Stakeholder Engagement Report

Stage 2 Develop and Assess

MAG East Midlands Airport

Contents

1 Introduction

This document details the stakeholder engagement undertaken by East Midlands Airport (EMA) to meet the engagement requirements of Stage 2 of CAP1616, the Civil Aviation Authority's (CAA) guidance on the regulatory process for airspace change[1]. This document forms part of the suite of documents submitted to the CAA at Gateway 2 of the CAP1616 process and is intended to be read alongside those documents. The purpose of the engagement at Stage 2 is to test the departure and arrival route options with stakeholders to ensure that they are satisfied that these are aligned with the design principles and that stakeholder comments have been considered. The way that this was achieved at EMA is described in this document and reflected in the other Stage 2 submission documents.

The full suite of Stage 2 submission documents is:

- The **Stage 2 Summary Document**, which draws together the key points from the Stage 2 submission and provides details of the Government's national programme of airspace change, the CAP1616 process and the progress to date of the ACP at EMA.
- **Design Options Evolution (DOE)**, Appendix A to the Stage 2 Summary Document shows the evolution of the design options through Steps 2A and 2B of the CAP1616 process. The resulting shortlist of design options will be considered in the Full Options Appraisal (FOA) at Stage 3.
- **Design Options Report (DOR)**, which sets out the EMA's approach to the design process and the output of that process in the form of design options for both departures and arrivals at the airport. It presents the options identified and describes how those options were refined to provide the comprehensive list of options to be progressed to the Design Principles Evaluation (DPE).
- **Design Principles Evaluation (DPE)**, which assesses how the design options have responded to the design principles established at Stage 1 of the CAP1616 process and identifies those design options that warrant further analysis at the next step.
- **Initial Options Appraisal (IOA)**, building on the results of the DPE, the IOA is the first of three option appraisals required as part of the CAP1616 process. The purpose of the IOA is to provide, at a minimum, a qualitative assessment of each design option providing stakeholders and the CAA with the relative differences between impacts, both positive and negative; and
- This report, the **Stakeholder Engagement Report (SER)**, which explains how engagement has been used in the processes described in the other Stage 2 documents and records its outputs.

These reports, together with their supporting appendices, will be published on the CAA Airspace Change Portal www.airspacechange.caa.co.uk.

[1] CAP1616: Airspace change: Guidance on the regulatory process for changing the notified airspace design and permanent redistribution of air traffic, and on providing airspace information (version 4, published March 2021)

2 Stakeholder engagement during Stage 2 'Develop and Assess'

2.1 Overview

Stage 2 (Develop and Assess) of the CAP1616 process focuses on the development of route options and is divided into two Steps: Step 2A - Options Development, and Step 2B - Options Appraisal. CAP1616 requires that stakeholder engagement is carried out as part of Step 2A.

Step 2A requires the creation of a comprehensive list of route options to address the Statement of Need (SoN) and respond to the design principles established at Stage 1. These options must then be tested with stakeholders and evaluated against the design principles to establish the list of route options to be progressed to Step 2B. The process followed at Step 2A to develop initial design envelopes, refine those design envelopes and then create route options within the design envelopes is summarised at sections 6 to 18 of the Summary Document.

Stakeholder input is an important component of Stage 2, and CAP1616 requires change sponsors to demonstrate how stakeholders' views and feedback have informed the development of the route options. A full chronology of the engagement activities completed by the airport during Stage 2 is contained in appendix 2.

Alongside the engagement described below, bilateral meetings were held with NATS En Route (NERL) as the operator of the upper airspace network and airports in the vicinity of EMA likely to be impacted by the EMA ACP, and other change sponsors, to communicate progress and to obtain feedback on the concepts and route options being developed. Feedback received during these meetings has been taken into account during the Stage 2 process, with changes incorporated as appropriate. Further details are provided in appendix 2.

2.2 Stakeholder engagement strategy

Stakeholder engagement to support Stage 2 was split into two phases. The first phase covering the identification of design envelopes, the broad areas where it would be possible to place routes, and the second phase detailing the revision to the design envelopes and the creation of specific route options. The decision to use this approach was informed by discussions with our advisers, the Consultation Institute (tCI) and by the experience gained when delivering Stage 2 of the airspace change programme at both London Stansted Airport and Manchester Airport. This approach allowed us to build stakeholder knowledge from phase one to phase two, ensuring stakeholders from all backgrounds could understand, follow, and make an informed contribution to the process. In addition, we were able to explain and test our initial design work with stakeholders, before refining and developing specific route options that took account of their feedback.

The purpose of the first phase of engagement was to explain the initial part of the design process and present the resulting design envelopes, taking account of identified constraints, operational requirements, and our design principles. This allowed us to hear stakeholders' thoughts on the process we had followed and the design envelopes that had been created. Then we took account of that feedback in the next part of the design process, where specific route options were developed.

At the second phase of engagement, we were then able to seek further feedback from stakeholders to ensure they were content that we had correctly interpreted and taken account of feedback from the first phase. Further detail on the content covered in both phases of engagement can be found later in this document (sections 3.5 and 5.2) and in appendices 3, 4 and 5.

We were particularly conscious of the technical nature of the design work required at Stage 2, as well as the differing levels of experience between different stakeholder categories. By splitting engagement into two distinct phases as part of Stage 2, we were able to ensure that all stakeholders, as well as members of the public, who might not previously have had any exposure to or knowledge of the ACP, were supported to help them understand the content that was being presented.

Figure 1, below, shows how engagement shaped the wider Stage 2 process.

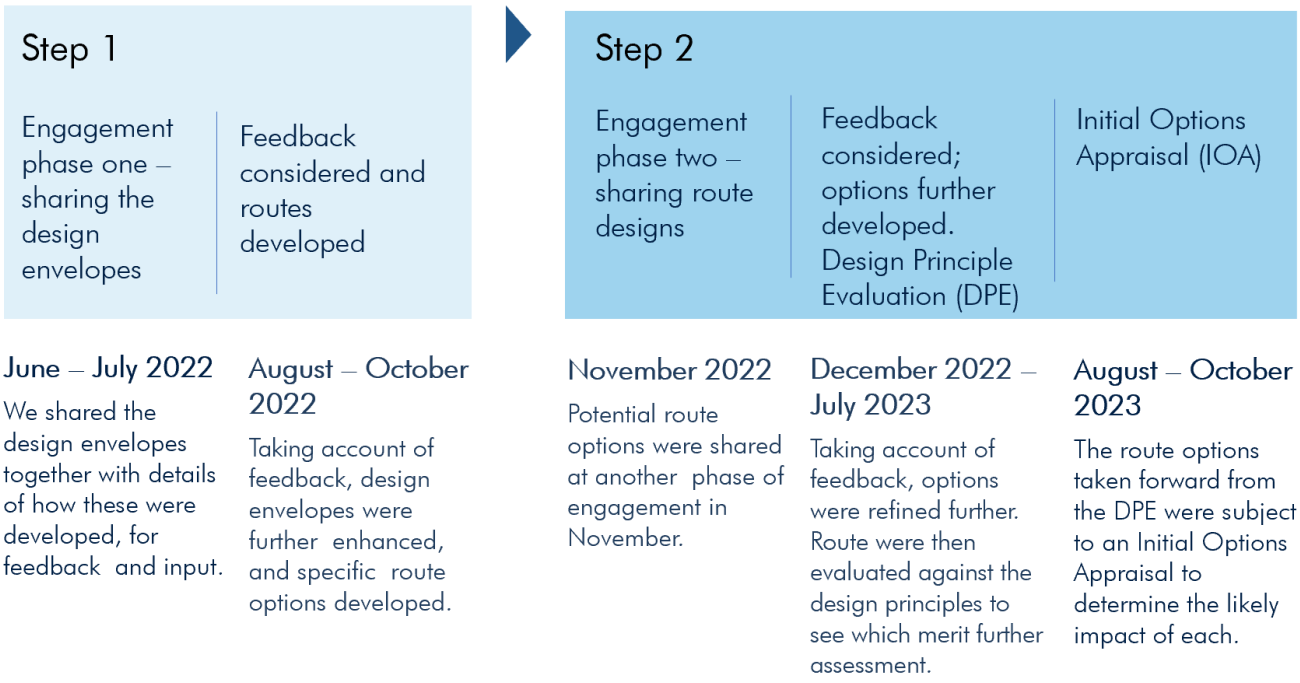

Figure 1: Stage 2 process

2.3 Stakeholders

As required by CAP1616, at Stage 1 we defined an area around the airport which may be affected by airspace change at EMA, within which aircraft landing at or taking off from EMA could possibly fly below 7,000ft, known as the potentially affected area. CAP1616 also sets out the categories of stakeholders to be engaged at Stages 1 and 2. These categories were used to form a list of stakeholders within the potentially affected area to engage with. In addition to engaging these stakeholders at Step 1B, we also chose to engage members of the general public. This resulted in two groups of stakeholders at Step 1B, those falling within the CAP1616 stakeholder categories and general public participants. For the purpose of this document, the collective group of CAP1616 stakeholders and the general public participants are referred to as 'stakeholders'.

As part of the CAP1616 process, we are required to engage with the same stakeholders at Stage 2 who were engaged at Step 1B. The COVID-19 pandemic had necessitated a pause of the EMA airspace project of over two years between passing through the Stage 1 gateway and the start of engagement for Stage 2. Given the time that had elapsed, the stakeholder list was reviewed to reflect any changes in representatives that had taken place and identify suitable replacement representatives where it was necessary to do so. By using this revised list in Stage 2, the same stakeholder categories as at Step 1B were engaged in the process, meeting the requirements of CAP1616.

In Step 1B, the general public had been engaged through face-to-face events independently facilitated by YouGov. The pause of the EMA ACP meant that the records held by YouGov of the members of the general public who attended the focus groups during Step 1B had been deleted, in-line with their General Data

Protection Regulations. Whilst the general public are not a required stakeholder for the purpose of Stage 1 and 2 of CAP1616, participants who had requested they be kept up to date on the EMA ACP, either through signing up through our website or taking part in our engagement at Step 1B, were invited to participate in the Stage 2 engagement activity facilitated by YouGov. Then, and in addition, YouGov recruited a mix of participants from the areas within the potentially affected area, ensuring a representative sample of the general public were involved in the engagement. This enabled feedback to be gathered from a broad mix of the general public, in terms of demographic mix, perception of the airport and aircraft noise and geographic spread across the potentially affected area. YouGov, as research experts, were well positioned to ensure a representative sample of attendees.

2.4 Methods of engagement

At the time of planning phase one engagement, in light of the COVID-19 pandemic, most stakeholder contact was still being conducted online. It was therefore felt that stakeholders would be more comfortable engaging online during phase one of Stage 2. Online engagement methods had been successfully employed at both London Stansted Airport and Manchester Airport and offered some important benefits in terms of participation levels, due to the added level of convenience and accessibility. Although phase one engagement during Stage 2 was conducted online, we also offered other methods of participation such as postal or telephone communication for any stakeholders who could not take part in online sessions. We did not receive any requests for these alternative methods of participation from any stakeholders. At phase two, as face to face engagement was becoming more commonplace again, we employed a blend of online and in person engagement activity.

As the content to be shared at Stage 2 of the CAP1616 process was more technically complex, our engagement during both phases consisted of a blend of independently facilitated engagement sessions and briefing sessions held by our own team. This flexible approach was devised to take account of the wide range of prior knowledge and expertise on the subject matter within certain stakeholder categories, with the general public sessions being independently facilitated. This provided independent assurance that general public participants, who were likely to have less technical knowledge had been supported to help them understand the content shown and were able to engage with it.

2.5 Stakeholder Reference Group

We established an independent Stakeholder Reference Group (SRG) during Stage 1. Their role is to provide advice on the communication, engagement, and subsequent consultation plans for the duration of the ACP. The SRG is designed to be reflective (but not necessarily representative) of local businesses, community and voluntary groups, and other interests.

Due to the lapse of time between Stage 1 and Stage 2 at EMA, a review of the SRG membership took place in early 2022. The SRG then met in April to review and comment on the suitability of the approach to engagement proposed for Stage 2. In addition, the SRG were asked to review and comment on the draft materials to be presented at the first phase of engagement, in order to test them for ease of understanding. They then met again in October to review the engagement plans and the proposed materials for the second phase of engagement. Feedback received was taken into account in the development of the materials presented at engagement.

The SRG will remain central to the development and monitoring of a full consultation plan for subsequent stages of the ACP, including during the full public consultation to be carried out at Stage 3.

3 Phase one engagement

3.1 Overview

The purpose of the first phase of engagement was to explain the initial part of the design process and to introduce stakeholders to the resulting design envelopes. We then sought feedback on the process followed and the individual envelopes to help inform the next stage of the design work.

Phase one engagement took place in June and July 2022 and consisted of eight discussion sessions facilitated by the EMA airspace team and two three-day forums facilitated by YouGov.

3.2 Discussion sessions

The discussion sessions facilitated by the EMA airspace team included stakeholders from aviation, business, community, national organisations, special interest groups and elected representatives. These events were 1.5 hours long and were held virtually using Microsoft Teams. Invitations to the sessions asked stakeholders to contact us if they needed any assistance in order to take part, no such requests were received. Each session contained stakeholders with similar interest and knowledge levels to enable discussion around common topics. Prior to the event, stakeholders were sent a pack of pre-read material (which can be found in appendix 3). This contained useful information to help set the scene for the discussion, including how aircraft currently arrive and depart from EMA and a reminder of the programme and progress so far. In addition, during the discussion sessions we revisited the information shared in the pre-read to enable stakeholders to ask any questions they may have had.

The format of our discussion sessions consisted of a presentation from the airspace team followed by the opportunity for stakeholders to pose questions arising from the presentation or the pre-read materials. The main content of the presentation was pre-recorded to ensure all stakeholders received the same information. Stakeholders were able to post questions into the meeting chat throughout the presentation which the team would then respond to in real time. After the event, we forwarded the presentation and a Q&A document containing the questions that stakeholders had asked within all the sessions, along with the corresponding answers. Stakeholders were also provided with a link to a Microsoft Forms online survey, where they could provide feedback after the session. The deadline for completing the survey was communicated at the end of the presentation and in the post-event emails. Stakeholders were also able to send any further comments or feedback after the session via email or post.

In total over 1,300 stakeholders received an invitation to take part, with regular reminders being sent leading up to the sessions. In total, 101 stakeholders representing 79 organisations attended our discussion sessions in phase one. Full details of stakeholders invited and those that attended can be found in our stakeholder list in appendix 1.

3.3 Forums facilitated by YouGov

For general public engagement, YouGov facilitated two, three-day online forums. This method was recommended by YouGov for phase one to allow participants to absorb the information by building their knowledge of the subject matter over time enabling audiences with potentially limited knowledge of the subject to provide a full and considered response. Information was provided over three days, building up their knowledge over this time and enabling YouGov to facilitate their understanding. Participants were asked to log in for a period of time each day, when they were presented with the engagement materials and then asked to provide their answers to a series of questions. The forum was 'open', enabling participants to see and comment on other individuals' answers to encourage discussion and debate. The airport team were able to watch the conversations each day, such that any questions not answered in the sessions could be addressed subsequently. We had tested this methodology at other MAG airports.

YouGov recruited a mix of participants from the areas within the potentially affected area. The particular forum that people were invited to was dependent on their location, meaning that each forum contained people from nearby areas allowing participants the opportunity to discuss the material with other participants located close to them. A total of 61 local general public participants were recruited to take part in the forums with 50 of these completing all three days. Further detail can be found in appendix 6.

3.4 Changes to the Potentially Affected Area

As described in section 2.3, at Stage 1 we defined an area around the airport which could be affected by airspace change at EMA, known as the potentially affected area. As part of the development of the design envelopes, ahead of the phase one engagement, it was established that there were two areas where it could be possible to design route options that would extend marginally beyond the area of potential impact identified at Stage 1. As a result, the potentially affected area was expanded, see the highlighted areas added in figure 2 below.

A further process of stakeholder identification to take account of these additional areas was completed prior to the first phase of engagement. As a result, a small number of additional stakeholders were identified comprising 14 parish councils and 1 city council, all of which were added to our stakeholder list and invited to take part in both phases of engagement activity. While none of these stakeholders accepted our invitation to engage, they received regular information on our progress through Stage 2 and details of where to access further detail on the work completed so far.

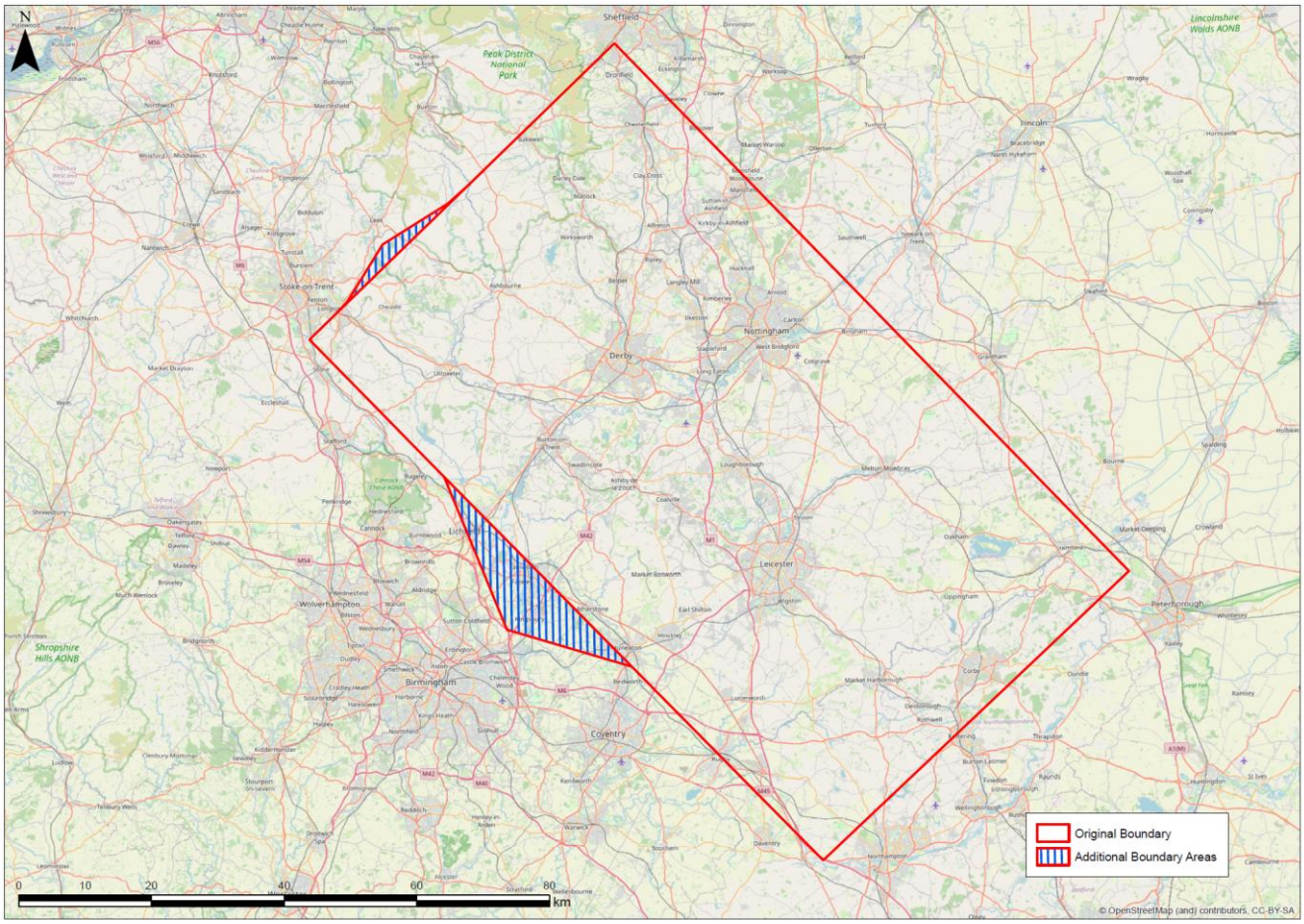

Figure 2: Revised area of potential impact

3.5 Material shared during phase one engagement

The purpose of phase one engagement was to guide stakeholders through the process behind the production of the initial design envelopes from which it would be possible to design route options that

complied with the SoN and responded to the design principles. To ensure the best possible understanding of the process, detailed background information was provided, including how EMA currently operates, how airspace works, how the design principles would influence our proposals and the constraints that had been applied to the development of the design envelopes. Whilst to some of the audience, this material might have been very familiar, for others, particularly participants drawn from the general public or those stakeholders that had not engaged with the airport previously, this background information was important to help develop their understanding of the complexities faced and enable them to contribute fully.

Prior to the engagement sessions, pre-reading material was circulated to remind participants of Stage 1 of the CAP1616 process at EMA and set out some brief details on current operations. In addition, a short, animated video was produced to support our engagement activity, a link to which has been provided here[2]. This set out the wider programme, outlined the work to be completed in Stage 2 and explained how stakeholder engagement formed part of it. This video was intended to act as an initial introduction and was sent to participants within the invitations to the engagement events and used at the start of the discussion sessions.

We have provided a summary of the content presented in the engagement sessions below, while full details of all the materials provided can be found in appendix 3.

3.5.1 Current operations

We felt it was important for stakeholders to understand how we currently arrive and depart aircraft in the airspace serving EMA, to enable them to contextualise the information we presented and provide a comprehensive response to any potential changes.

We started with an explanation of how aircraft currently depart from and arrive at the airport. Stakeholders were shown maps demonstrating the distribution of departing aircraft over a typical busy summer's day in 2019 on Runway 27 and Runway 09. The number of arrivals and departures in 2020 and 2021 was significantly affected by the pandemic, with a reduced number of passenger aircraft and an increased number of cargo movements. Maps showing operations in 2019 were shown as this year represents the last experience of (pre-pandemic) normal operations and hence it is the most appropriate illustration of normal operations. For departures these displayed:

- The Noise Preferential Routes (NPRs) on each runway end and the Standard Instrument Departure Routes (SIDs) that these encompass.
- The percentage of total departure movements for each NPR (for 2019).
- The typical altitude reached by aircraft along each route.

For arrivals, it was explained that although there are some similarities in routes for approaches, unlike departing aircraft there are no fixed flight paths for arriving aircraft until they are established on the Instrument Landing System (ILS), or 'final approach'. Maps showing arrivals on a typical busy summer's day onto each runway end were shown to demonstrate:

- The typical pattern of arrival traffic onto each runway end.
- The percentage of total arrivals approaching from each direction.
- The altitude reached by aircraft along each route.

[2] https://www.youtube.com/watch?v=fsGUUYRyDA8&t=7s

3.5.2 Airspace

Stakeholders were then introduced to the concept of airspace and its relevance to this programme. As part of this, we explained:

- What airspace is.
- How airspace is divided into distinct vertical layers.
- The difference between controlled and uncontrolled airspace.
- What controls and restrictions apply within the different layers.
- How multiple climbing and descending flights between different airports interact.

It was explained that within the airspace change programme, EMA is responsible for changes to arrival and departure routes from the ground to 7,000 feet (ft) and above that, is the responsibility of National Air Traffic Services (NATS). We explained that identifying the points at which arrivals descend below 7,000ft and departures reach 7,000ft gave us what we have described as a design boundary to work within. How the EMA airspace changes fit into the Manchester Terminal Manoeuvring Area (MTMA) was also explained, emphasising that any proposals that emerge from EMA would have to take account of the proposals emerging at other airports sharing the MTMA.

3.5.3 Defining the design boundary

It was explained that within the design boundary there were other factors that influenced what could be considered when creating our design envelopes and our comprehensive list of route options. These factors included:

- The international and national rules governing airspace and flight procedure design as defined by ICAO and the CAA.
- The performance capabilities and navigational equipage of aircraft.
- The need to connect to the NATS upper airspace network; and
- The future operational requirements of the airport.

Section 5 of the DOR sets these factors out in more detail.

In addition, it was explained that these factors would also be considered in the evaluation of the route options against what have been identified as 'must have' design principles, namely Keeping the Skies Safe, A Joined-up Approach and Meeting Demand.

With reference to the above factors, we were able to demonstrate to participants how we devised our design boundaries and mapped our constraints, explaining that this process gave us an outer omni-directional boundary showing where aircraft could be expected to reach 7,000ft from each end of the runway.

We explained that we had applied a similar omni-directional process to arrivals that would allow for Continuous Descent Approach (CDA) from 7,000ft with the outer edge representing the furthest point away from the airport that the shallowest gradient CDA could be achieved by the aircraft operating into and out of the airport.

Appendix 3 gives further details of how the creation of the design boundary for departures and arrivals was explained and presented to stakeholders.

3.5.4 Identifying constraints

Having defined the design boundary, it was explained that we then identified local factors within it that may constrain our designs. Within our design area there are no special locations identified by the CAA as danger areas or restricted areas. The major constraint described to participants was the boundary of controlled airspace. The area directly to the east of the airport is currently uncontrolled airspace meaning that routes for commercial aircraft cannot be designed in this area. In addition, the proximity of

Birmingham Airport, Derby Airfield, Nottingham Airport and Langar parachuting site were outlined as constraints.

It was explained that we had also identified a number of considerations within our design boundary, these are factors that could challenge our designs but could potentially be alleviated. These included Tatenhill, Leicester Airport and an area to the east which is currently uncontrolled airspace but may become viable to design routes within, subject to discussions that are being undertaken by NATS.

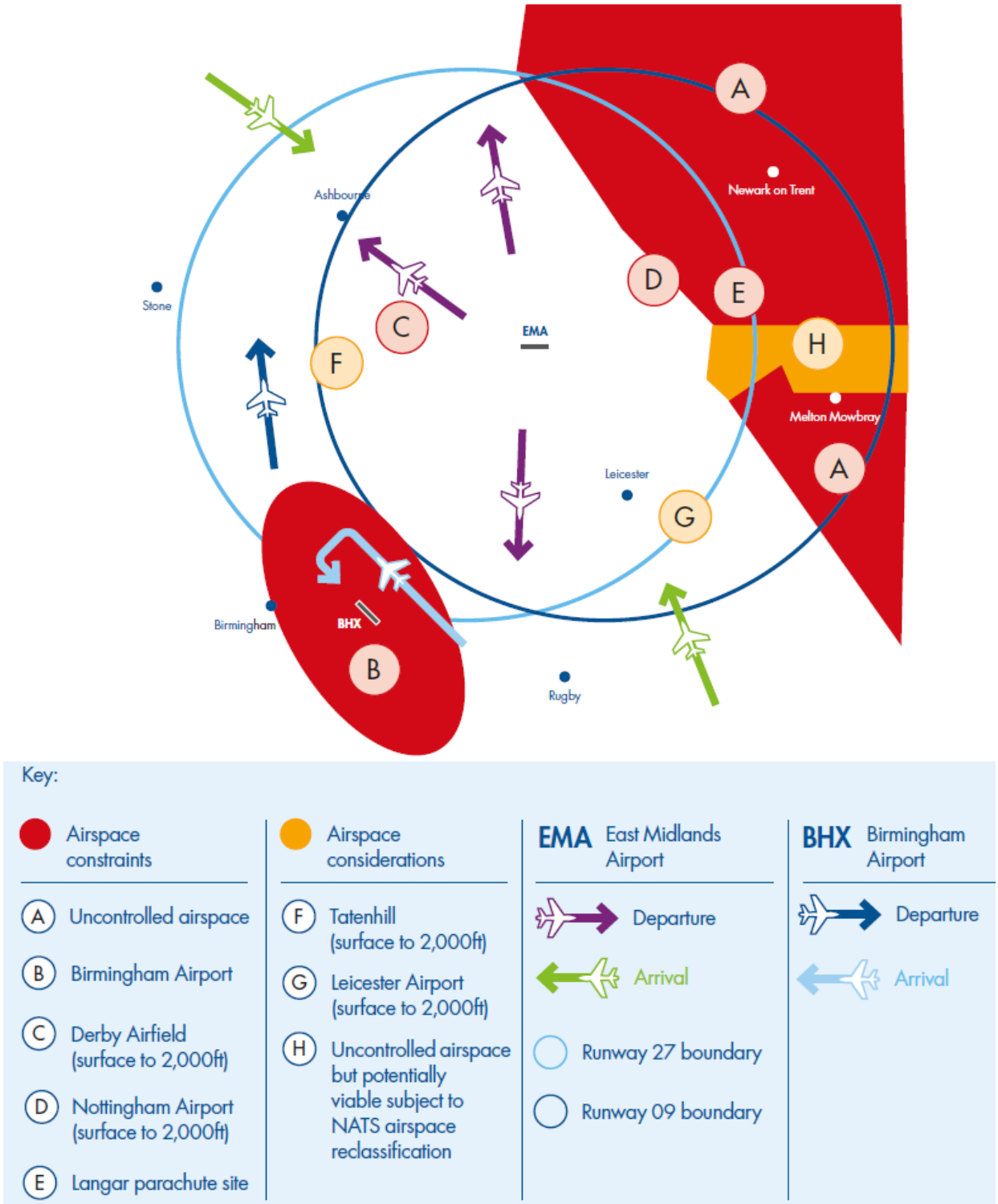

Figure 3: Constraints and considerations

3.5.5 Envelope design options

CAP1616 requires a comprehensive list of route options to be developed that address the SoN and align with the design principles. There is also a requirement to consider a 'do nothing' scenario and, where 'do nothing' is not feasible, 'do minimum' options.

These scenarios were explained to stakeholders. More detail on the 'do nothing' and 'do minimum' scenarios can be found in section 4 of the DOR and the materials presented to stakeholders can be found at appendix 3.

3.5.6 Initial departure design envelopes

The initial departure design envelopes that had been developed for Runway 27 and Runway 09 were presented. It was explained that each envelope was designed to enable the creation of route options that would address the SoN and align with the design principles. The process that was followed to design the initial design envelopes was explained and maps showing each envelope were presented.

3.5.7 Initial arrival design envelopes

In describing the initial arrivals design envelopes, we communicated the principles that had guided our design:

- The need to provide for CDA to both runway ends in line with our A Joined-up Approach, Limiting Our Footprint and Embracing Technology Design Principles; and
- The need to align our arrivals with the flow of traffic within the NATS network in line with our A Joined-up Approach Design Principle.

We detailed the constraints and considerations that influenced where the 7,000ft starting point for arrivals could be placed. It was explained that an arc had been drawn for each runway end representing the area where it would be possible to achieve a CDA from 7,000ft to the runway. The outer limit of the arcs would be the furthest away aircraft could be at 7,000ft and expect to achieve a CDA to that runway end.

It was explained that the 7,000ft starting point must be able to provide a CDA to both runway ends. This meant that the viable design area would be where the two arcs overlap as placing a 7,000ft starting point in this area would enable a CDA to either runway end. It was also explained that whilst it was likely that some vectoring by ATC would still need to take place, aircraft would follow Performance Based Navigation (PBN) routes, and this would mean that the initial path of the arrivals would likely be more concentrated than they are today. To provide points of reference, the position of the existing ROKUP and PIGOT holds were marked. Full details of the materials provided during this engagement can be found in appendix 3.

3.5.8 Respite

This final section of our engagement presentation sought stakeholder views on how they would like to see respite delivered. We felt it was important to include this topic, as the opportunity to share noise was one of the more frequent areas for discussion at the first stage of the process, and this is reflected in our Sharing the Load Design Principle. We therefore included this topic in order to understand the views of our stakeholders on this subject more fully, to inform how we could best create potential respite opportunities as our route options mature. It was also considered that this guidance would help inform the DPE assessment criteria for our Sharing the Load Design Principle.

Stakeholders were asked a number of questions to help drive the discussion such as what they felt would constitute a sufficient period of respite and whether there were preferable times of the day or week to have a period of respite. These questions are set out in appendix 3 and the stakeholder feedback received is outlined in appendix 8.

4 Phase one engagement stakeholder feedback

The first phase of engagement provided valuable stakeholder feedback via the following channels:

- Responses were recorded through the chat function and dialogue from the engagement sessions. The feedback received in each session was recorded to enable subsequent consideration and response.
- After the session, stakeholders were provided with a link to an online survey containing the questions posed in the session together with copies of the presentation and a Q&A document (appendix 10). The Q&A document listed all the questions asked in all the engagement sessions, together with our responses to each. Stakeholders then had the opportunity to absorb the content and provide any additional feedback after the event.
- Some stakeholders submitted feedback by email or post.

For the sessions facilitated by the EMA airspace team, the team documented the feedback received and created a report outlining this feedback (appendix 8). For the YouGov facilitated sessions, YouGov created a report of the forum discussions, and this report was discussed with, and presented to the airport team (appendix 6).

Outputs from both engagement methods were combined. Details of this feedback and our response can be found in appendix 10.

4.1 Feedback overview

Stakeholders acknowledged the complexity of the subject but indicated they understood the initial design process and agreed that it was a logical approach to creating options for arrivals and departures. Aviation representatives were positive about the programme and were keen to see implementation as soon as possible in order to realise the benefits of modernisation. General public participants were cautiously supportive of modernisation, but some stakeholders, particularly community and elected representatives tended to have more concerns. While conceptually, modernisation was welcomed, some were concerned about how change might impact their area, particularly in relation to noise impacts. This was driven primarily by the necessarily high-level nature of proposals at this stage, with many stakeholders keen to see more granular detail in order to allay specific concerns that they had.

Stakeholders were familiar with the meaning and purpose of the design principles and expressed the need for them to remain at the core of the route development. General public participants recognised that technology has a key role in this process, particularly to reduce emissions and improve efficiency. In addition, they welcomed the mandatory status of the Keeping the Skies Safe Design Principle but questioned how the remaining principles would be weighted or prioritised. It was explained that the DPE would consider each of the design principles equally with the exception of the three 'must have' design principles (Keeping our Skies Safe, A Joined-up Approach and Meeting Demand) which our route options must meet. Some elected and community representatives queried how specific design principles would be addressed and wanted further detail about how elements such as noise would be measured and prioritised over other impacts. It was explained that the DPE and IOA would include some noise metrics and more detailed noise assessment would be undertaken in Stage 3 as part of the Full Options Appraisal. With regard to noise prioritisation, we explained that Government guidance leads us to give priority to reducing noise over emissions for aircraft operating under 4,000ft.

There were requests for more granular detail, such as the expected number of routes that would be implemented and traffic levels using each, and more general questions around noise and air quality impacts. It was explained that these factors would be examined later in Stage 2 and further in Stage 3.

There was emphasis on subjects such as night flights and cargo and stakeholders questioned whether these factors would be considered in the route development. It was explained that at this stage we are looking only at where it would be possible to place routes, not how they might be used.

Training flights were frequently raised by stakeholders representing communities particularly close to the airport who wanted to understand how these would be impacted by airspace change. It was explained that as training flights do not follow specific departure routes or connect to the NATS upper airspace network, they would be unaffected by airspace change. As this topic featured heavily in our discussions and feedback, we prepared additional material on the subject for phase two engagement. Further details are set out in section 4.1.1.

Overall, stakeholders understood how the departure design envelopes had been created and recognised the difference in the existing structure and the proposed options. Feedback on the alternative departure envelopes was consistent across stakeholder groups. These were a set of envelopes which would act as an alternative for each of the primary design envelopes, included as a means of building in predictable respite. Aviation stakeholders felt these would result in additional fuel burn and community stakeholders expressed concern that these would result in greater noise impacts for some communities close to the airport who could be impacted by departure routes on both runway ends. Again, stakeholders requested further information, such as details of how many routes would be taken forward and how many flights would use each route. It was explained that this level of detail was not available at this stage.

Other feedback focussed on the potential for noise impacts on those communities already impacted by aircraft noise and whether new communities might also be affected, and stakeholders wanted assurance that the design principles relating to noise would be applied. Many stakeholders asked us to avoid overflight of specific villages, towns, and cities. In response to this feedback, route options were included in each envelope that avoid direct overflight of specific areas of population, including those mentioned by stakeholders, where it was reasonable to do so. In addition, stakeholders asked that we consider varying the initial departure for example, through tighter turns to minimise impact on communities that are particularly close to the airport. In response, some route options were developed that depart with an offset to potentially provide respite to communities that are particularly close to the extended runway centre line.

Some stakeholders asked that we consider implementing a steeper climb gradient for departing aircraft. It was explained that the 6% climb gradient was based on engagement with our airlines to understand their aircraft capability. We know therefore that a 6% climb gradient can be achieved by the fleet of aircraft in operation at EMA, which is consistent with our Embracing Technology Design Principle which outlines our commitment to support technology that is widely available. However, 6% will be a minimum and it is likely that our designs will allow those aircraft that can climb more quickly to do so.

The arrival design process and the resulting envelopes were also largely understood by stakeholders who recognised the benefits the proposed arrival structure, and the use of CDA operations, could provide. Community stakeholders voiced the need to consider steeper descent gradients to minimise the impact of noise. It was explained that the arrival route options would be designed within a range of descent gradients to enable an optimal CDA. Similar to departures, there were requests for further information regarding the expected traffic levels, noise and air quality impacts. Again, it was explained that this information was not available at this stage.

Some elected and community representatives asked us to consider curved approaches, earlier turns and changes to the existing joining point to provide benefits to local communities. It was explained that the minimum ILS intercept point is at 2,000ft but more than one joining point would be designed (e.g., at 2,500ft or 3,000ft) to provide noise respite and relief. Curved approaches and earlier turns were explored as part of the next phase of design outlined in section 4.2.

The importance of creating route options for respite and relief was a key feedback theme across all stakeholder groups. It was explained that the use of multiple routes would be considered as a method of noise sharing. This was well received during the sessions, but general public participants wondered how this

would be managed and whether this would impact efficiency. The need for predictable respite was raised by participants and time periods such as night, weekends and weekly rotations were suggested. However, if night respite was not feasible, some participants suggested the use of stricter financial penalties on noisier aircraft. Feedback relating to how we build respite into our designs has been recorded and will be considered later in the process when we move from looking at individual routes to examine how our route options could work together as a system.

Some feedback received was outside either the direct remit of our engagement at this stage, or of the ACP. This included aspects such as requests for additional information that is not available at this stage, (such as route usage information), training flights, the use of stricter penalties for noisier aircraft and other noise mitigation suggestions. Most of these issues are within the scope of the airport's Noise Action Plan (NAP). The draft NAP for 2024-2028 was subject to public consultation in the summer of 2023 and the feedback within the scope of the NAP was therefore fed into the NAP review process. The elements relating to later stages of the ACP have been captured and will either be considered further later in the process.

Stakeholders highlighted several local factors and locations that they felt should be taken account of in the route development process. This included green spaces, historic sites, gliding clubs and planned housing developments, among others. It was explained that consideration of Areas of Outstanding Natural Beauty (AONB), National Parks, effects on biodiversity, and local plans is required under the CAP1616 process. It was also explained that the suggestions put forward would be considered later in Stage 2 as part of the DPE in relation to the Noise Sensitive Locations Design Principle and would then be more fully assessed at Stage 3 of the CAP1616 process.

Full details of the feedback received, including the local factors and locations stakeholders raised is presented in the reports at appendices 6 and 8.

4.1.1 Training flights

During the first phase of engagement, a number of stakeholders asked questions about training flights and wanted to understand how the airspace change programme might affect how training flights are managed at EMA.

Training flights involve pilots under training flying in circuits, making approaches to the runway and then applying power to take off again. This means that pilots will usually be flying aircraft close to the airport, practicing take-off and landing several times. Training flights are different to normal operations in that they are conducted visually. This means they do not follow any designated departure route but navigate in a broadly rectangular circuit around the airport. This circuit uses visual reference to the ground and the track over the ground is not fixed.

In response to questions about training flights in the sessions, we explained that training flights do not follow any of our Standard Instrument Departure (SID) routes or connect to the NATS upper airspace network. As a result, the changes being made under the ACP will have no impact on their operation.

As part of the pre reading materials we provided to stakeholders attending phase two engagement, we prepared a short document containing further information on training flights. This included details of the restrictions that apply, how they are monitored as part of the NAP, the recent progress we had made in response to concerns raised by local communities and a link to further information. In addition, feedback received regarding training flights during engagement was shared with the relevant colleagues at EMA to feed into the NAP review process.

4.2 Refining the design envelopes and creating route options

Stakeholder feedback collected in the first phase of engagement informed the revision of the design envelopes for departures. It also influenced the creation of route options within the design envelopes for both departures and arrivals. The changes made to the design envelopes are set out below.

4.2.1 Changes to the design envelopes following phase one engagement stakeholder feedback

Following stakeholder requests that we consider different ways of building in respite opportunities for communities close to the airport, the alternative departure design envelopes were discounted. Aviation stakeholders felt these would result in additional fuel burn and community stakeholders expressed concern that these would result in greater noise impacts for communities close to the airport who could be impacted by departure routes on both runway ends. This feedback was explored and as a result it was determined that these envelopes would not align with our Noise 1, Noise 2 and Emissions Design Principles. In light of the discounting of the alternative departure envelopes, a number of envelopes were extended in order to enable us to create additional respite opportunities. As shown in figures 4 and 5, the green hatched areas show where the envelopes were extended, and the red hatched areas show those that were removed.

The Runway 27 north departure envelope was extended to the east to enable the creation of route options that avoid overflight of Belper and Ripley. In addition, the envelope was extended to the west to provide additional options to enable connectivity to the upper airspace network and avoid overflight of Derby. The north west departure envelope was extended to facilitate the inclusion of route options that avoid the west side of Derby and the creation of route options that closely follow major road networks in line with our Responsive Flight Paths Design Principle.

The east (right) envelope was extended to the south to enable the creation of route options that would take a tighter initial turn in response to stakeholder feedback. The east (left) departure envelope was discounted as it was determined that it would not align with the Meeting Demand Design Principle due to the interaction with other Runway 27 departure envelopes which would reduce the ability to deliver one minute departure separation. In addition, it was determined that the combination of four departure envelopes to the south west of the airport, including those that take the greatest percentage of EMA traffic, would concentrate departures and therefore not align with the Sharing the Load Design Principle. The south east departure envelope was widened to the south to enable the creation of additional route options that aim to follow the road network in line with our Responsive Flight Paths Design Principle. Both the south and south west envelopes were extended to the north to enable the creation of route options that would depart aircraft in a northerly direction initially before heading south in order to provide further noise relief to communities such as Melbourne and Wilson.

On Runway 09, the north departure envelope was reduced slightly to the east to ensure the route options in this envelope would align to CAA rules on distance from the boundary of controlled airspace. The north west envelope was widened in response to feedback asking that we consider additional options for respite and relief between Derby and Nottingham. The west (right) envelope was removed as options in this envelope were considered 'viable but poor fit' with the Meeting Demand Design Principle. This was determined due to its proximity to the southerly departures which would result in an increase in departure separation. The west (left) envelope has been retained to provide connectivity to the west.

The remaining south, south west and parts of the south east envelope were combined to form one southern envelope. Parts of the original south east envelope were discounted in order to ensure separation from arriving traffic. In addition, the space between the original south and south east envelopes were included in the amended new south envelope to provide additional opportunity for respite options.

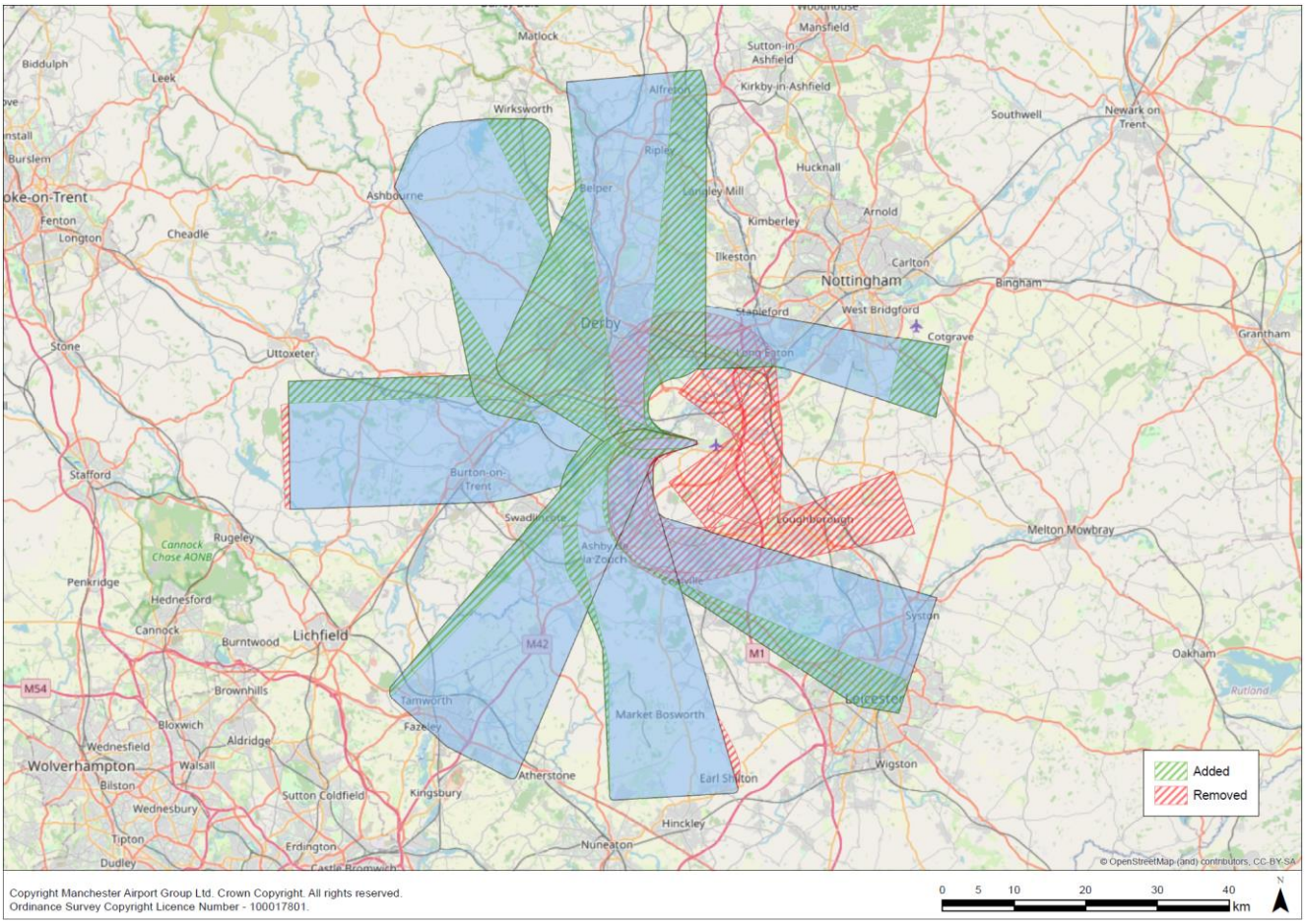

Figure 4 - Runway 27 Departure Envelope Amends

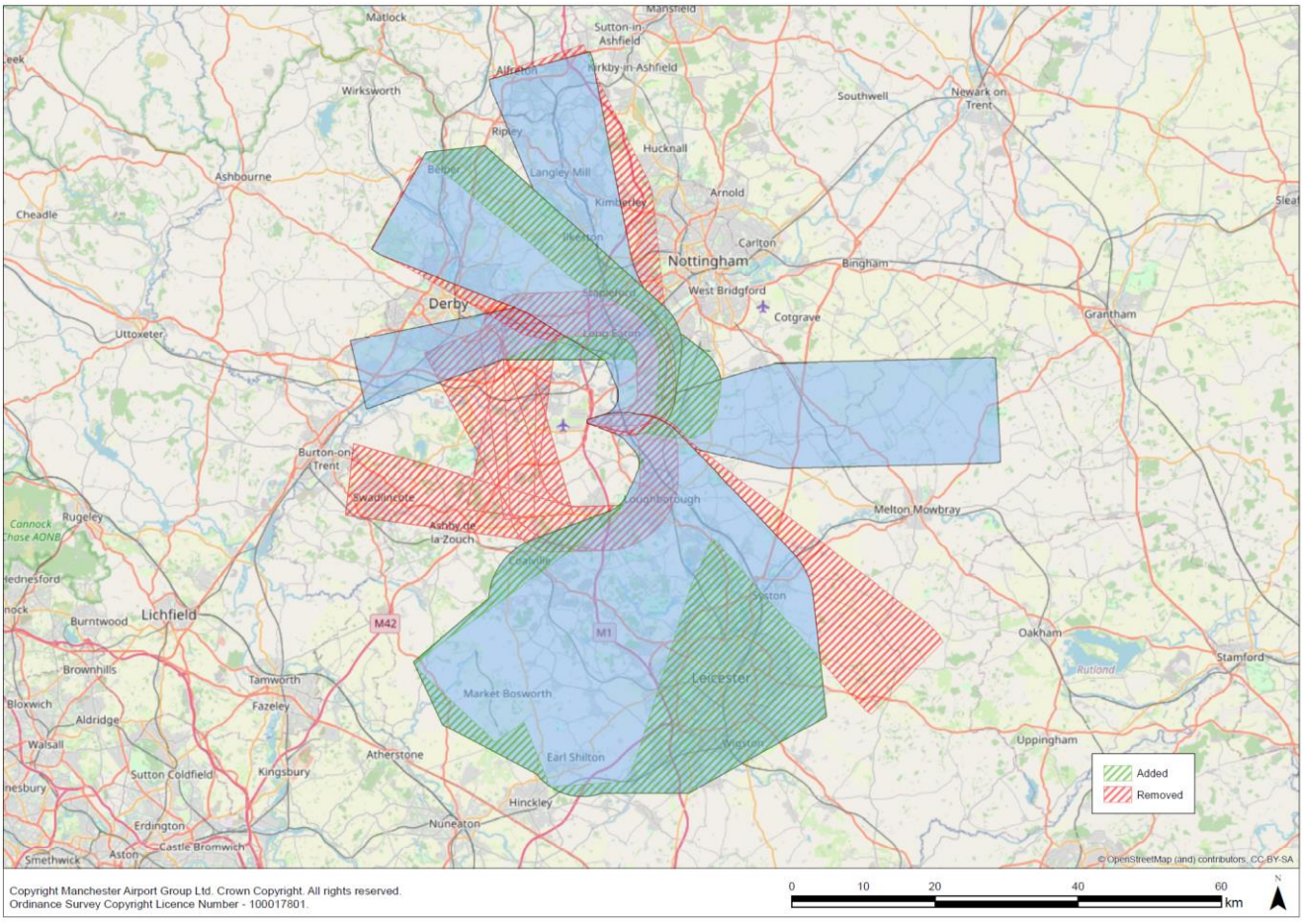

Figure 5 - Runway 09 Departure Envelope Amends

4.2.2 Generation of route options

Having amended the design envelopes and considered the additional factors identified by stakeholders at phase one engagement, a set of route options was then created within the design envelopes. The process used to create the route options for departures and arrivals is set out in sections 6 and 19 of the DOR.

It was clear from phase one engagement that providing opportunities to create respite within the overall design was of great importance to all stakeholder groups. For departures, this feedback influenced the extending, widening, and merging of other design envelopes to give greater scope for respite for overflown communities. For arrivals, in response to concerns about the level of concentration and the impact this could have on overflown communities, options were created that provide different final approach joining point heights to create a level of relief.

Stakeholders told us that they were concerned about noise impacts on overflown communities and specific locations that, due to proximity to the airport, were included in more than one envelope. Through the inclusion of various options, the potential for sharing noise can continue to be explored as the process develops.

5 Phase two engagement

5.1 Overview

The purpose of the second phase of engagement was to update stakeholders on the changes made to the design envelopes following the feedback received in the first phase of engagement and to outline the route options that had subsequently been developed.

As this phase would contain a higher degree of complexity than phase one, we used slightly different engagement methods. Like the first phase, we undertook two different methods of engagement, this consisted of discussion sessions for stakeholder groups and focus groups for general public participants. We offered a choice of both online and in person sessions so that participants could choose to engage in the way that suited them best.

5.1.1 Stakeholders engaged by the EMA airspace team

For all stakeholder groups, we held a number of discussion sessions led by the airport's airspace team. Due to the volume of material to cover, to ensure stakeholders could follow and digest the information, separate sessions were held for departures and arrivals. These took place across two weeks. Each engagement session lasted 1.5 hours and stakeholders were invited to the session with other similar stakeholders so that the conversations and questions raised would likely be most relevant to their specific areas of interest and knowledge levels. Invitations to the sessions also asked stakeholders to contact us directly if they needed any additional assistance in order to take part, although no such requests were received. Again, the main presentation was pre-recorded to ensure consistency of content. A pre read document, additional information relating to training flights (as described in 4.1.1) and a glossary document were sent to stakeholders in advance in order to give them some background to the session. All content shared during phase two engagement can be found at appendices 4 and 5.

In total, 16 discussion sessions were held over the course of November 2022, comprising both online and in person sessions. After the session, stakeholders were sent copies of the presentation, a Q&A document setting out our answers to questions raised by stakeholders during the sessions and a feedback survey. Stakeholders were given time to consider the content more fully before sending any additional comments and the survey acted as a reminder of the questions posed in the discussion sessions. Stakeholders were also given the opportunity to receive a printed copy of the materials and a video version of the presentation was also made available to help stakeholders to digest the content in the way best suited to them.

Overall, 105 stakeholders attended the discussion sessions. Further details on the stakeholder mix and feedback received can be found in appendix 9.

5.1.2 Stakeholders engaged by YouGov

For general public participants, we held a number of focus groups which were again facilitated by YouGov. This ensured that these stakeholders, who would be likely to have less knowledge of the subject matter, could be fully supported to understand the content. Facilitation by YouGov provided independent assurance that stakeholders had understood the material and that it was presented to them in a way that enabled them to fully engage. The other aim of this approach was to enable us to gather feedback from a broad range of the general public, in terms of demographic mix, perception of the airport and aircraft noise and also geographic spread across the potentially affected area. YouGov, as research experts, were therefore well positioned to enable us to engage with a broad cross section of the public. Focus groups were chosen for phase two, as the content became more extensive. The small group size also enabled YouGov to explore points of consensus or interest as a group.

Each participant was invited to attend two 1.5 hour focus groups, one covering departures and one focussed on arrivals. We understood that these participants would primarily be interested, and were most likely to have more knowledge of, the local factors in the envelopes and options located closest to them. Participants were therefore split by location so that each group would have a mix of stakeholders broadly located around the same area. In each session YouGov prioritised the envelopes that were most relevant to the location of the participants in that group. However, all participants were sent the full presentation of options after the event and sent a feedback survey allowing them to view and comment on all the envelopes.

A mix of online and in person focus groups were held giving participants the option of which format suited them best. A member of the EMA airspace team attended each group in order to support YouGov with any technical questions raised.

In total, 47 general public participants attended both focus groups. Further details on the participant mix and feedback received can be found in appendix 7.

5.2 Material shared during phase two engagement

For consistency, engagement materials for the second phase of engagement followed the same format as the first, comprising an explanatory presentation delivered in the session, pre read background information sent to stakeholders in advance and a Q&A document shared after the event with the presentation. However, due to the increased volume and complexity of information to be shared, separate departures and arrivals presentations were produced. In addition, large-scale maps and printed copies of the presentations were also created. When requested, additional maps were also produced to help stakeholders who wanted to take a more detailed look. To further support those attending the sessions, a video recording of the presentation was also circulated after the events for those that may wish to listen again to the narrative alongside the presentation, before responding to the feedback survey.

Both departure and arrival presentations provided a recap of the content that had been shared in phase one. This was important for any stakeholders that may not have attended the earlier phase but also as a reminder to those that had. An overview of the feedback stakeholders gave us at phase one was then outlined with details of how this had influenced the next phase of design. This enabled us to check with the stakeholders that we had not missed any pertinent feedback and had interpreted stakeholder comments correctly.

We then took stakeholders through the next steps of the design process that had been completed to create the route options. This included the stakeholder feedback from phase one engagement and the changes made in response to that feedback, and the application of our three 'must have' design principles, Keeping the Skies Safe, A Joined-up Approach and Meeting the Demand to the route options.

5.2.1 Developing the route options

It was then explained to stakeholders that, having incorporated the envelope changes, the route designers had then created route options within the amended design envelopes. The design process for the development of those route options, as described in detail in section 6 and 19 of the DOR, was explained. Details of the methodology for classifying the potential route options was provided along with an explanation of the three classifications of design option viability. These classifications are summarised in table 1 below and are explained fully in section 5.11 of the DOR.

Classification	Criteria	Outcome
Unviable	Would not comply with the requirements of ICAO Procedure for Air Navigation Services (PANS-OPS 8168) or did not have a supporting safety justification for non-compliance.	These options were not designed, due to a lack of compliance with the required standards. As a result, no such options were progressed to the DPE.
Viable but Poor Fit	A clear failure to align to one or more of the three 'must have' design principles with which all route options 'must' comply Safety (S), Programme (P), Continuity (C).	These are identified as lettered options and were not progressed to a full evaluation in the DPE. However, a rationale for misalignment to the three 'must have' design principles is included in both this DOR and the DPE including the results of any trade-off analysis.
Viable and Good Fit	Expected to meet the three design principles with which all route options 'must' comply Safety (S), Programme (P), Continuity (C).	These are identified as numbered options and were progressed to full DPE.

Table 1 - Viability classification

5.2.2 RNP-AR Curved approaches

In the first phase of engagement, some stakeholders asked us to consider implementing curved approaches, which are created through the implementation of Required Navigation Performance Authorisation Required (RNP-AR) procedures, which is a specialist type of Performance Based Navigation (PBN) approach. Only certain types of aircraft are capable of this procedure which also requires specialist aircrew training. This was considered as part of the phase two design process but the requirements of these approaches and the procedures that would need to be implemented were determined to be misaligned with a number of our design principles. This is because:

- Curved approaches require aircraft technology, which is not widely available, as well as specialist aircrew training. For this reason, they do not align with our Embracing Technology Design Principle which leads us to design to the latest, widely available navigational technology.
- To implement a mix of ILS approaches with only a very limited number of curved approaches would not align with our 'must have' Meeting Demand Design Principle. This is because the flow of ILS

arrivals would have to be paused to enable a curved approach to safely take place. This would cause inefficiencies by delaying arriving traffic and would increase the incidence of arrival traffic holding while waiting to land.

However, we will continue to work with airlines to understand developments in their fleet equipage, that could enable consideration of curved approaches, in the future.

5.2.3 Describing the route options

Stakeholders were shown a graphic of each design envelope and the initial 'viable and good fit' route options within them.

Each individual route option was represented by a line and numbered for easy identification. The end of each departure route option was shown to be the point at which aircraft on that route option achieved 7,000ft when flying a 6% climb gradient. It was explained that each departure option had been designed at this consistent 6% climb gradient to ensure our Keeping the Skies Safe Design Principle was met. The choice of 6% was informed by the fleet equipage survey, which showed this as the minimum climb rate that all aircraft using EMA can achieve. The fleet survey also showed that a greater climb rate would be possible for some aircraft, which is why the gradient was expressed as a minimum and it was stated that it is likely that those aircraft able to climb more quickly would be permitted to do so.

For each arrival route option, the start was shown at a height of 7,000ft before showing the route the aircraft would use before joining the final approach within a range of joining points. This range was demonstrated with points at 2,000ft, 2,500ft or 3,000ft.

We explained that some departure design envelopes contained an existing route and that these existing routes currently rely on ground-based navigation aids. As part of the Government's Airspace Modernisation Strategy (AMS) these ground-based navigation aids are to be removed from service, so we have designed a replication of these existing routes by applying PBN standards, to act as a 'do-minimum' option against which to compare other route options. It was explained that within these envelopes, further route options had been designed, over and above the replication of the existing route to create a comprehensive list of options.

We explained these further route options were designed to respond to the agreed design principles. By summarising the rationale for each of these further route options, we were able to explain which design principles we had sought to align with in designing a particular route option and the benefit that this was intended to secure.

In relation to the arrivals design envelopes, it was explained these did not contain existing routes due to the way arrivals currently operate using ATC vectoring. It was explained that the north arrival envelopes for both runway ends encompasses the position of the current ROKUP holding stack, but the current PIGOT holding stack to the south is outside of the design envelope as it is not possible to provide a CDA to both runway ends. It was explained that, as a result, an arrivals starting point from this position could not be exactly replicated.

The envelopes and corresponding route options were presented to stakeholders in the sessions with accompanying explanatory narrative. All the materials presented to stakeholders at phase two engagement are provided in appendices 4 and 5.

6 Phase two stakeholder feedback

The second phase of engagement provided valuable stakeholder feedback via the following channels:

- Responses were recorded through the chat function and dialogue from the engagement sessions. The sessions were recorded to enable a full review of the feedback received.
- After the session, stakeholders were provided with a link to an online survey containing the questions posed in the session.
- Some stakeholders submitted feedback by email or post.

All stakeholders were provided with copies of the presentation and a Q&A document after the event (appendices 4, 5 and 10). The Q&A document listed all the questions asked in all the engagement sessions, including phase one, together with our responses to each. Stakeholders then had the opportunity to absorb the content and provide any additional feedback after the event. This feedback was then incorporated into the reports referred to above.

For the sessions facilitated by the EMA airspace team, the team documented the feedback received and created a report outlining this feedback (appendix 9). For the YouGov facilitated sessions, YouGov created a report of the forum discussions, and this report was discussed with, and presented to, the airport team (appendix 7). Outputs from both engagement methods were combined and considered. Details of the feedback received, and the airport response can be found in appendix 9.

6.1 Feedback overview

Feedback indicated that stakeholders understood the design process followed and appreciated the volume of information and level of detail shared. They were keen to be involved and valued the purpose of the wider programme.

Overall, stakeholders and participants who had taken part in the first phase of engagement could see how feedback from those discussions had been considered. In addition, stakeholders could see how the design principles had been applied, but a few stakeholders had questions about the evaluations that are to follow and were keen to see the detail.

In line with phase one feedback, many stakeholders were eager for more granular detail such as predicted noise levels, number of routes per envelope and route usage. It was explained that this detail was not available at this early stage but will feature in later stages, once we have a shortlist of options. Again, noise and respite continued to dominate stakeholder discussion sessions with topics such as training flights, cargo and night operations frequently raised. Similar subjects were raised in the general public focus groups where there was a particular emphasis on night flights.

Those that questioned whether options aligned with the design principles, made comments about specific route options that they found unfavourable on the basis of overflight of specific areas. These comments generally referenced the noise design principles. It was explained that each route was designed to respond to the design principles in different ways to create a range of options. General public participants accepted the rationale for the three 'must have' design principles and the importance of safety and a joined-up approach. But some questioned if other principles such as noise and emissions should be categorised as must haves. It was explained that each principle will be assessed within the DPE with the options that best align with the design principles, including those around noise and emissions, taken forward.

Most stakeholders felt we had clearly explained how the departure route options had been developed. A minority were unsure as to why the alternative envelopes were discounted but remained supportive of this change in any event. It was explained that this change was a response to the strength of stakeholder

feedback from phase one and that we had considered alternative means of providing the respite these envelopes had been designed to achieve. General public participants were happy to see changes to the design envelopes as a result of the phase one feedback and were reassured that noise was fully considered, as it is a key priority for some. They were pleased to see that the envelopes offered a variety of options that could provide noise relief for areas which were overflown. Participants were also positive about the inclusion of direct routes with fewer diversions as they could see how this could provide greater efficiency.

Parish and community representatives in particular suggested a number of improvements to route options that were located close to their areas. These were explored and details of how these suggestions were taken into account are covered in section 6.1.1.

In terms of the arrivals sessions, the majority of stakeholders could see how their feedback had influenced the design process. However, one stakeholder felt their feedback relating to curved approaches had not been taken on board. It was however explained in the presentation and Q&A that this concept had been considered but determined to be Viable but Poor Fit with our design principles which was why it was not included in the route options presented.

Some aviation representatives questioned the requirement for a CDA and felt this constrained the options. This linked to feedback around the area of uncontrolled airspace to the east of the airport. Some aviation stakeholders were keen to explore the viability of enabling route options in this area to provide a more fuel-efficient routing from the east. However, there were mixed reactions to this in the sessions with General Aviation stakeholders strongly opposed to any expansion of controlled airspace. As this area would fall outside of the common CDA area, we have not proposed additional options in this area. However, this feedback will be considered as part of our ongoing bilateral discussions with NATS. In addition, to respond to this feedback we have created an additional Initial Approach Fix (IAF) to the north of Leicester to provide an option with a shorter track for arrivals from the east. Further details can be found in section 6.1.1.

Again, some stakeholders queried how communities close to the runway extended centre line (that are impacted by both arrivals and departures) would be taken into account with some suggesting that, for example, options should be chosen for departures that avoid those affected by arriving aircraft on a final approach. Wherever possible, departure options were included to avoid communities close to the runway centre line by departing at an offset. However, the rules relating to procedure design mean that we can only design within certain parameters, which limit the earliest position that a turn can take place after departure. This feedback will be further considered at Stage 3 when we begin to look at creating a network of routes from the shortlist of options to see how respite could be built in through the choice of routes taken forward and how they are used together.

General public participants emphasised the need for having two joining points to give a level of noise relief. In response, it was emphasised that each of the arrival options will have at least two PBN transitions to final approach. Stakeholders welcomed this suggestion. In response to feedback requesting the provision of further opportunities for noise relief, an additional 36 options were designed to provide a direct and indirect route option from each IAF to each Intermediate Fix (IF) in order to create further opportunities for noise respite or relief.

As for the phase one feedback, new housing developments and local plans were raised. It was explained that as part of CAP1616, EMA is required to consider local plans within the affected area. All known committed housing developments of 50 or more housing units within local plan allocations, large sites with planning consent and 5-year housing land supply statements falling within the 'Area of Potential Impact' will be included as part of the overflight analysis that will form part of the DPE and IOA. As we proceed through the process these will be regularly reviewed to take account of changes to local plans.

Some stakeholders expressed concern that some route options would overfly specific Sites of Special Scientific Interest (SSSI) on the basis that they considered these to be noise sensitive locations. It was explained that we have already designed some route options that do not overfly the specified SSSIs. Further, it is important to note that SSSIs are not designated on the basis of noise sensitivity. Rather, they are

designated as a result of being ecologically sensitive, requiring conservation. As a result of the existing options to avoid overflight of SSSIs, no additional options were designed as a result of this feedback. However, the effect of the airspace change process on biodiversity, including on SSSIs, will be considered fully at Stage 3.

6.1.1 Changes to route options

In response to specific stakeholder feedback, a number of additional route options were created following the second phase of engagement. In addition, amendments were made to the replicated routes for departures. Full details of the changes made are listed below.

Departures route options feedback

Stakeholders asked us to consider steeper climb gradients for certain route options. The 6% climb gradient is based upon the airline fleet survey and the ability of all aircraft to use this gradient. As a result, in line with our Embracing Technology Design Principle, which leads us to design to the latest widely available technology, this climb gradient will remain our design baseline. However, aircraft will not be constrained to fly this if they can climb at a higher rate, unless there are tactical reasons for constraining their climb. This means that while 6% will be the minimum climb rate, it is likely that those aircraft able to climb more quickly would be permitted to do so.

Some stakeholders felt that some options passed too close to specific communities, particularly those located close to the airport. In some cases, this feedback only expressed a preference or dislike for certain options. As each option is designed to respond to different design principles or to achieve different aims, none of our options were removed based on preferences expressed by stakeholders. However, some feedback requested modifications that stakeholders felt would offer improvements. These were explored in detail and some additional route options were created in response. For Runway 27:

- In the south envelope, stakeholder feedback asked us to consider new route options that start with a southerly offset before merging with existing route options to avoid specific communities. In response to this feedback, three additional route options have been designed in this envelope. Each new route option has been designed with the maximum possible southerly offset of 15 degrees taking it further away from Melbourne (route options 8, 9 and 10). In addition, feedback requested an enhanced northerly offset on one of the options in order to take it further from King's Newton and Melbourne and aim to track between King's Newton and Weston on Trent before heading south. In response to this, a new option was created with the maximum permissible offset of 15 degrees, an increase from the 10 degree offset the original route has (route option 11).
- In the south west envelope, two new route options were created in response to feedback asking us to modify two options to incorporate a northerly and southerly offset to reduce noise impact on Melbourne and Smisby (route options 6 and 7). An additional option (route option 9) was created with a southerly offset also to avoid Melbourne and then route between Ashby de la Zouch and Swadlincote as a noise beneficial option for all three communities.

For Runway 09:

- In response to feedback requesting an enhanced southerly offset to avoid overflight of Kegworth, additional options were created with the maximum southerly offset of 15 degrees in the north west envelope (route options 8, 9, 10 and 11), the north envelope (route option 6), the east envelope (route option 5) and the south envelope (route options 14, 15, 16 and 17).

The replicated routes were queried by some stakeholders as they felt these were not a close enough match to the current picture and in some cases, this meant that the replicated route would pass closer to certain communities than it currently does. It was explained that the replicated routes presented had been designed

to PBN design standards and replicated as closely as possible to the current departure route. As there are different design standards for PBN compared to conventional procedures, in some cases they will not match exactly. This is particularly the case when applying the first turn after departure and led to the difference in the replicated routes presented. In response to this feedback, we have designed new replicated routes which include amendments that allow them to match as closely as can be achieved to the current SIDs. These do not fully meet the first turn distance described in the UK CAA policy and guidance document for the design of departure procedures, CAP778[3], but are within ICAO PANS-OPS design requirements and are included as they have a proven safety case based on being operated safely currently. These are included in addition to the replicated routes previously presented.

Some stakeholders asked us to consider earlier turns south, particularly on Runway 27, in order to avoid or reduce the overflight of specific communities. This was explored in detail for both Runway 27 and Runway 09 with reference to ICAO and CAA design rules for Instrument Flight Procedure (IFP) design to understand the feasibility. UK CAA rules within CAP778 state that the first turn cannot commence before 1nm from Departure End of Runway (DER) however exceptions are permitted for environmental purposes with the minimum in these cases being 0.61nm from DER which aligns to the ICAO PANS-OPS minimum distance.

At EMA, the revised replicated routes fall within this acceptable range, with the minimum having a first turn at 0.66nm from DER on Runway 27. An earlier turn to the ICAO minimum permissible of 0.61nm was considered which would represent a difference of approximately 93 metres in the placement of the first turn. Analysis on the noise impact showed that this small change of lateral distance when combined the expected height of the aircraft would result in a benefit of less than 1dB. This is below the 3dB that has been defined by the CAA as the minimum that is perceptible under normal conditions, and on that basis, the additional change would not have created any benefit or noise reduction for the specific communities mentioned. In addition, because the turn at 0.66 miles is in use in current operations, it is supported by a CAA approved unit safety case having been demonstrated to be safe since introduction. A change to the ICAO minimum of 0.61 may be viable but would require additional safety justification to be made. Given there is no anticipated noise benefit to support this, as required by CAP778, no further amendment was made.

For Runway 09, the minimum distance for the first turn is greater and is situated at 1.264nm from DER. This is because the subsequent turns to join the network are of a radius that requires aircraft to remain inside controlled airspace, and this results in a minimum stabilisation distance to be built in ahead of that first turn. For this reason, it was not possible to create turns at an earlier position.

Other specific feedback asked us to consider amending routes to take them away from specific areas or between specific communities. Each suggestion was considered individually to understand whether it was viable and whether it could deliver an additional benefit. As outlined earlier in this section, many of these specific suggestions were adopted. However, there were cases where options had already been included that closely resembled the suggestion, and, in these cases, it was determined that no additional benefit would be provided by an additional route option. Within the Runway 27 north west envelope, a stakeholder asked that we create a route between Weston on Trent and King's Newton to follow the Trent Valley. This was explored but it was determined that there were already four options running between the two communities tracking close to the Trent Valley. This was also the case in relation to specific feedback regarding option 7 within the Runway 27 south east envelope which suggested this be modified to depart with an offset before tracking close to Breedon on the Hill. In this case it was determined that there were already options that were similar and the suggested amend would not deliver additional benefit.

Arrivals route options feedback

Some stakeholders queried the requirement for the defined CDA boundary and asked that we expand our scope to the area of uncontrolled airspace to the east. It was explained that in line with our Limiting Our Footprint Design Principle, we are looking to ensure we can provide a CDA to both runway ends and for Air

[3] CAP778: Policy and Guidance for the Design and Operation of Departure Procedures in UK Airspace https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=4045

Traffic Control (ATC) and airline operational reasons it would not align to our Design Principle Safety to provide one set of arrivals starting points for Runway 27 and another for Runway 09. As an example, it was explained that a starting point to the east may provide a CDA to Runway 27 but not for Runway 09 because the distance involved would result in too shallow a descent gradient when compared to the CDA design criteria. However, this feedback will be considered as part of our ongoing discussions with NATS to explore any potential to provide more direct routes in the upper airspace network from the east. In addition, to respond to this feedback we have created an additional IAF to the north of Leicester to provide an option with a shorter track for arrivals from the east.

Stakeholders were keen that we explore opportunities for noise respite and relief in our arrival designs. In response to this, to increase opportunities to build in noise relief, an additional IF was designed between the existing two IFs in the Runway 09 North Arrival envelope, at a height of 2,500ft. An additional six route options were designed to the new IF at 2,500ft. In addition, to create additional noise respite opportunities, 32 additional routes were designed to ensure, as a minimum, a direct and indirect route option from each IAF to each IF. These changes also align with our Sharing the Load Design Principle.

Feedback was received that asked us to consider shorter CDA routes. This was considered; however, it was established that the introduction of shorter distances would introduce several problems. Firstly, higher descent rates would be required to achieve the required height to establish on the ILS, and this would place aircraft outside of the noise beneficial range for a CDA which would likely have a greater noise impact for communities close to the airport. In addition, moving the IAF closer to the airfield could increase the chance of interaction with departure routes which would decrease efficiency, limit the potential for a CDA or may reduce continuous climb opportunities.

Bilateral engagement

Separate bilateral sessions were held with NERL at various stages of the design process to share our design envelopes and later, our initial route options, and consider these in the context of the emerging designs for the upper airspace network. Our initial designs were based on the position of the current network connection points with contingency applied to account for any foreseeable changes. This created the envelopes in the position and with the dimensions that were shown in the first phase of engagement.

The route development process within the NERL upper airspace design work identified that the current network connection point for EMA departures to the north west would result in network inefficiencies and environmental disbenefits when combined into a new system. Therefore, as a result of discussions with NERL based upon their simulations, and in line with our Programme Design Principle, the position of the Runway 27 North West departure envelope was amended, additional route options were designed within it, and two options within the Runway 09 North West envelope were amended. This change was intended to ensure continuous climb for EMA departures to the north west which provide both noise and emission benefits, and create improved safety and systemisation within the MTMA by removing the potential for interaction with traffic from other airports. It also has the benefit of providing greater opportunity to optimise EMA arrivals from the north. Further detail can be found in the DOR in section 5.9

In addition, engagement with NERL also identified that options in the Runway 27 South East envelope could route traffic in the opposite direction to the network flow. Further detailed design work is required with NERL to understand if safe separation exists or can be achieved through the modification of these options. Given this may have potential safety implications or limit the ability of EMA traffic to obtain continuous climb, a further seven routes were designed in the 27 South East envelope that route aircraft further east in order to avoid this potential interaction. These seven options are based on the existing easterly options within the 27 South East envelope with modifications towards the end of the route.

Bilateral engagement with Birmingham Airport determined that Runway 27 departure options in the south west and west envelopes would likely interact with Birmingham Airport operations. As Birmingham Airport are not part of the Masterplan, having completed their airspace change relatively recently, the position of their operations has been considered a constraint on EMA departure options to the south west and

west. This is reflected in the performance of these options in both the DPE and IOA. The degree of interaction will be examined further as part of detailed design activities undertaken at Stage 3, particularly any impact on safety.

7 Engagement next steps

The design process undertaken by the EMA airspace team has enabled us to bring forward a comprehensive set of route options for both departing and arriving aircraft. These route options have been tested with stakeholders and, as appropriate, refined and clarified to take account of the feedback we have received.

At Stages 1 and 2 of the CAP1616 process we have demonstrated our commitment to ensure that our ACP is informed by stakeholders, including members of the general public, and we will continue this commitment into Stage 3.

Our work to date has been guided by an independent SRG and we will continue to look to this group to help us adopt an inclusive approach, that ensures stakeholders' views remain at the heart of our developing proposals, and that we work within the confines of the CAP1616 process.

Further detail on the next steps within the CAP1616 process can be found in the 'Next steps' section of the DPE and IOA.

The completion of the work required at Stage 2 has developed and refined the route options available at EMA, as well as expanding the understanding of stakeholders' views on those options. While it is not a requirement of the CAP1616 process, all stakeholders will be provided with the information submitted to the CAA at the conclusion of Stage 2 and given the opportunity to discuss the content and ask questions, to ensure that they remain informed of the development of the ACP at EMA ahead of the full public consultation exercise at Stage 3. This will include details of the feedback gathered at phase two of engagement, the revised route options and the assessments undertaken as part of Step 2B. This will ensure they are fully updated on our latest work as we move towards Stage 3.

Glossary

ACOG	Airspace Change Organisation Group formed in 2019 as a fully independent organisation within NATS under the direction of the UK Government Department for Transport and Civil Aviation Authority, who are the co-sponsors of the AMS.
ACP	Airspace Change Proposal.
ADWR	Airspace Development Workshop Record - the output from bilateral discussions with NERL to record and inform their comprehensive list of options for the network that interfaces with EMA traffic.
Agl	Above ground level.
AIAA	Area of Intense Aerial Activity – Airspace within which aircraft, singly or in combination with others, regularly participate in unusual manoeuvres, not constrained by a formal route network.
AIP	The UK Aeronautical Information Publication - a document published by the UK CAA which contains information essential to air navigation. (www.aurora.nats.co.uk/htmlAIP/Publications/2022-07-14-AIRAC/html/index-en-GB.html).
Altitude Based Priorities	The ANG sets out a framework of 'Altitude Based Priorities', to be taken into account when considering the potential environmental impact of airspace changes.
AMS	Airspace Modernisation Strategy (CAP1711) - this is the Government's strategy and plan for the use of UK airspace, including the modernisation of airspace (www.caa.co.uk/cap1711). The original AMS was published in December 2018 and a refreshed version in January 2023. All references to the AMS are to this January 2023 version.
AMSL	Above mean sea level.
ANCON	The UK civil Aircraft Noise Contour Model. A computer model developed and maintained by the Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority which calculates contours of aircraft noise exposure levels around airports.
ANG	Air Navigation Guidance 2017 - Guidance to the CAA (from DfT) on its environmental objectives when carrying out its air navigation functions, and to the CAA and wider industry on airspace and noise management. (www.gov.uk/government/publications/uk-air-navigation-guidance-2017).
ANSP	Air Navigation Service Provider - an organisation which operates the technical system, infrastructure, procedures, and rules of an air navigation service system, which includes air traffic control.
AONB	Area of Outstanding Natural Beauty - an area of countryside which has been designated for conservation because of its significant landscape value, recognising its national importance.
AQMA	Air Quality Management Area - designated by a local authority and subject to a Local Air Quality Management Plan.
ATC	Air Traffic Control - service from an air navigation service provider providing guidance to aircraft through Controlled Airspace.
ATCC	Air Traffic Control Centre. There are two air traffic control centres in the UK both operated by NERL. The London ATCC deals with aircraft operating to the south of EMA and the Scottish ATCC deals with flights to the north of EMA.
ATCO	Air Traffic Control Officer – air traffic controllers who monitor the flow of aircraft into and out of the airport airspace by providing instructions and information to pilots, so that they fly safely and

	efficiently. ATCOs manage flights at both airports and within the en-route (upper) airspace network.
ATM	Air Transport Movement - an aircraft operation for commercial purposes, as opposed to a flight for recreational or personal reasons.
ATS	Air Traffic Services.
ATZ	Aerodrome Traffic Zone – An airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic.
BKY	Abbreviation for the Barkway DVOR navigation beacon and routes that use that as a navigation point.
BHX	The three letter IATA code for Birmingham Airport.
Biodiversity	The variability among living things from all ecosystems (including terrestrial, marine, and aquatic amongst others) and the ecological complexes of which they are part, including diversity within species, between species and of ecosystems.
CAA	Civil Aviation Authority - the aviation industry's regulator.
CAP	Civil Aviation Publication - a document published by the UK CAA which can provide information, guidance or policy depending on the subject covered. The list of all CAPs is published on the CAA website (www.caa.co.uk/our-work/publications).
CAP1385	The CAA's PBN enhanced route spacing guidance (www.caa.co.uk/cap1385).
CAP1498	The CAA's Definition of Overflight - this defines overflight as it relates to airspace regulation and provides an overflight metric which may be used to quantitatively compare different airspace options (www.caa.co.uk/cap1498).
CAP1616	The CAA's airspace change guidance document - it sets out the regulatory process which all airspace change proposals must follow (www.caa.co.uk/cap1616).
CAP1616a	A technical annex to CAP1616 - guidance on the regulatory process for changing airspace design including community engagement requirements. This annex outlines relevant methodologies for use in environmental assessments relating to airspace change (www.caa.co.uk/cap1616a).
CAP1711	Airspace Modernisation Strategy - this is the Government's strategy and plan for the use of UK airspace, including the modernisation of airspace (www.caa.co.uk/cap1711).
CAP1781	The CAA's DVOR/DME/NDB Rationalisation - guidance for the use of RNAV Substitution (www.caa.co.uk/cap1781).
CAP1926	General Requirements and Guidance Material for the use of RNAV Substitution (www.caa.co.uk/cap1926) and which supports airlines in the implementation of RNAV substitution under CAP1781
CAP1991	Procedure for the CAA to review the classification of airspace (www.caa.co.uk/cap1991).
CAP2091	CAA Policy on Minimum Standards for Noise Modelling -document defines categories of noise modelling sophistication and sets out requirements of the minimum category which different stakeholder or sponsor groups should use when providing noise calculations to the CAA. (www.caa.co.uk/cap2091).
CAP2156A	Airspace change Masterplan - CAA acceptance criteria: the criteria against which the CAA will make the decision whether to accept the airspace change Masterplan into the Airspace Modernisation Strategy (www.caa.co.uk/cap2156A).
CAP2302	A Low Noise Arrival CAP2302 - a report that makes recommendations to implement low noise arrivals (www.caa.co.uk/cap2303).

CAP493	Manual of Air Traffic Services - contains procedures, instructions and information which are intended to form the basis of air traffic services within the United Kingdom (www.caa.co.uk/cap493).
CAP725	The CAA's airspace change process guidance document that preceded CAP1616 (www.caa.co.uk/cap725).
CAP760	CAA's Guidance on the Conduct of Hazard Identification, Risk Assessment, and the Production of Safety Cases (www.caa.co.uk/cap760).
CAP778	The CAA's Policy and Guidance for the Design and Operation of Departure Procedures in UK Airspace (www.caa.co.uk/cap778).
CAA Controlled Airspace Containment Policy Statement	The CAA Controlled Airspace Containment Policy Statement (January 2014 superseded in August 2022) sets out the minimum criteria applicable to containment of instrument flight procedures for airports already within Controlled Airspace (CAS). Annex B provides the design criteria that have been applied to the arrival and departure routes in this ACP. (https://publicapps.caa.co.uk/docs/33/Policy%20for%20the%20Design%20of%20Controlled%20Airspace%20Structures%20110822.pdf).
CAS	Controlled Airspace is airspace within which air traffic services are provided. There are different classifications which define the air traffic control service provided and the requirements of aircraft flying within it. All commercial (passenger) flights fly within Controlled Airspace.
CATI & CATIIIB (approaches)	Categories of precision approach and landing (including Instrument Landing System (ILS) and Autoland) operations are defined according to the applicable Decision Altitude/Height and Runway Visual Range/visibility. A category I (CATI) approach requires a higher decision height and better visibility than a category IIIB (CATIIIB) approach. The technical apparatus for CATIIIB approaches allow an airport to maintain operations in very poor visibility.
CCO	Continuous Climb Operations - allows departing aircraft to climb continuously, which reduces the level of noise heard on the ground, reduces fuel burn and emissions.
CDA	Continuous Descent Approach - allows arriving aircraft to descend continuously which reduces the level of noise heard on the ground, reducing fuel burn and emissions.
CF	Course to Fix - a path that terminates at a fix with a specified course at that fix.
Change sponsor	An organisation that proposes, or sponsors, a change to the airspace design in accordance with the CAA's airspace change process.
CHASE	The northerly of the two holds used for arrivals at Birmingham Airport.
Class G airspace	Class G airspace is also referred to as uncontrolled airspace and is airspace where an ATC service is not deemed necessary or cannot be provided for practical reasons. This means there are no restrictions on which aircraft can enter it, what equipment the aircraft must carry, or the routes taken by the aircraft.
Comprehensive list	The full list of design options that are viable designs as required by Stage 2 of the CAP1616 process and which are detailed in the Design Options Report.
CONOPS	Concept of Operations - a document that outlines how we want the airspace system to work in the future and the standards that we will use.
CO_2	Carbon dioxide, one of the gases produced when burning aviation fuel.
COVID-19	Coronavirus disease 19 is a contagious disease caused by a virus that was identified in 2019 and which resulted in a pandemic in the year 2020.
CP	Country Park - areas of land designated and protected by local authorities to provide access to the countryside.

Cumulative Impact	Where an environmental topic/receptor is affected by impacts from more than one source/project at the same time and the impacts act together.
CTA	Control Area - the controlled airspace that exists in the vicinity of an airport.
dB	Decibels - a unit used to measure noise levels.
DEFRA	Department for the Environment, Food and Rural Affairs (UK Government).
DER	Departure End of Runway - a term that, when used in PANS-OPS 8168, determines the start point for the design of a departure procedure.
Design envelopes	Broad areas where it is possible to design routes and which are the areas where we have created design options for arriving and departing aircraft.
Design option	An output from the route design process that responds to the design principles and the Statement of Need (SoN). Design options are a requirement of the CAP1616 process. During the engagement carried out at Stage 2, design options were also referred to as route options.
Design principles	The principles encompassing the safety, environmental and operational criteria, and the strategic policy objectives that the change sponsor seeks to achieve in developing the airspace change proposal. They are an opportunity to combine local context with technical considerations and are therefore drawn up through discussion with affected stakeholders. The design principles at East Midlands Airport were established during Stage 1 of the CAP1616 process.
DF Coding	Direct to Fix coding - type of waypoint used in the design of PBN procedures.
DfT	Department for Transport.
DME	Distance Measuring Equipment - a ground-based beacon that allows aircraft to measure their precise distance from its location, often used to define a turn point.
DOE	Design Options Evolution - shows the evolution of the design options through Stages 2A and 2B of the CAP1616 process. Included as Appendix A to the Stage 2 Summary Document.
DOR	Design Options Report - this responds to the requirements of CAP1616 to develop a comprehensive list of options that address the SoN and that align with the design principles. It details the design process and the output of that process in the form of design options for both departures and arrivals.
DPE	Design Principle Evaluation - the document that undertakes an evaluation of the Viable and Good Fit options described in this report against the design principles.
DTY	Abbreviation for the Daventry DVOR navigation beacon and routes that use that as a navigation point.
DVOR	Doppler VHF Omni-directional Range - ground-based radio navigation beacon used by pilots to assist in aircraft navigation.
EASA	European Union Aviation Safety Agency.
Education (facilities)	For our analysis we have used the 'Ordnance Survey Address Base' count of educations facilities, details of which they receive from the local government contributing authority. These include all educational services including College, Further Education, Higher Education, Children's Nursery / Crèche, Preparatory / First / Primary / Infant / Junior / Middle School, Non State Primary / Preparatory School, Secondary / High School, Non State Secondary School, University, Special Needs Establishment and Other Educational Establishments.
EU	The European Union - an economic and political union of 27 countries.
EMA	The three letter IATA code for East Midlands Airport.
ERCD	The Environmental Research and Consultancy Department of the Civil Aviation Authority.
FAF	Final Approach Fix - The point at which the aircraft starts its final approach to land.

FASI-N	Future Airspace Strategy Implementation – North: The programme of airspace changes across the northern part of the UK, including East Midlands Airport, that is implementing the Governments Airspace Modernisation Strategy.
FASI-S	Future Airspace Strategy Implementation – South: The programme of airspace changes across the southern part of the UK including London that is implementing the Governments Airspace Modernisation Strategy. Whilst the East Midlands Airport ACP will de deployed as part of FASI-N programme, the route structures to and from EMA to the south result in the need to align with the network being developed as part of FASI-S.
FIR	Flight Information Region - airspace delegated to a country by ICAO. In the UK there are two FIRs, London and Scottish.
FL	FL means 'Flight Level' and uses the standard international pressure (1013.2 hPa) to express altitude in hundreds of feet. For example, FL90 equates to 9,000ft calculated according to the 'constant' pressure altitude, rather than local pressure (QNH).
Flat segment	A defined period of level flight as required by a PANS-OPS PBN Approach procedure.
Flight path	The routes taken by aircraft within airspace.
Flight Level	A means to separate aircraft (above the transition altitude) by using a standard pressure setting for all aircraft.
FMS	Flight Management System - a specialised computer system that automates a wide variety of in-flight tasks, and which encompasses a data base to allow SID and arrivals routes to be pre-programmed and flown.
FOA	Full Options Appraisal - the options appraisal carried out at Stage 3 of the CAP1616 process.
Focus group	Group of representative stakeholders brought together to discuss proposals and offer feedback.
Ft	Feet.
GA	General Aviation - defined by ICAO as 'all civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire'.
GANP	The ICAO Global Air Navigation Plan provides a global strategy to modernise the air traffic management system. The GANP provides the foundation for the delivery of the UK AMS (CAP1711). (https://www.icao.int/airnavigation/documents/ganp-2016-mobile.pdf).
GBAS	Ground Based Augmentation System - augments the existing GPS by providing corrections to aircraft in the vicinity of an airport to improve the accuracy of, and provide integrity for, the aircraft's GPS navigational position.
GDPR	The General Data Protection Regulations.
GIS	Geographic Information System.
GNSS	Global Navigation Satellite System - a term used to describe a system that uses satellites for position fixing.
GPS	Global Positioning System - a satellite-based radio navigation system owned by the United States government and operated by the United States Space Force.
HAZID Workshop	Hazard Identification workshop – the first part of the safety assurance process which identifies the safety requirements and potential interactions that may have a safety impact. It is held with air traffic control experts as well as airline representatives operating from East Midlands Airport.
IAF	Initial Approach Fix - the start of the approach phase of flight. For the East Midlands arrival design options, the IAF is at 7,000ft.
IF	Intermediate Fix – a defined point on an arrival procedure, where the aircraft speed and configuration are adjusted, shortly before the aircraft starts the final approach.

IATA	The International Air Transport Association - a trade association that supports aviation with global standards for airline safety, security, efficiency and sustainability.
ICAO	International Civil Aviation Organisation - an agency of the United Nations
IFP	Instrument Flight Procedure.
ILS	Instrument Landing System - a radio navigation system that provides vertical and horizontal guidance to arriving aircraft to help them land safely, especially in bad weather.
Instrument Approach Procedures (IAPs)	A series of predetermined manoeuvres for the orderly transfer of an aircraft operating under instrument flight rules from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.
Intermediate segment	The element of the approach between the IF and FAF where the descent gradient is either minimised or where a portion of level flight is designed into the procedure to assist with aircraft stabilisation.
IOA	Initial Options Appraisal - the document that is the first iteration of the three option appraisals required by CAP1616 - the design options appraised within the IOA are the outputs from the DPE.
KIAS	Knots of indicated airspeed - the number shown on the airspeed indicator.
km	Kilometres.
KTS	Knots – nautical miles per hour.
LAeq	Equivalent continuous sound level, or Leq/LAeq, is the average sound level for a specific location, over a given period.
LBA	The three letter IATA code for Leeds Bradford Airport.
LDA	Localiser Directional Aid - an assisted approach not aligned with the landing runway, used in places where terrain or other factors prevent the localiser antenna from being aligned with the runway that it serves.
LOAEL	Lowest Observed Adverse Effect Level - below this level, there is no detectable effect on health and quality of life due to the noise.
LNAV	Lateral Navigation - a term for lateral (left/right) navigation used within Performance Based Navigation.
LPL	The three letter IATA code for Liverpool John Lennon Airport.
LTMA	London Terminal Manoeuvring Area – the designated area of Controlled Airspace that deals with air traffic in the London area.
m	Metres.
MAGIC map	Interactive map managed by DEFRA containing authoritative geographic information about the natural and built environment from across Government.
MAP	Missed Approach Procedure - on occasion, inbound aircraft are unable to land successfully on their first approach and perform an action known as a 'Go-Around'. The Missed Approach Procedure outlines a mechanism to route the aircraft, without conflict with departing or arriving aircraft, and re-establish it on to the arrivals path for another approach.
MAN	The three letter IATA code for Manchester Airport.
Masterplan	The strategic plan for the coordinated national programme of airspace change, created by the ACOG under the direction of the CAA and DfT. The criteria the CAA will apply to accept the Masterplan are contained in CAP2156a (www.caa.co.uk/cap2156A).
Medical (facilities)	For our analysis we have used the 'Ordnance Survey Address Base' count of 'Medical', details of which they receive from the local government contributing authority. These include Dentist, General Practice Surgery / Clinic, Health Centre, Health Care Services, Hospital, Hospice, Medical / Testing / Research Laboratory, Professional Medical Service, Assessment /

	Development Services. Not all of these are 'noise sensitive' receptors and in Stage 3 those which are not 'noise sensitive' will be removed from future analysis.
Mean track	For noise modelling purposes, an average track over the ground, derived from radar data samples.
Modal average path	The path over the ground most commonly flown, derived from radar data samples.
MSD	Minimum Stabilisation Distance - a design criteria within PANS-OPS 8168 that ensures aircraft stability when flying a procedure.
MTMA	Manchester Terminal Manoeuvring Area - the designated area of Controlled Airspace that deals with traffic to the north of East Midlands Airport.
NATS	The air navigation service provider for the UK, formerly National Air Traffic Services. NATS 'En Route' manage the traffic in the upper airspace.
NDB	Non-Directional Beacon - a ground based radio beacon that emits a signal in every direction, used as an instrument approach aid for some airport procedures, including contingency procedures at EMA.
NERL	NATS En Route Ltd - the part of NATS that delivers en route air traffic control.
nm	Nautical miles.
NNR	National Nature Reserves - designated under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 to protect important habitats, species or geology.
Noise abatement	Activity to reduce the emission of noise from a given source (aircraft operations).
Noise-sensitive receptors	Specific locations or developments identified as likely to be adversely affected by noise from or due to aircraft operations. Individual locations will have varying degrees of sensitivity (measured noise exposure levels) depending upon their use. These provide a useful reference to the design principles N1, N2 and N3 where the number of people affected by noise, noise effects and noise sensitive areas are referenced.
NP	National Park - designated areas under the National Parks and Access to the Countryside Act 1949 to protect landscapes because of their special qualities.
NPR	Noise Preferential Route – initial flight path corridor around the SID that departing aircraft are required to remain within until they reach a minimum height of 5,000ft. Each NPR at EMA is 2.4km wide (1.2m either side of the SID).
NWMTA	North Wales Military Training Area: A designated area of airspace used extensively by the RAF for military training flights and which restricts use by civil air traffic.
Overflight	According to CAP1498, the definition of overflight is 'an aircraft in flight passing an observer at an elevation angle (approximately the angle between the horizon and the aircraft) that is greater than an agreed threshold, and at an altitude below 7,000ft.'
PANS-OPS	An ICAO document that stands for Procedures for Air Navigation Services Document 8168 that outlines the rules and criteria for designing aircraft flying procedures - commonly shortened to PANS-OPS.
PBN	Performance Based Navigation - a range of specifications that requires aircraft to navigate to specific accuracy standards, mainly by using satellite-based navigation systems. It is designed to improve track-keeping accuracy for departing and arriving aircraft. The transition to PBN is a UK and international policy requirement and a foundation of the AMS and this ACP.
PBN IR	The PBN IR introduces the gradual implementation of PBN flight procedures to support safer, greener, and more efficient aircraft operations. The regulation is binding in its entirety and directly applicable in all EU Member States.

Peak District	The Peak District - an upland area in England at the southern end of the Pennines. Mostly in Derbyshire, it extends into Cheshire, Greater Manchester, Staffordshire, West Yorkshire and South Yorkshire.
PDG	Procedure Design Gradient.
PIGOT	The southerly of the two existing holding stacks used for arriving aircraft at EMA. It is situated south east of Leicester.
Places of Worship	For our analysis we have used the 'Ordnance Survey Address Base' count of 'Places of Worship', details of which they receive from the local government contributing authority. These include any Abbey, Baptistry, Cathedral, Church, Chapel, Citadel, Gurdwara, Kingdom Hall, Methodist, Mosque, Minster, Stupa, Succah, Synagogue, Tabernacle or Temple.
Planned Property Developments	Property developments with a reasonable prospect of being developed based on Local Plan allocations and Local Authority five-year Housing Land Supply Assessment data. During engagement we have used the term 'Future Housing Sites' to represent the broader phrase of planned property development as we are not aware of other future noise sensitive developments that would sit within this category. Data was collated by CBRE and supplied to East Midlands Airport in December 2022.
Point Merge	Is based on a specific precision-area navigation (P-RNAV) route structure, consisting of a point (the merge point) and pre-defined legs (the sequencing legs) equidistant from this point. The sequencing is achieved with a 'direct-to' instruction to the merge point at the appropriate time.
Q&A	Question and Answer - a list of questions (and their answers) that help the reader understand the subject material.
RAG	Red, amber, green - a means of assessing a project's status using the traffic light colours.
RF	Radius to Fix (RF) is a constant radius PBN turn around a defined turn centre which produces a highly accurate track over the ground.
RNAV1	Area Navigation 1 is one of the specifications within PBN. Aircraft must maintain specific navigational accuracy within the flight. The '1' suffix refers to the accuracy requirement in the procedure, in this case aircraft must fly within +/-1 nautical mile of the centreline of the designed route.
RNP APCH	Required Navigation Performance Approach - a type of RNP procedure used in the descent phase of flight.
RNP-AR	Required Navigation Performance-Authorisation Required – a specialist type of PBN arrivals procedure, which requires suitably equipped aircraft, and crews to be trained in its use.
RNP1	Required Navigation Performance - one of the specifications under PBN. Aircraft must maintain specific navigation accuracy, and in RNP are aided by on-board performance monitoring and alerting. It provides slightly more predictable track-keeping when compared to RNAV1. The '1' suffix refers to the accuracy requirement in the procedure, in this case aircraft must fly within +/-1 nautical mile of the centreline of the designed route.
RNP1+RF	Required Navigation Performance with Radius to Fix turns.
ROKUP	The northerly of the two existing holding stacks used for arriving aircraft at EMA. It is situated close to Belper.
Route option	A term used in engagement to describe the design options that have been created in this step of the Airspace Change Process.
SAC	Special Area of Conservation - Designated under the Conservation of Habitats and Species Regulations 2017 as making a significant contribution to the conserving of the habitats of protected species.
Safety Case	A written demonstration of evidence and due diligence provided by a corporation to demonstrate the ability to operate safely and effectively control hazards.

SARG	Safety and Airspace Regulation Group which drives UK Civil Aviation Authority (CAA) safety standards including overseeing aircraft, airlines and air traffic controllers. They are also responsible for the planning and regulation of UK airspace.
Secretary of State	The title typically held by Cabinet Ministers in charge of Government Departments.
SESAR	The Europe-wide Single European Sky Air Traffic Management Research programme - a joint undertaking is an institutionalised European partnership between private and public sector partners set up to accelerate through research and innovation the delivery of the Digital European Sky (www.sesarju.eu).
SID	Standard Instrument Departure - pre-determined flight path set by Air Traffic Control that aircraft follow when departing an airport.
SME	Subject Matter Expert(s) is a person (are people) who has (have) accumulated great knowledge in a particular field or topic.
SoN	Statement of Need - the means by which the change sponsor sets out what airspace issue or opportunity it is seeking to address and what outcome it wishes to achieve, without specifying solutions, technical or otherwise. East Midlands Airport's SoN can be found online (https://airspacechange.caa.co.uk/documents/download/773).
SPA	Special Protection Area - protected areas for birds classified under the Wildlife and Countryside Act 1981 and protected under the Conservation of Habitats and Species Regulations 2017.
SSSI	Sites of Special Scientific Interest - areas of importance designated and protected by Natural England under the Wildlife and Countryside Act 1981 to recognise the land's wildlife, geology or landform is of special interest.
STAR	Standard Terminal Arrival Route - a pre-determined flight path set by Air Traffic Control that aircraft follow when arriving at an airport.
Step 1B Design Principles Report	A document that formed part of East Midlands Airport's Stage 1 submission to the CAA (https://airspacechange.caa.co.uk/documents/download/5447).
T-Bar	A name given to a type of RNAV final approach procedure. There is a final approach based on an extended centreline from the runway and then perpendicular to that, two Initial Approach Segments are connected to form a 'T' shape.
Technical Coordination Group	Created by ACOG the Group regularly meet to discuss and resolve policy and technical issues affecting airspace design across all airports.
TNT	Abbreviation for the Trent DVOR navigation beacon and routes that use that as a navigation point.
TODA	Take off Distance Available - the length of the paved surface of the take-off runway plus the length of the clearway.
TOS	Traffic Orientation Structure ensures smooth traffic flows and decrease the safety risks associated with crossing traffic.
Track to fix	A Track to Fix (TF) leg is used in PBN procedures to create a line between two waypoints. It is defined by the flight track to the following waypoint and Track to a Fix leg are sometimes called point-to-point legs for this reason.
Tranquillity	There is no universally accepted definition of tranquillity and therefore no accepted metric by which it can be measured. In general terms it can be defined as a state of calm. The consideration of impacts upon tranquillity for airspace change is with specific reference to National Parks and Areas of Outstanding Natural Beauty (AONB), plus any locally identified 'tranquil' areas that are identified through community engagement and are subsequently reflected within an airspace change proposal's design principles.

Transition	The part of the arrival route from the IAF at 7,000ft where aircraft are descending prior to joining the final approach at the FAF.
Transition Altitude	The altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes. Above this, the reference is to a Flight Level.
Transport Act 2000	The Transport Act 2000 is an Act of the Parliament of the United Kingdom. The Act provided for a number of measures across the transport industry. In the aviation sector, the Act set a framework for creation of a public-private partnership of National Air Traffic Services.
Uncontrolled airspace	Uncontrolled airspace is airspace where an ATC service is not deemed necessary or cannot be provided for practical reasons. This means there are no restrictions on which aircraft can enter it, what equipment the aircraft must carry, or the routes taken by the aircraft. In airspace classification terms this is also referred to as Class G airspace.
Unviable	Options which would not comply with the rules or for flight procedure design, specifically the requirements of ICAO PANS-OPS 8168, or if they are not compliant with these rules, did not have a supporting safety justification.
VHF	Very High Frequency.
Viable and Good Fit	Options that are viable to design and which would be expected to meet the three design principles with which all design options 'must' comply (design principles Safety, Programme, and Continuity).
Viable but Poor Fit	Options that are viable to design, but which would not be expected to meet the requirements of the design principles Safety, Programme and Continuity.
VNAV	Vertical Navigation - a term for vertical (up/down) navigation used within Performance Based Navigation.
VRP	Visual reference point.

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