Stage 2 Summary Document - V2

Develop and Assess

February 2022

London Stansted Airport
Future Airspace

MAG
London Stansted
Airport

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Document Title	Summary Document V2
Version	V2
Date	April 2022
Document History	V1 – submitted to CAA February 2022
Amendments	1. The DOR has been amended to clarify the approach to CAS requirements: • Section 24.7, page 49 2. Reference to new appendix (Summary Document Appendix A Design Options Evolution): • Section 6.6, page 15 3. The rationale for using a 'Do Minimum' baseline in the DPE has been updated to improve clarity: • Section 19.4, page 42

Glossary

ACOG	Airspace Change Organisation Group
'Listening to Stakeholders – Our Proposed Design Principles for Airspace Change'	A document that formed part of London Stansted Airport's Stage 1 submission to the CAA https://airspacechange.caa.co.uk/documents/download/2156
ABBOT	One of two existing hold stacks used at London Stansted Airport.
ACP	The Airspace Change Proposal at London Stansted Airport.
Agl	Above ground level
AIP	Aeronautical Information Publication. A document published by the UK CAA which contains information essential to air navigation. https://www.aurora.nats.co.uk/htmlAIP/Publications/2021-11-04-AIRAC/html/index-en-GB.html
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
Amsl	Above mean sea level
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.
ATM	Air Transport Movement: An aircraft operation for commercial purposes, as opposed to flight for recreational or personal reasons.
ATS	Air Traffic Services
Biodiversity	The variability among living things from all ecosystems (including terrestrial, marine, and other aquatic among others) and the ecological complexes of which they are part; including diversity within species, between species and of ecosystems (ref:www.caa.co.uk/cap1616).
BKY	Abbreviation for the Barkway navigation beacon and routes that use that as a navigation point.
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 at www.caa.co.uk An ICAO document that stands for Procedures for Air Navigation Services. This outlines the rules and criteria for designing aircraft flying procedures.
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
CCO	Continuous Climb Operations: Allows departing aircraft to climb continuously, which reduces the level of noise heard on the ground and also 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 and also reduce fuel burn and emissions.
Change sponsor	An organisation that proposes, or sponsors, a change to the airspace design in accordance with the CAA's airspace change process.
CLN	Abbreviation for the Clacton navigation beacon and routes that use that as a navigation point.
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.
Controlled airspace	Controlled airspace is airspace within which air traffic control 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.
COVID-19	A disease caused by a new strain of Coronavirus.
CP	Country Park: Areas of land designated and protected by local authorities to provide access to the countryside.
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 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 and in Stansted's case – members of the public. The design principles at London Stansted Airport were established during Stage 1 of the CAP1616 process.
DET	Abbreviation for the Detling navigation beacon and routes that use that as a navigation point.
DfT	Department for Transport
DME	Distance Measuring Equipment
DOR	Design Options Report: This responds to the requirements of CAP1616 to develop a comprehensive list of options that address the Statement of Need (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 Principles Evaluation: The document that undertakes an evaluation of the Viable and Good fit options described in this report against the Design Principles.
FAF	Final Approach Fix: The point at which an aircraft starts its final approach to land.
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.
FIR	Flight Information Region: Airspace delegated to a country by ICAO. In the UK there are two FIRs, London and Scottish.
Flight path	The routes taken by aircraft within airspace.
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
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.
IAF	Initial Approach Fix: The start of the approach phase of flight. For the Stansted arrival design options, the IAF is at 7,000ft unless stated otherwise.
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.
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 Design Principles Evaluation (DPE).
LAM	Abbreviation for the Lambourne navigation beacon and routes that use that as a navigation point.
LNAV	Lateral Navigation: A term for lateral navigation used within Performance Based Navigation.
LOREL	One of two existing hold stacks used at London Stansted Airport.
LTMA	London Terminal Manoeuvring Area: The designated area of controlled airspace surrounding the London airports.
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: A documented procedure for an aircraft to follow if a safe landing cannot be completed.
Masterplan	The strategic plan for the coordinated national programme of airspace change, created by the Airspace Change Organising Group (ACOG) under the direction of the CAA and DfT.
MSD	Minimum Stabilisation Distance: A design criteria within PANS-OPS 8168 that ensures aircraft stability when flying a procedure.
NATS	The air navigation service provider for the UK, formerly National Air Traffic Services. NATS 'en-route' manage the traffic in the upper airspace and also climbing and descending to land in the London area.
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-sensitive receptors	Specific locations 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.
NP	National Park: Designated areas under the National Parks and Access to the Countryside Act 1949 to protect landscapes because of their special qualities
NUGBO	A navigation fix to the NW of Stansted used by STN departures that exit UK to the south west.
PANS-OPS 8168	An ICAO document that stands for Procedures for Air Navigation Services. This outlines the rules and criteria for designing aircraft flying procedures.
PBN	Performance Based Navigation: Which is 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 foundation to the Airspace Modernisation Strategy and this ACP.

RAG	Red, Amber, Green
Ramsar	Wetlands of international importance designated under the Ramsar Convention 1976.
RNAV1	Area Navigation 1 is one of the specifications within Performance Based Navigation (PBN). Aircraft must maintain specific navigational accuracy within the flight.
RNP APCH	Required Navigation Performance Approach: A type of RNP procedure used in the descent phase of flight.
RNP1	Required Navigation Performance: One of the specifications under Performance Based Navigation (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.
Route options	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.
SID	Standard Instrument Departure: A pre-determined flightpath set by Air Traffic Control that aircraft follow when departing an airport.
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. London Stansted Airport's SoN can be found at https://airspacechange.caa.co.uk/documents/download/514.
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
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 Initial Approach Fix (IAF) prior to joining the final approach at the Final Approach Fix (FAF).
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.
UTAVA	A navigation fix to the NW of Stansted used STN departures that exit UK to the west and north west.
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 (Safety, Policy and Demand).
Viable but poor fit	Options that are viable to design but which would not be expected to meet the requirements of the Safety, Policy or the Demand Design Principles.
VNAV	Vertical Navigation. A term used in Performance Based Navigation.
VOR	VHF Omni-directional Range (Beacon)

1. Introduction

1.1
The Airspace Change Programme (ACP) in relation to departures from and arrivals at London Stansted Airport forms part of the UK Government's wider Airspace Modernisation Strategy (AMS). This presents an opportunity to update the way aircraft movements are managed across the whole country.

1.2
This document provides a summary of the second stage in the ACP at Stansted, and accompanies the following reports also being submitted to the Civil Aviation Authority (CAA) at Gateway 2 of the CAP1616 process:

1.2.1. Design Options Report (DOR), which sets out Stansted'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 design options identified and describes how those options were refined to provide the comprehensive list of options to be progressed to the Design Principles Evaluation;

1.2.2. Design Principles Evaluation Report (DPE), which assesses how the design options have responded to the design principles and identify those that warrant further analysis at the next step;

1.2.3. Initial Options Appraisal Report (IOA), which is the first iteration of the three option appraisals required by CAP1616 – the design options appraised within the IOA are the outputs from the Design Principles Evaluation (DPE). The purpose of the IOA is to provide, at a minimum, a qualitative assessment of each option providing stakeholders and the CAA with the relative differences between impacts, both positive and negative; and

1.2.4. 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.

1.3
These reports, together with their supporting appendices and this document, will be published on the CAA Airspace Change Portal www.airspacechange.caa.co.uk.

2. Requirement for change

2.1
Airspace is a critical part of national infrastructure. Like the road and rail network, it plays a vital role in enabling movement of people and products quickly and efficiently, enabling connectivity and driving economic growth.

2.2
Although the UK has some of the most congested and complex airspace in the world, the way it is managed has changed little since the 1950s. In 2017, the UK Government established a national programme through the CAA to modernise UK airspace and to make better use of the technology which is available on today's aircraft, enabling UK aviation to meet future challenges and opportunities.

2.3
Modernising UK airspace has the potential to bring a number of benefits, including reduced delays, greater reliability, more efficient operations and the chance to build on the UK's already world-class aviation safety record. In addition, it presents an opportunity to address some of the wider impacts of aviation such as noise and emissions.

2.4
Despite the effect COVID-19 has had on the aviation industry, the need to modernise the UK's airspace is unchanged and remains a clear priority for the government. In common with the rest of the aviation sector, Stansted's passenger numbers have been significantly affected by the current COVID-19 pandemic. Stansted is confident that its traffic levels will recover quickly with the airport handling 200,000 movements per year and playing a major role in the UK and regional economy. In 2018 Stansted served around 28 million passengers and contributed almost £1bn to the economy.[1] In addition to its passenger operations, Stansted has a busy cargo operation, bringing in valuable supplies and supporting the export of UK goods.

[1] Economic Impact of the MAG Airports, CSR Update 2019 – York Aviation, June 2019

3. CAP1616

3.1
As the national regulator, the CAA has responsibility for approving all changes to airspace. In December 2017, the CAA published its Airspace Modernisation Strategy (AMS) and created a change process called CAP1616: *Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information.*

3.2
CAP1616 was most recently updated in March 2021. It sets out the seven stages that the CAA requires airports to complete to carry out modernisation of their airspace, including detailed guidance on the involvement of stakeholders, including local communities, when developing change proposals.

3.3
CAP1616 includes four 'gateways' at which the CAA will assess the work undertaken by airports before allowing them to progress to the next stage of the process. Stansted received CAA approval for Stage 1 at the Define Gateway on 5 August 2020.

Figure 1: The seven stages of airspace change

2020	2021/2022	2022/2023	2023	Early 2024	Late 2024	2025 onwards
Stage 1 Define	Stage 2 Development and assessment	Stage 3 Full public consultation	Stage 4 Update and submission of proposals	Stage 5 Decision	Stage 6 Implementation	Stage 7 Post-implementation review
Step 1A In December 2018 we sent the CAA our Statement of Need, which was approved and provisionally classed as a Level 1 change.1 **Step 1B** We gathered views on design principles during early 2020. Our Stage 1 work was approved by the CAA in the summer of 2020.	Using the design principles produced during Stage 1 as a framework to evaluate different design options, we developed and assessed options for airspace change. We will be sending details of those design options to the CAA for approval in Spring 2022.	We will prepare to consult the public on these options. Once we have approval from the CAA to proceed, a formal consultation will take place in 2022/2023.	We will update our airspace change proposal, taking stakeholders' feedback into account, before sending it to the CAA in 2023.	We expect the CAA's decision on whether to approve any airspace change in early 2024.	If approved, any airspace changes could be put in place in late 2024.	The CAP1616 process gives the CAA and airports 12 months to review any change that has been made to airspace.

3.4
This document and the four accompanying reports submitted to the CAA alongside it detail the work carried out at Stansted to satisfy the requirements of Stage 2 of the CAP1616 process. Together, they form Stansted's submission at the Develop and Assess Gateway.

3.5
Stansted's progress to date is shown on the timeline below.

3.6
As shown in the timeline, there will be further opportunities for more detailed engagement with stakeholders through the remainder of the process. This will include a full public consultation at Stage 3, as the ACP progresses through the subsequent stages of the CAP1616 process.

3.7
The Airspace Change Organising Group (ACOG) was set up by the CAA and the Department for Transport (DfT) in 2019 to coordinate the national programme of change and create a strategic Masterplan[2]. Iteration two of the Masterplan was published in January 2022. This sets out the four geographical clusters of change, determined by the location of airports' airspace structures, known as Terminal Manoeuvring Areas (TMAs). Airports within each cluster currently have routes which interact to varying degrees, creating inefficiency. The Masterplan identifies and sets out the approach to addressing these regional interdependencies. Stansted forms part of the London Terminal Manoeuvring Area (LTMA).

[2] https://publicapps.caa.co.uk/docs/33/CAP2312B%20UK%20Airspace%20Change%20Masterplan%20Iteration%202.pdf

4. Stage 1 overview

4.1
Stage 1 (Define) is divided into two Steps:

- Step 1A – Assess Requirement; and
- Step 1B – Design Principles.

Step 1A – Assess Requirement

4.2
In December 2018, Stansted completed Step 1A by submitting a Statement of Need (SoN) to the CAA, setting out why an airspace change was necessary. The reasons provided included taking the opportunity to *"make further use of… new technologies so that the operational efficiency and environmental benefits that modern aircraft offer can now be fully realised."* In January 2019, the CAA approved the SoN, agreeing that Stansted could initiate an airspace change.

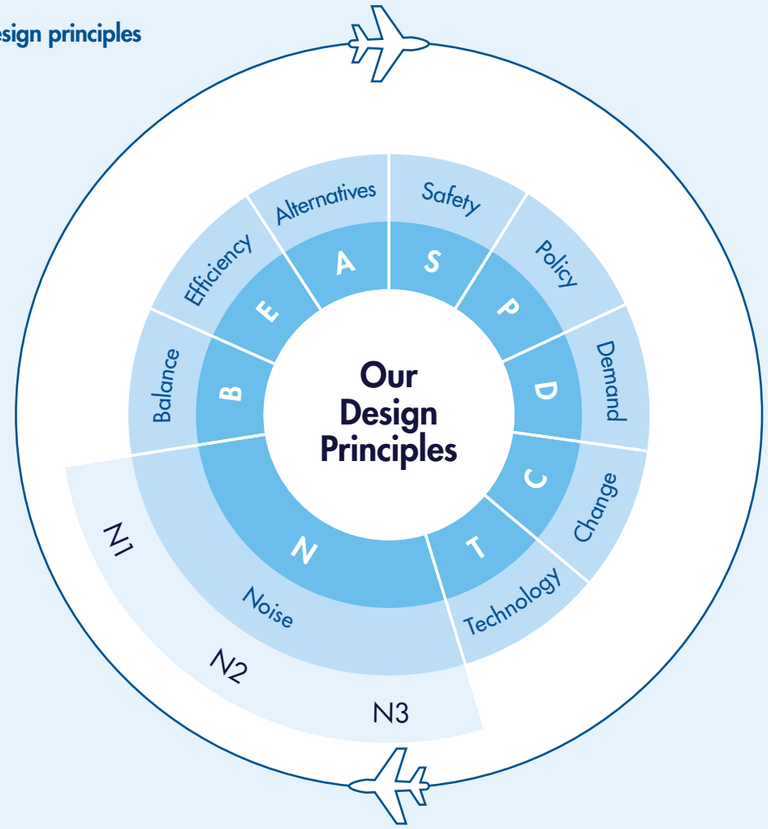
Step 1B – Design Principles

4.3
Step 1B requires the change sponsor to identify design principles to provide a framework for the evaluation of the options to address the issues and opportunities identified in the SoN.

4.4
The process followed at Stansted to develop the design principles through a two-way engagement with affected stakeholders is set out in full in the report *'Listening to Stakeholders – Our Proposed Design Principles for Airspace Change'* and its appendices. The report includes details of the stakeholders engaged with, the feedback provided and how the design principles responded to that feedback. The report was submitted to and approved by the CAA in August 2020.

4.5
The final design principles, as approved by the CAA, are set out overleaf.

Figure 2: The design principles



(S) Safety
Safety is our highest priority; our routes must be safe for airspace users and communities on the ground, and must comply with national and international industry standards and regulations.

(P) Policy
Any changes must be consistent with the CAA's Airspace Modernisation Strategy and the FASI-S programme, taking into account the needs of other change sponsors and airspace users.

(D) Demand
The airspace design must provide for the utilisation of aircraft movements permitted by planning permissions and within statutory limits in force at the airport.

(C) Change
Where we choose routes that fly over new areas there will have to be a clear and objective benefit in doing so.

(T) Technology
Routes should be designed to make use of the latest widely available aircraft navigation technology and facilitate continuous climb and descent to/from both ends of the runway.

(N) Noise
N1 In order to address the effects of aircraft noise, each route should seek to minimise the number of people overflown.

N2 The use of multiple routes and/or other forms of respite, such as different time periods and balanced runway mode when operationally viable, will be considered.

N3 Where practical, our route designs should avoid, or minimise effects upon, noise sensitive receptors. These may include designated sites and landscapes (such as SSSI and AONB), cultural or historic assets, and sites providing care.

(B) Balance
Our designs will consider both noise and emissions, and seek to strike the best balance. In so doing, we will take account of the Government's altitude-based priorities, which emphasise minimising noise below 7,000 feet.

(E) Efficiency
We will seek to minimise the amount of controlled airspace that we require, and our future route designs should ensure an efficient and systemised operation at Stansted, minimising interactions with other airports and maintaining priority access for emergency services.

(A) Alternatives
Where the adoption of modern navigation standards and/or flight profiles mean that some aircraft cannot fly the new routes, we will seek to minimise the environmental impacts from those aircraft.

5. Stage 2 overview

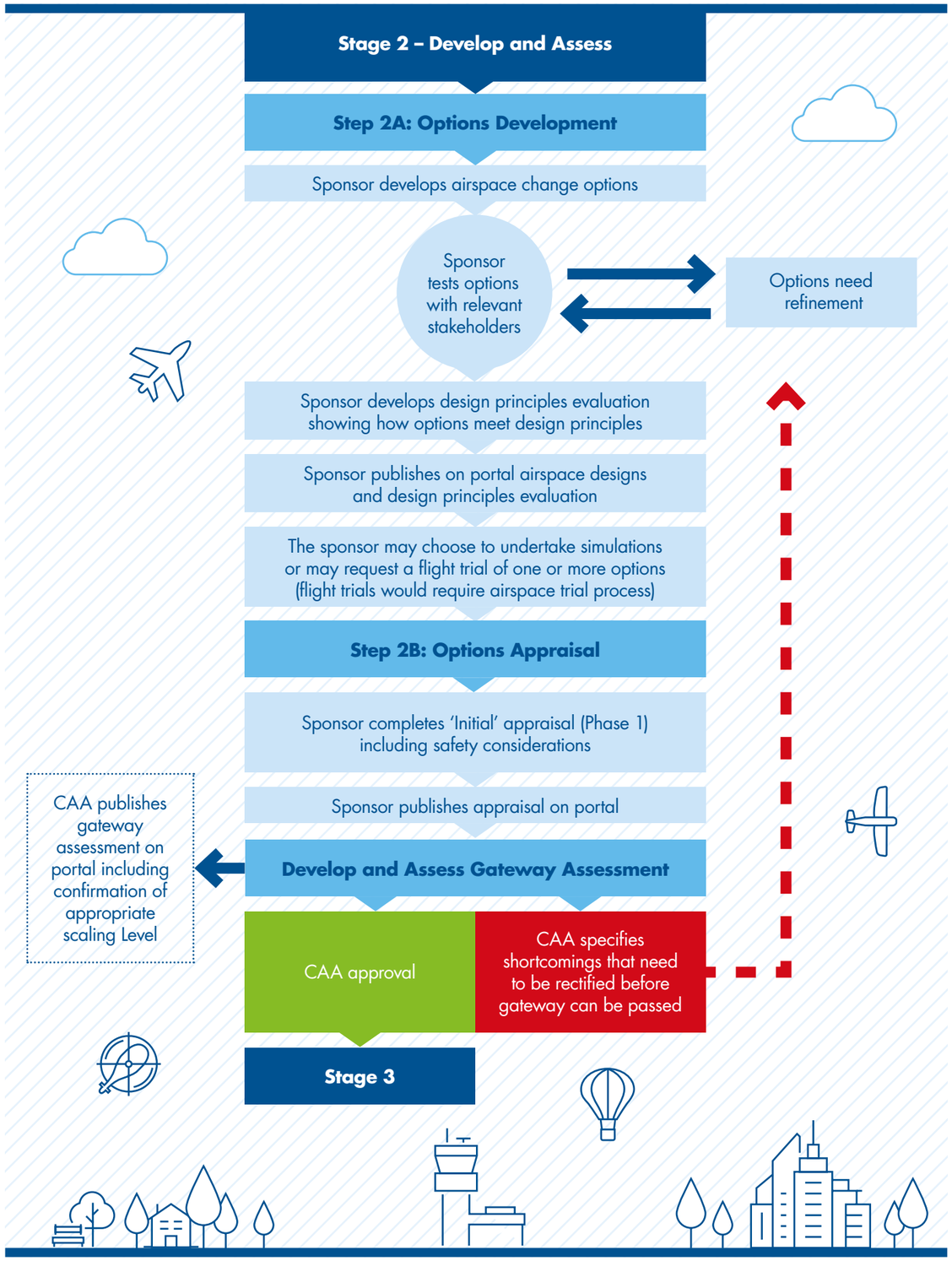
5.1
Stage 2 (Develop and Assess) of the CAP1616 process focuses on the development of route options and is divided into two Steps: Step 2A – Options Development, and Step 2B – Options Appraisal.

5.2
Step 2A requires the creation of a comprehensive list of route options to address the 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. In Step 2B, the route options are assessed to understand their wider impact, as part of an initial options appraisal. This is followed by a full options appraisal at Stage 3.

5.3
As for Stage 1, stakeholder engagement is an important component of Stage 2, CAP1616 requires the demonstration of how stakeholders' views and feedback have informed the development of the route options. A full description of the engagement activities completed by Stansted during Stage 2, including engagement with the general public, is set out in the separate SER and SER Appendix 2 Chronology of Engagement.

5.4
The work carried out by Stansted at Step 2A is described in full in the DOR, SER and the DPE. The work carried out at Step 2B is detailed in the IOA. These documents, together with supporting appendices and this document, will be published on the CAA Airspace Change Portal www.airspacechange.caa.co.uk.

Figure 3: Stage 2 process



Step 2A – Design Options Report (DOR)

6. Introduction

6.1
CAP1616 Step 2A requires us to develop a comprehensive list of route options that address the SoN and that align with the design principles. The DOR is the Stansted response to that requirement and presents the process followed to arrive at a comprehensive list of route options for evaluation against the design principles, as illustrated in the flowchart below.

6.2
This process allowed Stansted to refine the possible route options to ensure that the options progressed to the full DPE addressed the SoN and were capable of aligning with the design principles. This process was carried out for both arrivals and departures route options.

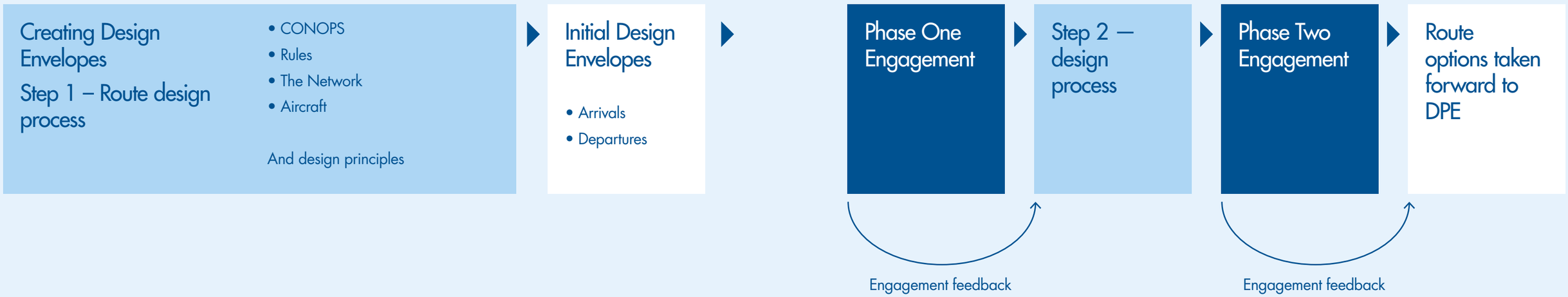
6.3
The initial stage of the design process considered the current operations at Stansted, as well as the requirements identified in the SoN. A design boundary was established based on technical requirements, with design envelopes then developed based on that boundary. The design envelopes formed the broad areas where it would be possible to design route options for departures and arrivals.

6.4
A second phase of design work was then undertaken to create specific route options from the design envelopes, with an initial assessment of viability applied so as to ensure that only those route options that were capable of aligning with the design principles were taken forward to the full DPE.

6.5
As required by CAP1616, the route options were tested with potentially affected stakeholders to gather feedback on the alignment with the design principles and allow further opportunity for any concerns and suggestions to be raised as part of the ongoing two-way engagement at Stansted. Stansted opted to undertake two distinct phases of stakeholder engagement, testing first the initial design envelopes and then the route options developed from those envelopes. In addition to engaging with potentially affected stakeholders, Stansted also engaged with members of the general public.

6.6
Sections 8 to 18 of this document summarise the design process and the engagement exercise undertaken. For the full details, please refer to the DOR. In addition Summary Document Appendix A - Design Option Evolution.

Figure 4: Design option process



7. Statement of Need

7.1
CAP1616 requires the change sponsors to identify a comprehensive list of route options that could potentially address the SoN and align with the design principles. To ensure that the route options proposed in the DOR addressed the SoN, the following key requirements from the SoN were considered:

- removal of the reliance on ground-based navigational aids;
- modernisation of airspace arrangements for aircraft operating to and from the airport at altitudes of 7,000ft and below;
- making best use of new navigational technologies, so that the operational efficiency and environmental benefits that modern aircraft offer can be fully realised; and
- integration with other airports and the wider changes to the airspace system being pursued through the national airspace modernisation programme.

7.2
Section 6 of the DOR provides further detail as to how these requirements were taken into account in the development of the design envelopes and route options.

8. Baseline

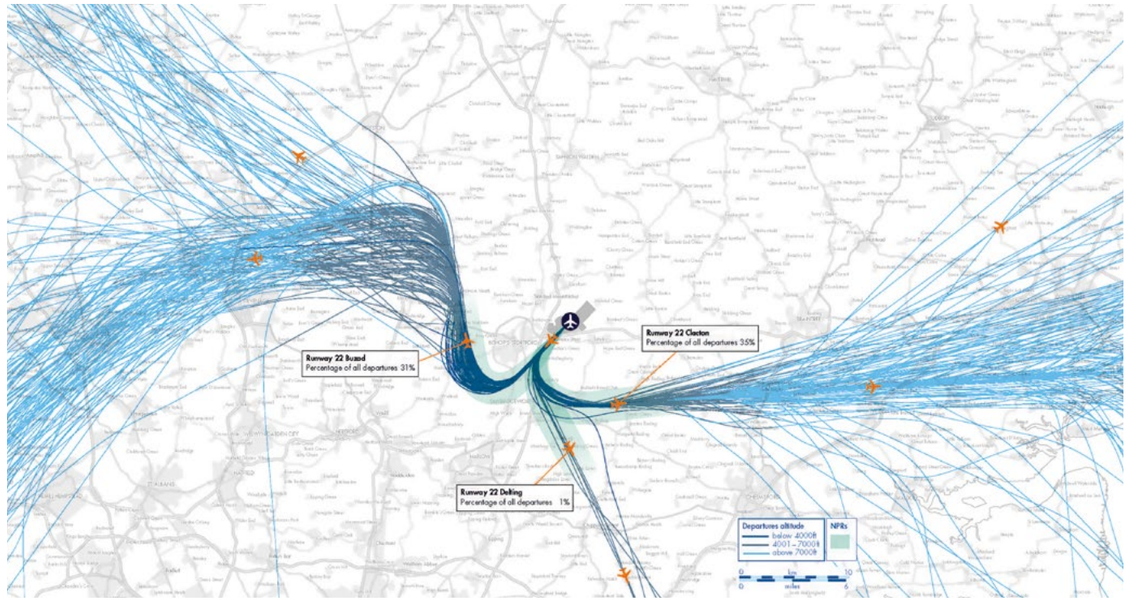
8.1
Before developing the route options, the existing departure and arrival operations at Stansted were considered. This provided a baseline against which to develop the comprehensive list of route options required by CAP1616. The existing operations at Stansted are described below.

Departures

8.2
Figure 5 shows the distribution of departing aircraft from Runway 22 over a typical summer's day. There are three Noise Preferential Routes (NPRs) which encompasses the six Standard Instrument Departure Routes (SIDS) from Runway 22. The proportion of total departure movements is shown by the percentage figures, while the colours distinguish the altitude reached by aircraft along each of the routes. The figure below shows that certain SIDs are restricted to fewer movements due to operational restrictions. The Detling route is restricted to relatively few movements, due to operational restrictions caused by the interaction with other air traffic related to London Heathrow and London City Airport. These restrictions limit the use of the Detling route to night time only.

8.3
Figure 6 shows the distribution of departing aircraft from Runway 04 over a typical summer's day. As for Runway 22, there are three NPRs encompassing the six SIDS from Runway 04. The proportion of total departure movements is shown by the percentage figures, while the colours distinguish the altitude reached by aircraft along each of the routes. Again, the Detling route is restricted to relatively few movements, due to the interaction with flights from Heathrow and London City Airport which again limit the use of this route to night time only.

Figure 5: Typical summer's day departures from Runway 22, with percentage of total departures over the year 2018



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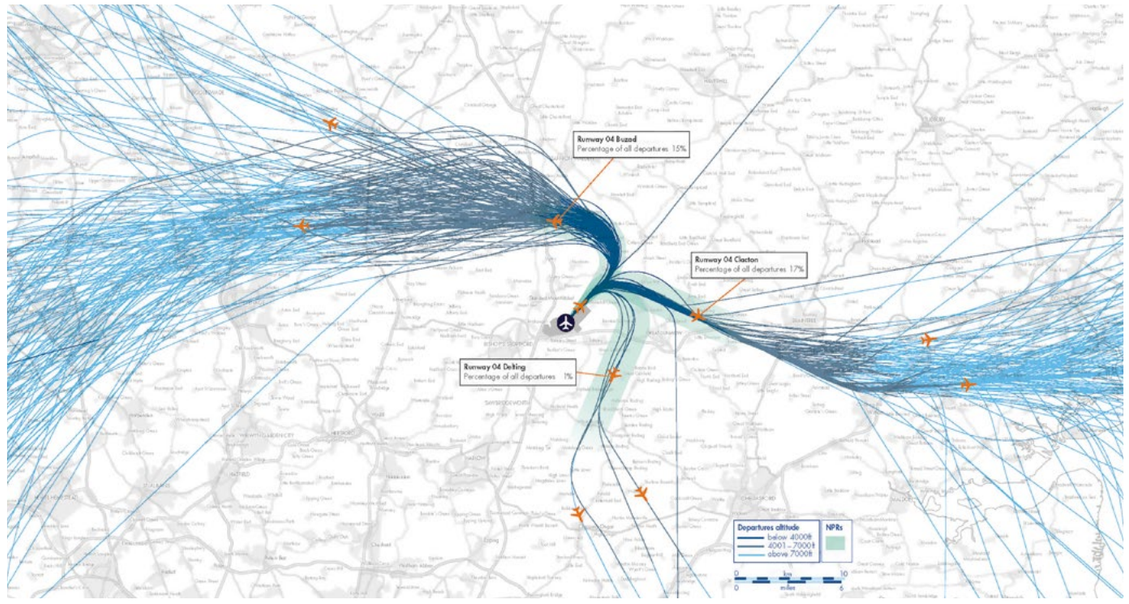

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Figure 5 shows the distribution of departing aircraft from Runway 04 over a typical summer's day. As for Runway 22, there are three NPRs encompassing the six SIDS from Runway 04. The proportion of total departure movements is shown by the percentage figures, while the colours distinguish the altitude reached by aircraft along each of the routes. Again, the Detling route is restricted to relatively few movements, due to the interaction with flights from Heathrow and London City Airport which again limit the use of this route to night time only.

Arrivals

8.7

There are no fixed flight paths for arriving aircraft until they are established on the instrument landing system (ILS), or 'final approach'. This is due to the requirement to line up with the runway from at least 6 nautical miles (NM) away.

8.8

Arriving aircraft approach UK airspace from several entry points before routing towards Stansted's Airspace. Air Traffic Control (ATC) ensure that aircraft are sequenced for safe separation by controlling the speed, direction, and height of the aircraft prior to them being turned on to the ILS. When Stansted is busy, arriving aircraft may be held by ATC in a 'holding stack' before being instructed to make their final approach. The two holding stacks serving Stansted, LOREL and ABBOT, are shown overleaf.

8.9

In addition to the review of the current departures and arrivals operations at Stansted, a Fleet Equipage Survey was carried out to assess the capabilities of the current and projected 2025 aircraft fleets operating from Stansted. This provided information including each airline's capability to fly different standards of satellite navigation routes, the climb performance of aircraft and the types of on-board navigation equipment. This approach ensured that the design process included options that would be flyable by all aircraft operating out of Stansted.

Figure 7: Typical summers day arrivals onto Runway 22, with percentage of total arrivals over the year 2018

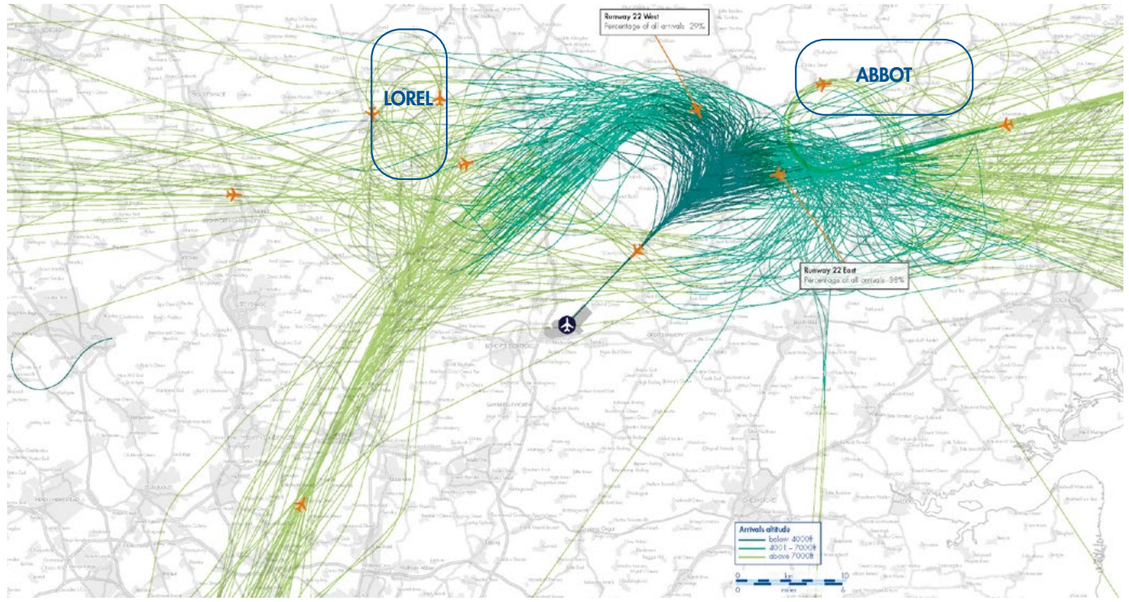
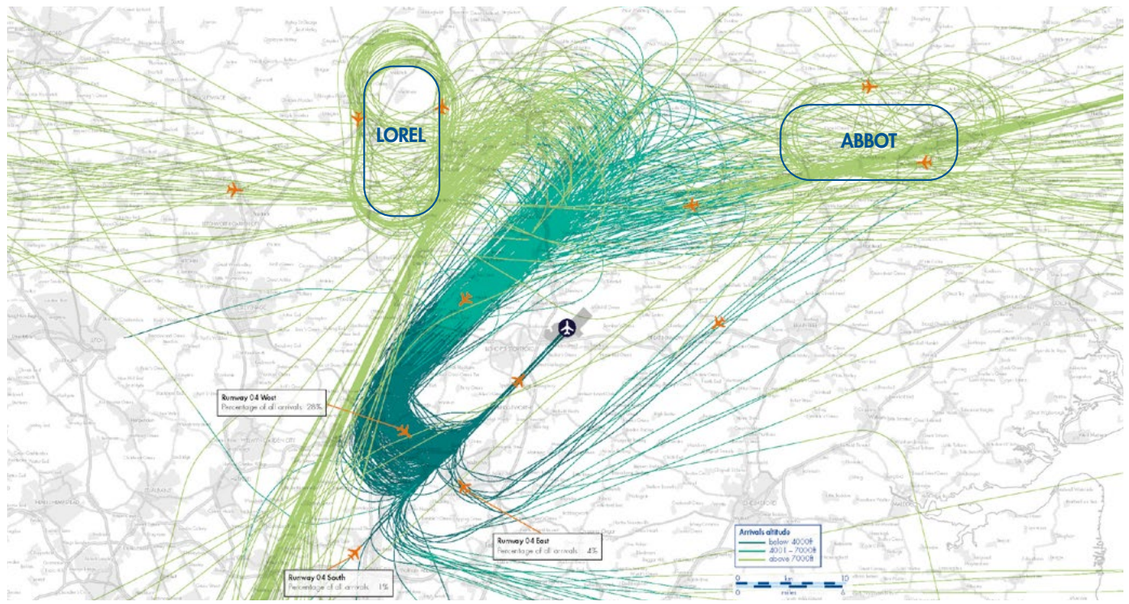


Figure 8: Typical summer's day arrivals onto Runway 04, with percentage of total arrivals for 2018



9. Design boundary

Departures

9.1
To establish the departures design boundary, the ICAO PANS OPS rules and regulations and the information from the Fleet Equipage Survey were applied to understand where aircraft could fly. The 6% gradient of climb achievable by all aircraft and the ICAO PANS OPS rules provided the maximum boundary, assuming a constant climb, as well as the area within which designs would not be possible. These areas are indicatively shown on Figure 9, below.

Arrivals

9.2
The initial arrivals design boundary was established by reference to the distance from London Stansted that would allow for continuous descent from 7,000ft at an angle of descent of 3°, based on the information regarding aircraft capabilities gathered by the Fleet Equipage Survey. Figure 9, shows the viable area of arrival designs below on an indicative basis.
The outer edge of the circle is the furthest point away with the shallowest gradient to facilitate a CDA. As aircraft performance in descent varies, the risk of a level out from this area, which would mean a CDA wasn't achieved is greater, illustrated here by the shading. The closer to the airport, the more realistic a CDA becomes, shown below as a darker shade of green.
Full details of the development of the departures and arrivals design boundaries are set out at section 5 of the DOR.

Figure 9: Viable design boundaries for continuous climb departures

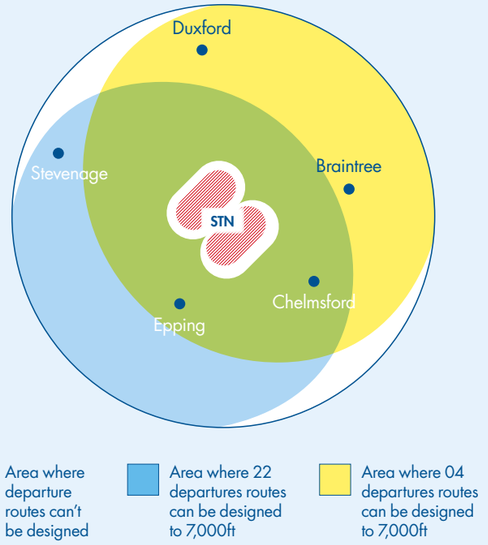
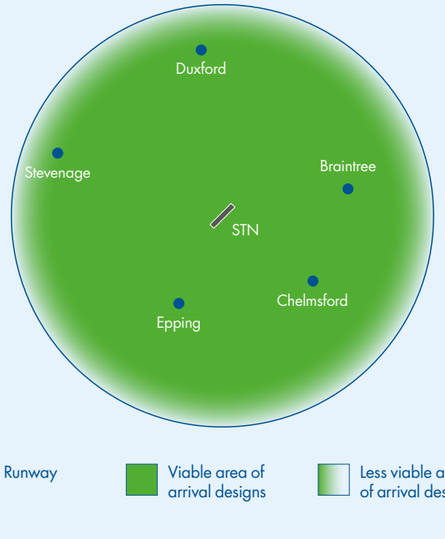


Figure 10: Viable design boundary for Continuous Descent Approach



10. Constraints

10.1

Having determined the design boundary, local factors that could impact on safety were identified by analysing the airspace and current operations in the north east LTMA. Where factors were identified, they were categorised as either a constraint or a consideration:

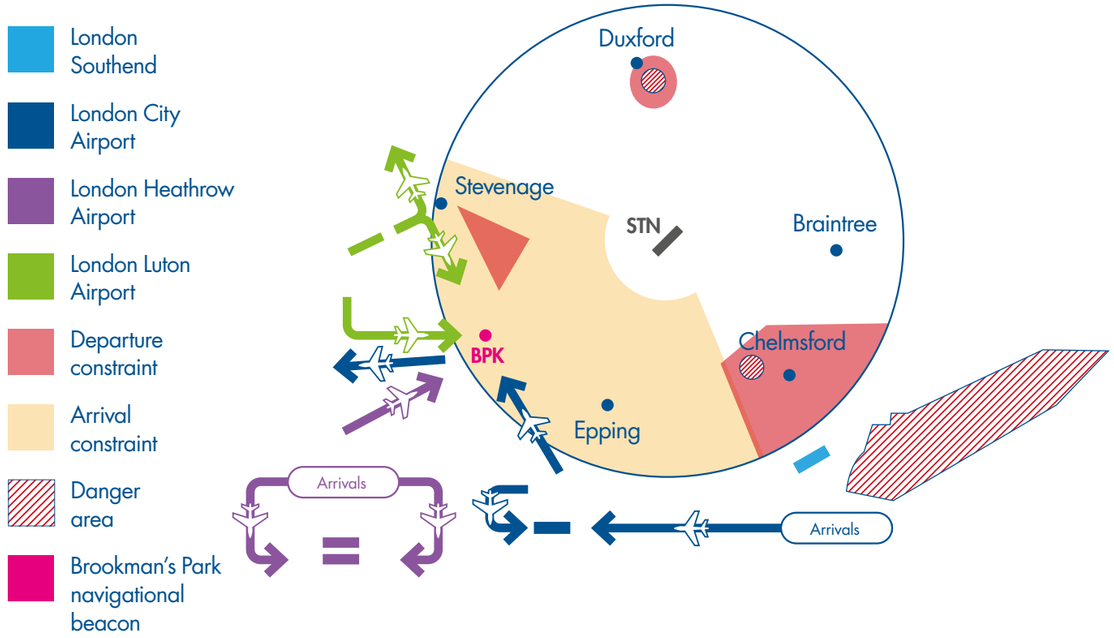
- **Constraints** were defined as aspects that have a direct impact on designs or limit the placement of arrival and departure route options.
- **Considerations** were defined as aspects that do not limit designs, but which needed to be taken account of in designing options.

10.2

This exercise identified the following constraints and considerations, as shown in Figure 11, below:

- Shoeburyness Danger Area EGD 136 & 138 A/B/C/D (Constraint): The danger area extends permanently to 13,000ft and occasionally to 60,000ft. Given the proximity of the danger area to Stansted, departing aircraft would not be capable of climbing to a sufficient height above the danger area.
- Cambridge and Chelmsford Gas Venting Stations (Consideration): Both venting stations are a notified hazard to a radius of 0.25nm and an altitude of 2,700ft. However, their altitude and distance from Stansted (based on a 6% climb gradient) means they do not impact on the route options. As such, they were noted as a consideration only.
- Luton (Constraint): There is potential for air traffic using Stansted and Luton to interact under certain circumstances, so for safety reasons an area of constraint was established to the west.
- Airspace congestion to the south west (arrivals constraint): the Brookman's Park (BPK) navigation beacon to the south west was identified as being an area of crowded airspace due to the use of the beacon by flights from Stansted, Luton, Heathrow, and London City. While the use of the beacon will reduce as airports transfer to Performance Based Navigation (PBN), this will remain a highly congested area for departures because of the proximity of the airports and the need to connect to the upper airspace network system to leave UK airspace.

Figure 11: Constraints and considerations mapping



11. Design envelopes

11.1
The design boundary and the relevant constraints and considerations outlined above enabled the development of design envelopes.

11.2
For departures, design envelopes were constructed to start at the runway and finish at 7,000ft. These were designed taking into account the SoN, the design principles, the constraints, and the information contained in the Fleet Equipage Survey, which informed the navigation standard being applied and the climb gradient being used.

11.3
The design envelopes were designed such that they expand in a linear fashion until they were 8,000m wide (or approx. 4.5 NM) at the point they reached 7,000ft. The width of the design envelopes provided the flexibility to design route options that responded to different elements of the design principles, ensuring that a comprehensive list of options could be compiled. The majority of the design envelopes were based on the current SIDs, with additional design envelopes created where these had the potential to provide a tangible benefit in line with the Design Principle Change (C).

11.4
For arrivals, a similar approach was used, taking into account the SoN, the design principles, the constraints, and the information contained in the Fleet Equipage Survey. The starting point was to use the position of the existing conventional approach procedures from the LOREL and ABBOT holding stacks, to provide for the 'do minimum' options. Using these positions, an arrivals design envelope was constructed to encompass the area where a Continuous Descent Approach (CDA) to at least one runway end was possible. In addition to the use of the existing holding stacks as a start point, six alternative areas where the 7,000ft starting point could be located were considered, as shown in Figure 12.

11.5
Full details of the approach taken to the development of the design envelopes are set out at sections 6 to 19 of the DOR.

Departures

11.6
By applying the above process, a total of 14 departure design envelopes were established. These initial departure design envelopes are shown in Figure 11 and provide for departures from both runway ends, Runway 22 and Runway 04. Figures 12 and 13 show the initial design envelopes for each runway end.

Figure 12: Initial design envelopes for departure options

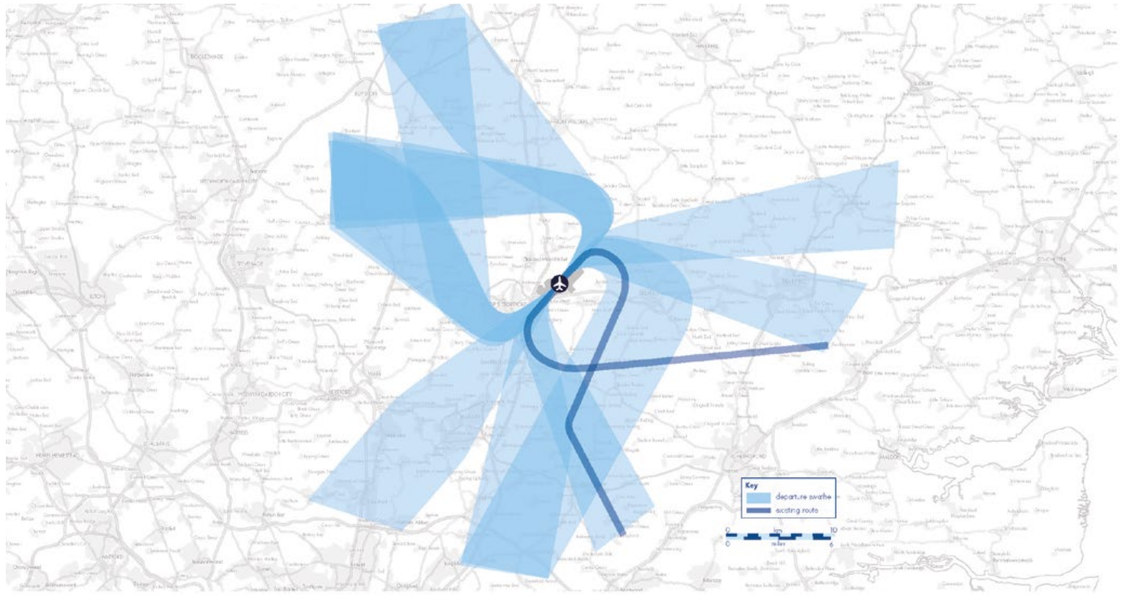


Figure 13: Initial design envelopes Runway 22 departures

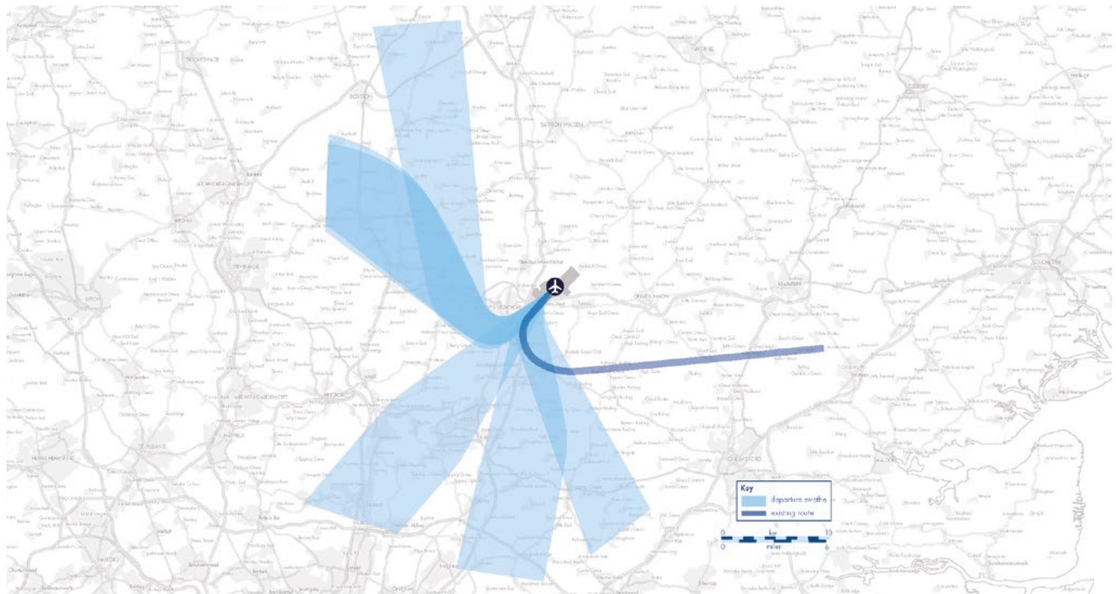


Figure 14: Initial design envelope for Runway 04 departures

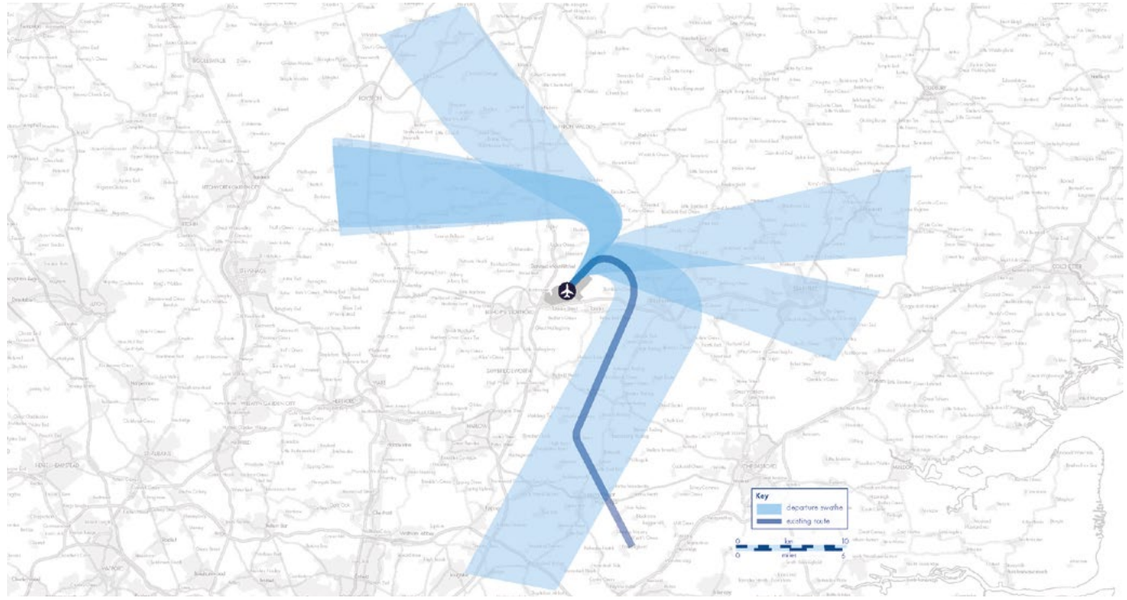
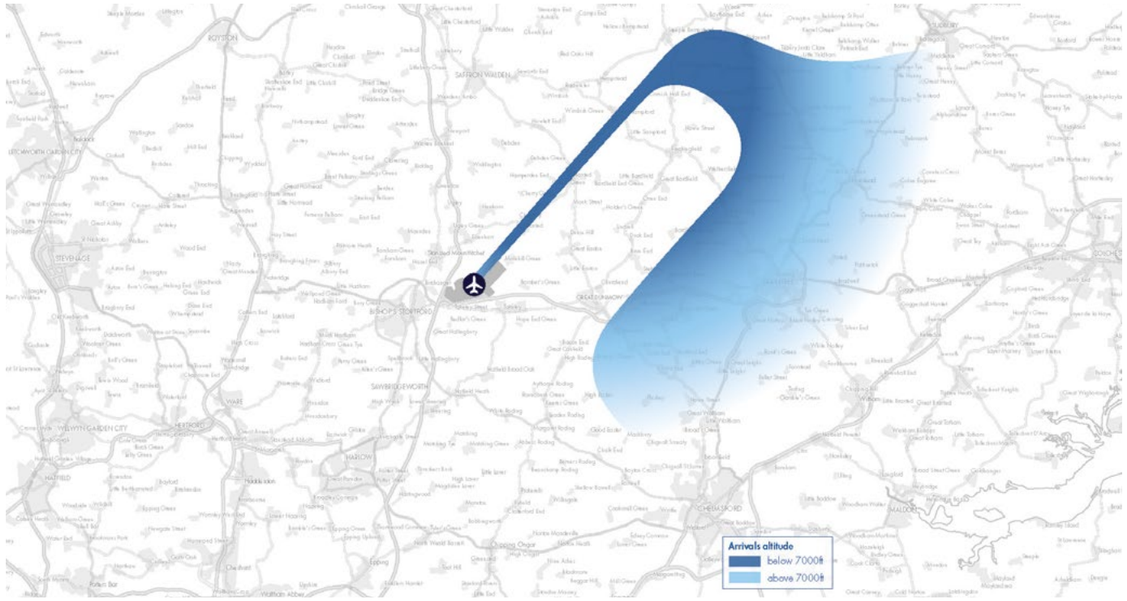


Figure 16: Arrival envelope east for Runway 22



Arrivals

11.7
For arrivals, the key constraint was the airspace congestion to the south west, as identified at 10.2 above. As a result, the arrivals design was restricted to the green area shown in Figure 15, on an indicative basis. Within that area, six arrivals design envelopes were identified.

11.8
To identify the initial arrivals design envelopes, the existing holding areas LOREL and ABBOT were considered, as well as the potential for these areas to be relocated as part of NATS' redesign of airspace above 7,000ft. The initial arrivals design envelopes were then constructed where a CDA to at least one runway end was possible. This resulted in six areas from which the 7,000ft starting point could be located, including a design envelope for each of the two existing hold areas.

11.9
The initial arrivals design envelopes are shown in Figures 16 to 20.

Figure 15: Area of arrivals constraints

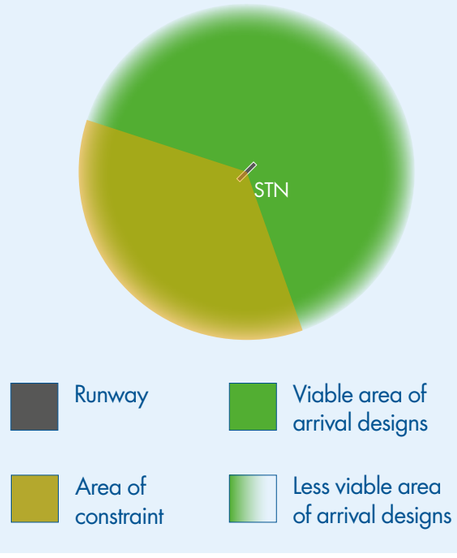


Figure 17: Arrival envelope west for Runway 04

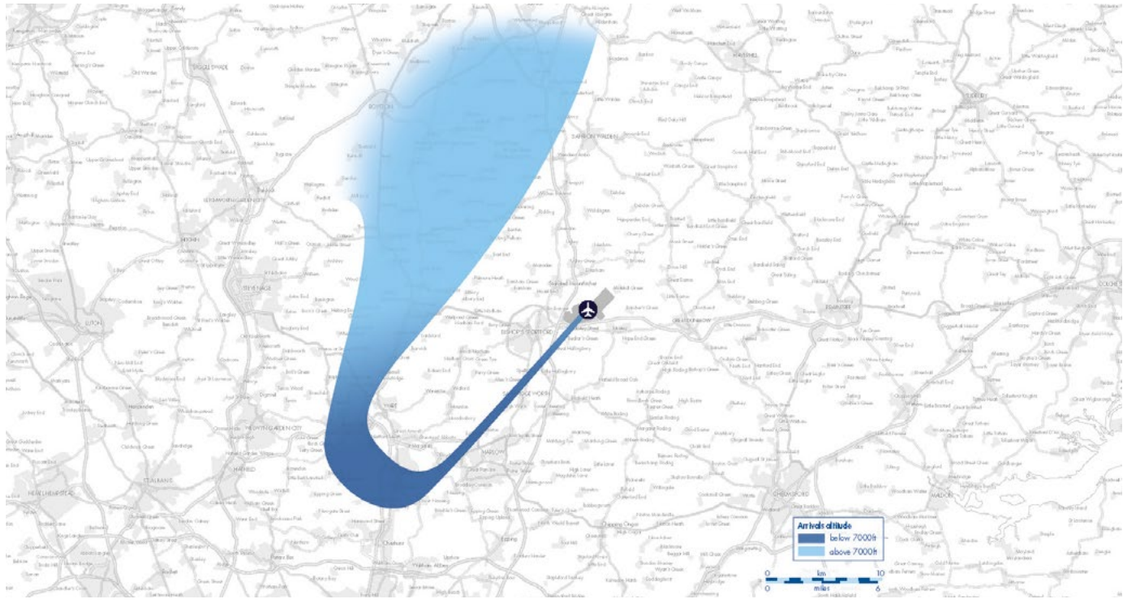


Figure 18: Arrival envelope west for Runway 22

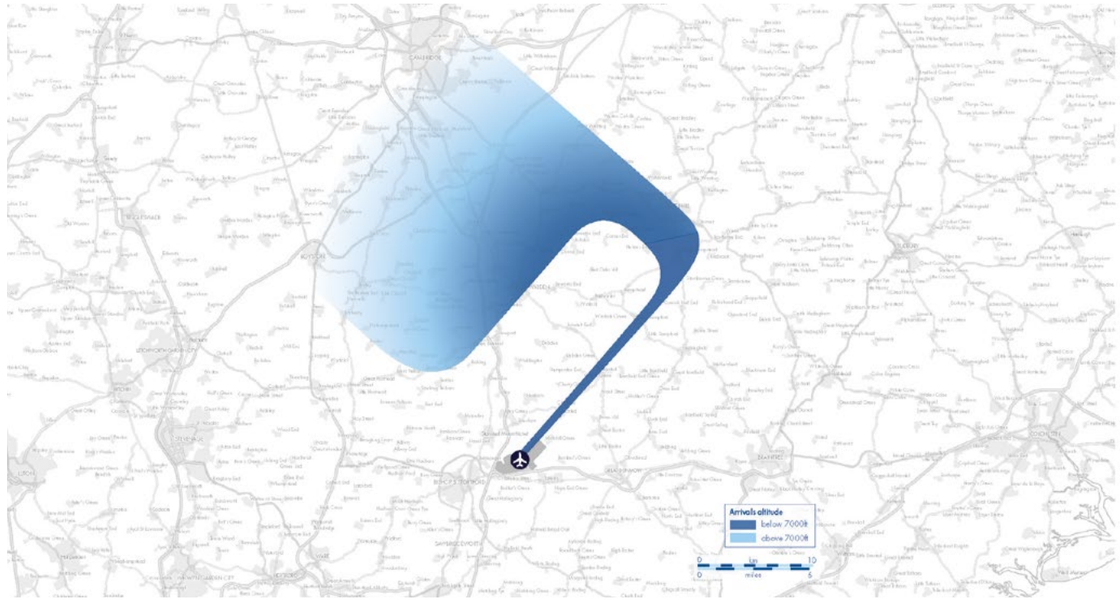


Figure 19: Arrival envelope east for Runway 04

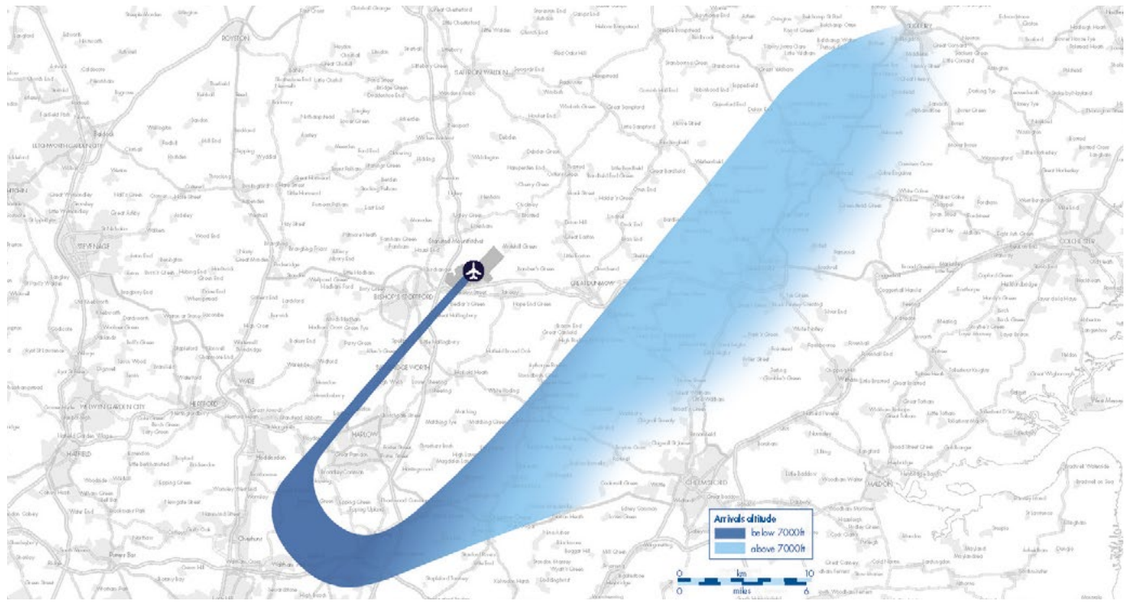


Figure 20: Arrival envelope centre West for runways 22 & 04

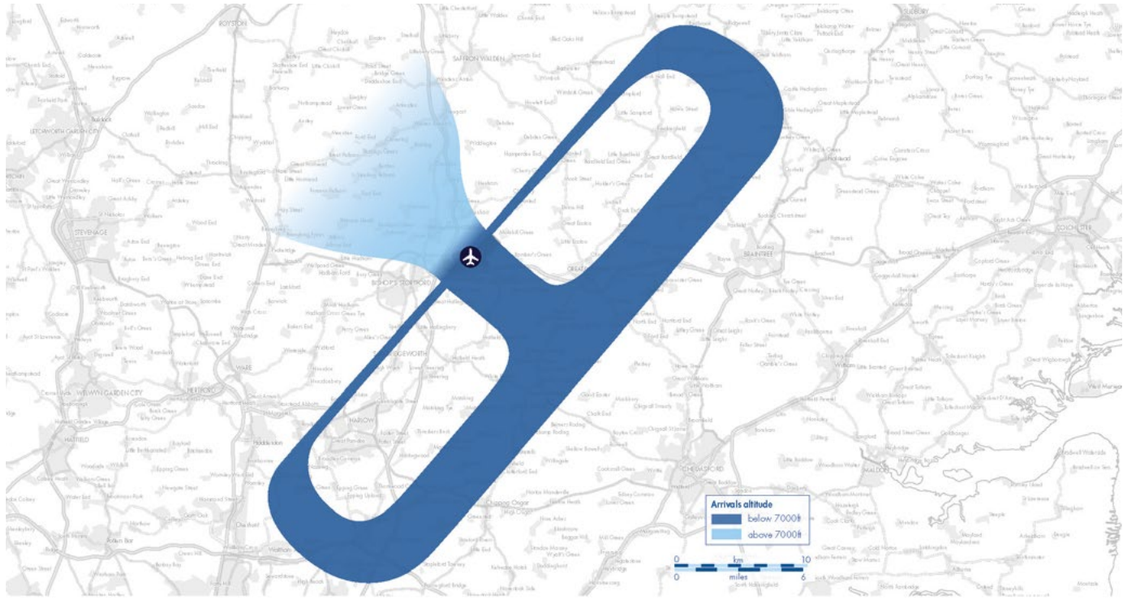
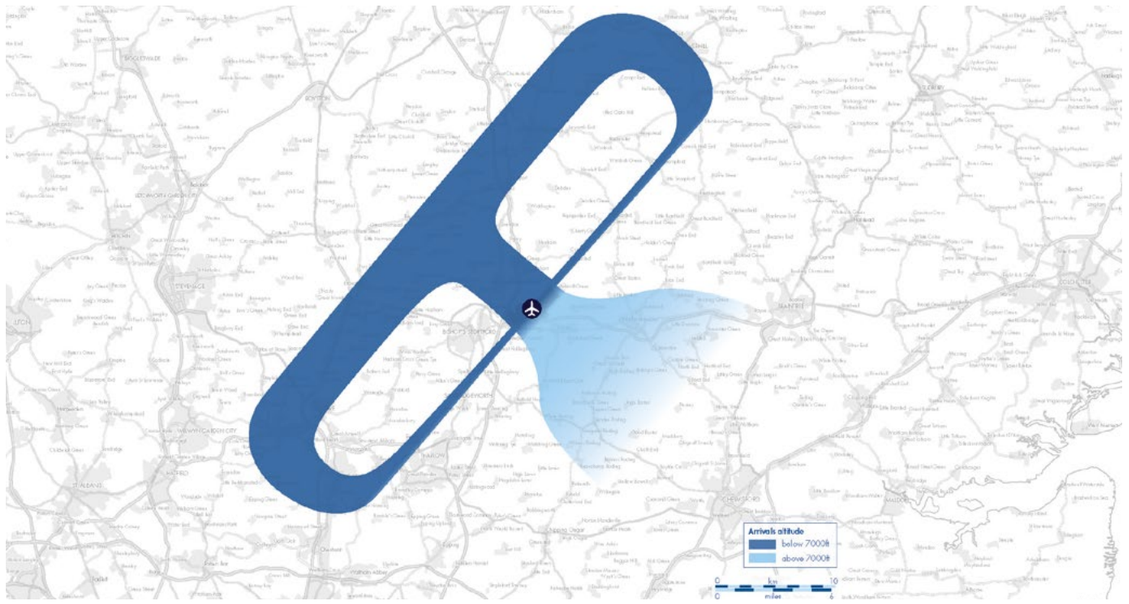


Figure 21: Arrival envelope centre east for runways 22 & 04.



12. Phase one engagement

12.1
Stakeholder engagement during Stage 2 was split into two phases to enable an interactive approach to be adopted and to allow the initial design envelopes to be tested with stakeholders (during the first phase of engagement) before the design envelopes were refined and specific route options developed. The second phase of engagement then allowed the specific route options to be tested with stakeholders, before the options were updated to take account of stakeholder feedback prior to the DPE. In addition to engaging with potentially affected stakeholders, Stansted also engaged with members of the general public.

12.2
The phase one engagement focused on the initial design envelopes, giving participants the opportunity to comment on the process followed and the envelopes created. The early engagement of stakeholders and general public participants enabled us to use their feedback to influence subsequent amendments to the design envelopes and take account of the views in the next stage of the design process, where the specific route options were developed.

Figure 22: Stage 2 engagement process

Step 1

Engagement one – Sharing the design envelopes

Feedback considered, routes developed

Step 2

Engagement two – Sharing route designs and design principle assesment

Feedback considered, options further developed

Initial options appraisal

June

In discussion sessions like this one, we shared the design envelopes together with the details of how these have been developed, for feedback and input.

July – September

Taking account of the feedback, design envelopes were further enhanced and specific route options developed.

November

Potential route options were shared at another round of discussion sessions in November.

November – December

Taking account of feedback, options refined further and subject to DPE.

December – February

The options were subject to an initial options appraisal to determine the likely impact of each. Once complete, full details of all the work undertaken at Stage 2 will be submitted to the CAA for assessment.

12.3
In addition to feedback in relation to the initial design envelopes, participants expressed the importance of avoiding certain buildings, features or areas, including proposed areas of housing development. A further mapping exercise was carried out in response to this feedback, as detailed in section 4 of the SER.

12.4
Full details of the phase one engagement undertaken, including the engagement materials, the feedback received from participants and the resulting changes to the design envelopes, are set out in the SER and supporting appendices.

13. Revised design envelopes

13.1

Feedback from the first phase of engagement informed the revision of the design envelopes and the creation of route options. The changes made to the departure design envelopes in response to this feedback are set out in full at section 4 of the SER and outlined in the table below.

Changes to the design envelopes following phase one engagement stakeholder feedback
The new envelope referred to as Runway 22 North East was created in response to stakeholder feedback requesting the creation of an alternative option to the current 22 East departure envelope. In addition, this option had the potential to address the Design Principle Noise 2 (N2) as it would offer an opportunity to provide respite. The envelope was designed with a 6% climb gradient.
Both the 22 West A and B envelopes were repositioned to potentially reduce the interaction with London Luton Airport, avoid overflying communities, provide opportunities to create respite and reduce fuel burn and track miles. As identified by stakeholders, these changes provided the potential for greater alignment with the design principles Efficiency (E), Noise 1 (N1), Noise 2 (N2) and Balance (B).
A minor change to positioning of 22 East and 04 East design envelopes to correct a presenting error. This was then explained to stakeholders during the phase two engagement.

13.2

Figures 24 and 25 shows the changes to the departure design envelopes outlined in the above table. The black shading identifies the expansion of a design envelope and red shading signifies a reduction.

13.3

As part of the refinement of design envelopes and creation of route options ahead of the phase two engagement, it was established that there were viable route options that would extend beyond the 'Area of Potential Impact' identified at Stage 1 of the CAP1616 process. As a result, it was necessary to expand this area to encompass changes to the departures and arrivals design envelopes, as shown by the black line in Figure 23.

Figure 23: Revised area of potential impact

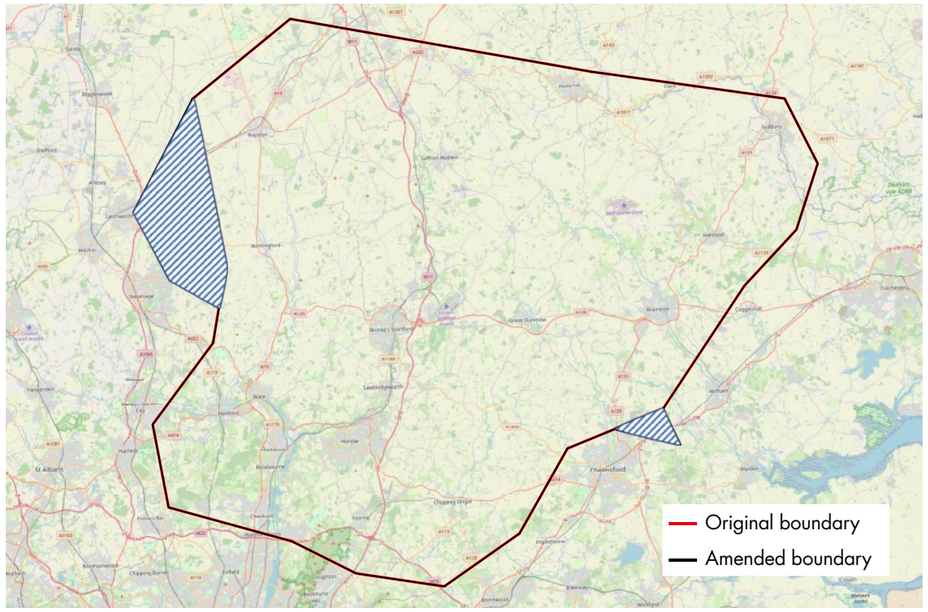


Figure 24: Revised departure design envelopes – Runway 04

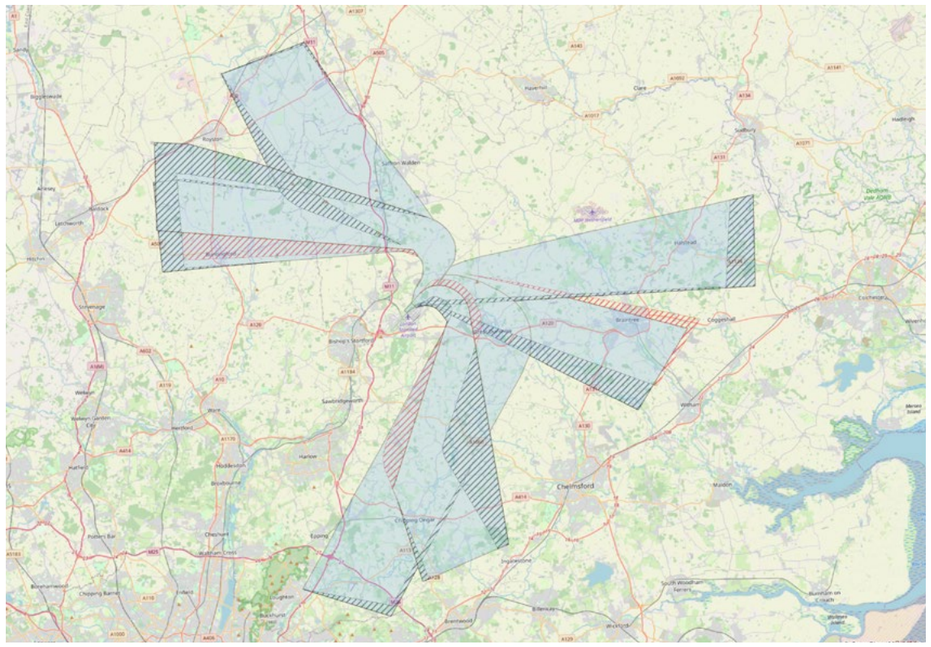
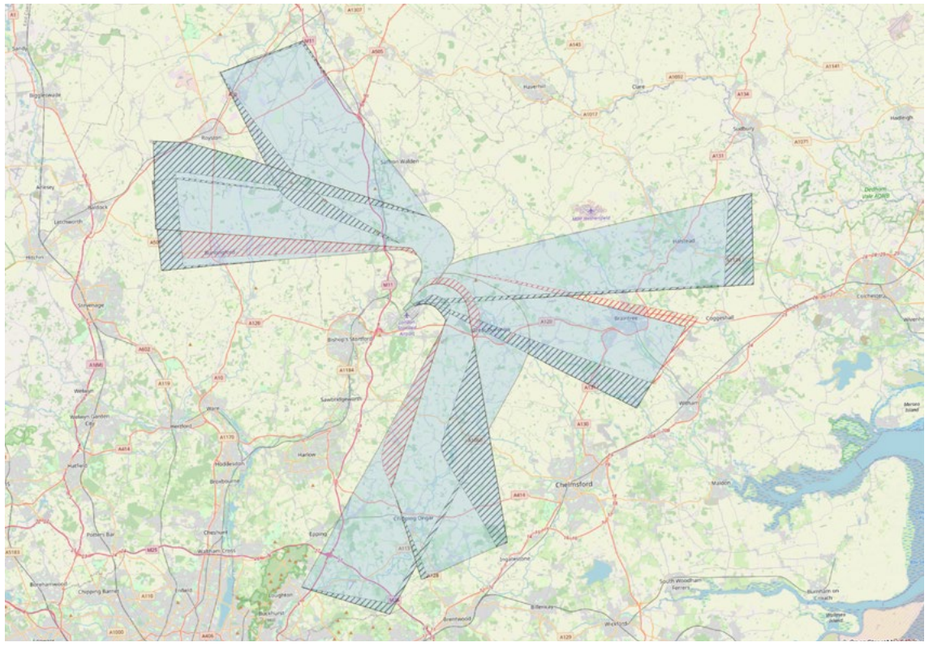


Figure 25: Revised departure design envelopes – Runway 04



13.4
As the Area of Potential Impact informed the stakeholder engagement carried out at Stage 1, a further process of stakeholder identification was undertaken to account for the expansion of the Area of Potential Impact. This highlighted a small number of additional stakeholders within the categories set out in CAP1616, comprising 25 additional parish councils. 11 of these parish councils had already been invited to a previous engagement, as parish councils bordering the original Area of Potential Impact had already been included at Stage 1. However, all identified parish councils within the additional area were invited to a specific engagement session.

13.5
During that engagement session, an overview of the design principles established in Stage 1 and the first part of the Stage 2 work was shared, to give stakeholders an opportunity to share their views. While take-up was limited with one parish council responding, all those newly identified parish councils were added to our stakeholder list and invited to take part in the second phase of Stage 2 engagement. Full details of the engagement carried out are set out in the SER.

14. Departure route options

14.1
The revised design envelopes for departing aircraft were then used to develop an initial comprehensive list of route options within those envelopes.

14.2
Where a design envelope contained an existing route that relied on ground-based navigation aids, these routes were replicated as far as is practicable by applying modern Performance Based Navigation (PBN) standards, which rely on satellite guidance rather than ground based navigation aids. This provided a 'do minimum' option for each of the existing routes.

14.3
Similarly, the two existing departure routes that are designed to PBN standards, having been consulted upon and agreed in 2018, were established as the 'do minimum' option for design envelopes 22 East (Clacton) and 04 South East (Detling).

14.4
Having established the 'do minimum' option for the design envelopes containing existing routes, further route options were developed within the design envelope that responded to the design principles. Consistent with the Design Principle Change (C), which requires any new routes to achieve a clear and objective benefit, additional routes were identified where it is was likely they could provide a benefit that aligned with one or more the design principles. Examples include creating a more direct routing to reduce emissions, reducing the number of people overflown or avoiding noise sensitive areas. Where a design envelope did not contain an existing route, a new set of route options were developed using the same principles.

14.5
PBN standards allow for higher levels of navigational accuracy. Two PBN technologies were applied to departure route design, Area Navigation 1(RNAV1) and Required Navigation Performance (RNP1). This was due to the Fleet Equipage Survey having shown that all aircraft flying into Stansted could use the less demanding RNAV1 and 80% could utilise the more stringent RNP1. While the technologies are largely the same, the slightly different design rules achieve differing levels of consistency and accuracy so that in practice aircraft flying the different standards will show a slightly different spread of tracks. By applying both standards, the comprehensive list of options contained routes that made best use of modern technology widely available, whilst providing alternatives for all aircraft identified in the Fleet Equipage Survey.

14.6
Full details of the initial comprehensive list of departure route options are set out at sections 8 to 20 of the DOR.

15. Arrivals route options

15.1
When the initial design envelopes shown in Figures 15 to 20 were considered together, they covered a wide area within which a continuous descent approach was possible to at least one runway direction. In the second design stage we refined this area by applying the "must-have" Design Principle Policy (P) which states that airspace changes must be consistent with the CAA's Airspace Modernisation Strategy. This document provides objectives on environmental aspects and managing noise, and both this and the DfT Air Navigation Guidance 2017, specifically highlight the use of Continuous Descent Approaches (CDAs) as a means for achieving these objectives.

15.2
The requirement to provide a CDA resulted in a reduction of the design envelopes and design options were then designed within these design envelopes, commencing at an Initial Approach Fix (IAF) of 7,000 ft. Any option unable provide for CDAs for both runway ends was not fully aligned to the Policy design principle and could only be classed as 'viable but poor fit', with reference to the route classification exercise summarised at section 16, below.

15.3
As a result of the above exercise, our arrivals design envelope was refined to be based on design parameters which will allow CDAs to both runway ends. The criteria used were based upon ICAO PANS OPS guidance for continuous descent approaches and those for the design of arrival (approach) procedures. Further detail of these can be found in the DOR.

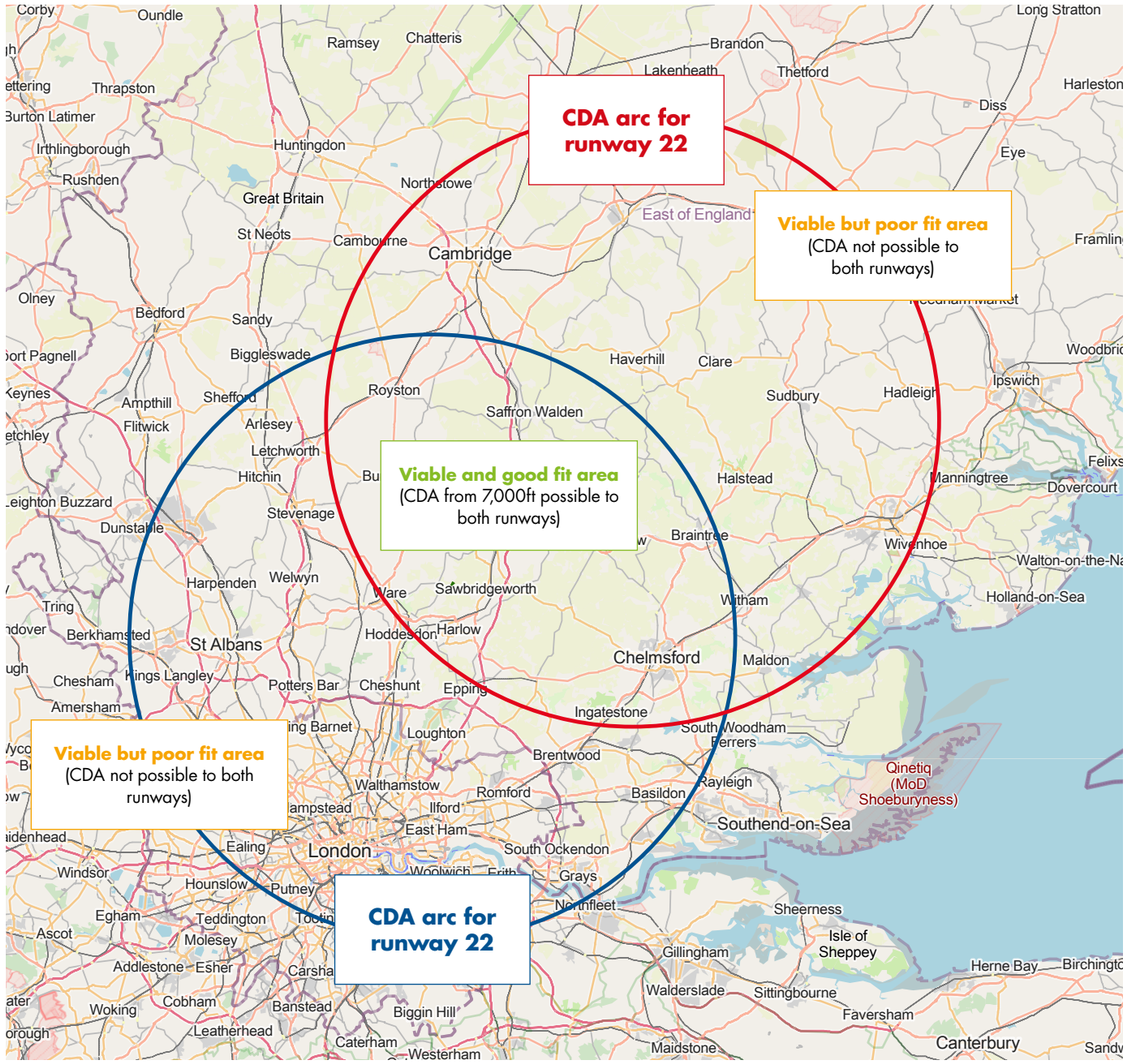
15.4
The application of these design criteria results in two overlapping arcs. Within the overlap area, a CDA to both runways is achievable (based upon the criteria above) and options in this area are deemed viable and good fit. Outside of these arcs, a CDA to only one runway is possible and designs in this area were classified as viable but poor fit.

15.5
The diagram overleaf shows the overlapping arcs for options with a 2,000ft joining point (or approximately 5 miles from touchdown) onto final approach which was chosen as the minimum in line with ICAO guidance.

15.6
Additional envelopes were created for a 2,500ft and 3,000ft joining point, although the additional track miles required to fly these routes resulted in a progressive reduction to the overlapping area.

15.7
There was found to be no overlapping area at a 3,500ft joining point meaning that there is no common CDA area, and in line with the criteria described above, no options were designed for this range or above. As with departures, design options were developed on the basis of a clear link to one or more of the design principles. Full details of the process followed for the design of arrivals options and the list of arrivals options are set out at sections 20-34 of the DOR.

Figure 26: CDA design area for route options with a 2,000ft joining point



16. Viability classification

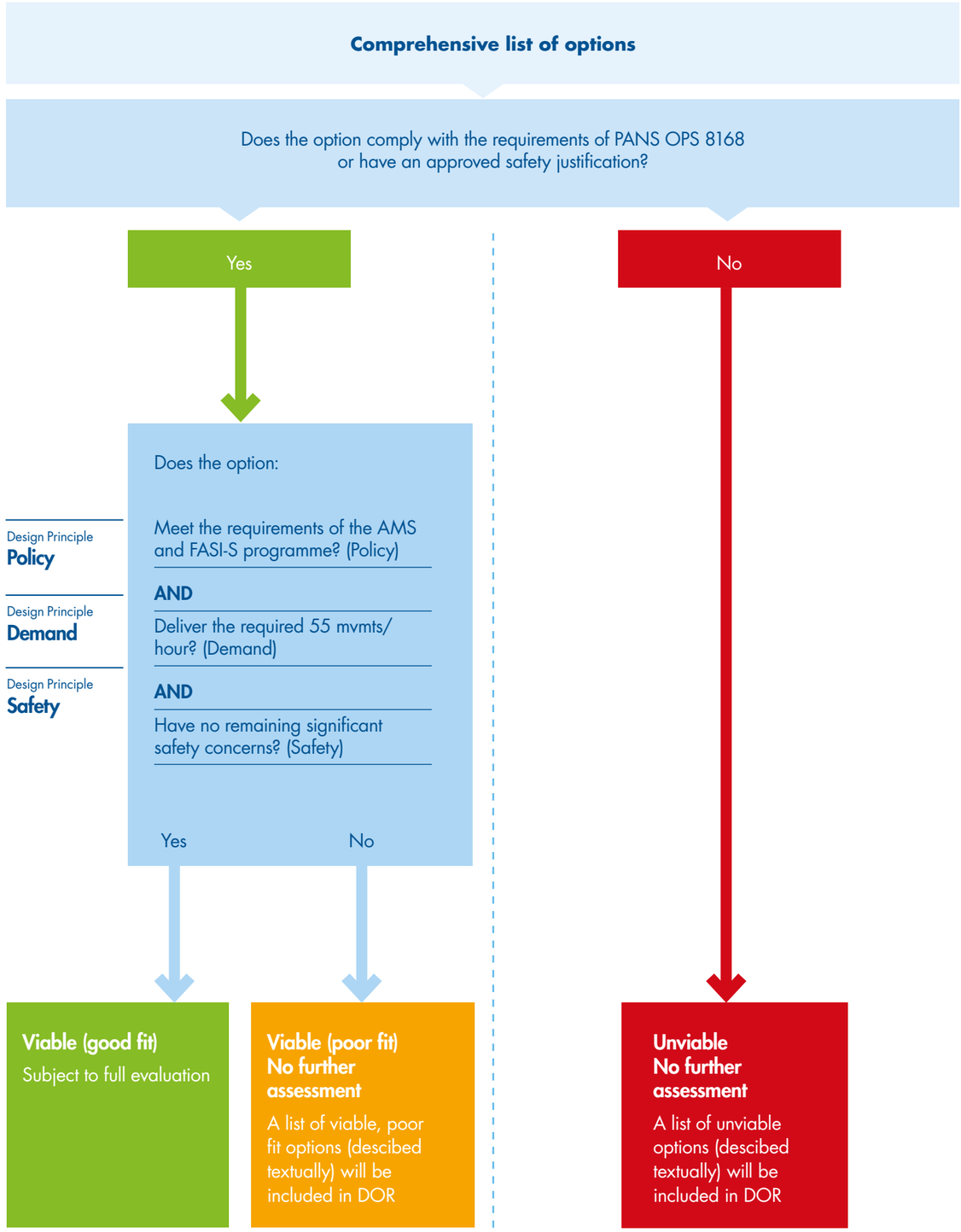
16.1
Having established the initial comprehensive list of route options, a viability filter was applied to determine which route options should progress to the DPE. The viability filter relied on the requirement in CAP1616 for the list of route options to address the Statement of Need, align with the design principles and take account of international standards.

16.2
The viability filter resulted in the route options being assigned one of the following classifications, as shown in Figure 27.

Classification	Criteria	Outcome
Unviable	Would not comply with PANS OPS design criteria or did not have a supporting safety justification for non-compliance.	Not progressed to DPE
Viable but poor fit	Fail to meet the requirements of the three design principles with which all route options 'must' comply (Safety (S), Policy (P) and Demand (D)).	Not progressed to full DPE, although an initial evaluation against the three 'must have' design principles is included in the DPE.
Viable and good fit	Expected to meet the three design principles with which all route options 'must' comply (Safety (S), Policy (P) and Demand (D)).	Progressed to full DPE.

16.3
The full details of the viability assessment are set out at section 5 of the DOR, while the list of viable route options progressed to the phase 2 engagement is provided in the DOR at section 7 to 19 for departures and 22 to 34 for arrivals.

Figure 27: Generating route options



17. Phase 2 engagement

17.1
The purpose of the second phase of engagement was to update stakeholders and general public participants on the development of the design envelopes following the phase one engagement and to present the route options that had subsequently been developed. As well as being presented with the viable route options, the process to determine how route options were 'viable and good fit', 'viable but poor fit' or 'unviable' was explained to participants.

17.2
Full details of the engagement undertaken, the engagement materials, the feedback received from stakeholders and the resulting changes to the route options are set out at section 4 of the Stakeholder Engagement Report.

18. Comprehensive list of options

18.1
As a result of the process summarised above, a comprehensive list of options that address the Statement of Need and respond to the design principles was compiled. This list of options reflected feedback received during both phases of stakeholder engagement and took account of the developing national masterplan for airspace change, including stakeholder feedback from other sponsors of airspace change. The list of options progressed to the full DPE are described in sections 7 to 19 and 22 to 34 of the DOR.

19. Design Principle Evaluation

19.1
As required by the CAP1616 process, the list of route options arising from the DOR were considered in a DPE. In addition, the route options identified as 'viable but poor fit' were evaluated against the three 'must have' design principles of Safety (S), Policy (P) and Demand (D), as presented at section section 5 of the DOR. However, as they did not comply with the 'must have' design principles, these route options were not evaluated further.

19.2
The purpose of the DPE was to evaluate how each of the viable route options aligned with the design principles. The process identified which of the route options merited further analysis in Step 2B of the CAP1616 process, the IOA, on the basis of the ability of each route option to meet the requirements of the design principles.

19.3
To ensure consistency in how each route option was evaluated, detailed criteria were devised for each of the design principles. The full criteria for each design principle are set out at section 4 of the DPE.

19.4
Each viable route option was assessed against the design principles, using the criteria established for each. As part of that assessment, the compliance of each route option with each of the design principles was categorised as follows:

- Met
- Partially met
- Not met

As set out in section 3 of the DPE, where our Design Principles require a comparator (DP Change, DP Noise 1, DP Noise 3, DP Balance), the 'Do Minimum' has been considered to be the appropriate baseline for the DPE.

19.5
The full details of the evaluation of each viable route option is presented at section 5 to 29 of the DPE, including an analysis as to whether each design principle is "met", "partially met" or "fully met" by each route option.

19.6
As some of the design principles, particularly Demand (D), Noise 2 (N2) and Efficiency (E), can only be fully considered when individual route options are combined together into operating systems, the assessment of these design principles was limited at this stage. However, unless there was clear evidence to suggest a route option would perform poorly, no routes were excluded from being carried forward to Step 2B as a result of their assessment against these design principles. As a result, the routes carried forward for further consideration provided a flexible range of options that can achieve an integrated network that aligns with the design principles and responds to the emerging designs of other airspace change sponsors, as their separate airspace change proposals mature. As detailed at section 24 of this document, further evaluation will be carried out as required in Stage 3.

19.7
In addition to detailing the evaluation of each route option against the design principles, the DPE also considered the ability of each route option to respond to the technical criteria at Appendix F of CAP1616. This analysis is set out in sections 5 to 29 of the DPE.

19.8
Of the 91 departure route options identified, the DPE demonstrated that 63 had sufficient merit to be progressed to Step 2B - Initial Options Appraisal. Of the 72 arrival route options identified, TBC were carried forward to Step 2B.

19.9
Full details of the analysis conducted for each route option together with the summary assessment of whether the design principle is either not met, partially met, or fully met can be found in the DPE. The list of route options progressed to Step 2B is set out at section 19 and 29 of the DPE.

Step 2B – Initial Options Appraisal

20. Introduction

20.1
CAP1616 requires sponsors to complete an Initial Options Appraisal process that assesses the benefits of the various route options compared to a baseline, with the appraisal to be carried out in accordance with CAP1616, The Green Book and WebTAG.

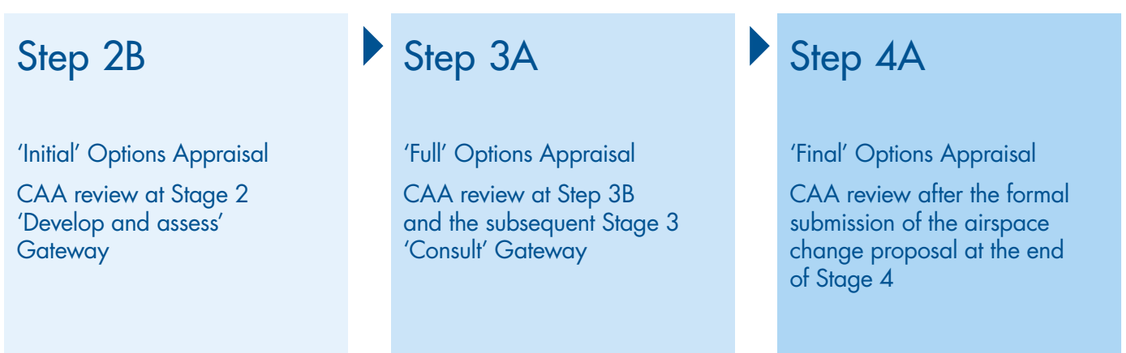
20.2
At the IOA, the requirement is to determine the high-level criteria and then conduct a qualitative assessment against each route option. This serves as the foundation for a fuller and more quantitative assessment later in the CAP1616 process. The key elements of this process are as follows:

- High-level objective and assessment criteria.
- Baseline definition – current operations.
- Longlist of options (including a do-nothing/minimum option).
- Shortlist of options.
- Preferred or final option(s).

The options appraisal requirement of CAP1616 evolves through three iterations as shown in Figure 25 and Figure 26 Options appraisal phases.

20.3
The first box is the subject of the Initial Options Appraisal,IOA which forms part of the submission to the CAA at the Stage 2 Develop and Assess Gateway.

Figure 28: Options appraisal phases



21. Purpose

21.1
The Initial Options Appraisal (IOA) is the first iteration of three option appraisals required by CAP1616 and forms Step 2B within Stage 2 Develop and Assess of the seven stage CAP1616 process. The design options appraised within the IOA are the outputs from the Design Principles Evaluation (DPE) undertaken within Step 2A of Stage 2, which itself identified those routes which best align with the design principles.

21.2
The purpose of the IOA is to provide, at a minimum, a qualitative assessment of each option within the comprehensive list of viable options, providing stakeholders and the CAA with the relative differences between impacts, both positive and negative. The impacts are determined by comparing each of the route options, carried forward from the DPE, against a baseline. For the IOA at Stansted the 'do nothing' scenario was used as the baseline, with 'do minimum' options also being assessed against that baseline. This reflects the theoretical nature of the 'do minimum' scenario at Stansted, as described in detail at section 3.7 of the IOA.

21.3
The IOA undertaken by Stansted meets the requirements for the initial appraisal as defined within CAP1616, which are summarised in Figure 29 (replicated from Table E1, CAP1616).

Figure 29: CAP1616 requirements for inclusion at each phase of the options appraisal

Requirement	Initial	Full	Final
High-level objective and design principles	✓	✓	✓
Comprehensive list of viable options	✓	✓	✓
Qualitative assessment of comprehensive list of viable options	✓	✓	✓
Shortlist options	✓	✓	✓
Qualitative assessment of shortlist	✓	✓	✓
Full analysis of shortlist options	✓	✓	✓
Preferred options	✓	✓	✓
Modifications following consultation		✓	✓
Proposed options			✓

22. Methodology

22.1
Stansted has reviewed the requirements for IOA within CAP1616 in detail and has adopted a clear and consistent methodology for assessing design options against a defined baseline. This methodology is set out in full at section 2 of the IOA.

22.2
The assessment, which included some early quantitative elements in addition to the qualitative assessments required by CAP1616, considered the impacts identified in CAP1616, as replicated in the table below. The quantitative assessments were used to estimate the number of households and therefore residents overflown; the number of noise sensitive buildings overflown; and the number of and names of Sites of Special Scientific Interest (SSSIs) and country parks potentially impacted.

Figure 30: Impacts assessed within the options appraisal

Affected Group	Impact
Communities	Noise impact on health and quality of life
	Air Quality
Wider Society	Greenhouse Gas impact
	Capacity and resilience
General Aviation	Access
General Aviation/commercial airlines	Economic impact from increased effective capacity
	Fuel burn
Commercial airlines	Training costs
	Other costs
Airport/Air Navigation Service Provider	Infrastructure costs
	Operational costs
	Deployment costs
Safety Assessment	Safety Assessment
Wider Society	Tranquillity
	Biodiversity

23. Outputs

23.1
The IOA categorised the individual options within the Comprehensive List of Viable Options, as either; the preferred option, favoured option, acceptable, rejected, or baseline, as shown in the table below.

Colour Key	
Preferred Option(s)	When compared to the baseline, there is a clear and obvious benefit. This option is viewed as more favourable than the other options within the design envelope and as such is the preferred option within the design envelope.
Favourable	When compared to the baseline, there is a clear and obvious benefit.
Acceptable	When compared to the baseline, there is an equal benefit.
Rejected	When compared to the baseline, there is a clear and obvious dis-benefit. As such, these options are rejected.
Baseline/Previously Rejected	Option included for completeness.

23.2
The assessment of each route option against the assessment criteria, and the categorisation of route options in accordance with the above criteria, is set out at in the Initial Options Appraisal – Full Analysis Table Appendix A1 of the IOA.

24. Operating networks

24.1
Consistent with the requirements of Step 2A of CAP1616, we have undertaken a design process to identify a comprehensive list of route options. In Step 2A, these route options have been evaluated against the design principles that we identified through stakeholder engagement in Stage 1. This work is reported separately in the Design Options Report (DOR) and the Design Principles Evaluation (DPE). Those that best align with the design principles were carried forward in the process to Step 2B.

24.2
Route options carried forward to Step 2B have been subject to an initial appraisal. The findings of that appraisal are set out in this IOA and the accompanying assessment tables.

24.3
The IOA is the first of three appraisals required under CAP1616 and, subject to the approval of the CAA, we will now consider the shortlisted options identified in the IOA in greater detail as part of Stage 3. This further assessment will increasingly make use of quantitative data and will explore local factors in greater detail than the level of assessment has allowed to date. The next stages in our appraisal will be guided by the requirements set out in CAP1616, including the metrics set out in Appendix E.

24.4
In setting out our shortlist of route options we have benefitted from extensive engagement with stakeholders and the general public. Among the stakeholders were other sponsors of airspace change. We can therefore be confident that our proposals are consistent with the emerging proposals from other change sponsors, in so far as they are known at this time. However, these separate but dependant airspace changes will continue to mature, and it will be important for us to understand how proposals from other airports within our LTMA cluster might interact with the proposals for STN and how collectively our developing route options are best integrated into the network at higher altitudes. We will continue to work with other change sponsors, including NATS, so that our decisions are informed by the best available information and consistent with the developing national masterplan. If required, we will review the work we have undertaken to date to reflect emerging information.

24.5
The next logical step in considering airspace change is for individual route options to be combined into operating networks. This will support ongoing engagement and, in turn, will allow for a more detailed evaluation against the Design Principles N2, D and E. These consider noise respite, demand and efficiency respectively.

24.6
In addition, as the shortlisted route options are combined into operating networks, it is likely that some of the route options will respond less well to the design principles. For example, they may prove to be incompatible with other route options, may conflict with the proposals from other change sponsors or may result in a higher cumulative impact. This may mean that certain route options will be discounted, because they are highly unlikely to perform as well as other options. As such, they would not be taken forward to the full options appraisal or public consultation at Stage 3. Consistent with the developing national masterplan, we recognise that 'trade-offs will be identified by ACP sponsors during the development of the initial and full options appraisals (Stages 2B and 3A of the CAP1616 process) and in collaboration with ACOG when assessing the combined and net impacts of interdependent options'.

24.7
Our Efficiency design principle states that we will seek to minimise the amount of controlled airspace we require, which seeks to ensure that the needs of other airspace users are considered. However, because of the potential for routes to be refined or amended, as referred to above, it would be premature to define future Controlled Airspace (CAS) requirements at this stage. As such, we will identify CAS requirements for groups of options during Stage 3. All stakeholders will be provided with an indication of the CAS requirements within our Step 3C Consultation material, and the comments received will be taken into account and considered as part of the consultation analysis activities in Step 3D. More details of this approach are provided in the DOR at section 4.5.

24.8
Further refinement of route options whereby certain options are not to be appraised fully at Stage 3 will be fully explained in preparing for Stage 3. We will ensure that affected stakeholders are afforded the opportunity to provide feedback prior to the full options appraisal.

25. Updating Stakeholders

25.1
The completion of the work required at Stage 2 has developed and refined the route options available at Stansted, as well as expanding the understanding of stakeholders' views on those options. While it is not a requirement of the CAP1616 process, all stakeholders that have participated in engagement activities to date will be provided with the information submitted to the CAA at the conclusion of Stage 2, to ensure that they remain informed
of the development of the Airspace Change Proposal at London Stansted ahead of the full public consultation exercise at Stage 3.

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