of the daytime 2018 L_{Aeq} 16hr contour	Option could be expected to offer a reduction in the number of people within the LOAEL, subject to detailed modelling	Option could have positive or negative effect but not possible to tell without detailed noise modelling.	Option could be expected to generate an increase in the number of people within the LOAEL, subject to detailed modelling
		Respite considered	Whether or not the route was specifically developed with respite in mind	Option was specifically designed for respite purposes	N/A	Option was not specifically designed for respite purposes
		OVERALL DP EVALUATION (Any mixture of Met, Partly met, not met = Partly met)				

DP#	DP Statement	DP Component	APPROACH TO EVALUATION	MEETS	PARTIALLY MEETS	DOES NOT MEET
DP3	**Tranquillity-** Where practical, route designs should limit effects upon noise sensitive areas. These may include cultural and historical assets, tranquil or rural areas, sites of care or education and AONBs.	N/A	A qualitative assessment which compares the overflight of AONBs and National Parks below 7000ft of each option compared to the baseline. Assessment does not consider overflight of cultural and historical assets, rural areas or sites of care or education as swathes are too broad	Swathe does not overfly any or overflies less AONB or National Park below 7000ft	Swathe continues to overfly AONB or National Park below 7000ft	Swathe overflies more AONB or National Park below 7000ft
DP4	**Emissions and Air Quality-** The proposed design should minimise CO2 emissions per flight.	**CO2 emissions**	A qualitative SME assessment of whether the option can be expected to reduce, increase or not change CO2 emissions compared to the baseline owing to the estimated track miles associated with the option. See DP8 for CCO/CDO consideration	Option expected to enable more efficient routings, reducing co2 emissions	No Change or Similar to the baseline	Option expected to enable more inefficient routings, increasing co2 emissions
		Air Quality	A qualitative statement on whether the options could be expected to affect local air quality. ANG2017 states that due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. If an option has a change to flightpaths below 1000ft it will be evaluated as 'Partially Met' however further analysis will be required to determine the scale of change to local air quality. If an option has no change to flightpaths below 1000ft it will be evaluated as 'Met'.	No change below 1000ft expected therefore option is unlikely to affect local air quality	Option has potential to affect local air quality below 1000ft	N/A - Not possible to ascertain without detailed modelling
		OVERALL DP EVALUATION (Any mixture of Met, Partly met, not met = Partly met)				
DP5	**Airspace Dimensions-** The volume and classification of controlled airspace required for LBA should be the minimum necessary to deliver an efficient airspace design, considering the needs of all airspace users	N/A	A qualitative SME assessment of whether the option is expected to reduce, maintain or increase the volume and complexity of Controlled Airspace.	Option likely to allow a reduction in CAS	Options likely to require similar volume of CAS	Option likely to require increased volume of CAS

DP#	DP Statement	DP Component	APPROACH TO EVALUATION	MEETS	PARTIALLY MEETS	DOES NOT MEET
DP6	**Airspace Complexity-** The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.	N/A	The outcomes of DP5 will be used to evaluate this design principle on the assumption that more CAS could increase complexity and bottle necks in uncontrolled airspace and a reduction in CAS should reduce it. For reduction of complexity inside CAS, see DP8 assessment.	Evaluated in DP5 and met that design principle	Evaluated in DP5 and Partly Met that design principle	Evaluated in DP5 and did not meet that design principle
DP7	**Technical Requirements-** The design shall be fully compliant with PANS-OPS and UK CAA criteria to meet the technical capability requirements of aircraft using the airport.	N/A	Qualitative assessment by UK APD of whether designing a procedure within the swathe is likely to be achievable within PANS OPS	No cause of concern for APD	Potential to have some IFP design challenges	Not possible within PANS OPS
DP8	**Systemisation-** The new procedures will integrate with the en-route network, as per the FASI-N programme. If required, the arrival transitions shall integrate with the IAPs, deconflict with the departure procedures, reducing the requirement for tactical coordination.	N/A	Qualitative assessment of whether the departure swathe is in the required direction of NELSA/POL/MAMUL or if the arrival stack/swathe is in the preferable network location. It is not possible to ascertain whether all departures and arrivals will be deconflicted owing to the significant number of possible combinations at this stage.	Expected to integrate with the future MTMA en-route network	Expected to integrate but not ideal	Not expected to integrate with the future MTMA en-route network
DP9	**Operational Cost-** Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.	N/A	Not possible to ascertain whether there is an adverse "impact on community disturbance" as there is no approved metric for assessing such. It is likely any change will have an impact to some degree but not possible to ascertain if it would be an adverse effect. Fuel efficiency is qualitatively evaluated in DP4	N/A	N/A	N/A

DP#	DP Statement	DP Component	APPROACH TO EVALUATION	MEETS	PARTIALLY MEETS	DOES NOT MEET
DP10	**AMS Realisation-** This ACP must serve to further, and not conflict with, the realisation of the AMS.	N/A	The outcomes of DP1, 2, 3, 4, 5, 6, 8 are considered to assess this design principle with the exception of Do Nothing (baseline) which conflicts with the objectives of the AMS	DP1, 2, 3, 4, 5, 6, 8 all met	DP1, 2, 3, 4, 5, 6, 8 mixture of met, partly met and not met	DP1, 2, 3, 4, 5, 6, 8 all not met
DP11	**PBN-** The new procedures should capitalise on as many of the potential benefits of PBN implementation as are practicable.	N/A	A qualitative SME assessment of whether the option makes use of PBN and if aircraft upgrades may be required (RF or AR)	Expected to be designed to PBN standards that do not require aircraft fleet upgrades	Expected to be designed to PBN standards that may require aircraft fleet upgrades	Does not utilise PBN

Table 17: Design Principle Evaluation Methodology

5.6 DPE: Summary Tables

5.6.1 The full DPE can be found in Annex 1. It contains a breakdown of how each option has responded to each category within each DP. Tables 18-20 contain summaries of the full DPE, showing each options' performance against each DP as a whole.

DP# / Options	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	OUTCOME
32SE-BASELINE												DISCONTINUE
32SEB												PROGRESS TO IOA
32SEC												PROGRESS TO IOA
32SED												PROGRESS TO IOA
32SEE												PROGRESS TO IOA
32SEF												PROGRESS TO IOA
32SEG												PROGRESS TO IOA
32S&W-BASELINE												DISCONTINUE
32S&WA												PROGRESS TO IOA
32S&WC												PROGRESS TO IOA
32S&WD												PROGRESS TO IOA
32S&WF												PROGRESS TO IOA
32S&WG												PROGRESS TO IOA
32S&WH												PROGRESS TO IOA

Table 6: Summary of Design Principle Evaluation - RWY 32 Departures

DP# / Options	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8	DP9	DP10	DP11	OUTCOME
14SE- BASELINE												DISCONTINUE
14SEA												PROGRESS TO IOA
14SEB												PROGRESS TO IOA
14S&W- BASELINE												DISCONTINUE
14S&WC												PROGRESS TO IOA
14S&WD												PROGRESS TO IOA
14S&WE												PROGRESS TO IOA
RW32 Combination Option A (RWY32NEWA)												DISCONTINUE
RW32 Combination Option B (RWY32NEWB)												PROGRESS TO IOA
RW32 Combination Option C (RWY32NEWC)												PROGRESS TO IOA
RW32 Combination Option D (RWY32NEWD)												PROGRESS TO IOA
RW32 Combination Option E (RWY32NEWE)												PROGRESS TO IOA
RW14 Combination Option A (RWY14NEWA)												PROGRESS TO IOA
RW14 Combination Option B (RWY14NEWB)												PROGRESS TO IOA

Table 19: Summary of Design Principle Evaluation - RWY 14 Departures & Combination options

	Arrival Options									
DP#	**Baseline**	**System 1**	**System 6**	**System 7**	**System 8**	**System 9**	**System 10**	**System 11**	**RNP AR RW14**	**RNP AR RW32**
DP1										
DP2										
DP3										
DP4										
DP5										
DP6										
DP7										
DP8										
DP9										
DP10										
DP11										
OUTCOME	**DISCONTINUE**	**PROGRESS TO IOA**	**PROGRESS TO IOA**	**PROGRESS TO IOA**	**PROGRESS TO IOA**	**PROGRESS TO IOA**	**PROGRESS TO IOA**	**PROGRESS TO IOA**	**PROGRESS TO IOA**	**PROGRESS TO IOA**

Table 20: 2019 Summary of Design Principle Evaluation - Arrivals

5.7 Outcomes of the DPE

5.7.1 Our options were designed to explore multiple competing demands/principles i.e. improved operational performance, a reduction in population numbers affected by noise, a reduction in CO_2 emissions per flight, a reduction in the volume of CAS, minimise overflight of AONBs and National Parks and so on.

5.7.2 In airspace design, especially for complex ACPs like this, it is highly unlikely that a single option designed at the outset can address all these demands to the maximum extent. It is inevitable that where one option may fully meet Principle X it may only partly meet Principle Y, and another option vice-versa. This is demonstrated in Section 5.6.

5.7.3 There is no CAP1616 requirement to discontinue options based on the outcome of the DPE. Owing to the purely qualitative DPE, LBA decided to only discontinue an option on the grounds of safety, technical viability, whether it is likely to meet the objectives of the AMS or whether it will integrate with NERL's emerging MTMA network design. In this regard the do nothing scenarios were discounted for not meeting the objectives of the AMS although the do nothing scenarios will be kept for comparative purposes against a baseline going forwards.

5.7.4 Our goal is to arrive at a final proposal that best balances the series of competing demands. As we progress through the Initial Options Appraisal (Stage 2), network integration, Full Options Appraisal, consultation (Stage 3) and refinement (Stage 4), designs will be whittled down and/or most likely merged to combine the optimal components of different options.

5.8 Next Steps

5.8.1 The ACP now progresses to Step 2B of CAP1616 Stage 2. This involves carrying out an Initial Options Appraisal (IOA) of the remaining options, to understand in further detail the benefits and impacts of each option.

5.8.2 The IOA is the first of three phases of appraisal undertaken as part of the ACP. It forms part of the iterative process of CAP1616, whereby the detail of analysis builds as options are refined and matured through the stages.

6. GLOSSARY

Acronym	Term	Description
ACOG	Airspace Change Organising Group	Established in 2019 at the request of the Department for Transport and Civil Aviation Authority to coordinate the delivery of key elements of the UK's Airspace Modernisation Strategy.
ACP	Airspace Change Proposal	To carry out any permanent change to the published airspace, the Civil Aviation Authority (CAA) requires the change sponsor to carry out an airspace change proposal in accordance with CAP1616.
ADS-B	Automatic Dependent Surveillance Broadcast	A means by which aircraft can automatically transmit and/or receive data such as identification, position, and additional data, as appropriate in a broadcast mode via a data link.
AIP	Aeronautical Information Publication	A publication which contains details of regulations, procedures and other information pertinent to the operation of aircraft in the particular country to which it relates.
AMS	Airspace Modernisation Strategy	UK Government has tasked the aviation industry to modernise airspace in the whole of the UK. The long-term strategy of the CAA and the UK Government is called the Airspace Modernisation Strategy (AMS). Its CAA document reference number is CAP1711.
AMSL	Above Mean Sea Level	
ANSP	Air Navigation Service Provider	An organisation that provides the service of managing the aircraft in flight or on the manoeuvring area of an airport and which is the legitimate holder of that responsibility.
AONB	Area of Outstanding Natural Beauty	
ATC	Air traffic control	The ground-based personnel and equipment concerned with controlling and monitoring air traffic within a particular area.
ATZ	Aerodrome Traffic Zone	An airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic.
CAA	Civil Aviation Authority	The UK Regulator for aviation matters
CAP1616	Civil Aviation Publication 1616	The airspace change process regulated by the CAA
	Capacity	A term used to describe how many aircraft can be accommodated within an airspace area without compromising safety or generating excessive delay
CAS	Controlled Airspace	Generic term for the airspace in which an air traffic control service is provided as standard; note that there are different sub classifications of airspace that define the particular air traffic services available in defined classes of controlled airspace.
-	Centreline	The nominal track for a published route
-	Concentration	Refers to a density of aircraft flight paths over a given location, this generally refers to high density where tracks are not spread out; this is the opposite of dispersal
CCO	Continuous Climb Operations	An aircraft operating technique facilitated by the airspace and procedure design and assisted by appropriate ATC procedures, allowing the execution of a flight profile optimised to the performance of aircraft, leading to significant economy of fuel and environmental benefits in terms of noise and emissions reduction
CDO	Continuous Descent Operations	An aircraft operating technique in which an arriving aircraft descends from an optimal position with minimum thrust and avoids level flight to the extent permitted by the safe operation of the aircraft and compliance with published procedures and ATC instructions
-	Conventional navigation	The historic navigation standard where aircraft fly with reference to ground-based radio navigation aids
-	Conventional route	Routes defined to the conventional navigation standard, i.e. using ground-based radio navigation beacons to determine their position.

Acronym	Term	Description
CTA	Control Area	Controlled airspace extending upwards from a specified limit above the earth. Control Areas are situated above the Aerodrome Traffic Zone (ATZ) and afford protection over a larger area to a specified upper limit.
CTR	Control Zone	Controlled airspace extending upwards from the surface of the earth to a specified upper limit. Aerodrome Control Zones afford protection to aircraft within the immediate vicinity of aerodromes
db	Decibels	A unit used to measure the intensity of a sound (or the power level) of an electrical signal by comparing it with a given level on a logarithmic scale.
DER	Declared End of Runway	
-	Dispersal	Refers to the density of aircraft flight paths over a given location, this generally refers to lower density – tracks that are spread out; this is opposite of Concentration
DPE	Design Principle Evaluation	An evaluation of each option against each design principle which forms part of Stage 2A of the CAP1616 process
-	Easterlies	When a runway is operating such that aircraft are taking off and landing in an easterly direction
-	Final Approach	The final part of an arrival flight path that is directly lined up with the runway
FL	Flight Level	The Altitude above sea-level in 100 feet units measured according to a standard atmosphere. A flight level is an indication of pressure, not of altitude. Only above the transition level (which depends on the local QNH but is typically 4000 feet above sea level) are flight levels used to indicate altitude; below the transition level feet are used.
FLARM	Flight Alarm	FLARM (an acronym based on 'flight alarm') is the proprietary name for an electronic device which is in use as a means of alerting pilots of small aircraft, particularly gliders, to potential collisions with other aircraft which **are similarly equipped.**
FUA	Flexible Use Airspace	Airspace which is not solely designated for a single purpose, but can be allocated flexibly according to need, or switched entirely on/off according to a schedule or agreed process.
-	Flight-path	The track flown by aircraft when following a route, or when being directed by air traffic control
ft	Feet	The standard measure for vertical distances used in air traffic control
FASI	Future Airspace Implementation Strategy	Under the Government's Airspace Modernisation Strategy (AMS, ref 15) airports in the UK are required to update their airspace and routes in a coordinated way.
GA	General Aviation	All civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire. The most common type of GA activity is recreational flying by private light aircraft and gliders, but it can range from paragliders and parachutists to microlights, balloons, and private corporate jet flights.
IFP	Instrument Flight Procedures	A published procedure used by aircraft flying in accordance with the instrument flight rules, which is designed to achieve and maintain an acceptable level of safety in operations and includes an instrument approach procedure, a standard instrument departure, a planned departure route and a standard instrument arrival.
ILS	Instrument Landing System	An ILS operates as a ground-based instrument approach system that provides precision lateral and vertical guidance to an aircraft approaching and landing on a runway, using a combination of radio signals to enable a safe landing even during poor weather.
IOA	Initial Options Appraisal	A qualitative appraisal of an option against a baseline 'do nothing' scenario, as required at Step 2B of CAP1616
L_{Aeq}		The most common international measure of noise, meaning, 'equivalent continuous sound level'. This is a measurement of sound energy over a period of time.
$L_{Aeq\ 16h}$		The A-weighted Leq measured over the 16 busiest daytime hours (0700-2300) is the normal time-period used to develop the Airport Noise Contours for day-time operations.

Acronym	Term	Description
$L_{Aeq\ 8h}$		The A-weighted Leq measured over the 8 night-time hours (2300-0700) is the normal time-period used to develop the Airport Noise Contours for night-time operations.
-	Lower Airspace	Airspace in the general vicinity of the airport containing arrival and departure routes below 7,000ft. Airports have the primary accountability for the design of this airspace, as its design and operation is largely dictated by local noise requirements, airport capacity and efficiency
NAP	Noise Abatement Procedures	Noise abatement procedures are designed to minimise exposure of residential areas to aircraft noise, while ensuring safety of flight operations
NATS NERL		NATS NERL - The UK's licenced air traffic service provider for the en route airspace (upper network) that connects airports with each other, and with the airspace of neighbouring states.
nm	Nautical Mile	Aviation measures distances in nautical miles. One nautical mile (nm) is 1,852 metres. One road mile ('statute mile') is 1,609 metres, making a nautical mile about 15% longer than a statute mile.
-	Network Airspace / Upper network	En route airspace above 7,000ft in which NATS has accountability for safe and efficient air traffic services for aircraft travelling between the UK airports and the airspace of neighbouring states.
NTK	Noise Track Keeping	A system that monitors and records radar data to monitor aircraft operations and report statistics focused around noise.
PANS OPS	Procedures for Air Navigation Services Aircraft Operations	PANS-OPS is contained in an ICAO Document 8168 which sets out the design criteria and rules for instrument flight procedures which include approach and departure procedures.
PBN	Performance Based Navigation	Referred to as PBN; a generic term for modern standards for aircraft navigation capabilities including satellite navigation (as opposed to 'conventional' navigation standards)
RMA	Radar Manoeuvring Area	An ATC operational area articulated as a volume of airspace by the ANSP. It facilitates the close-in radar vectoring by ATC that is required to take the aircraft safely from a holding stack and established onto final approach.
RNAV / RNAV 1	aRea NaVigation	This is a generic term for a particular specification of Performance Based Navigation. The suffix '1' denotes a requirement that aircraft can navigate to with 1nm of the centreline of the route 95% or more of the time. In practice the accuracy is much greater than this.
RNP-RF	Required Navigation Performance – Radius to fix	An advanced navigation specification under the PBN umbrella. The suffix '1' denotes a requirement that aircraft can navigate to with 1nm of the centreline 95% or more of the time, with additional self-monitoring criteria. In practice the accuracy is much greater than this. The RF means Radius to Fix, where airspace designers can set extremely specific curved paths to a greater accuracy than RNAV1.
RNP-AR	Required Navigation Performance – Authorisation required	An advanced navigation specification under the PBN umbrella. 'Authorisation required' refers to aircraft and operators complying with specific airworthiness and operational requirements. RNP-AR allow airspace designers to set extremely specific curved paths to a greater accuracy than RNAV1, these can be designed before and after the Final Approach Fix.
-	Separation	Aircraft under Air Traffic Control are kept apart by standard separation distances, as agreed by international safety standards. Participating aircraft are kept apart by at least 3nm or 5nm lateral separation (depending on the air traffic control operation), or 1,000ft vertical separation.
SID	Standard Instrument Departure	Usually abbreviated to SID; this is a route for departures to follow straight after take-off.
	Tactical Intervention	Air traffic control methods that involve controllers directing aircraft for specific reasons at that particular moment (see Vector)
TMA	Terminal Manoeuvring Area (Terminal Airspace)	An aviation term to describe a designated area of controlled airspace surrounding a major airport or cluster of airports where there is a high volume of traffic.
TMZ	Transponder Mandatory Zone	Airspace of defined dimensions where the carriage and operation of transponder equipment is mandatory.

Acronym	Term	Description
VFR	Visual Flight Rules	Visual Flight Rules (VFR) are the rules that govern the operation of aircraft in Visual Meteorological Conditions (VMC) (conditions in which flight solely by visual reference is possible)
VMC	Visual Meteorological Conditions	Visual meteorological conditions (VMC) are the meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima
VSA	VFR Significant Area	A volume of airspace which has been identified as being particularly important to VFR operations. A VSA might take the form of a route, a zone, or an area chosen for its particular importance to GA users. These areas do not have any official status but are intended to highlight the importance of a particular area so that future airspace development plans can take account of the GA activity.
-	Vector / vectoring	An air traffic control method that involves directing aircraft off the established route structure or off their own navigation – ATC instruct the pilot to fly on a compass heading and at a specific altitude. In a busy tactical environment, these can change quickly. This is done for safety and for efficiency.
-	Westerly operation	When a runway is operating such that aircraft are taking off and landing in a westerly direction