Additional information for stakeholders second engagement

Design Options Development

The process

In CAP1616 Step 2A[1] Bournemouth Airport is required to develop a full list of Design Options (DO) that address the Statement of Need (SoN) and Design Principles (DPs) that were developed, with the help of stakeholders, in Stage 1 of the ACP process.

Bournemouth Airport developed Design Options by firstly assessing and describing the baseline, or 'Do Nothing' option. Using this as a starting point, conceptual options were derived using 'swathes' or general directions. This produced a number of directional options for both runways and for departures and arrivals.

The next step in the process was to ensure that the Design Options met the SoN and to evaluate the DOs against the DPs; this process is called the Design Principle Evaluation (DPE). Stakeholders once again are invited to provide feedback on how effectively (or not) the DPs have been applied to the options. The DPE is then amended to reflect this feedback.

Stakeholders input is vital at this stage as they are likely to have expert knowledge relating to one or more of the design principles, for example an environmental organisation will have more detailed knowledge regarding the environmental sensitivity of areas potentially overflown, or a pilot may have more experience of technical constraints of a proposed option. Bournemouth Airport has provided the initial scoping, where possible, to aid stakeholders in assessing the DPs against all options.

Once this is complete, Bournemouth Airport must conduct an initial appraisal of the options developed. The purpose of this is to produce a viable list of options, including the 'do nothing' option which the options will now be assessed against, in addition to the following:

- An indicator of the likely noise impacts.
- High level assessment of the costs and benefits involved.

Additionally, Bournemouth Airport is required to provide the following:

- A description of the change proposal.
- Criteria for assessing the list of options, including how these criteria were used to develop a shortlist.
- Shortlist options, including indication of preferred option.
- Evidence of the above or strategy for filling in the gaps before a full appraisal at Stage 3.

The outputs from this process are:

- Design Principle Evaluation and Options development

[1] The CAA's guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic. Available here.

- Initial Options Appraisal

Methodologies and frameworks

The following is to explain how Bournemouth Airport has carried out the work so far, assumptions made and to illustrate the thought process behind the development of options.

Design Envelopes

The options were developed using broad areas, or 'swathes,' to create design options and these options were coded by Arrival/Departure, runway, design envelope and individual letter to identify each option within each design envelope. This is illustrated in Figure below.

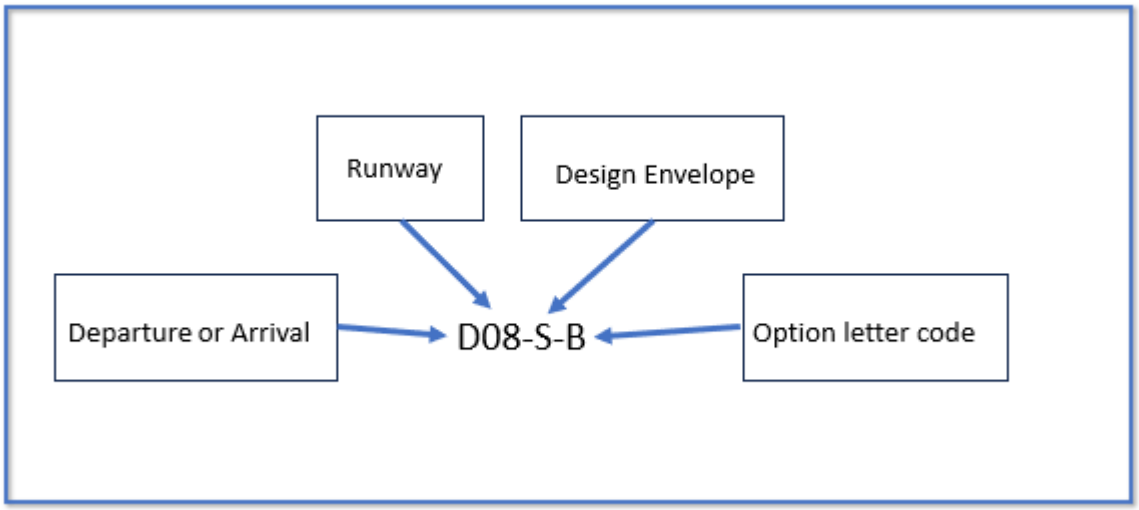


Figure 1 Illustration of Design Option code

Bournemouth Airport progress

Bournemouth Airport initially sought feedback from stakeholders on the DPE of options in December 2022. However, since then Bournemouth Airport has reassessed the baseline, or current situation, based on new data and minor changes in operations. As there were some minor adjustments to these baselines, it was necessary to reassess the options. The following is a summary of these changes, beginning with a description of the baseline changes; the new baselines are shown over track data [2] to illustrate why these changes have been made. The subsequent sections describe the design envelope and options changes. These are a series of images illustrating the old options alongside the new options.

[2] These track data are for the period of 16th June-15th September 2023 inclusive, this is considered the busy period.

Baseline changes

Runway 08

08 Departures

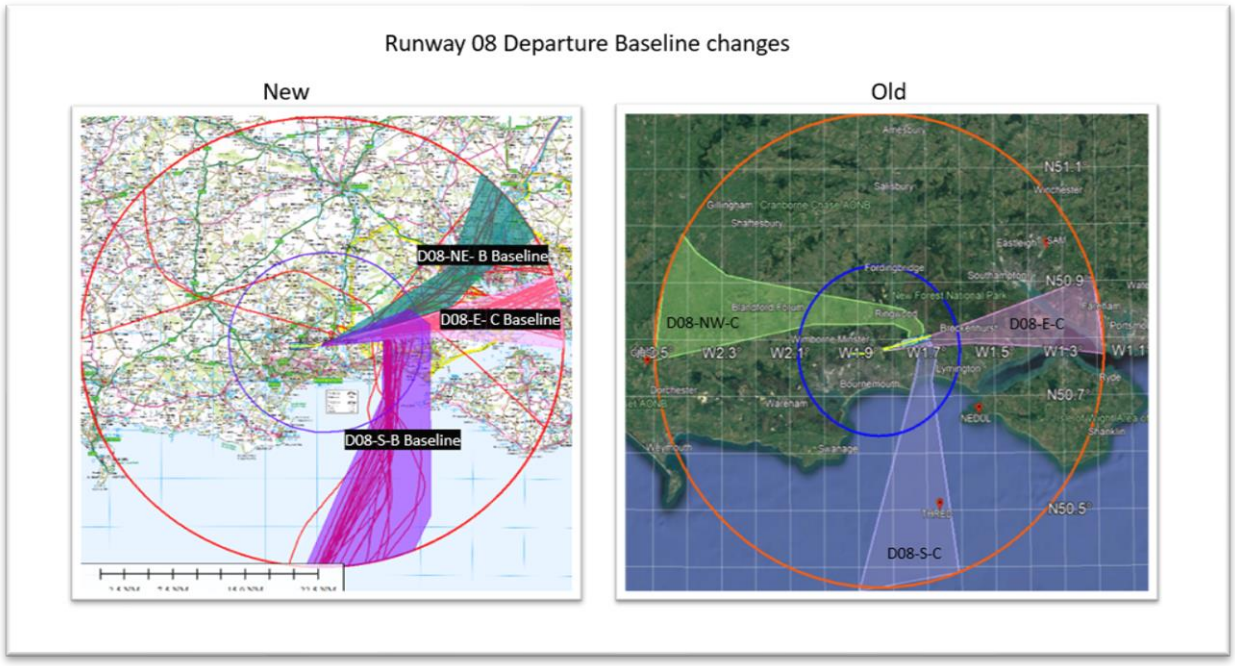
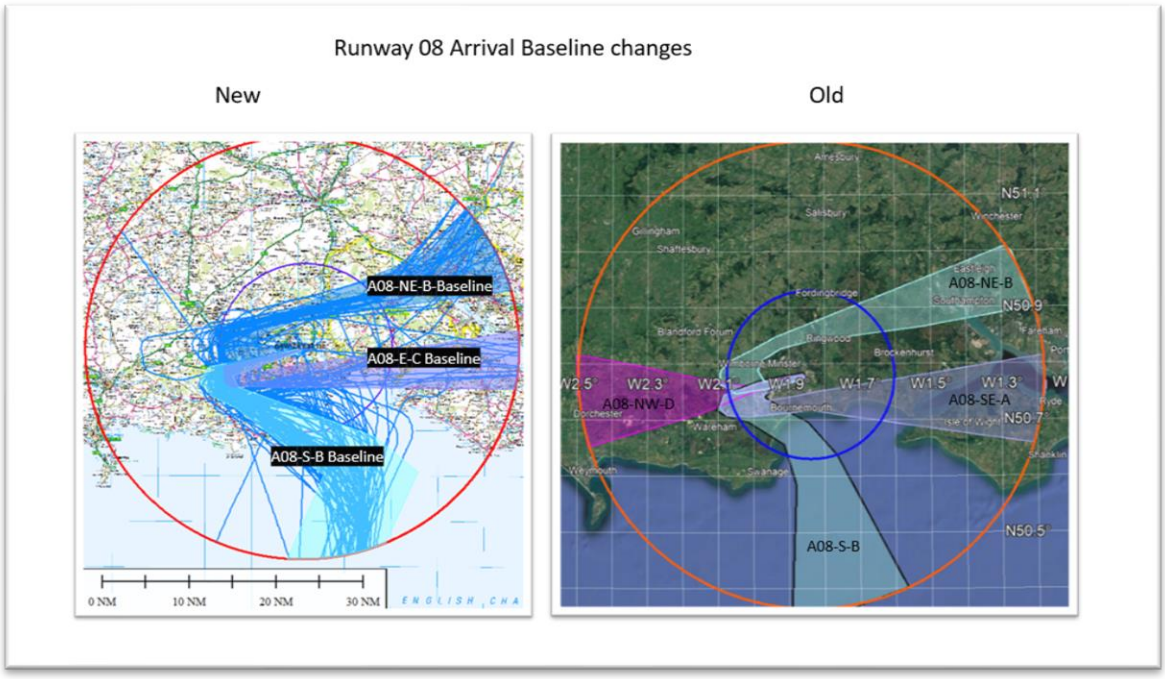


Figure 2 Runway 08 Departures New and old baselines

The baseline to the Northwest was removed due to there being no procedures and few flights departing to the Northwest. The East baseline was split into two design envelopes to reflect current operations. The south baseline was made slightly broader to reflect current operations.

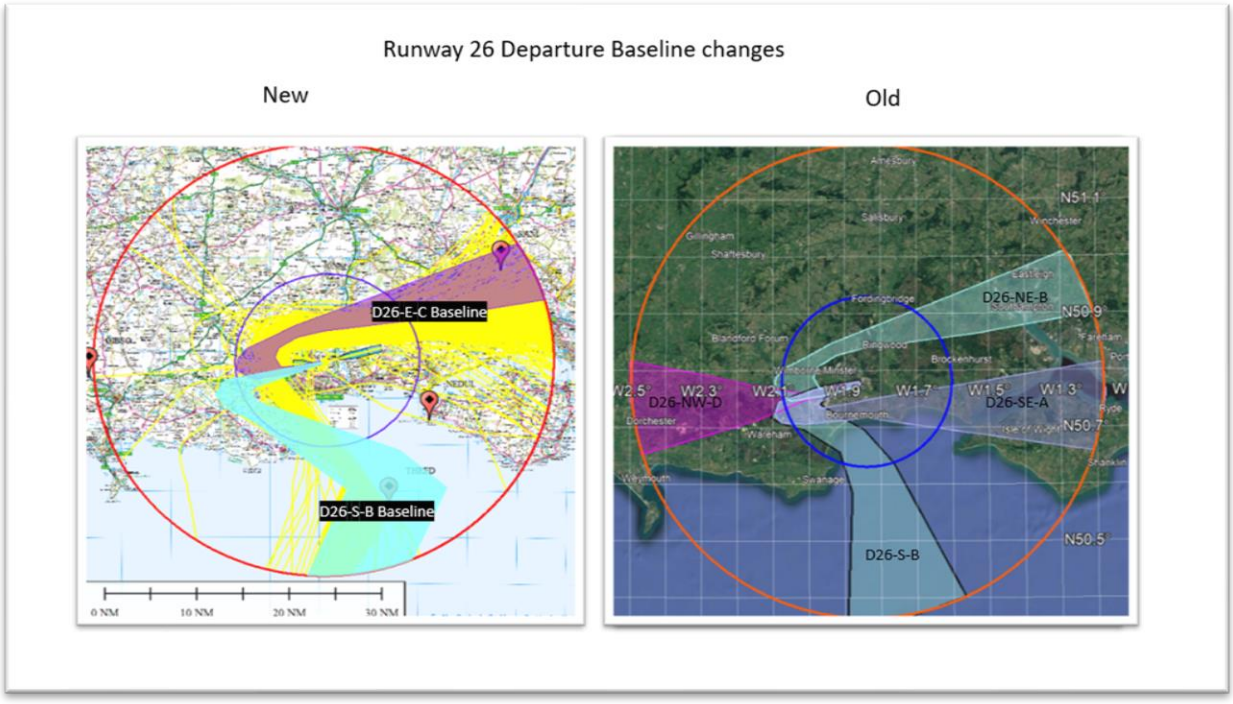
08 Arrivals



The baseline to the Northwest was removed due to there being no procedures and few flights arriving from the Northwest. The South baseline has slightly changed shape to reflect current day arrivals. Arrivals from the East remain the same, the design envelope has changed name to East from Southeast. The Northeast baseline has changed slightly at the 10 Nautical Mile mark to reflect arrivals from the North.

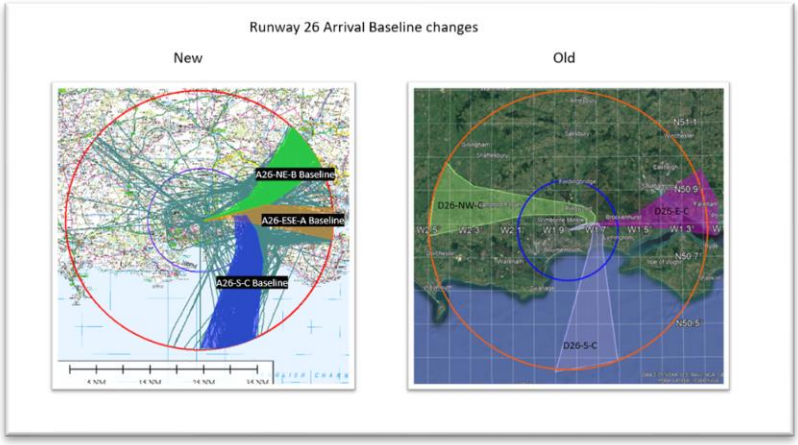
Runway 26

26 Departures



The baseline to the Northwest was removed due to there being no procedures and few flights departing to the Northwest. The new baseline to the South is similar to the old, however has been adjusted to reflect current departures. The Southeast baseline has been removed as no departures turn left from Runway 26 for an East or Southeast departure. The Northeast design envelope has been changed to East only (see below).

26 Arrivals



The baseline to the Northwest was removed due to there being no procedures and few flights arriving from the Northwest. The East design envelope has been split into Northeast and East/Southeast to reflect current operations, there are therefore two new baselines for arrivals from the North and from the Southeast. The South baseline is largely the same, however has been changed at the 10 Nautical Mile mark to reflect current arrivals.

Design Envelope changes

The new option design envelopes are listed by Runway and Departure/Arrivals in the tables below. The design envelope is in the heading with each conceptual swathe listed below and the baseline is indicated after the baseline option.

This is followed by images of the new options design envelope compared to the old options, i.e., the options previously presented in December 2022. This is to help identify where changes to options have been made.

Runway 08 Options Design Envelopes

Departures

North and West	Northeast	East	South
D08-NW-A	D08-NE-A	D08-E-C Baseline	D08-S-A
D08-NW-B	D08-NE-B Baseline	D08-E-D	D08-S-B Baseline
D08-NW-C			
D08-NW-D			
D08-NW-E			

Figure 3 Runway 08 Options Design Envelope Departures

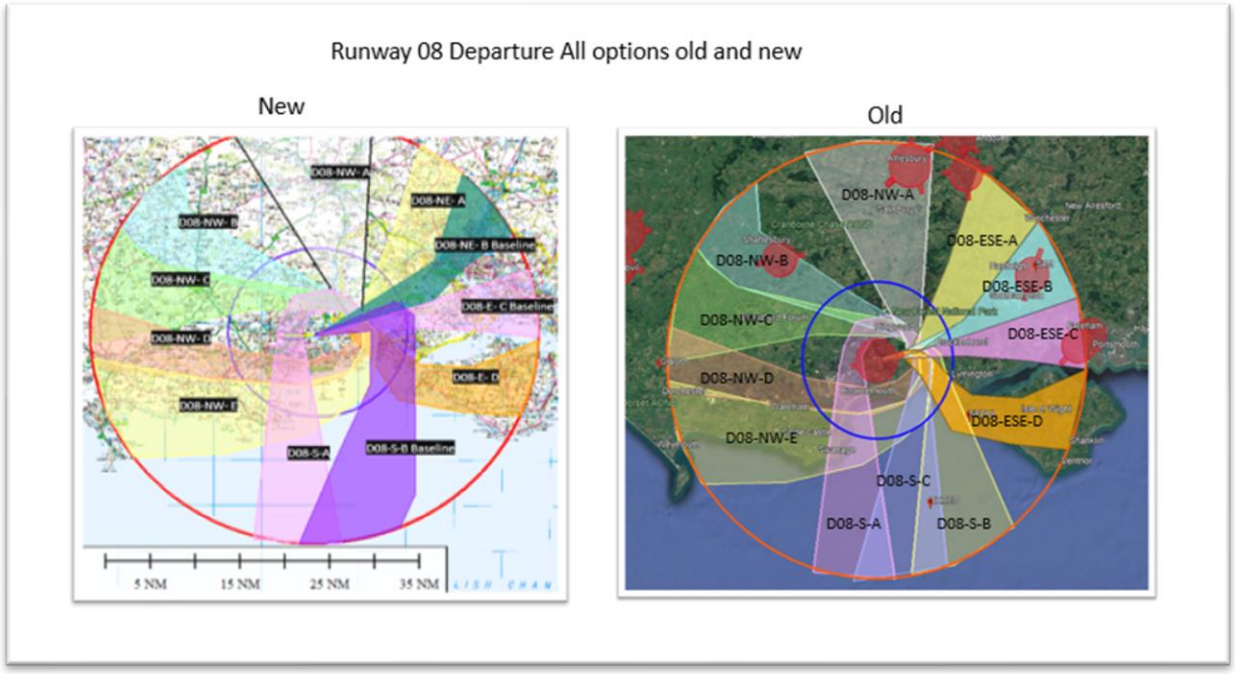


Figure 4 All departure options for runway 08

Arrivals

North and West	Northeast	Southeast	South
A08-NW-A	A08-NE-A	A08-SE-B	A08-S-A
A08-NW-B	A08-NE-B Baseline	A08-SE-C Baseline	A08-S-B
A08-NW-C	A08-NE-C		A08-S-C Baseline
A08-NW-D			
A08-NW-E			

Figure 5 Runway 08 Options Design Envelopes Arrivals

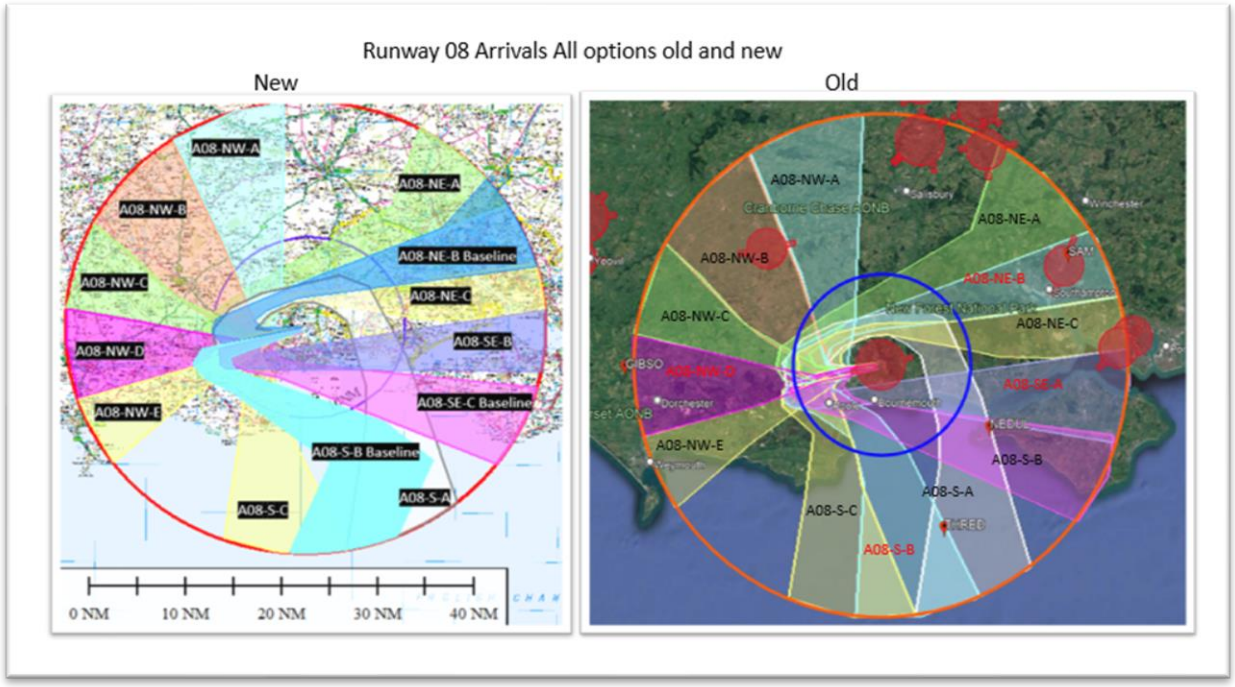


Figure 6 All arrival options for runway 08

Runway 26 Options Design Envelopes

Departures

North and West	East	South
D26-NW-A	D26-NE-A	D26-S-A
D26-NW-B	D26-NE-C Baseline	D26-S-B Baseline
D26-NW-C	D26-NE-D	D26-S-C
D26-NW-D	D26-NE-E	
D26-NW-E		

Figure 7 Runway 26 Options Design Envelopes Departures

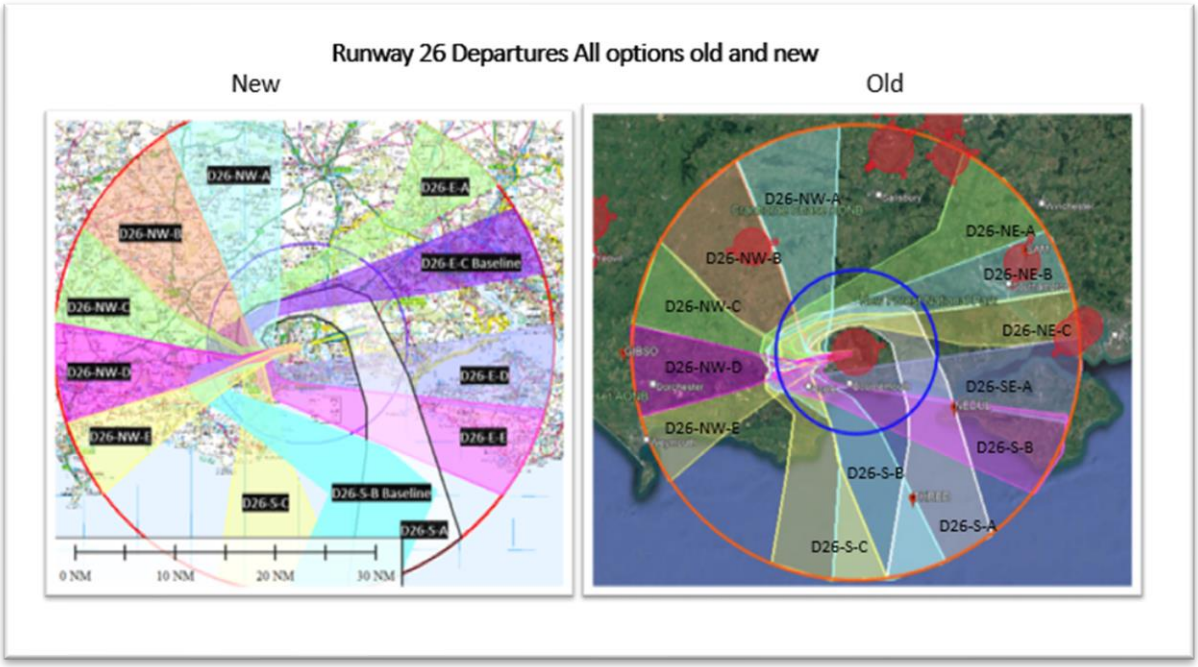


Figure 8 All departure options for runway 26

Arrivals

North and West	Northeast	East Southeast	South
A26-NW-A	A26-NE-A	A26-ESE-A Baseline	A26-S-A
A26-NW-B	A26-NE-B Baseline	A26-ESE-B	A26-S-C Baseline
A26-NW-C			
A26-NW-D			
A26-NW-E			

Figure 9 Runway 26 Options Design Envelope Arrivals

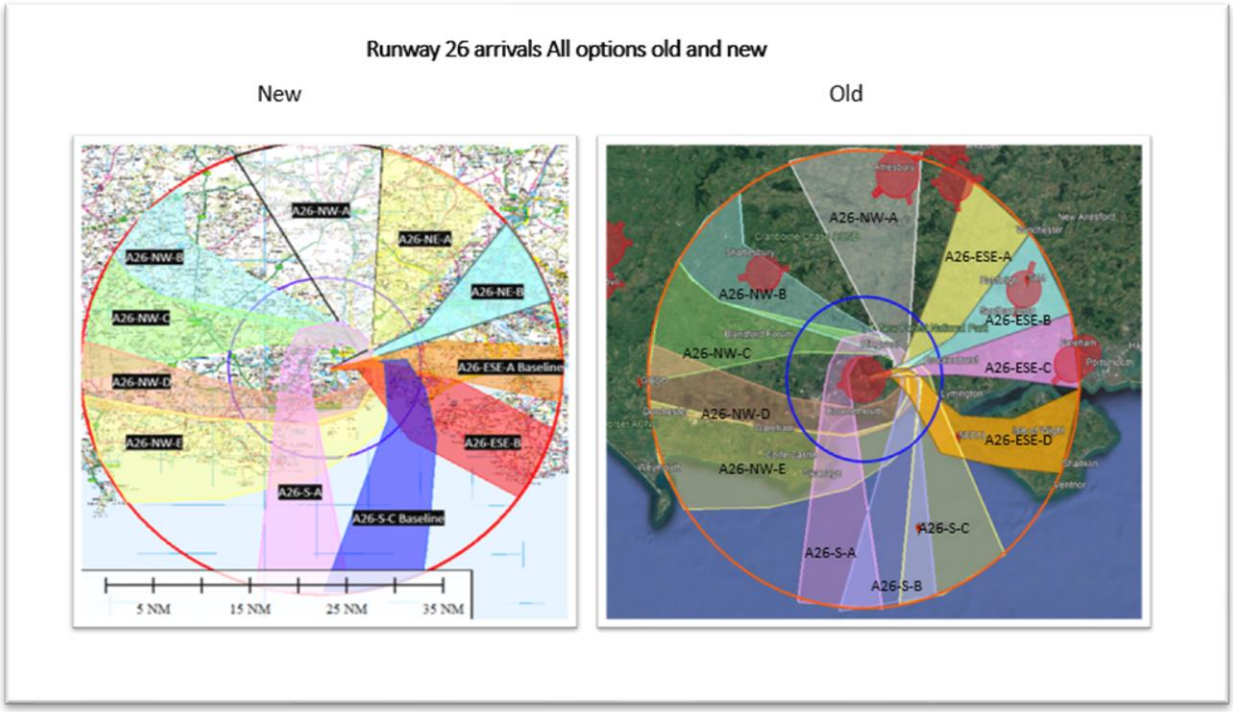


Figure 10 All arrival options for runway 26

Options Design Envelope Changes

The following images illustrate the changes in the options since Bournemouth Airport last engaged with stakeholders in December 2022. The baseline changes are described above and reflect the changes in current operations: the options have remained the same where possible, although changes have been made where necessary, in relation to the baseline.

Runway 08

Departures

Northwest Design Envelope

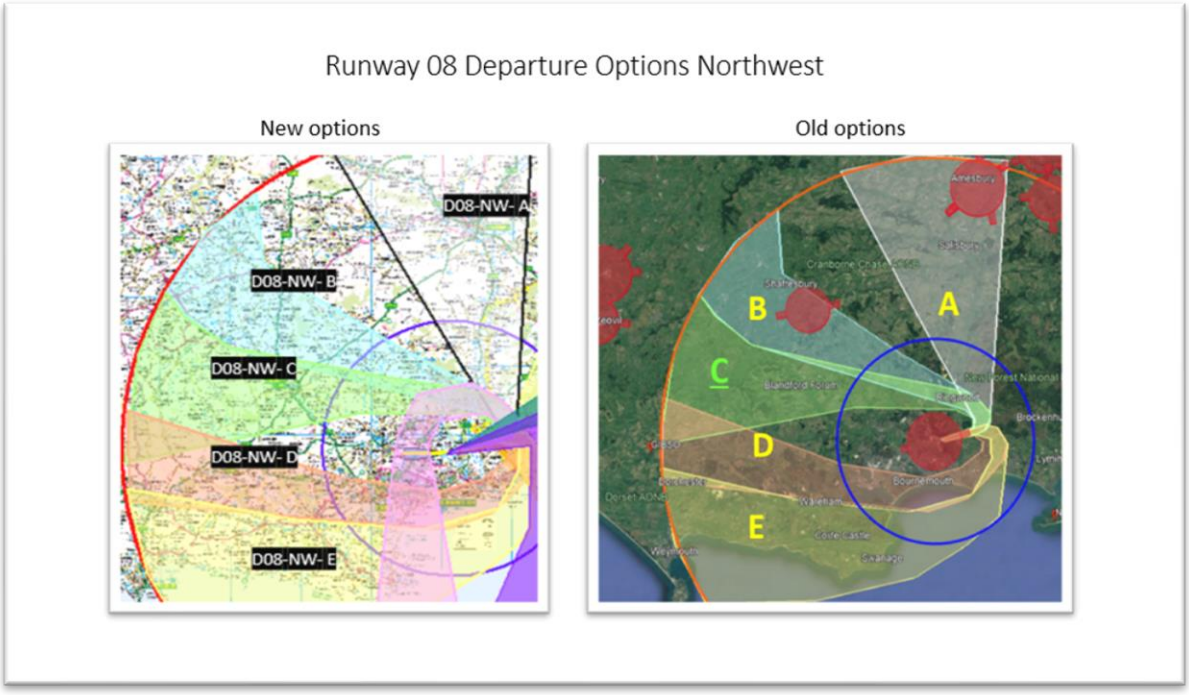


Figure 11 Runway 08 Departure Options Northwest old and new

There have been no changes in the Northwest design envelope except for the removal of the baseline.

Northeast Design Envelope

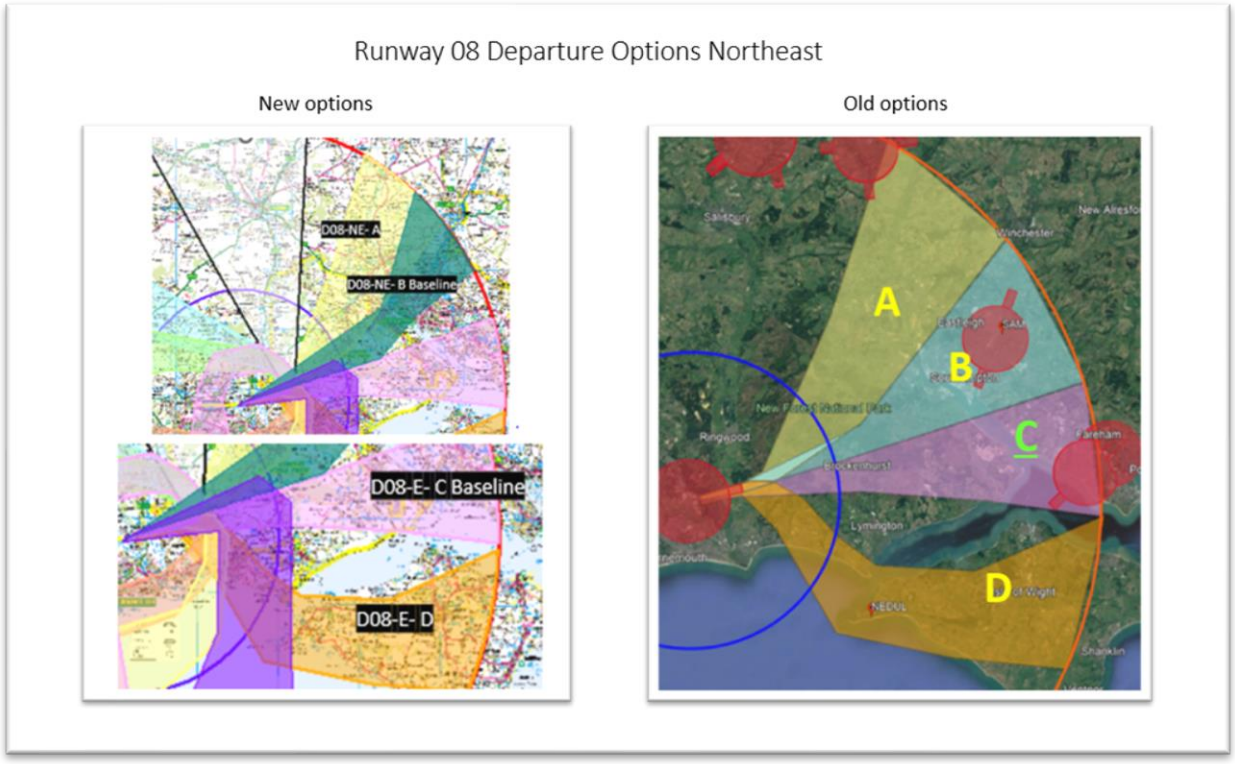


Figure 12 Runway 08 Departure Options Northeast: old and new

The options for the North and East have been split into two design envelopes. This is because there are now two baselines: one for the Northeast and one for the East. The options (A and D) remain the same, however are now in separate design envelopes (Northeast and East respectively).

South Design envelope

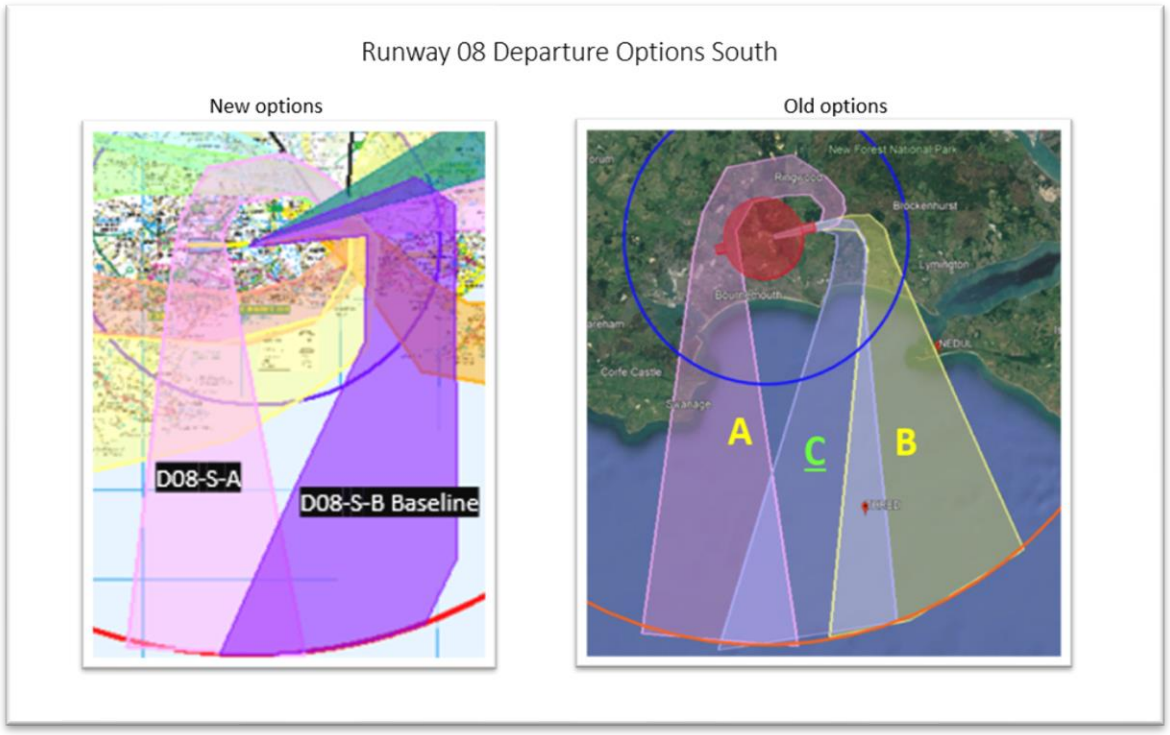


Figure 13 Runway 08 Departure options South, old and new

Option A remains the same. As the baseline has changed to reflect current operations, option C has been removed, however this area is largely covered by the current baseline.

Arrivals

Northwest Design Envelope

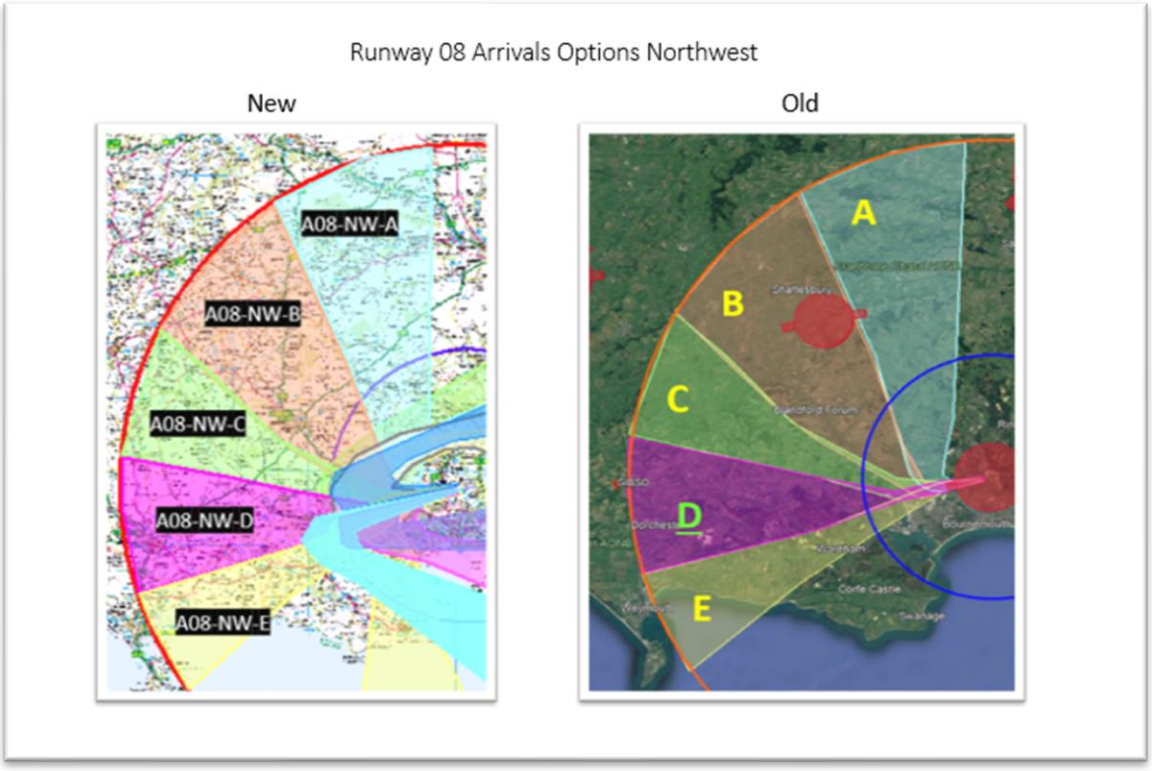


Figure 14 Arrival 08 options Northwest, old and new

There have been no changes to the options for Northwest arrivals, except for the removal of the baseline.

Northeast Design Envelope

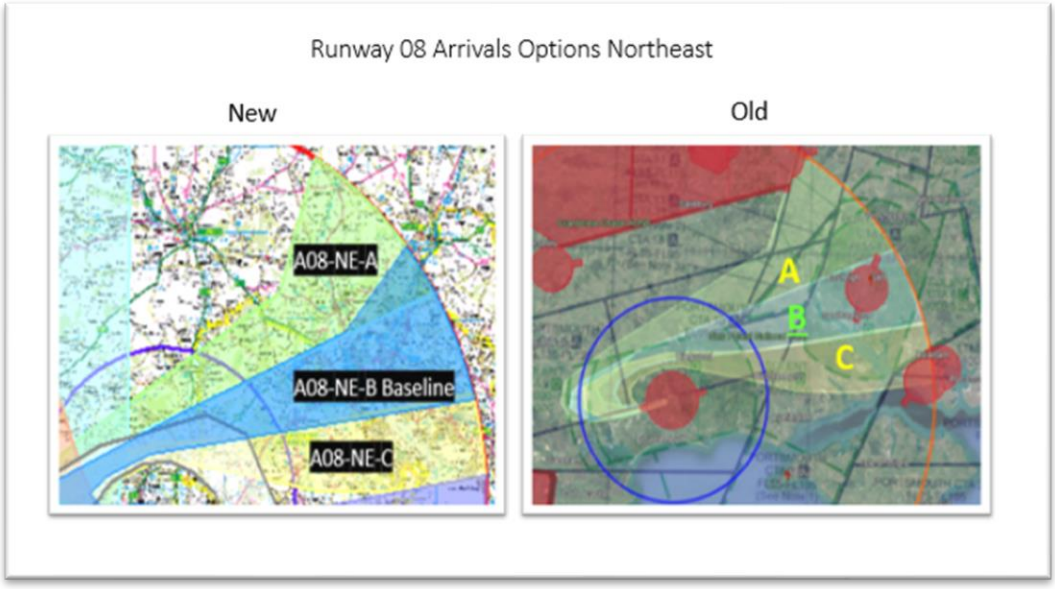


Figure 15 Arrival 08 options Northeast, old and new

Options A and C remain the same. Option B, the baseline, has been changed slightly to reflect current arrivals.

Southeast Design Envelope

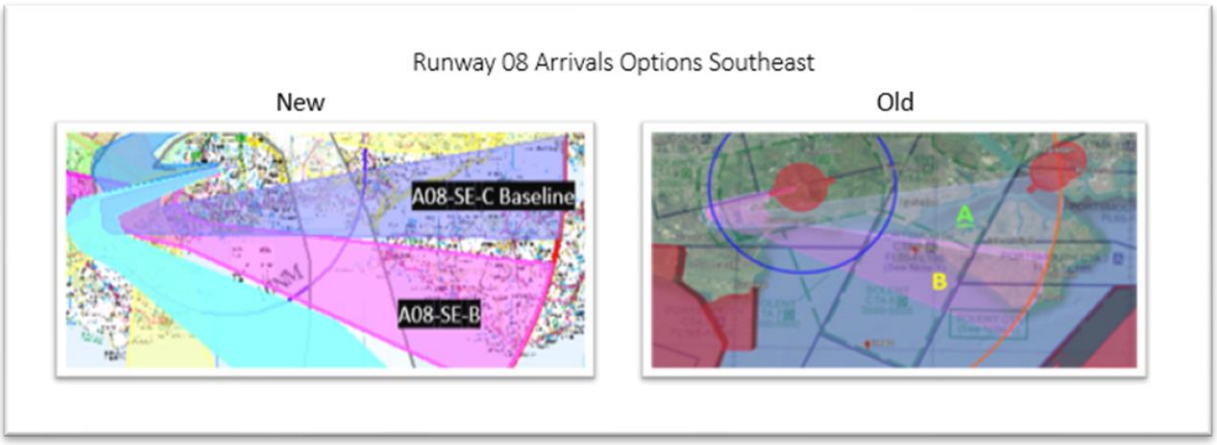


Figure 16 Arrival 08 options Southeast, old and new

The baseline has been adjusted slightly and renamed option C. Option B remains the same.

South Design Envelope

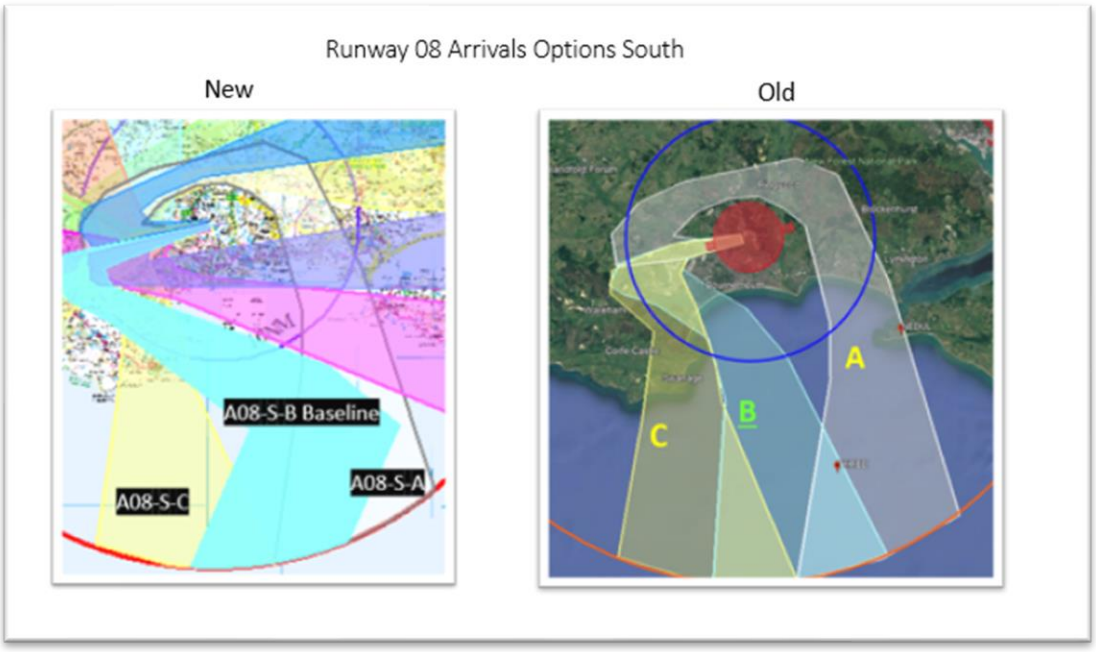


Figure 17 Arrival options South, old and new

Runway 26

Departures

Northwest Design Envelope

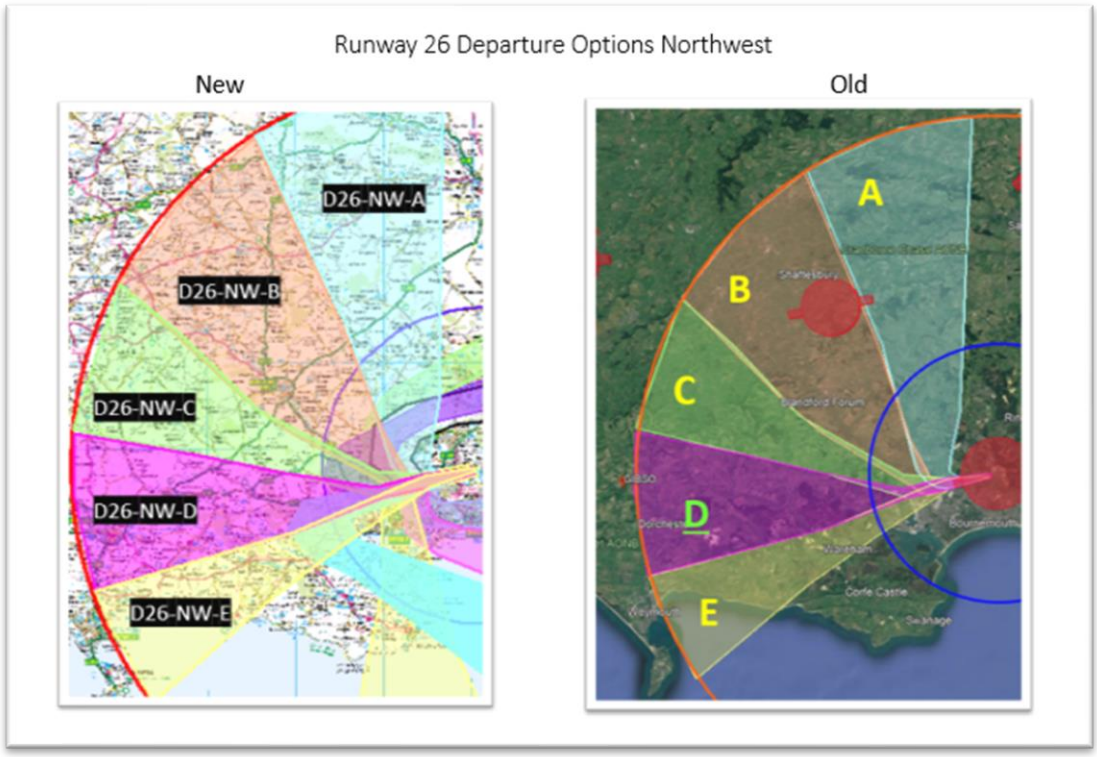


Figure 18 Departure options Northwest, old and new

There have been no changes to the design options for the Northwest, except for the removal of the baseline.

East design Envelope

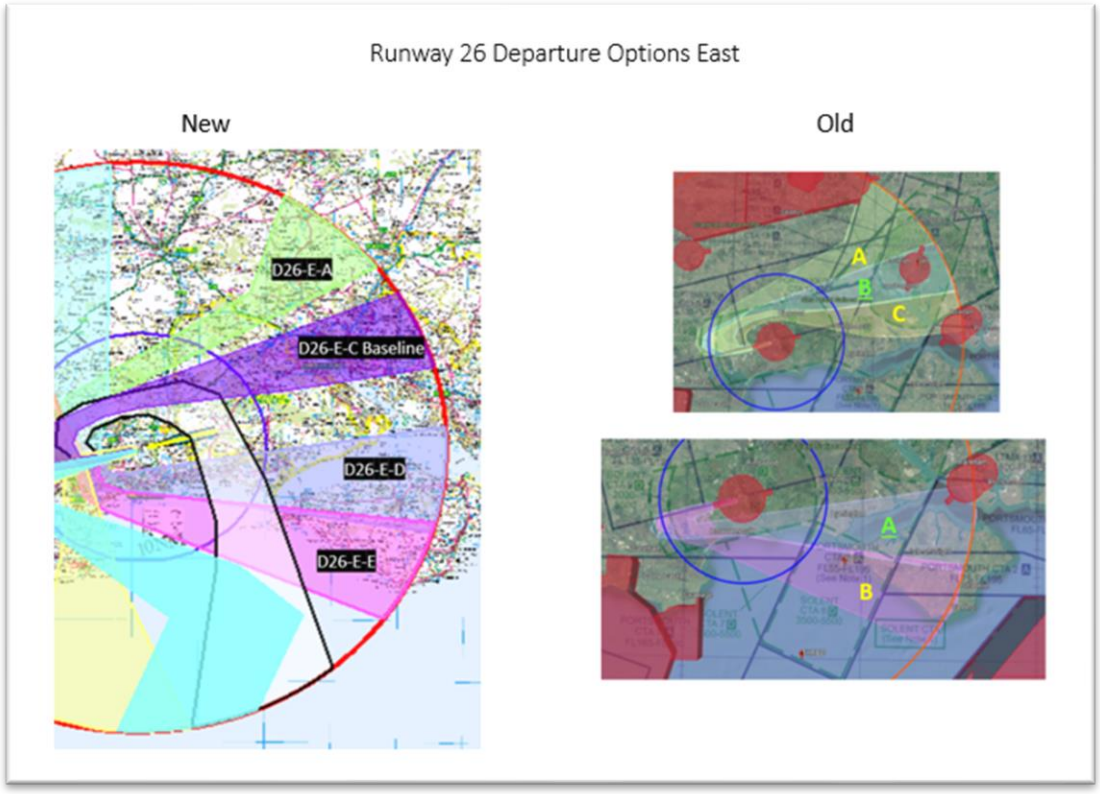


Figure 19 Departure Options East, new and old

There is now one design envelope for the East. The previous 'Southeast' A baseline has been removed as there is no evidence of departures turning left for the southeast. New options D and E have been created; however, these are the same as the old A and B options for the Southeast. The new baseline C has been changed slightly to reflect current operations and option B (Northeast) has been removed.

South Design Envelope

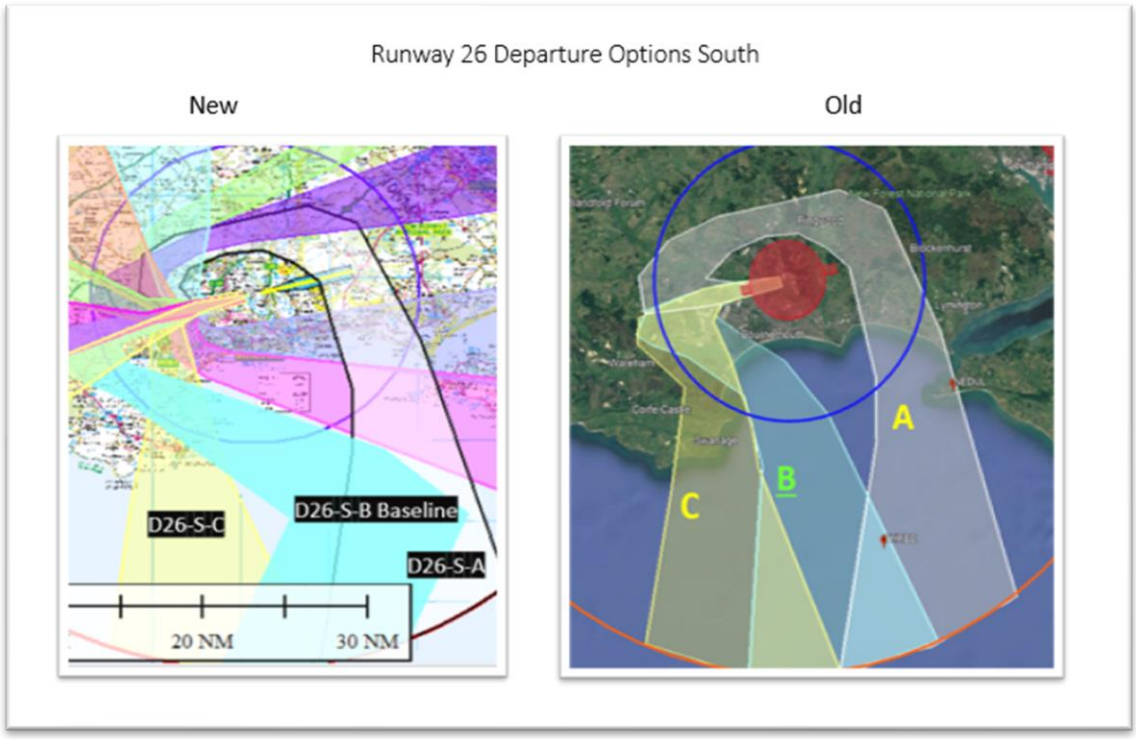
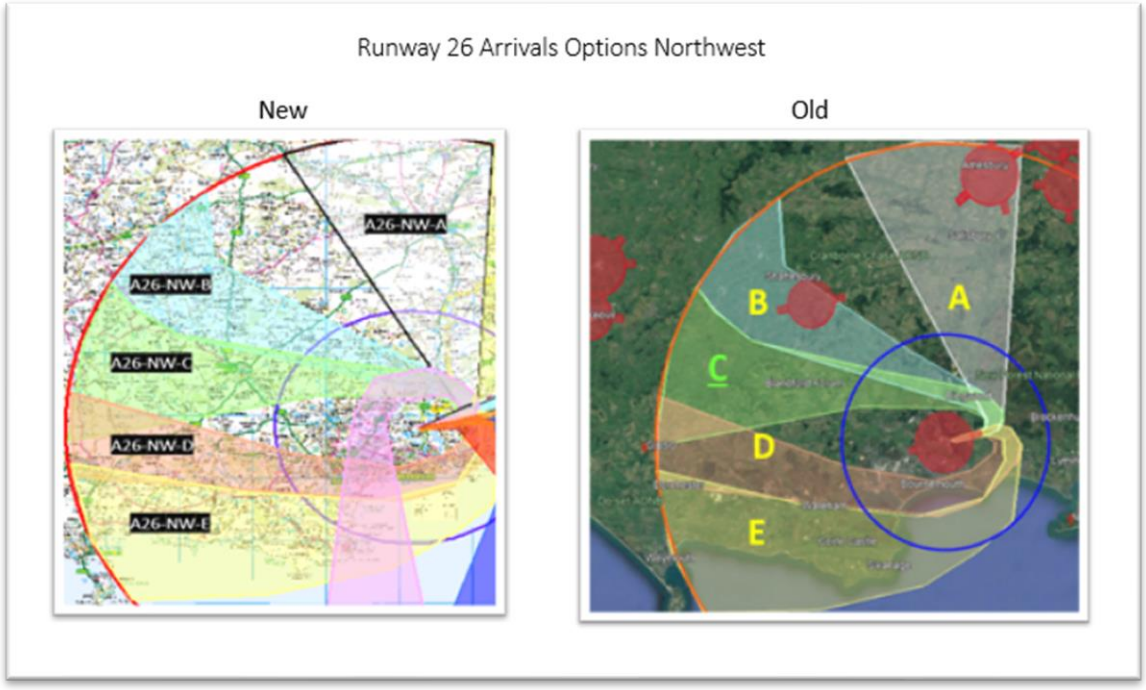


Figure 20 Departure Options South, old and new

Options A and C remain the same, option B baseline has changed to reflect current operations.

Arrivals

Northwest Design Envelope



There have been no changes to the options except for the removal of the baseline.

East Southeast and Northeast Design Envelopes

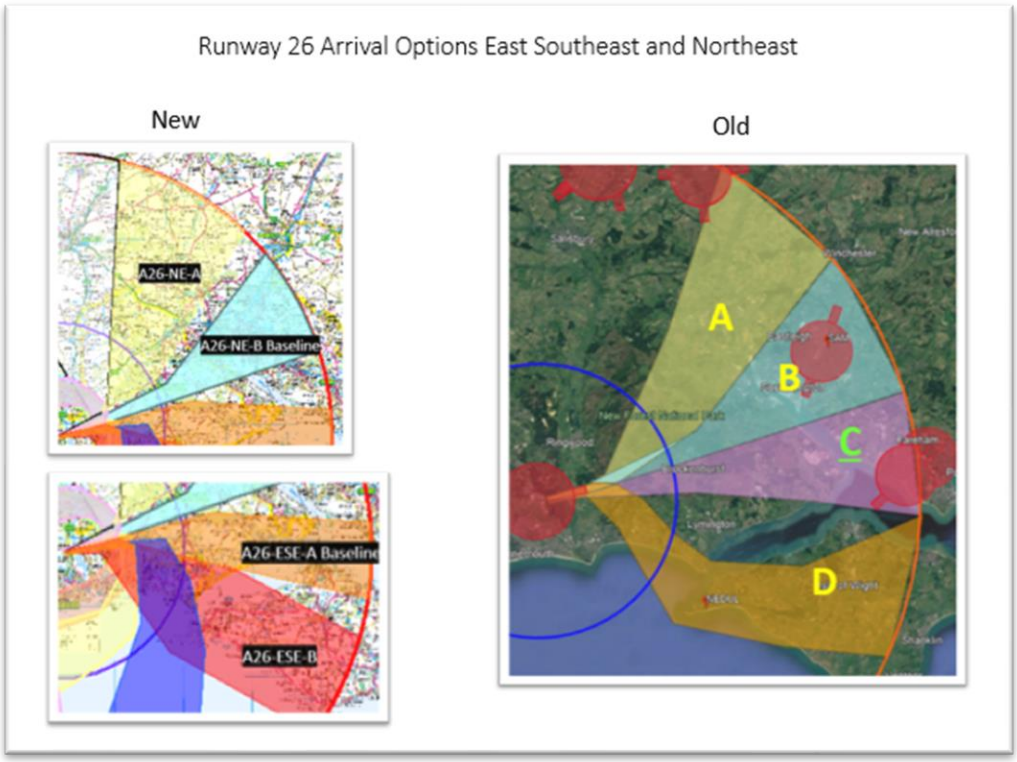


Figure 21 Arrival options East Southeast and Northeast, old and new

The old Northeast design envelope has been split into two, Northeast and East Southeast. The original baseline for Northeast has been retained for the East-Southeast envelope and a new northeast baseline has been created to reflect current arrivals. Option C has been removed and option B for the East Southeast has been created.

South Design Envelope

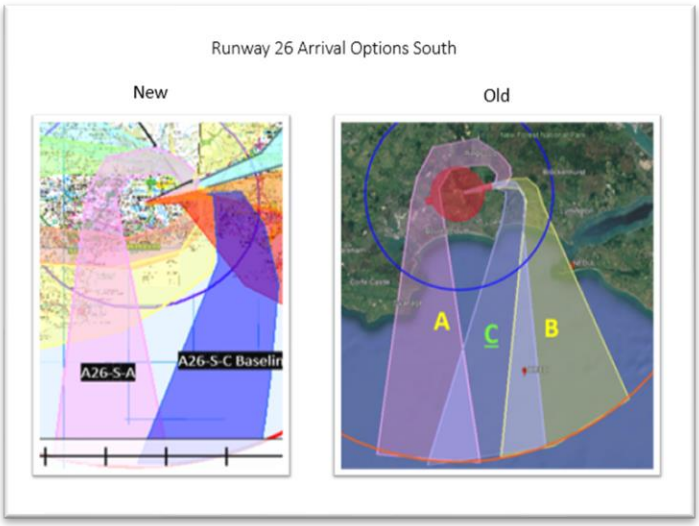


Figure 22 Arrivals options South, old and new

The baseline remains option C and has been modified slightly to reflect current operations. Option B has been removed.

Considerations

In line with Bournemouth Airport's DPs and the CAAs requirements[3], certain considerations must be taken into account when decisions about design options are being made. The following highlights environmental (including noise), population and airspace considerations.

The environmental considerations include Areas of Outstanding Natural Beauty (AONB), National Parks and other environmentally sensitive areas such as Special Conservation areas (SAC), Special Protection Areas (SPA) and Ramsar sites.

The Government have altitude-based priorities for consideration with regards to environmental impacts, which are summarised below. These priorities were considered in the development of the DPs and must be evaluated in each environmental section where appropriate:

- To limit and, where possible, reduce the total adverse effects on people in the airspace between the ground and 4,000ft.
- Preference should be given to the option which is most consistent with existing published airspace arrangements where options for route design from the ground to below 4,000 feet are similar in terms of the number of people affected by total adverse noise effects.
- The airspace between 4,000ft and 7,000ft, the environmental priority should be noise reduction unless there is evidence that changes would disproportionately increase CO_2 emissions.
- The airspace above 7,000ft, priority should be given to the reduction of aircraft CO_2 emissions and the minimising of noise is no longer the priority.
- Where practicable, it is desirable that airspace routes below 7,000ft should seek to avoid flying over Areas of Outstanding Natural Beauty (AONB) and National Parks.
- Airspace changes below 7,000ft should consider local circumstances in the development of the airspace design, including the actual height of the ground level being overflown, appropriate community engagement also must be conducted by the sponsor.

Bournemouth Airport must consider population distribution when developing design options [4]. This is to consider the local context to proposed changes and includes the expectations and preferences of different stakeholders. A population density map is provided below to aid stakeholders in understanding where populations are in relation to the airport and furthermore the height at which aircraft are likely to be over these populations.

The airport must also consider other airspace users, such as the General Aviation community. A map of the surrounding airspace is provided in order to understand the airspace structure surrounding Bournemouth Airport. This should also aid airlines and other commercial operators to understand how the potential changes in air traffic operational procedures my affect them.

[3] See CAP1616 Appendix B: Environmental metrics and assessment requirements, pages 154-174
[4] See CAP1616 Appendix D page 192

Environmental

This section contains maps with the identified environmentally sensitive areas. The first illustrates all such areas in one map and the subsequent maps detail these areas in separate maps for clarity. The Noise Preferential Routes (NPR)[5] are also indicated in yellow and blue at the centre of figures 23 and 24.

Bournemouth Airport is surrounded by several environmentally sensitive areas that are important for biodiversity, natural beauty, and ecological conservation. There are some notable environmentally sensitive areas around Bournemouth Airport including some that are statutory designations such as AONB, National Parks and Ramsar sites. These are noted after each map in this section.

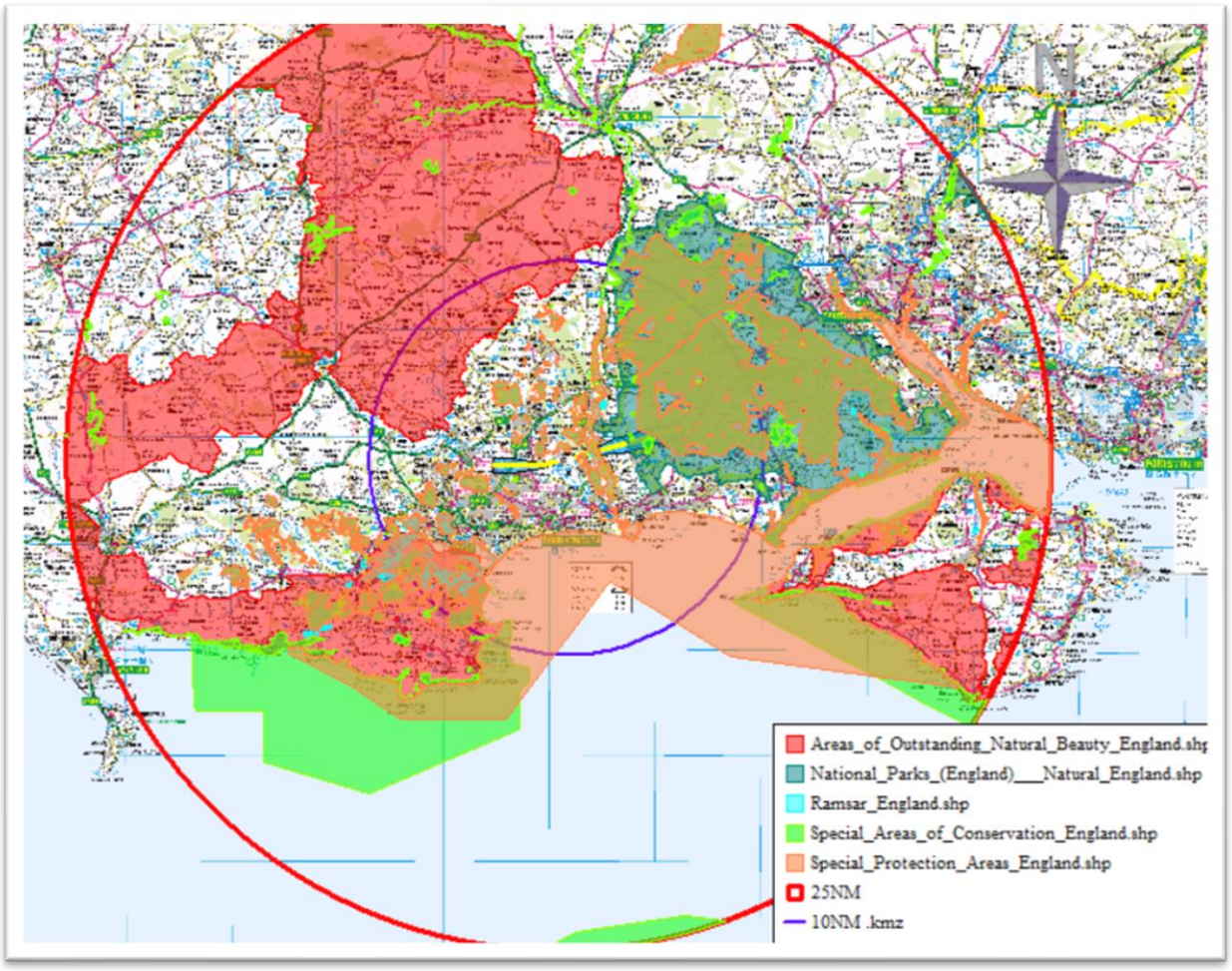


Figure 23 Environmentally sensitive areas

Efforts to balance the operations of Bournemouth Airport with the preservation of these environmentally sensitive areas are crucial. The airport has environmental policies in place to minimise its impact on these areas, such as noise abatement procedures and wildlife management

[5] Aircraft departing from certain airports follow set departure routes agreed by Government or the Local Authority, with the aim of providing certainty in respect of, and, where possible, minimising noise impacts on the ground.

initiatives[6]. Bournemouth Airport work with Local Authorities and environmental organisations to ensure the long-term sustainability and protection of these ecologically significant regions.

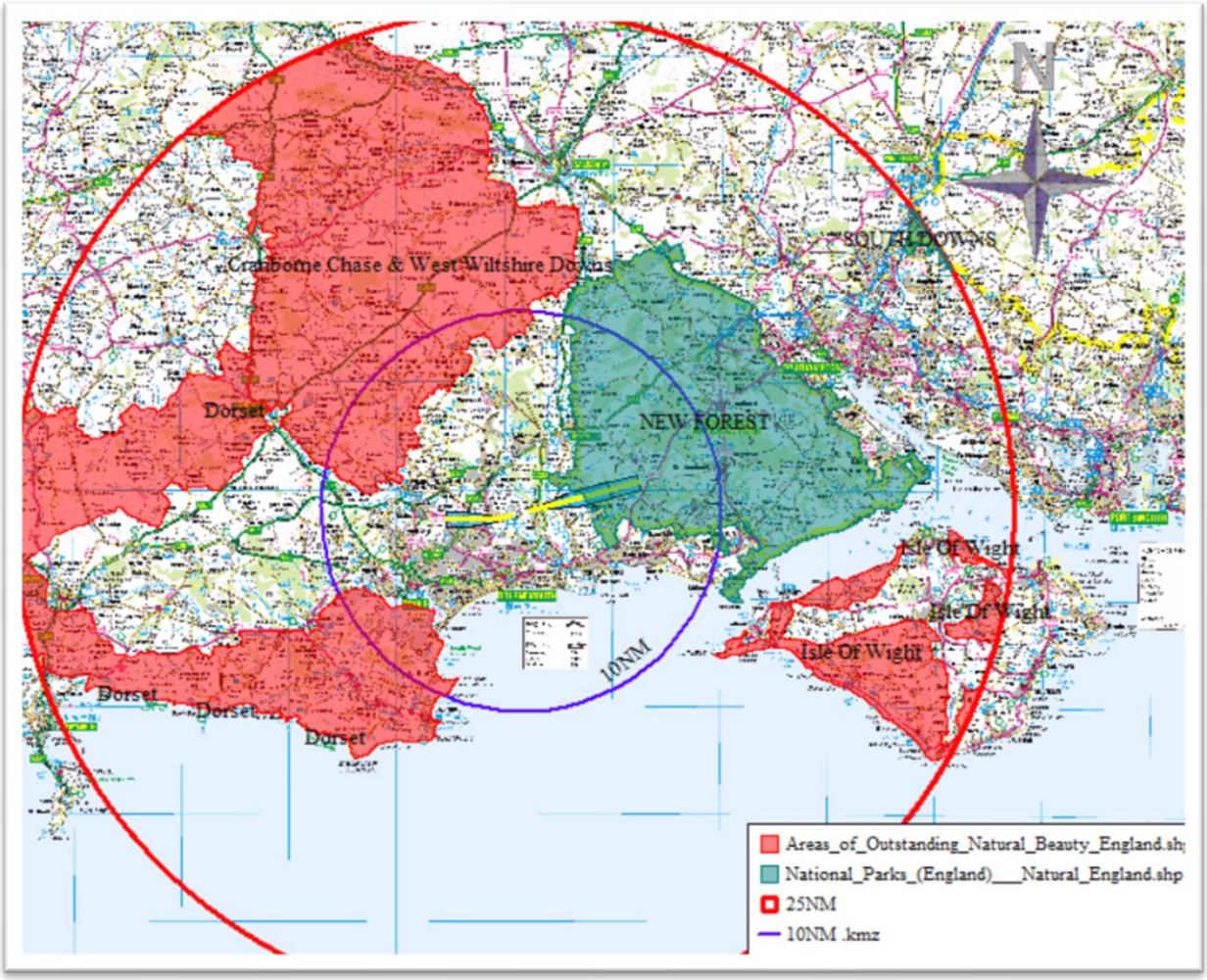


Figure 24 AONB and National Parks

Cranborne Chase AONB is a cherished landscape that combines natural beauty with cultural significance. Its designation as an AONB ensures that the area's unique qualities are protected and that sustainable practices are encouraged to preserve it for future generations to enjoy.

The New Forest National Park is a designated protected area located primarily in the counties of Hampshire and Wiltshire. It is renowned for its natural beauty, rich ecological diversity, cultural heritage, and outdoor recreational opportunities.

[6] For example, Wildlife Hazard Management

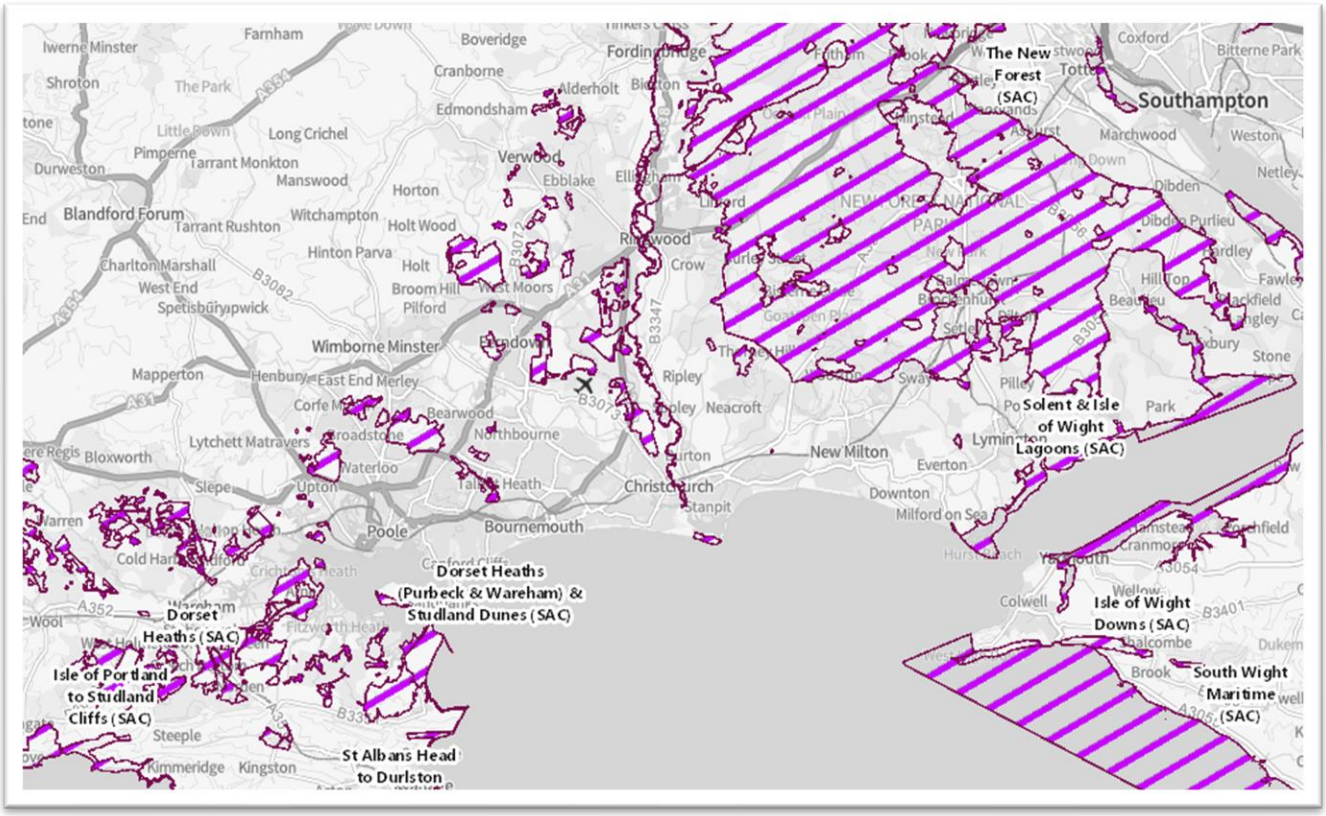


Figure 25 Special Areas of Conservation (SAC)

Special Areas of Conservation (SACs) are designated protected areas in the European Union that are chosen for their ecological significance and conservation value. SACs are designated under the European Union's Habitats Directive and aim to protect habitats and species of European importance. The protection afforded to SACs remain unchanged following the UK EU Exit[7].

SACs surrounding the airport include (but not limited to):

- The New Forest (to the Northeast)
- Great Yews (close to the airport)
- Dorset Heaths (Southwest)
- St Albans Head (Southwest)
- Isle of Wight (South East)

[7] For further information see The Department of Agriculture, Environment and Rural Affairs website: Biodiversity and EU Exit

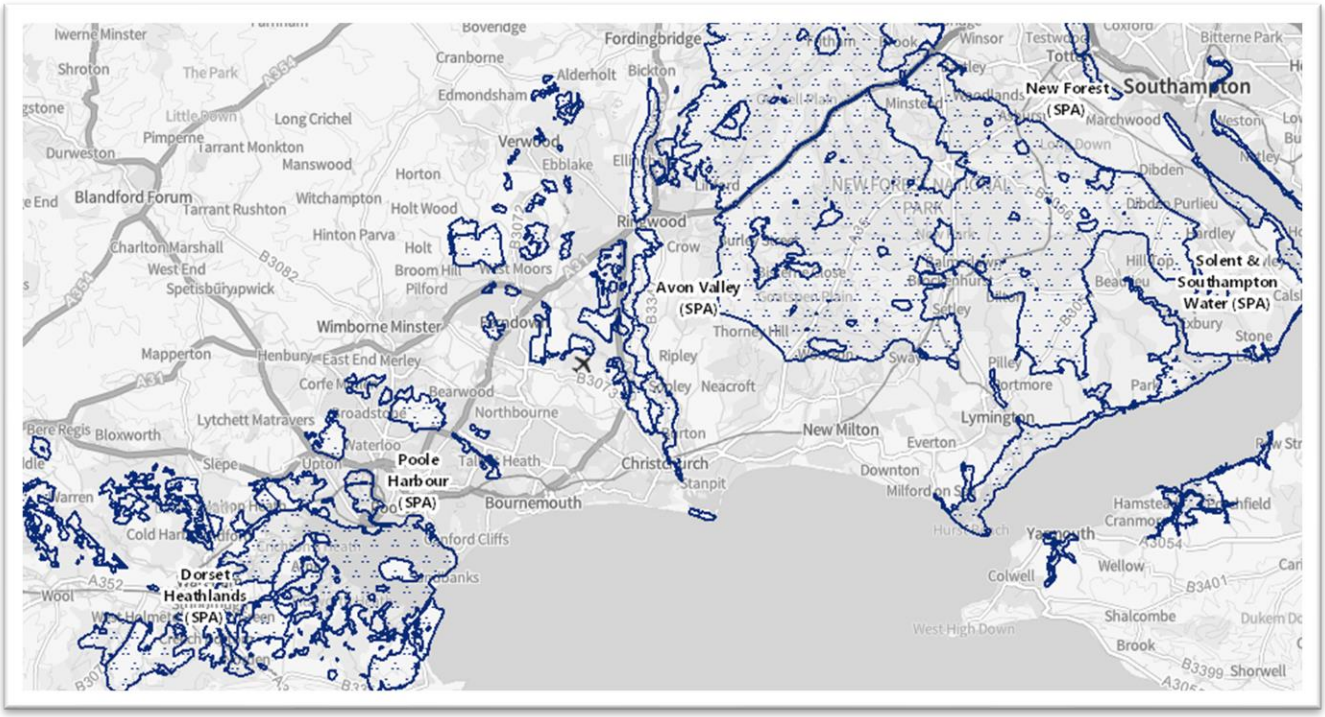


Figure 26 Special Protection Areas (SPA)

Special Protection Areas (SPAs) are designated protected areas in the European Union that are chosen for their importance as habitats for certain bird species. These areas are designated under the EU Birds Directive and are intended to protect and conserve the habitats of wild birds, especially migratory and vulnerable species. The protection afforded to SPAs remain unchanged following the UK EU Exit[8].

SPAs in the vicinity of Bournemouth airport include, but not limited to:

- Avon Valley
- Dorset Heathlands
- Poole Harbour
- New Forest

[8] For further information see The Department of Agriculture, Environment and Rural Affairs website: Biodiversity and EU Exit

Figure 27 Ramsar Sites

Ramsar sites are designated wetlands of international importance under the Ramsar Convention, and they typically cover a wide range of wetland types, including lakes, rivers, marshes, and coastal areas.

Ramsar sites near Bournemouth Airport are:

- Avon Valley
- Poole Harbour
- Dorset Heathlands
- New Forest
- Solent and Southampton Water

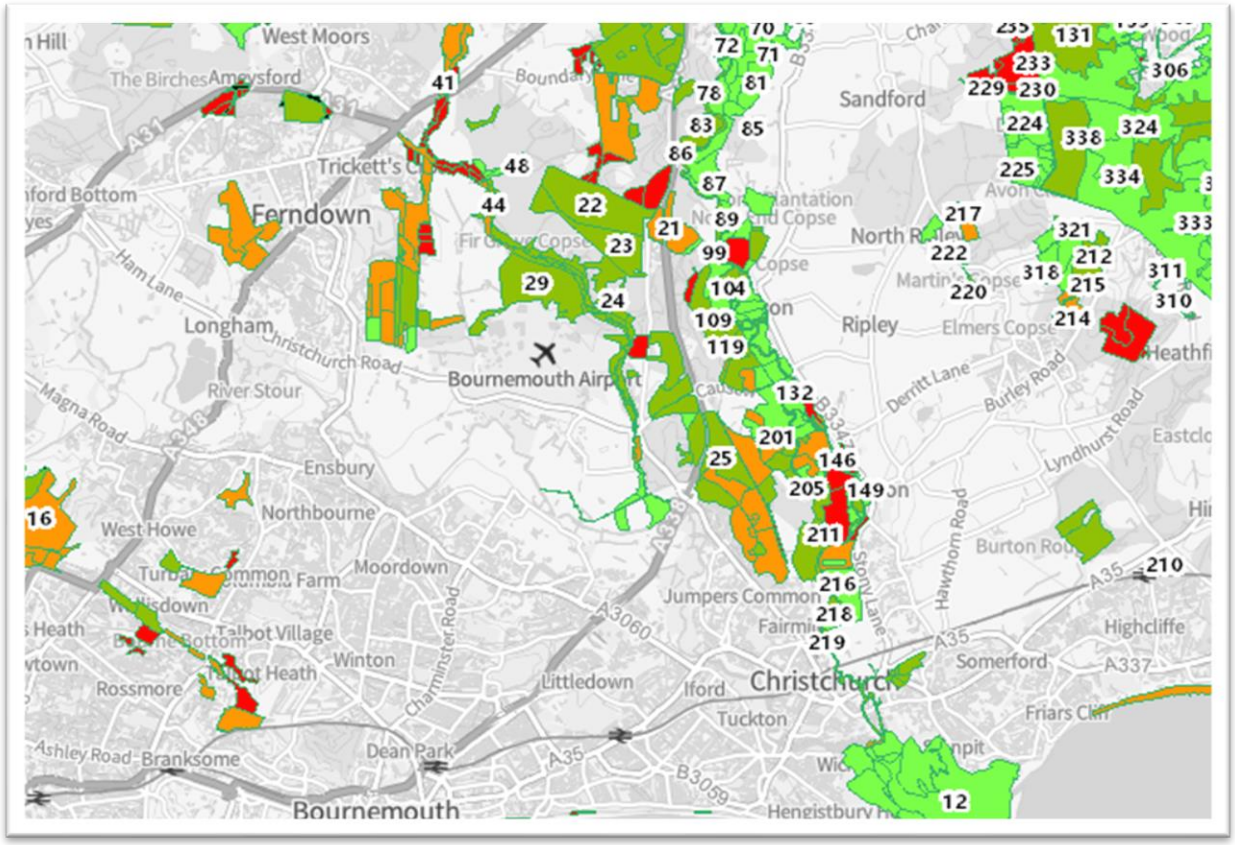


Figure 28 Sites of Special Scientific Interest (SSSI)

Sites of Special Scientific Interest, or SSSIs, are designated areas that are recognised for their ecological, geological, or geomorphological importance. These areas are legally protected to conserve and protect their unique features and the species that inhabit them. SSSIs are considered some of the most valuable and sensitive natural and geological sites in the UK.

There are numerous SSSIs near Bournemouth airport, a detailed list can be found on [Natural England's website](#).

Noise

The following strategic noise maps provide noise contours for Bournemouth Airport. The noise contours have been produced based on actual aircraft movements at the airport for 2021. The noise indices Lden, LAeq, 16h and Lnight are provided to illustrate noise across a 24-hour period. The contours have been computed at 5 dB(A) steps from 50 dB(A) to 75 dB(A,) with the exception of Lnight which has been computed from 45 dB(A) to 70 dB(A).

Noise indices definitions[9]:

[9] L : Sound and Vibration Terms and Definitions (acoustic-glossary.co.uk)

Lden: day-evening-night noise level, the A-weighted, Leq (equivalent noise level) over a whole day, but with a penalty of 10 dB(A) for night-time noise (23:00-07:00) and 5 dB(A) for evening noise (19:00-23:00), also known as the day evening night noise indicator.

LAeq,16h (UK Government Environmental Noise Definition): the equivalent continuous sound level in dB(A) that, over the period 07:00-23:00 hours, contains the same sound energy as the actual fluctuating sound that occurred in that period.

Lnight, the A-weighted, Leq (equivalent noise level) over the 8-hour night period of 23:00 to 07:00 hours, also known as the night noise indicator.

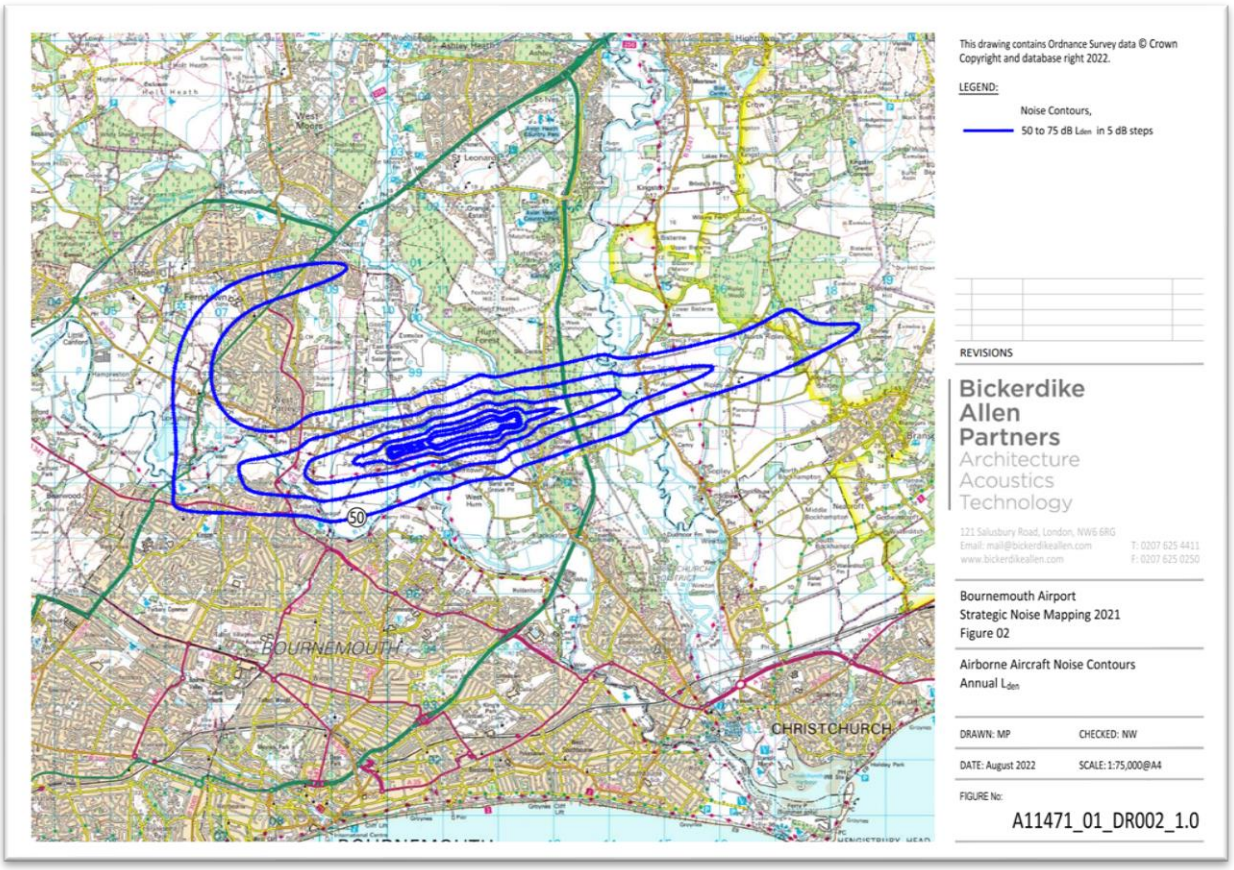


Figure 29 Airborne Aircraft Noise Contours Annual Lden

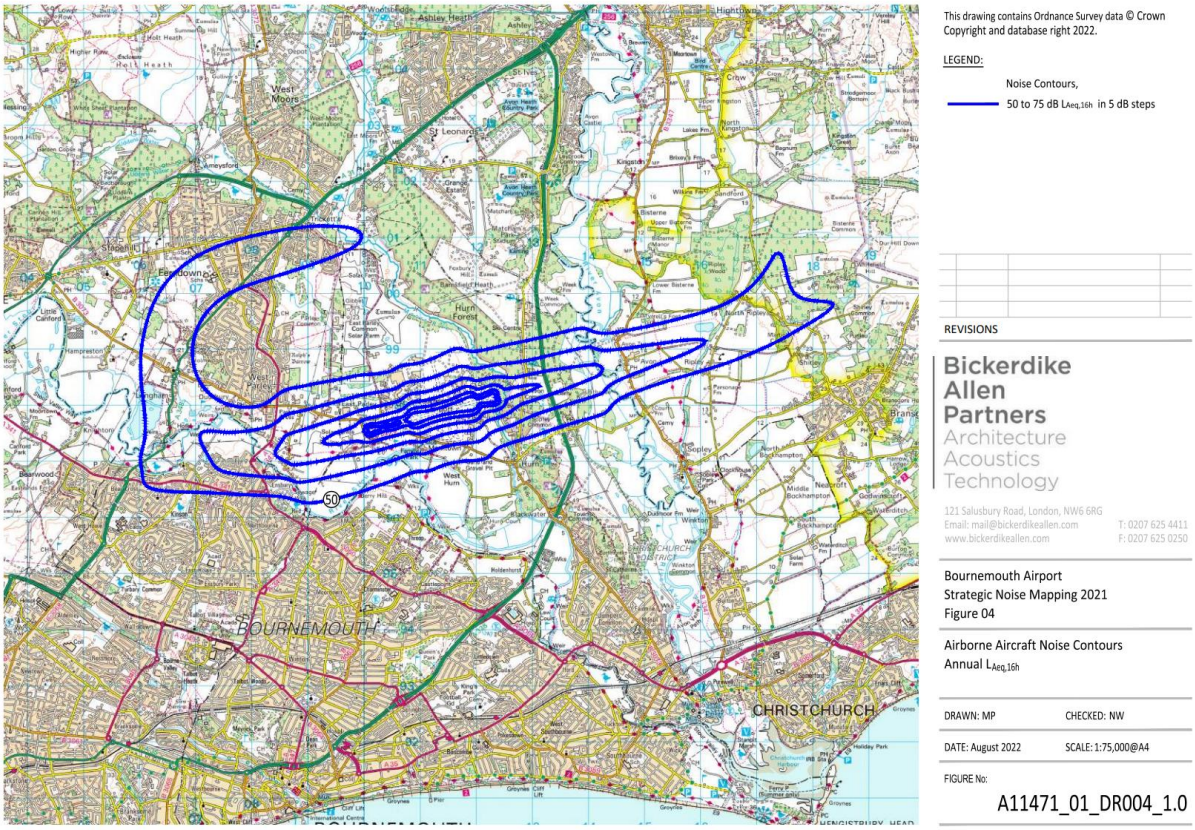


Figure 30 Airborne Aircraft Noise Contours Annual LAeq,16h

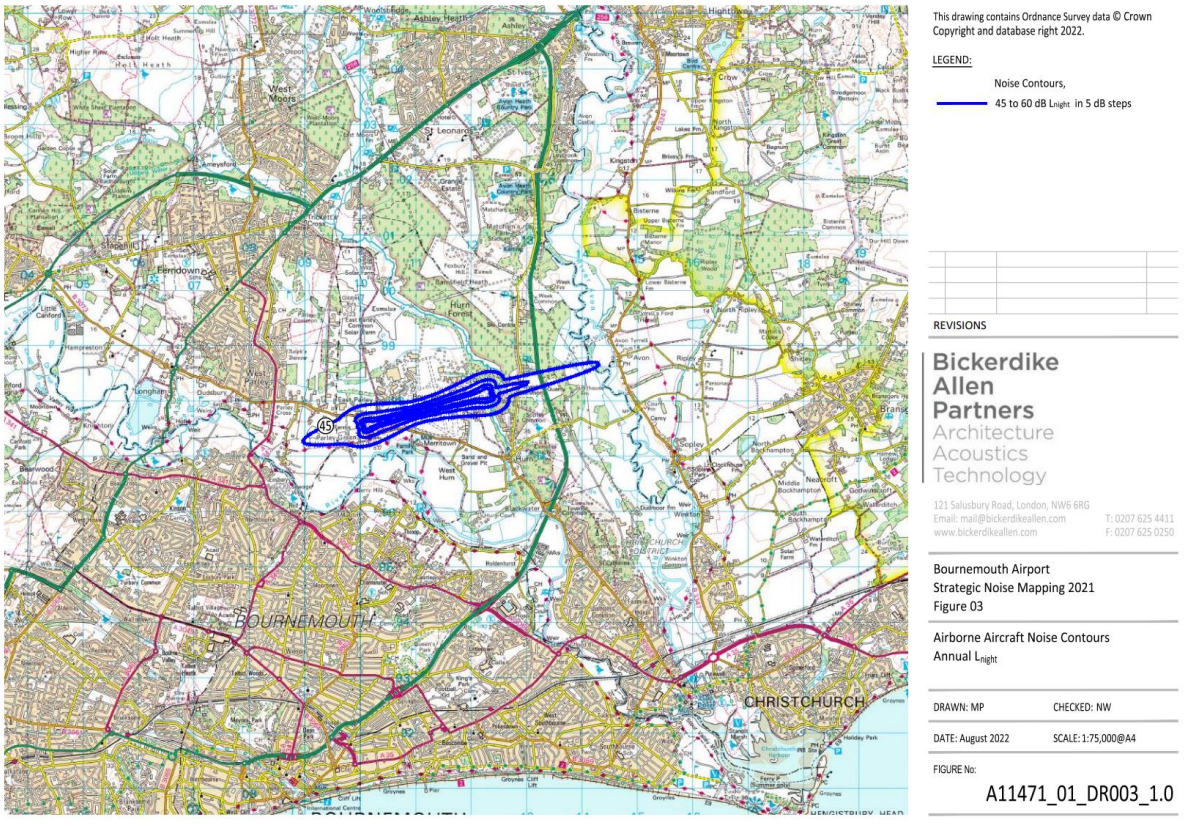


Figure 31 Airborne Aircraft Noise Contours Annual Lnig

Population

Local Communities in the immediate vicinity of Bournemouth Airport include several towns and villages, such as Hurn, Christchurch, Ferndown, and Ringwood, among others. Farther afield, and within a ten mile radius, local communities include:

- Bournemouth
- Poole
- Christchurch
- Ferndown
- Ringwood
- West Moors
- Wimborne Minster
- Verwood
- St Leonards
- Sopley

Figure 32 OS map of towns and villages near Bournemouth Airport

Figure 33 Google Earth Image of vicinity around Bournemouth Airport

The above two images (Figure 32 and 33) show some of the towns and villages within a 10 Nautical Mile (Blue ring) and 25 Nautical Mile (red ring) radius of Bournemouth Airport. The blue line is an indicator of where all aircraft should be clear of 4000ft, and the red circle is indicative of where aircraft will be over 7000ft.

The following two maps show the population density of areas surrounding the airport, using the same two indicative circles for height of aircraft. The density is shown using population weighted centroid (PWC) data from the Office for National Statistics 2021 census data[10]. PWC is a method for calculating population density that uses single reference points to represent the spatial distribution of the population in a given area. The population-weighted point is calculated by multiplying the coordinates of each point in the area by the population of that point, summing these values, and then dividing by the total population of the area.

[10] ONS Geography Website

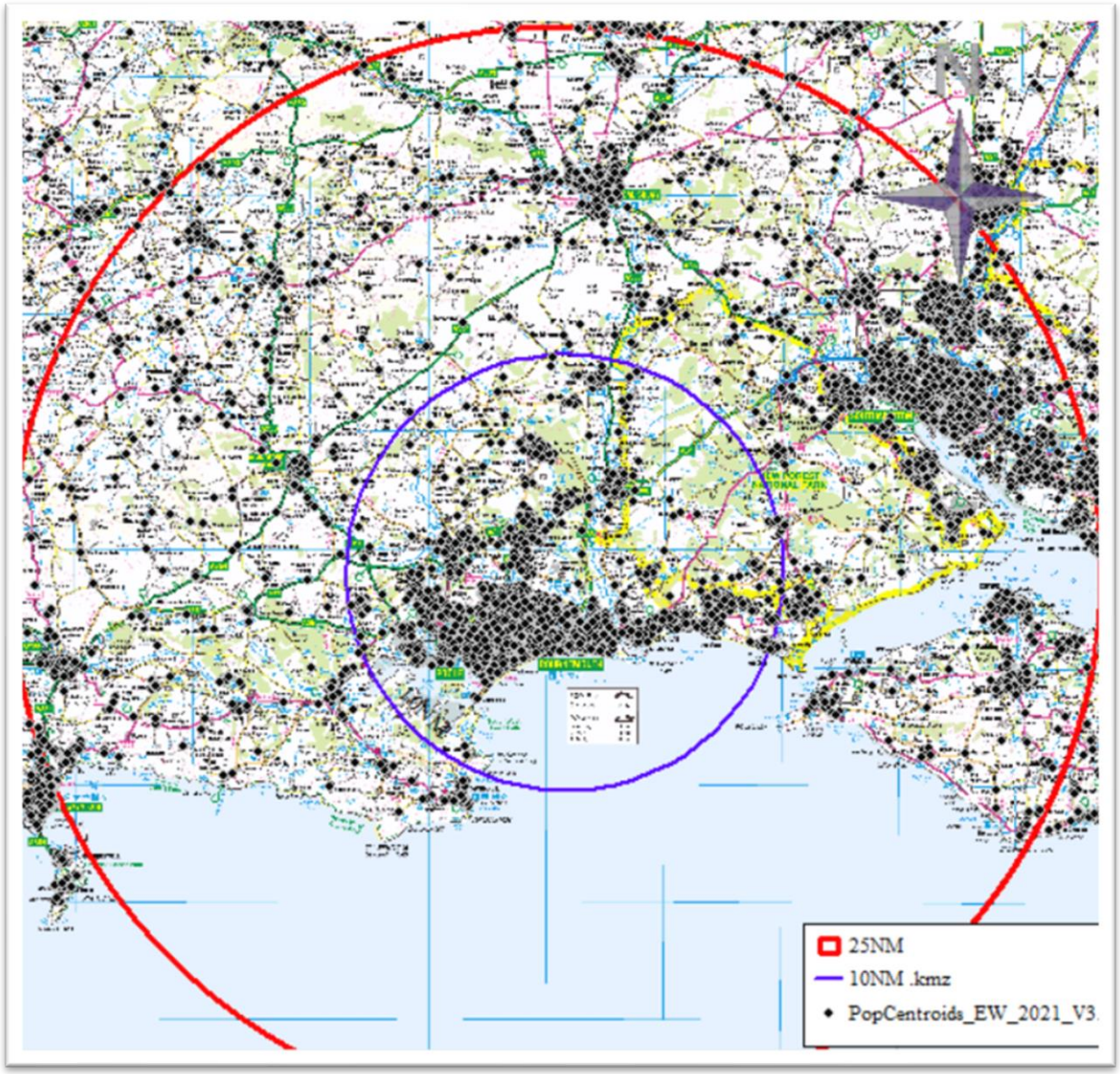


Figure 34 Population density within a 25 NM radius of Bournemouth Airport over OS map

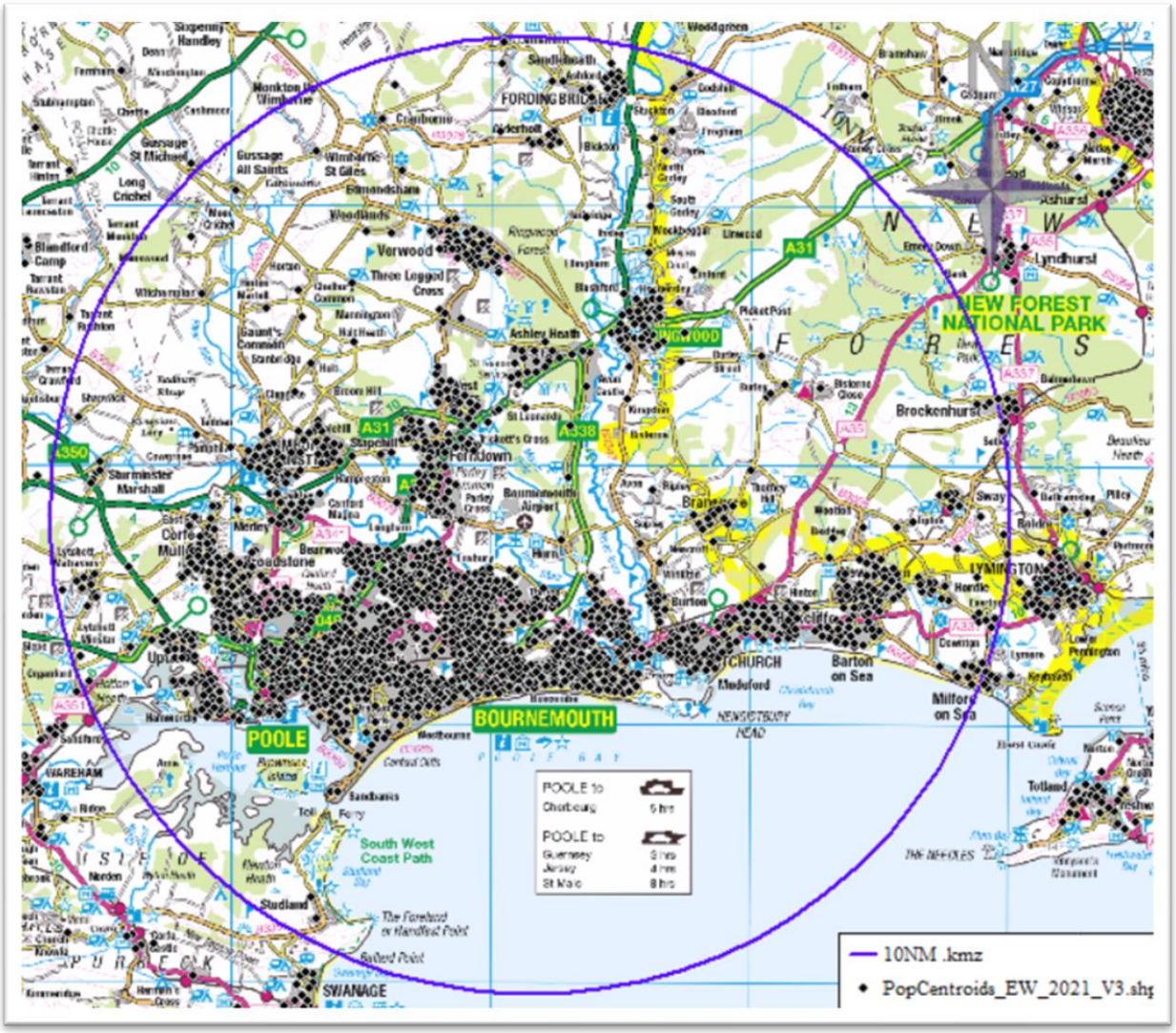


Figure 35 Population density within a 10 NM radius of Bournemouth Airport

Airspace

Bournemouth Airport has an operational control tower that manages take-offs, landings, and ground movements on the airport's runways and taxiways. The control tower communicates with aircraft within the airport's immediate vicinity.

Bournemouth Airport is situated within Class D controlled airspace[11]. This means that air traffic control services are provided for both instrument flight rules (IFR) and visual flight rules (VFR) operations within this airspace. Pilots are required to establish communication with air traffic control and receive clearances to enter and exit this airspace.

The Terminal Control Area for Bournemouth Airport extends around the airport to manage air traffic departing and arriving at the airport..

[11] For more information about airspace classification visit the CAA's How airspace works and the roles of those involved page

The airspace around Bournemouth Airport is managed by air traffic controllers who provide services such as vectoring aircraft to final approach, sequencing departures, and ensuring separation between aircraft in the vicinity. The airport also provides air traffic control services for the Solent and Southern Region (see figures 36-38).

Occasionally, there may be temporary or permanent restricted airspace areas around Bournemouth Airport due to military operations, air shows, or other special events. Pilots are required to adhere to published notices and NOTAMs (Notices to Aviation) regarding restricted airspace.

The airport has established published instrument approach and departure procedures for pilots to follow. These procedures ensure safe and efficient operations in and out of the airport, particularly in varying weather conditions.

In the vicinity of Bournemouth Airport, there may be specific airspace designations, such as the Bournemouth Control Zone and Terminal Control Area, which have defined altitudes and communication requirements for pilots.

Bournemouth Airport coordinate with neighbouring airports to ensure safe operations, especially when managing airspace for arrivals and departures in busy areas like the London airspace region.

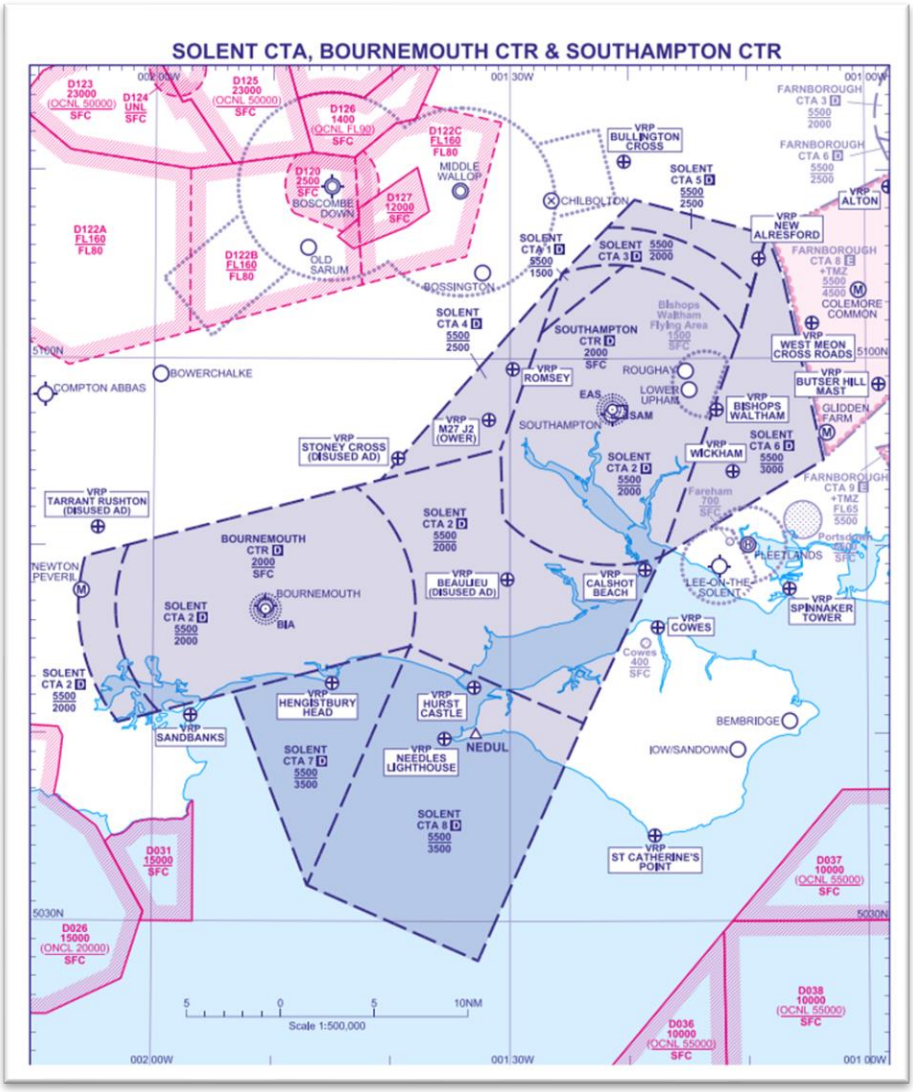


Figure 36 Map showing Solent Control Area (CTA) and Bournemouth and Southamption Control Zone (CTR)

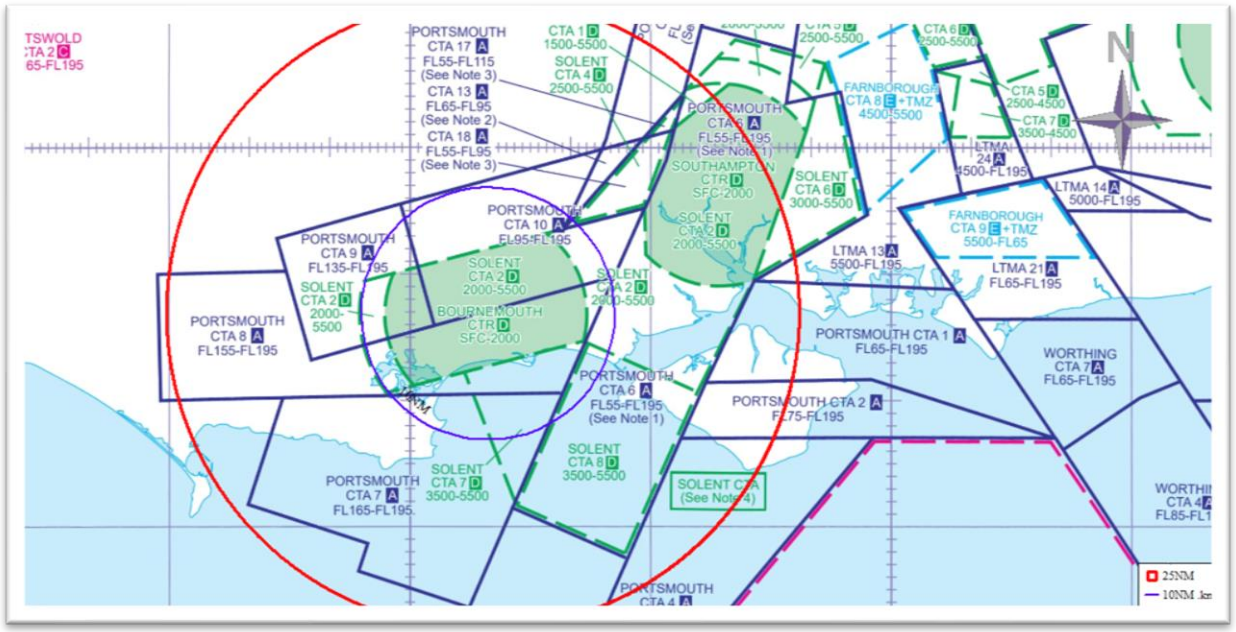


Figure 37 Map of neighbouring Control Areas around Bournemouth Airport

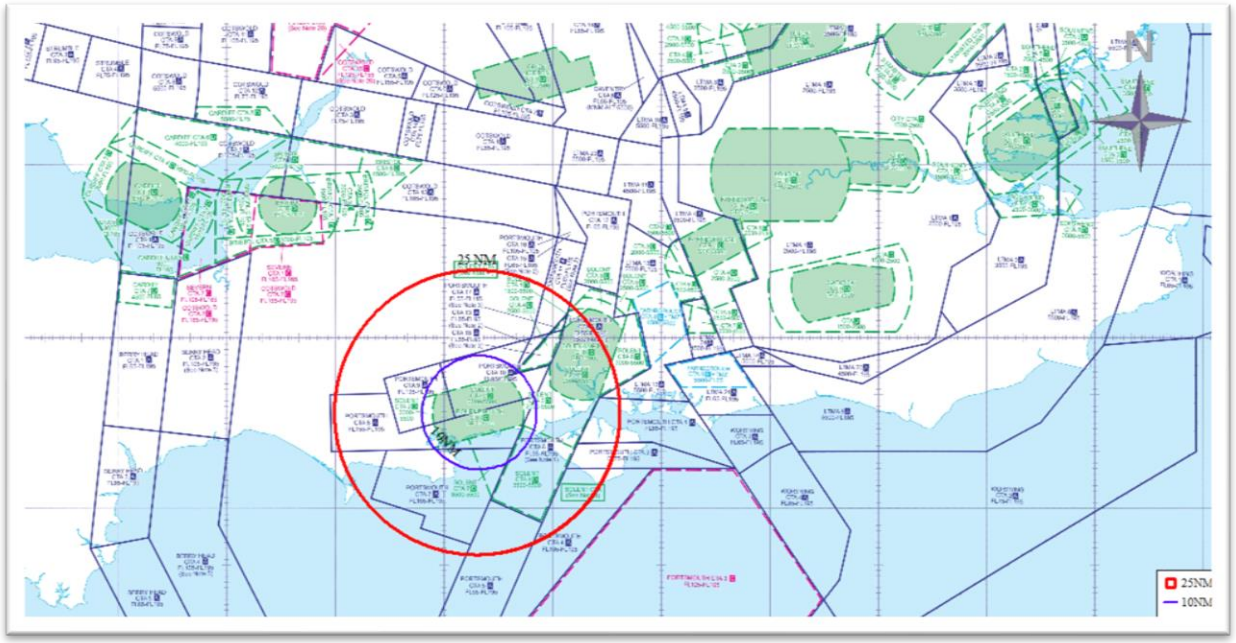


Figure 38 Map of the wider network surrounding Bournemouth Airport

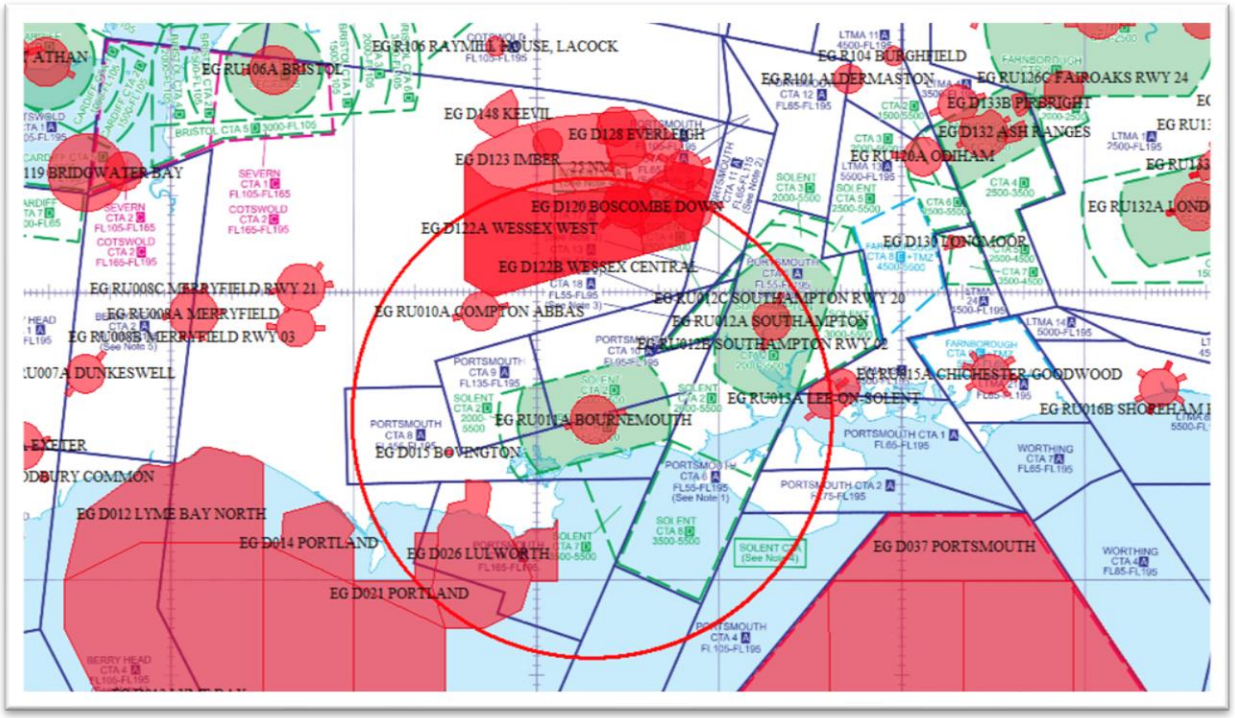


Figure 39 Prohibited, Restricted and Danger areas surrounding Bournemouth Airport

Connectivity and arrivals

Bournemouth Airport is part of the London Terminal Manoeuvring Area (LTMA). The LTMA is a specific area of controlled airspace that covers the greater London region and its surrounding airports. The LTMA is one of the busiest and most complex areas of controlled airspace in the UK and Europe.

Bournemouth currently shares the same arrival procedures as Southampton. Bournemouth does not have Standard Instrument Departures (SIDs) but has initial departure routes which join with the Air Traffic Services (ATS) route network at designated waypoints. These routes may be varied at the discretion of Air Traffic Control (ATC).

NATS (NERL) have recently published an LTMA early position report. This report explains the initial designs of the network. Some key points for Bournemouth Airport from this report are as follows:

> *Please note: there was additional information which partially incorrect and out of date, and did not fully reflect the situation at the time, and is therefore redacted, for full details of NERL's Stage 2 submission relating to Bournemouth Airport please see this link.*

Summary

This document aims to provide additional information for stakeholders completing the feedback survey for Bournemouth Airport CAP1616 Stage 2 (Re) Engagement Feedback Form. The feedback form

should be completed in conjunction with the presentation supplied. This document provides further information regarding options development, description of the changes since the previous engagement and aid for assessing the Design Principles against the options, for example further environmental and airspace information.