Liverpool John Lennon Airport
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Consultation Document

Liverpool John Lennon Airport Airspace Transition

Date: 13th January 2020
Revision: Issue 1
Ref: 71137 067

Co-financed by the Connecting Europe Facility of the European Union

Document Details

Reference	Description
Document Title	Consultation Document
	Liverpool John Lennon Airport Airspace Transition
Document Ref	71137 067
Issue	Issue 1
Date	13th January 2020
Client Name	Liverpool John Lennon Airport

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Glossary

Acronym	Meaning
ACC	Airport Consultative Committee
ACP	Airspace Change Proposal
AMS	Airspace Modernisation Strategy
amsl	above mean sea level
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATZ	Aerodrome Traffic Zone
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CTA	Control Area
CTR	Control Area
dB	Decibel
dBA	Decibel A-Weighted
DfT	Department for Transport
DPE	Design Principle Evaluation
DVOR	Doppler VHF (Very-High-Frequency) Omnidirectional Range
ft	feet
FL	Flight Level
GA	General Aviation
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
IAF	Instrument Approach Fix
IAP	Instrument Approach Procedure

Acronym	Meaning
ICAO	International Civil Aviation Organisation
IFP	Instrument Flight Procedure
LJLA	Liverpool John Lennon Airport
MAP	Missed Approach Procedure
NATMAC	National Air Traffic Management Advisory Committee
NATS	formerly National Air Traffic Services
NDB	Non-Directional Beacon
NMSC	Noise Monitoring Sub Committee
PBN	Performance Based Navigation
SATNAV	Satellite Navigation
SFC	Surface
SID	Standard Instrument Departure
STAR	Standard Arrival Route
TMA	Terminal Manoeuvring Area
VFR	Visual Flight Rules

1 Introduction

1.1 Welcome

Welcome to Liverpool John Lennon Airport's Consultation Document. In here we will explain the background to our consultation, we will tell you what we are consulting on and we will explain how you can have your say.

This consultation is open to everyone; if there is anyone you know who you feel may be affected by these proposed changes, and may not have heard about our consultation, please feel free to share this document with them or let them know that they can find all the information regarding this consultation on the CAA airspace change portal[1]. If you, or anyone you know, requires this information in an alternative format, please ask at one of our public events listed in Section 12 or write to us at the following address:

Airspace Change
Aviation House
Liverpool John Lennon Airport
Liverpool
L24 1YD

1.2 Background

The majority of UK airports, including Liverpool John Lennon Airport (LJLA), are seeking to modernise the routes aircraft fly to and from the airport. The routes are known as Instrument Flight Procedures (IFPs) which broadly means that the aircraft's onboard instruments or systems are used to navigate to and from the airports, and along the national and international 'en-route' airways. For example, an aircraft taking off from LJLA for Spain, may depart on Runway 27 out to the west over the Mersey Estuary and follow one of the IFPs until it enters the airway system which takes it towards its destination. Essentially, LJLA are responsible for defining the procedural routes or IFPs from the point the aircraft leaves the runway until it enters the airway. Similarly, for arriving aircraft LJLA are responsible for defining the IFPs flown by aircraft from the point they leave the airways giving them a clear route to touch down on the runway.

Some of the airspace above an airport 'belongs to' or is controlled by the airport. Above LJLA we control an area of airspace that stretches out approximately 10 nautical miles from the airport, some of which is beneath or shared with Manchester Airport. Sometimes when airports make changes to the IFPs they also need to change the airspace. However, LJLA is not proposing any changes to the airspace that we control; we plan to contain the new IFPs within existing controlled airspace.

Modernisation of the IFPs is required to allow aircraft to make use of Global Navigation Satellite Systems (GNSS) technology to enhance levels of efficiency, define more accurate routing and allow the airport to explore different options for the way aircraft approach and depart LJLA.

There are also some regulatory requirements that LJLA needs to consider. We wish to comply with Resolution 36/23 ratified by the 36th International Civil Aviation

[1] https://airspacechange.caa.co.uk/PublicProposalArea?pID=28

Organisation (ICAO) General Assembly, as well as with the UK Airspace Modernisation Strategy (AMS)) published by the Civil Aviation Authority (CAA), by introducing routes and procedures compliant with Performance Based Navigation (PBN) criteria; it is understood that EU States are required to make these changes by 2024. To comply with these directives, and alongside other UK airports, LJLA is required to explore options for IFPs[2] that are compliant with PBN criteria. Essentially, this means introducing IFPs to arrive and depart from the airport that are designed and flown with reference to GNSS rather than the traditional ground-based navigation aids (see paragraph 3.2).

1.3 Governmental Guidance and Process for making an Airspace Change Proposals

Although LJLA are not seeking changes to the current volume of airspace that we control, any change to the IFPs flown by aircraft departing and arriving at an airport constitutes an airspace change and is therefore subject to the regulatory guidance for Airspace Change Proposals. Specifically, the CAA Civil Aviation Publication (CAP) 1616 Airspace Design: *Guidance on the Regulatory Process for Changing Airspace Design Including Community Engagement Requirements*.

At the beginning of 2018, the CAA introduced a new process that the regulator and sponsors of airspace change proposals should follow when proposing any airspace change. This new process was developed to ensure a greater level of transparency and two-way engagement with local communities. The new process is described in CAP 1616, available here:

https://publicapps.caa.co.uk/docs/33/CAP1616E2interactive.pdf

CAP 1616 is a relatively new process. Under Section 66 of the Transport Act 2000, the Secretary of State gave the CAA (the UK aviation independent regulator) a number of airspace-related functions, including: the duty to develop policy and strategy on the classification and use of airspace; to publish the UK airspace design; and to approve changes to it. Under Section 70 of the Transport Act 2000, the CAA has a duty to take several factors into account when considering whether to agree to an airspace change proposal. This includes taking account of specific guidance on the environmental objectives contained within the current Air Navigation Guidance.

The CAP 1616 Airspace Design process sets out the CAA's role to consider changes to airspace design. CAP 1616 sets out the framework for the stages of the process and the activities that must be undertaken within each stage and in particular, the consulting and engagement requirements with those potentially impacted.

For an airport, airspace change on this scale usually only happens once in a generation, and LJLA wishes to offer its local communities and other airspace users an opportunity to review and influence the final designs that will be submitted to the CAA for approval.

[2] Including alternative Standard Instrument Departures (SIDs), arrival Transitions and Approaches – more about these different types of IFPs is explained later.

2 About this Consultation

2.1 Overview

The aim of this consultation is to seek the views of any groups or individuals who may be interested in this Airspace Change Proposal (ACP) and the affect it may have on them. LJLA is proposing to introduce Instrument Flight Procedures (IFPs) that can be flown with reference to Global Navigation Satellite Systems (GNSS) for aircraft arriving at, and departing from, LJLA.

We are not seeking to increase existing current available capacity to handle additional volumes of air traffic. Our airspace change is aimed at using new satellite-based technologies, increasingly available in aircraft and on the ground, to create more efficient routes to reduce delays and protect existing capacity. However, this change does offer an opportunity to identify and minimise the environmental impacts of aircraft operations, wherever possible.

We appreciate that many of you may have concerns about changes to flightpaths and operations at LJLA. Therefore, we have sought to ensure that this change favourably balances the requirement to deliver safe, effective and sustainable arrival and departure procedures against the requirements of local communities who would wish to minimise any environmental impact, particularly noise.

2.2 Linked Airspace Change Proposals

Our proposal is not progressing in isolation; we are considering our alignment to the wider schemes for modernising UK airspace. For example, our new routes ensure aircraft reach the new airway exit and entry points that are part of the UK AMS. We are also aware that our neighbour – Manchester Airport – will be embarking on an airspace change proposal of their own. As well as ongoing bilateral engagement between the two airports, Manchester Airport has engaged LJLA during their Stage 1 Design Principles development activities.

CAP 1616 requires consideration of any cumulative impact where there are links between neighbouring or coordinated ACPs. Whilst LJLA recognise that many of our communities could potentially be affected by the combined plans of both airports, due to the differing stages of the two projects, it is not currently possible for LJLA to assess the cumulative impacts. Manchester Airport is understood to be at Stage 1B in the CAP 1616 process and therefore it is too early for them to present any designs to enable this cumulative assessment process to take place.

LJLA and Manchester Airport continue to engage with one another to assess the feasibility and achievability of a coordinated ACP implementation schedule. We anticipate that we will be in a position to offer further clarity on this issue via our planned ACP submission documents in Summer 2020.

2.3 Our Stakeholders – You

Stakeholders are third-party groups or individuals interested in the LJLA ACP. A full list of all organisation and individual stakeholders can be found in Appendix A1 of the Consultation Strategy, which has been published on the CAA airspace change portal.

2.3.1 Aviation Stakeholders

Key aviation stakeholders who operate in, or around the airspace in the vicinity of LJLA will be contacted directly. In addition, we are inviting members of the National Air Traffic Management Committee (NATMAC) to participate in this consultation. The following aviation stakeholders will be contacted:

- LJLA-based operators, including airlines and General Aviation (GA)
- Local Airports and Aerodromes (e.g. Manchester Airport, Hawarden Airport and Manchester City Airport)
- Local GA airfield and clubs
- Air Navigation Service Providers (Manchester Airport and NATS[3])
- Ministry of Defence
- NATMAC

2.3.2 Non-Aviation Stakeholders

As the introduction of GNSS procedures is likely to alter aircraft tracks over the ground, we are consulting those communities that may be impacted by the proposed changes. We have therefore asked the following community stakeholder organisations to participate by representing the interests of their local communities and residents:

- Local and Combined Authorities
- Nationally Elected Representatives
- Town and Parish Councils
- LJLA Consultative and Noise Monitoring Committees

2.3.3 Environmental Stakeholders

We are also consulting with those organisations whose primary interest concerns the environmental impacts of these changes (e.g. noise, local air quality and tranquillity).

2.4 Engagement Activities So Far

We have carried out a significant level of engagement with stakeholder representatives prior to this public consultation. A targeted range of engagement activities have been conducted in accordance with the process set out in CAP 1616. Specifically, stakeholders such as local council representatives, neighbouring airports, environmental organisations and airlines have been involved in the development of a set of Design Principles upon which we have developed our options for the new routes. You can see our Design Principles and a description of the engagement activities on the CAA portal at Step 1B. Here is the link to the LJLA page:

https://airspacechange.caa.co.uk/PublicProposalArea?pID=28

2.5 Engagement Prior to commencement of Airspace Change Process

Prior to submission of the Statement of Need and subsequent Assessment Meeting (required by CAP 1616 Step 1A), LJLA had begun to engage with some stakeholders to ensure that they are informed of the intended changes and subsequent engagement

[3] NATS – National Air Traffic Services Ltd; NATS are providers of UK en-route air traffic services handing over traffic to and from the airport air traffic controllers as aircraft transit the airways.

and consultation requirements. Specifically, LJLA has engaged with the following stakeholders:

- Local Authorities, Environmental and Planning Departments
- Meetings with local airports, including Manchester Airport
- LJLA Airport Consultative Committee (ACC) and Noise Monitoring Sub-Committee (NMSC)
- Local Members of Parliament

2.6 Stage 1: Engagement on Design Principles

LJLA used a structured questionnaire to elicit information and comments from the stakeholders that were analysed to derive the Design Principles. Questionnaires were sent to both aviation and non-aviation stakeholders and the language and questions were designed to help LJLA understand the constraints that should be considered when developing the Design Principles.

LJLA also held a series of Focus Groups to further elicit and discuss Design Principles with selected relevant stakeholders. Three focus groups were organised that included mixed attendance from the following stakeholder types:

- Airport Users, GA and ANSPs
- LJLA Airport Consultative Committee (ACC) and the Noise Monitoring Sub-Committee (NMSC)
- Local Authorities/Planning Authorities

Once the shortlist of Design Principles had been developed, LJLA undertook a second round of engagement in order to understand which Design Principles were the most important to the stakeholders and their representative organisations. Stakeholders were asked to rank the Design Principles in order of priority. In addition, stakeholders were asked to provide any amplifying comments on their responses and given the opportunity to suggest any additional Design Principles that they felt ought to be considered. A final prioritised shortlist of Design Principles was created. You can see our Design Principles and a description of the engagement activities on the CAA portal at Step 1B. Here is the link to the LJLA page:

https://airspacechange.caa.co.uk/PublicProposalArea?pID=28

2.7 Stage 2: Options Development and Appraisal

At Stage 2, Step 2A, we used the Design Principles derived in Stage 1 to develop our Design Options that aligned with the original Statement of Need submitted to the CAA at the start of the process. Initially, we defined a comprehensive set of Design Options which included between 1 and 5 options for each individual departure or arrival route. These were all shown to the same stakeholders engaged in Stage 1 seeking any views or comments regarding the draft new designs for the IFPs. The stakeholders suggested some alternative options, and these were duly included for assessment.

As well as sharing the options via email, LJLA hosted workshops to explain in more detail the different departure and arrival options being considered as part of the process. The aim of these was to ensure that stakeholder concerns had been properly understood and accounted for in designing options; stakeholders were able to participate via the physical annotation of map overlays to illustrate their ideas or comments. For those stakeholders that were unable to attend the workshops, LJLA organised visits to relevant organisations to ensure that they had the information required to make an informed response to the Options Development engagement.

The comprehensive list of Design Options was refined to a longlist through our Design Principles Evaluation (DPE) – this activity assessed the designs to see if they met our Design Principles and resulted in a several options being rejected for not meeting them. The result of the DPE was a shorter list of options taken forward to Initial Options Appraisal required by Step 2B.

At Step 2B the options were appraised against the cost and benefit criteria of CAP 1616 Table E2; these criteria include noise impact on communities, CO_2 emissions, air quality, capacity and resilience of UK airspace infrastructure, and economic impact on airline, general aviation and the airport itself. This activity resulted in a shortlist of options carried forward for Full Options Appraisal in Stage 3. The Full Options Appraisal builds on the Initial Options Appraisal to provide a more detailed quantitative assessment of the same cost/benefit criteria in CAP 1616, Table E2. The Full Options Appraisal is also where we carried out our detailed noise and environmental impact assessment of the options. The Full Options Appraisal is a complex assessment used to identify the final list of options you see in this Consultation Document.

You can see our comprehensive list of design options, and the processes by which they were shortlisted on the CAA portal at Step 2A Options Development and Step 2B Initial Options Appraisal. You can also view the Full Options Appraisal and the detailed noise and other cost/benefit assessments therein at Stage 3 on the portal. Here is the link to the LJLA page:

https://airspacechange.caa.co.uk/PublicProposalArea?pID=28

3 Current Airspace and Routes

3.1 Overview

This section provides a description of our current airspace and IFPs and how they are used to allow you to consider the baseline against which to compare the proposed routes.

3.2 Background

Currently and historically, aircraft have navigated by flying over a series of ground-based radio beacons or 'navigation aids'. The current IFPs mark the routes flown by aircraft as they fly away from one beacon and towards the next. The majority of these beacons will become obsolete in the next two years and aircraft will navigate UK and international airspace by referencing satellites instead - in a similar manner to GPS or 'SATNAV' used by most of us to find our way on the ground.

The UK as a whole, is currently undertaking a programme (known as the DVOR[4] Rationalisation and NDB[5] Withdrawal Programme), which will phase out the majority of ground-based navigation aids during 2022. This programme will reduce the number of DVOR beacons from 46 to 19, and completely withdraw the use of NDB beacons for the purpose of en-route navigation. Many of these ground-based systems were initially introduced in the early 20th Century and are now reaching the end of their productive life. These ground-based aids have for many years defined the tracks and turning points of what are now known as "conventional procedures". The removal of these ground-based navigation aids therefore necessitates the introduction of GNSS technology to define future GNSS routes that will also be more accurate and reliable. Increasingly, aircraft manufacturers and airlines are equipping their aircraft with the technology to fly these routes.

The UK current airspace system was designed many years ago; since then the increasing volume of air traffic has increased congestion in the airspace system and reduced airspace efficiency leading to delays for airlines and passengers. Improvements in aircraft technology and performance, together with an increase in the number of aircraft with this new equipment, now presents an opportunity to modernise UK airspace and flight procedures. Modernisation also allows the UK aviation community to exploit opportunities to enhance the overall environmental performance of the airspace system, where these exist. Modernisation will also ensure operations at UK airports can be conducted more efficiently for the benefit of both operators, fare-paying passengers and local communities.

3.3 LJLA Airspace

Certain volumes of airspace around an airport 'belongs to' or is controlled by that airport. These are represented by 3-dimensional boxes, wedges or cylinders which have a lower limit or base level (sometimes down to the ground) and an upper limit (usually adjoining en-route airways or in LJLA's case, adjoining Manchester Airport's

[4] Doppler VHF (Very-High-Frequency) Omnidirectional Range – a type of ground based radio navigation aid.
[5] Non-Directional [*radio]* Beacon.

airspace. Figure 1 shows the lateral and vertical extents of the airspace currently controlled by LJLA. The airspace is sub-divided into different areas, each with a declaration of the lower and upper altitude associated with it. Each area is categorised as one of the following types:

- Aerodrome Traffic Zone (ATZ) – a 2.5 nautical mile circle, extending from the surface (SFC) to 2,000 ft above mean sea level (amsl)
- Control Zone (CTR) – an area extending from SFC to 2,500 ft amsl
- Control Area (CTA) – an area, normally above the CTR, with a designated lower and upper altitude.

LJLA has 4 separate CTAs (numbered 1-4 in Figure 1 below) which each have different lower and upper altitudes e.g.: LJLA control area CTA2 has a base of 2,000 ft amsl and an upper limit of 3,500 ft amsl, as show in the orange example label here:

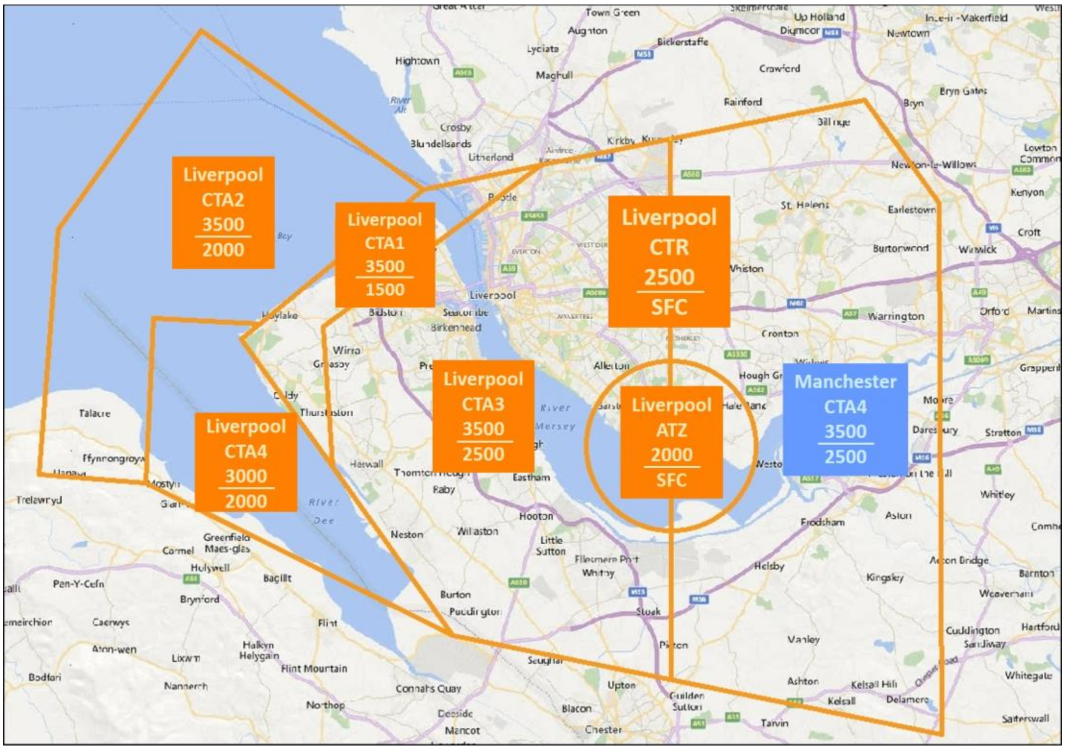


Figure 1 - LJLA Airspace areas and altitudes

Please note: airspace that is controlled by Manchester Airport exists immediately above and adjacent to LJLA airspace e.g. Manchester CTA4 sits above the Liverpool CTR and to the east of Liverpool CTA3. Figure 2 below shows the vertical cross-section of the airspace around LJLA.

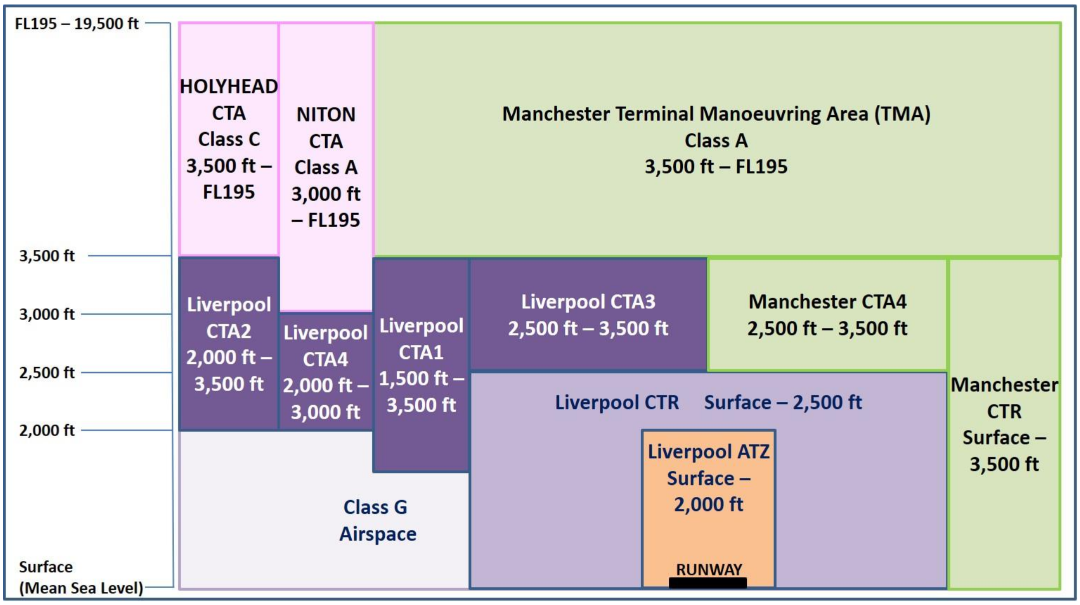


Figure 2 - LJLA Airspace Cross-Section

LJLA airspace is shown in purple/orange, Manchester airspace in green and the en-route airspace, controlled by NATS, is shown in pink. The Class G airspace in the bottom left of Figure 2 is 'uncontrolled airspace' – anyone can fly here without talking to air traffic controllers and pilots are responsible for seeing and avoiding one another. The altitude (heights) of the various airspace segments are given on the left-hand side – FL is short for Flight Level and is typically used as a way of abbreviating the altitude of airspace above a certain height to the nearest 500 feet (ft) e.g. FL100 is approximately 10,000 ft; FL195 as show on our image is approximately 19,500 ft.

3.4 LJLA Current Operations

To provide some insight into the distribution of aircraft tracks currently arriving and departing from LJLA, Figure 3 and Figure 4 below show LJLA arrivals in red and departures in green showing levels of traffic that are typical for a peak summer day. There is no significance to the selected dates other than being a summer day on which the wind direction[6] determined the given runway that would be used. The tracks shown are those where aircraft arrive and depart along the LJLA published IFPs. It should be understood, that other General Aviation (GA) aircraft, not shown in these Figures, may arrive and depart from the aerodrome along other published VFR[7] routes, or routes agreed between the aircraft pilot and LJLA Air Traffic Control (ATC). These VFR routes are not the subject of this airspace change project, and will not change as a result.

The naming convention for airport runways is based on the first two digits of the compass bearing that the runway points towards. The single runway at LJLA is orientated east-west, so aircraft taking off in a westerly direction will be heading 270° and hence will be operating from Runway 27. Aircraft taking off in an easterly direction will be heading 090° and hence will be operating of Runway 09.

[6] Aircraft take off and land **into** the wind; therefore, the wind direction on a given day determines which runway direction is in use for that day. If the wind is blowing from the east, Runway 09 will be in use; aircraft will land and take off on a heading of 090° i.e. the nose of the aircraft will point towards the east.
[7] VFR – Visual Flight Rules (a set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going).

Figure 3 depicts operations from Runway 27; this is normally the preferred runway because there is a prevailing westerly wind and aircraft normally take-off and land into the wind. Figure 4 depicts operations from Runway 09, associated with days on which the airport experiences easterly winds. The aircraft tracks shown in each Figure were generated on separate days during the summer of 2019.

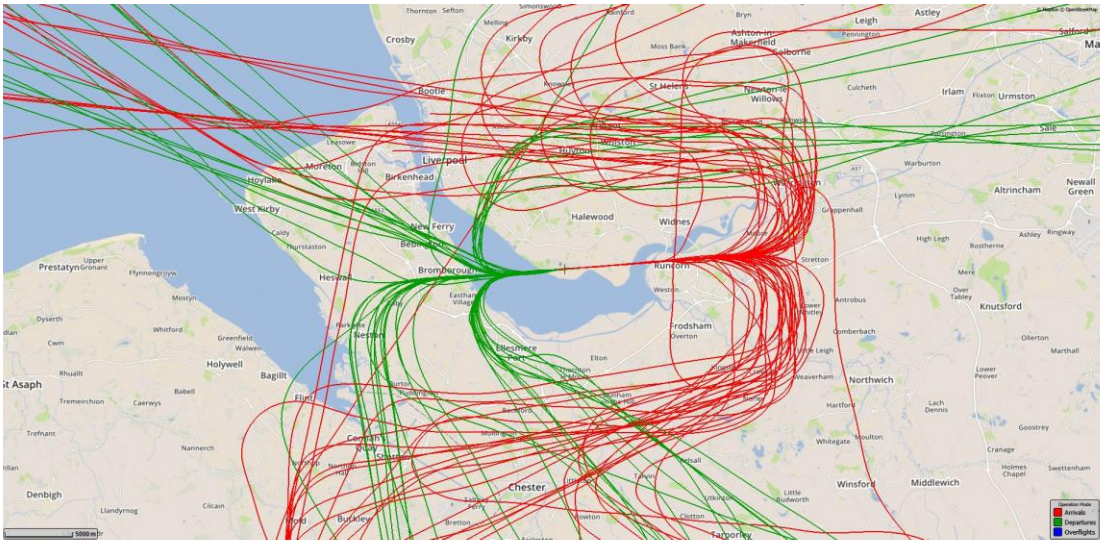


Figure 3 - Runway 27 Arrivals (red) and Departures (green) (12th July 2019)

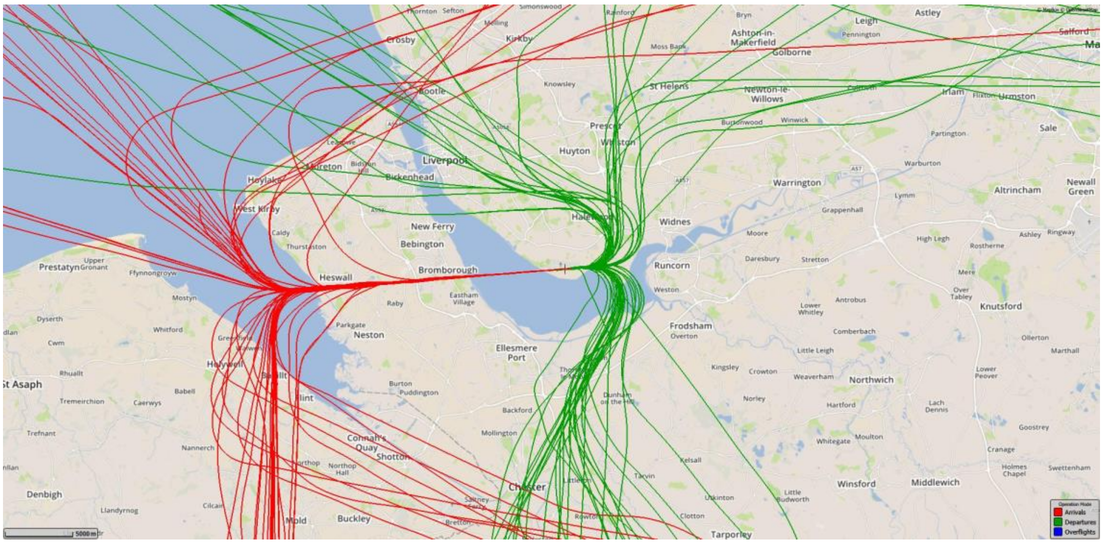


Figure 4 - Runway 09 Arrivals (red) and Departures (green) (2nd August 2019)

3.5 LJLA Current Noise Levels

For the purpose of the noise assessments, the current operations at LJLA are known as ‘Baseline 2019’. Aircraft flying along the procedures above in Figure 3 and Figure 4 generate a level of noise on the ground that may have an impact on local communities. Figure 5 below shows the calculated noise contours that represents the area around the airport within which noise levels can currently be expected to exceed

51dBA $L_{Aeq\ 16hr}$[8]. The Department for Transport (DfT) directs that this is the level above which noise is considered to be a nuisance during the day. The contours represent average noise levels which means that people may also be affected by noise outside the area of the contour. See paragraph 3.6 for further information on noise events outside the contours.

The image in Figure 5 shows the bands or contours representing the average noise levels during the 16-hour daytime period between 0700 and 2300 hrs during the summer season[9]. If you live within one of these bands, the average noise you may be exposed to is given by the colour key. DfT policy also regards 51dBA as the point at which the adverse effects of noise on health and wellbeing begin to be seen on a community basis. However, LJLA recognises that people who live outside of these areas are still likely to experience incidents of noise above these levels and indeed to be concerned about noise. If you would like to find out about our noise assessments in greater detail, please view our Full Options Appraisal document via the link in Section 11.

The map background in Figure 5 shows that households in and around Speke, Hale, Halebank and Runcorn are primarily affected by current noise levels at the airport, with the remainder of the noise contours over sparsely populated, industrial areas or over the River Mersey. The noise is concentrated along the runway and primarily associated with the straight-ahead track taken by aircraft shortly after take-off in either direction.

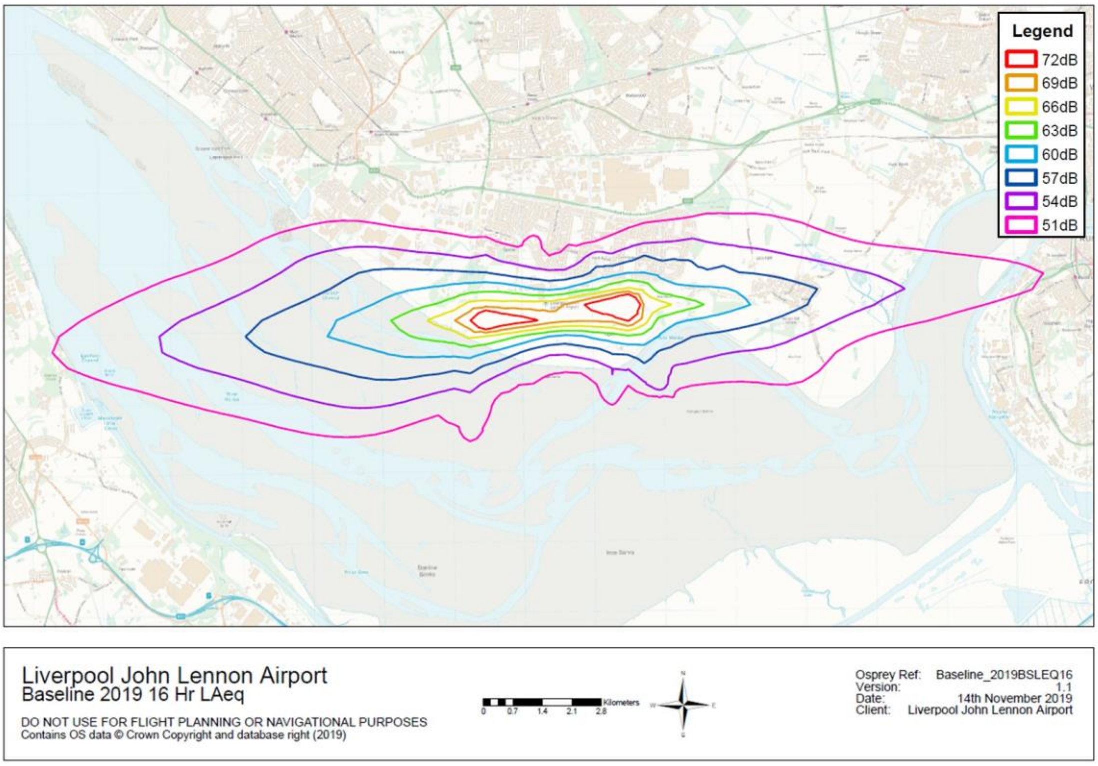


Figure 5 - Baseline 2019 Noise Contour 51dBA $L_{Aeq\ 16hr}$

[8] CAP 1616 requires the production of LAeq noise contours to portray noise impacts. LAeq is the equivalent continuous sound level[8], measured in decibels[8] (dB). The 'A' subscript means A-weighted (which matches the frequency response of the human ear) and the 'eq' subscript is an abbreviation of the word equivalent. Separate contours are produced for day and night[8] operations

[9] Data was collected between 16th June 2019 and 15th September 2019 (inclusive)

Figure 6 below shows the calculated noise contour for LJLA's current operations; it represents the average noise levels for the 8-hour nightime period between 2300 and 0700 hrs during the summer season based on 2019 traffic; these are the areas around the airport within which noise levels can be expected to exceed 45dBA $L_{Aeq\ 8hr}$. This is the level that DfT considers to be nuisance noise and to have a potential impact on community wellbeing at night.

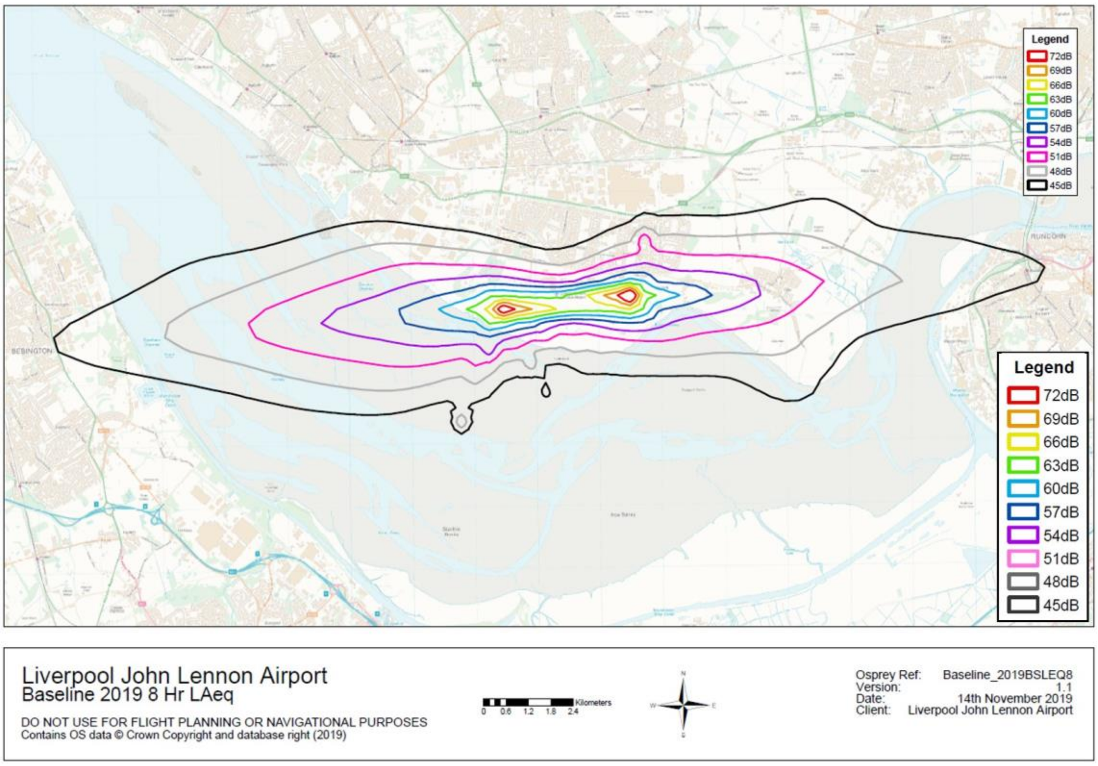


Figure 6 - Baseline 2019 Noise Contour 45dBA $L_{Aeq\ 8hr}$

3.6 Experience of Noise Outside the Contours

People living outside of the noise contours above are still likely to experience noise events during the day and night depending on where they live. To illustrate this, we present information showing where these noise events might exceed 65dBA during the day or 60dBA during the night for the Baseline 2019 (current operations); these are known as N65 and N60 assessments[10]. Figure 7 and Figure 8 below show the N65 (day) and N60 (night) assessments respectively for the current operations. Each contour represents the area around the airport within which the number of events of noise from flights to/from LJLA exceeding 65dBA(day) or 60dBA (night) would be experienced by people living within the contour, during an average 24hour period in summer. People living outside of these contours are still likely to experience noise events exceeding 65dbA in the daytime and 60dbA during the night, but fewer than 15 events per day, on average.

Night time is defined as between 2300 hrs (11pm) and 0700 hrs (7am).

[10] CAP 1616 secondary assessment metrics include the presentation of N65 and N60 contours showing the areas that experience noise events above 65dBA (day) and 60dbA (night) respectively.

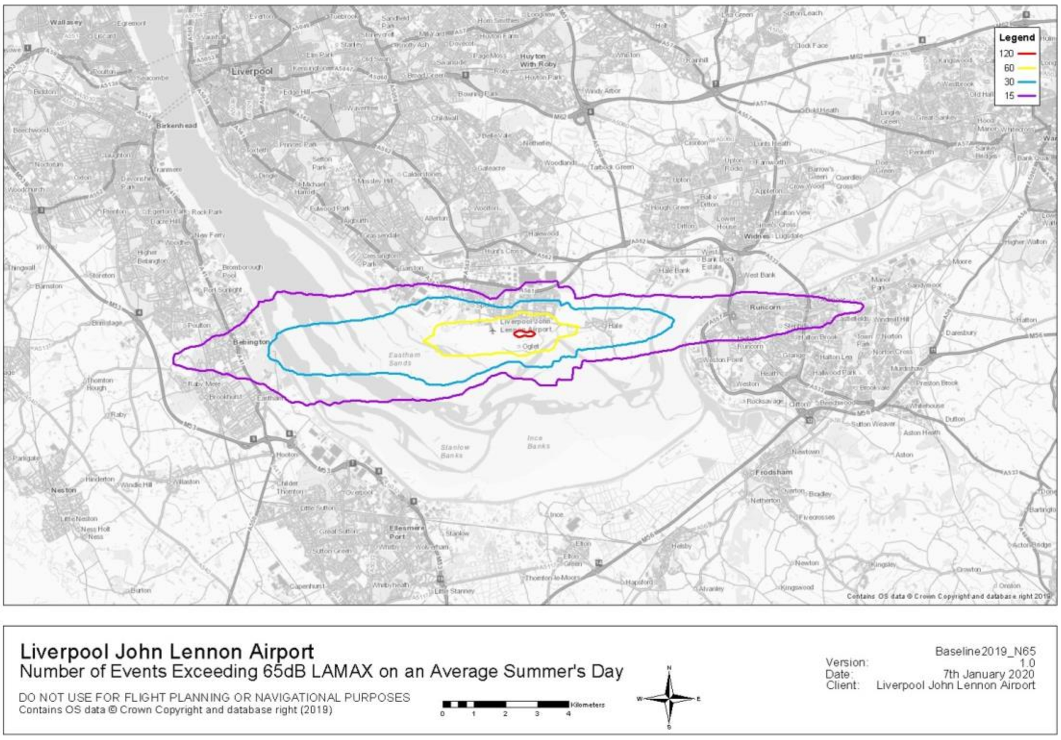


Figure 7 - LJLA Current Day Operations Exceeding 65dBA (N65)

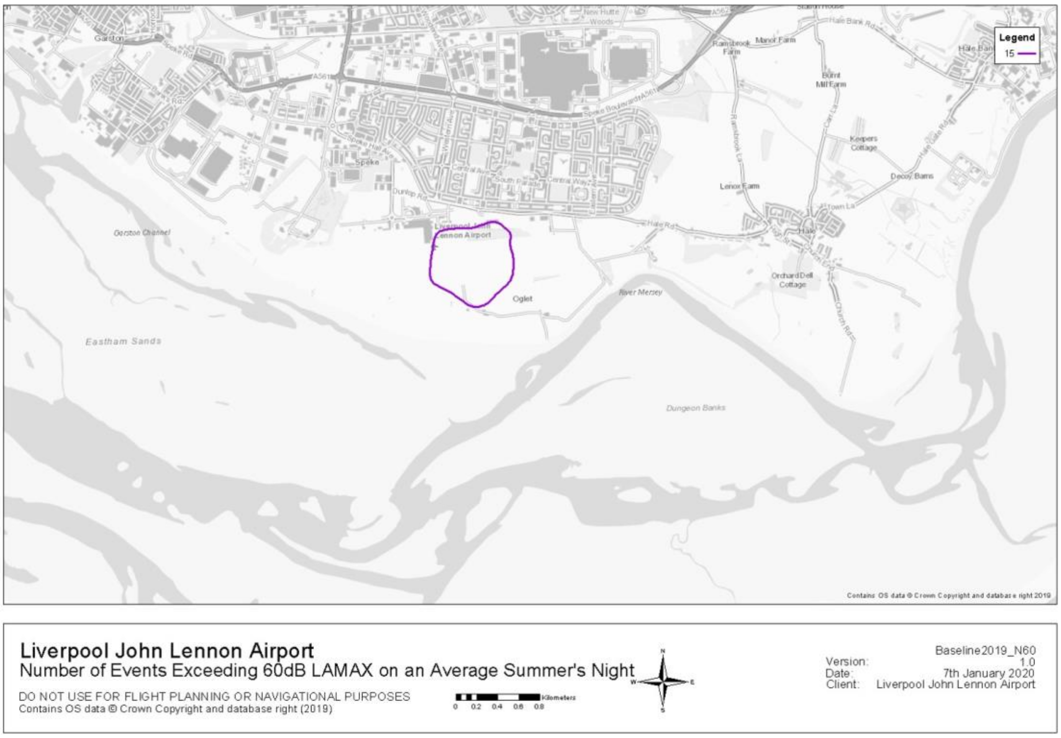


Figure 8- LJLA Current Night Operations Exceeding 60dBA (N60)

3.7 LJLA Future Projected Noise Levels

As part of this consultation we are required to make a comparison of the proposed options to the Baseline at two future intervals. To support this, there are a number of

Figures below depicting the assessment of likely noise impacts in 2021 (the year the changes could be made) and in 2031 (ten years after the changes could be made), assuming we only maintain the current routes. These are known as Baseline 2021 and Baseline 2031.

A number of figures are shown on the following pages to show these future projected noise levels:

- Figure 9 - Baseline 2021 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$
- Figure 10 - Baseline 2021 8hr Night Noise Contours above 45dBA $L_{Aeq\ 8hr}$
- Figure 11- Baseline 2031 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$
- Figure 12 - Baseline 2031 8hr Night Noise Contours above 45dBA $L_{Aeq\ 8hr}$

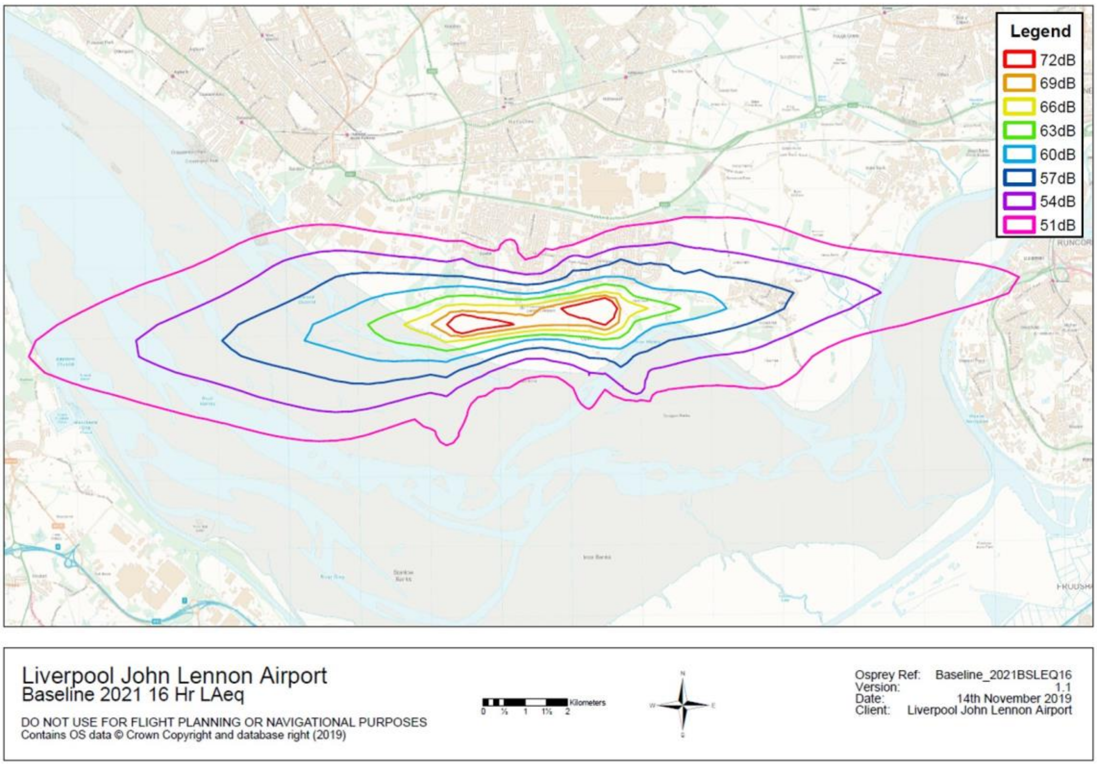


Figure 9 - Baseline 2021 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$

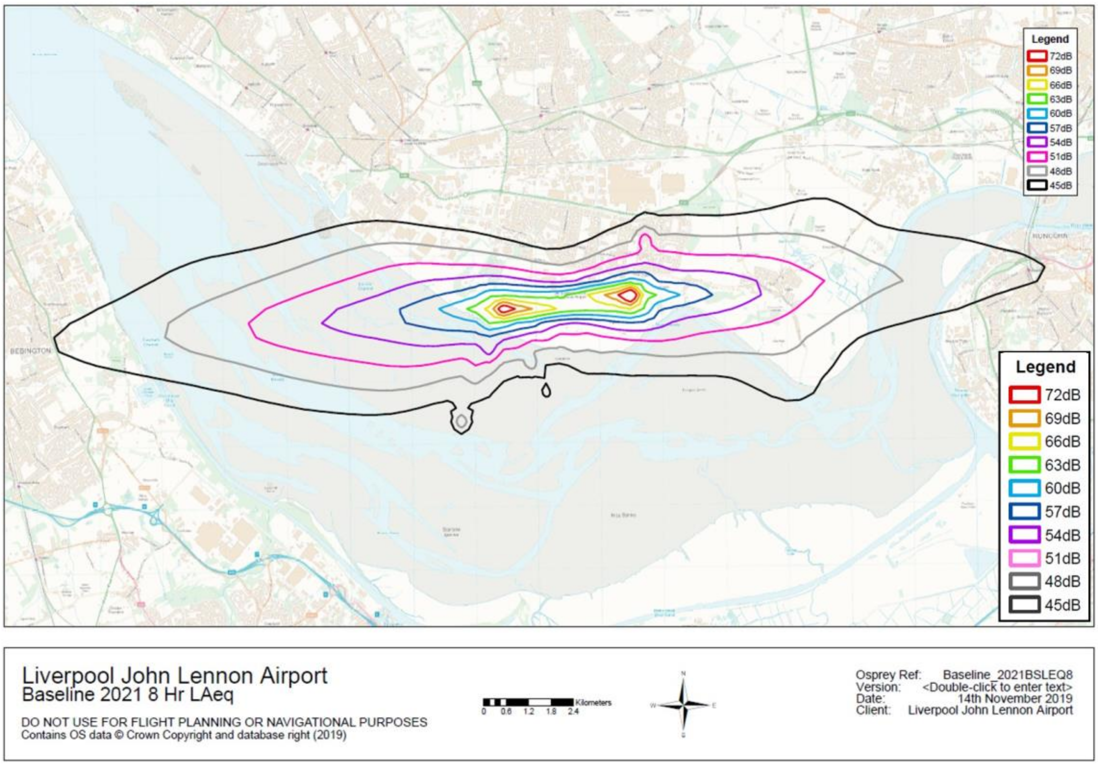


Figure 10 - Baseline 2021 8hr Night Noise Contours above 45dBA $L_{Aeq\ 8hr}$

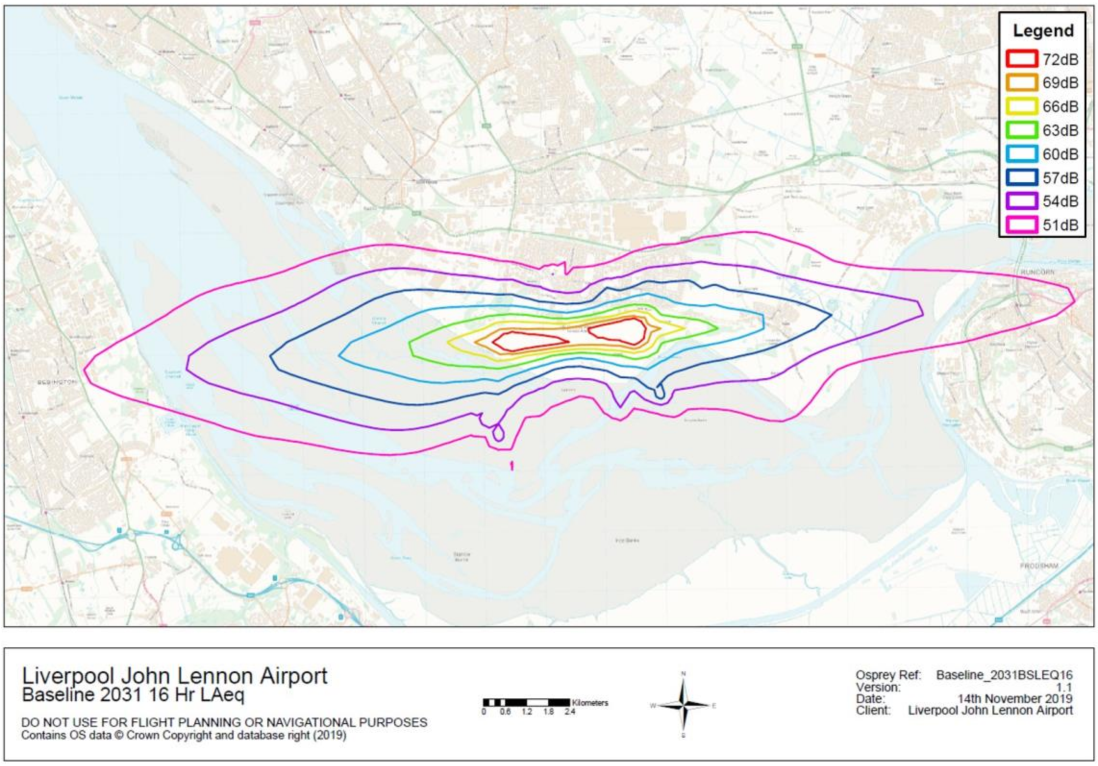


Figure 11 - Baseline 2031 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$

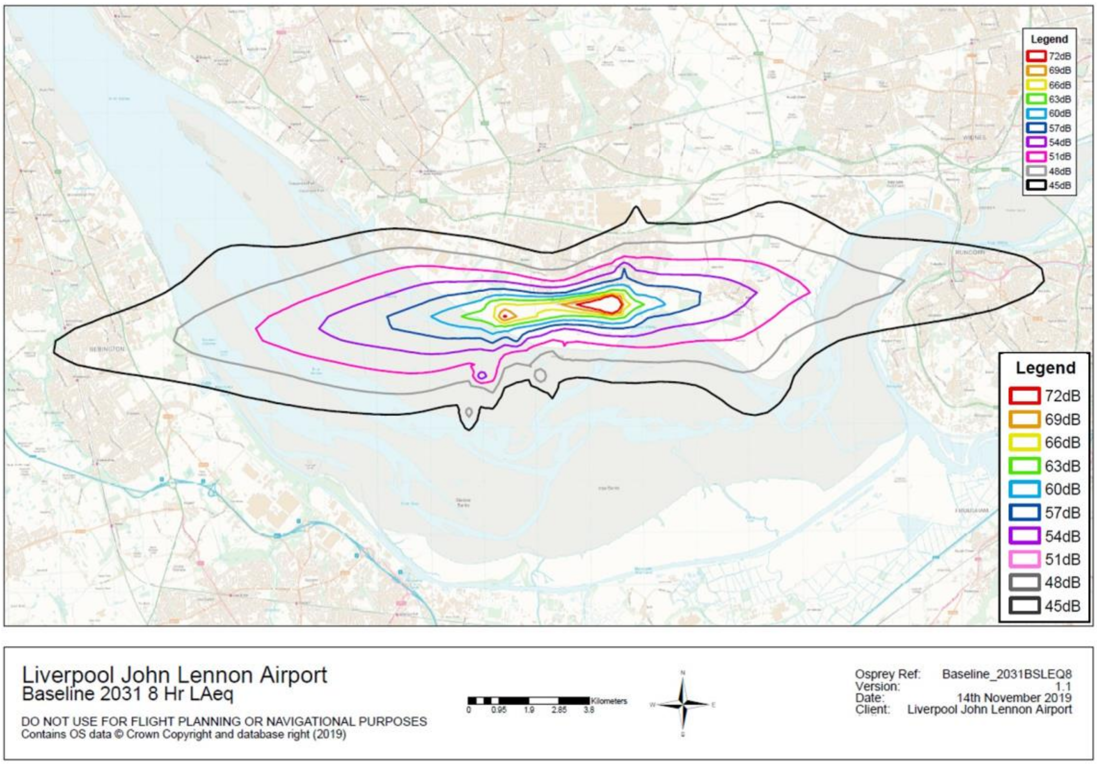


Figure 12- Baseline 2031 8hr Night Noise Contours above 45dBA $L_{Aeq\ 8hr}$

Figure 13 and Figure 14 below show, for an average 24hr period in summer, the N65 (day) and N60 (night) assessments respectively for the current method of operating, projected to 2031, and assumes the new procedures have not been implemented. Each contour represents the area around the airport within which the number of events of noise from flights to/from LJLA exceeding 65dBA (N65) in the daytime and exceeding 60dBA (N60) during the night, would be experienced by people living within the contour.

Night time is defined as between 2300 hrs (11pm) and 0700 hrs (7am).

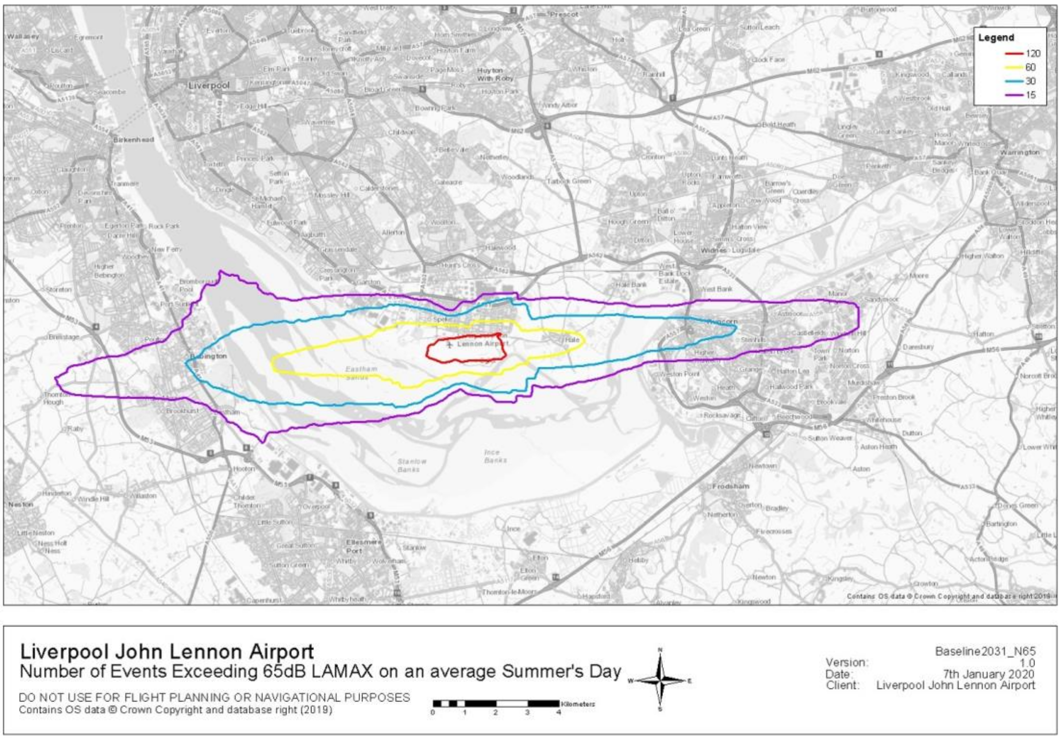


Figure 13 - LJLA Projected Day Operations 2031 Exceeding 65dBA (N65)

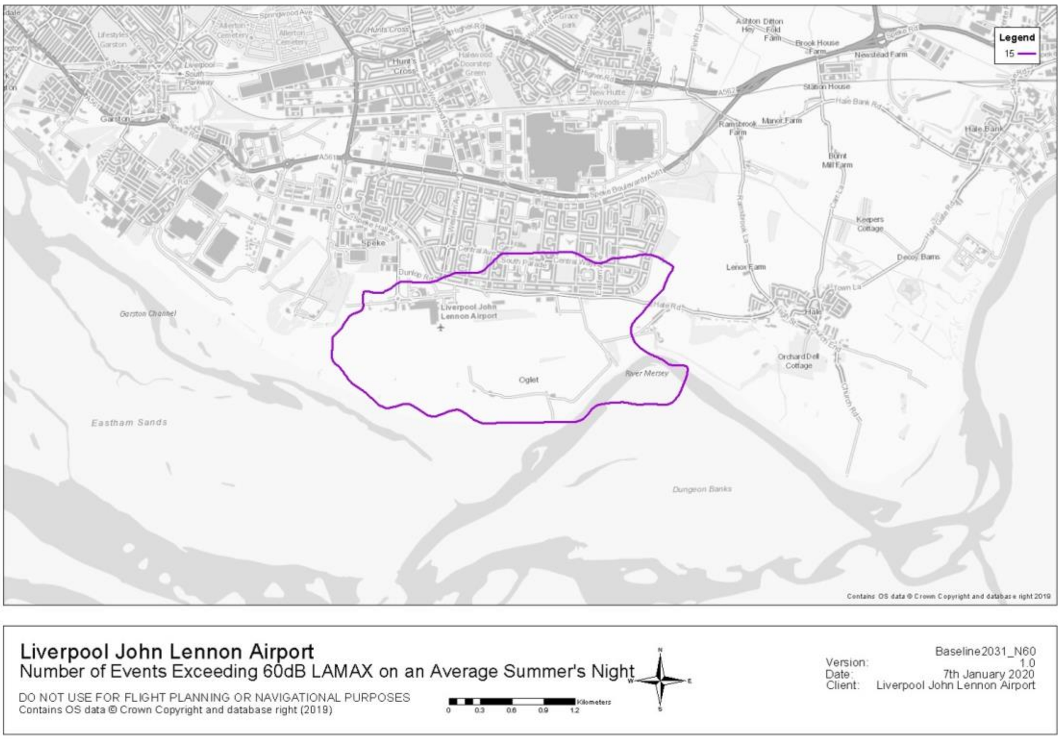


Figure 14 - LJLA Projected Night Operations 2031 Exceeding 60dBA (N60)

4 Proposed Changes

4.1 Proposed Procedures

LJLA is seeking to modernise their Instrument Flight Procedures (IFPs) for aircraft departing from, and arriving at, LJLA. IFPs is a term used to describe the published routes aircraft fly over the ground, both in plan and elevation view. These new procedures allow aircraft to use GNSS technology to follow routes more accurately and to allow the airport to make more efficient use of the airspace, whilst maintaining or enhancing current levels of safety.

It is important to understand that when airspace change proposals are developed for the introduction of procedures utilising improved navigational technologies, including the use of GNSS, aircraft are more likely to be able to follow the prescribed flight paths more accurately and therefore result in less dispersal of traffic flying the routes. This concentration is likely to change the distribution of aircraft noise over the communities close to LJLA, with some communities experiencing an increase in noise, while others experience a decrease.

LJLA is proposing to introduce Standard Instrument Departures (SIDs), Instrument Approach Procedures (IAPs) and Transitions (the section of the route between the airways and the approach procedure) as part of this ACP.

An overview of the new procedures is given in the paragraphs below. There is a lot of information contained in this Section of the document; **if you are keen to skip ahead and view the changes on a map, it is worth reading paragraph 4.6 to help you understand the images before looking at the maps in Section 5 to 10 onwards**.

In paragraph 4.6 we explain how these procedures are combined to give the overall options that we would like your views on; Sections 5 to 10 present maps containing various combinations of these procedures for your consideration. Section 11 describes how you can participate in this consultation.

4.2 Explanation of Waypoints

All of the procedures are constructed of a series of waypoints designed to be flown by the automatic systems that the majority of modern aircraft use for navigation. A waypoint is defined positionally by its Latitude and Longitude, and generally will not necessarily represent a physical feature on the ground but will be positioned so that the routes designed are technically flyable by the various aircraft types. Some waypoints describe the point at which the route integrates with the national airways structure. The aircraft navigation systems will automatically direct the aircraft according to the routing designed into the procedure.

If a waypoint is designated a 'Fly-By' waypoint, the aircraft will initially be heading in the direction of the waypoint but the aircraft will anticipate a point in space to turn before it reaches the waypoint so that the aircraft ends up heading directly towards the next waypoint in sequence, as shown in Figure 15 below. Depending on the angle of turn, the aircraft may not overfly the actual waypoint at all. In addition, the actual flight path that an aircraft follows during these turns will vary slightly depending on the flight performance of each aircraft, creating a small amount of dispersion of aircraft tracks during the turn. All of the waypoints used for the LJLA procedure designs are designated as 'Fly-By' waypoints.

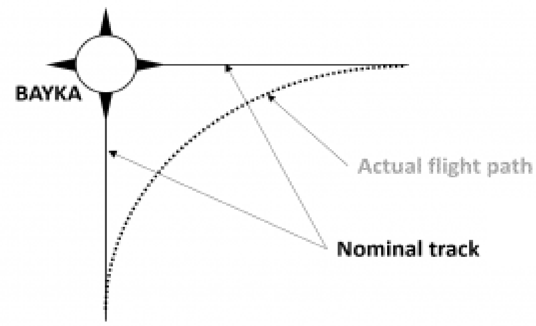


Figure 15 - Fly-By Waypoint

4.3 The New Proposed Standard Instrument Departures

A Standard Instrument Departure (SID) describes the route that an aircraft must fly on departure from an airport in order to connect safely with the en-route airspace structure. Aircraft will follow a defined route profile, including any altitude constraints, to a designated waypoint that forms part of the national airspace structure. LJLA is planning on introducing three SIDs for each of the departure runway directions, which will direct aircraft towards their en-route destination. The individual procedures, including any alternative options being considered, are outlined in the following paragraphs.

4.3.1 Runway 27 SID AGGER AR

AGGER is a waypoint approximately 10 miles north east of LJLA and will generally be used for aircraft with destinations to the north or east. After take-off, aircraft following the 27 SID AGGER AR procedure, will climb straight ahead on runway heading to 500 feet (ft) before turning right to follow the route of the River Mersey and continuing to climb. Aircraft will then turn right again to route directly to the point AGGER, reaching a height of approximately 11,000 ft at AGGER ready to join the airways structure. The 27 SID AGGER AR procedure includes an earlier than usual right-hand turn to keep aircraft over the River Mersey instead of turning them later over the communities of Bebington.

During the detailed technical IFP design activities in CAP 1616 Stage 3, 27 SID AGGER AR was found to require a minor deviation from PANS-OPS[11] criteria associated with the position of the first waypoint. 27 SID AGGER AR derived from engagement activities when stakeholders raised the possibility of having a procedure where aircraft turned right over the Mersey shortly after take-off rather than turning later overhead communities in The Wirral, thus providing a shorter SID with lower noise and environmental impacts.

Despite this minor deviation, 27 SID AGGER AR remains a viable option however, LJLA decided to reintroduce the fully compliant original option considered during stakeholder engagement: 27 SID AGGER. This alternative option is described below; it is fully compliant and therefore attractive from a regulatory point of view, but it

[11] PANS-OPS: Procedures for Air Navigation OPerationS. These are the international rules governing the design of flight procedures and are set out in PANS-OPS ICAO Document 8168. ICAO stands for International Civil Aviation Organisation, a specialised agency of the UN that ensures each member country’s aviation operations and regulations conform to global norms.

results in increased track miles and a greater noise impact due to the later right-hand turn over The Wirral versus 27 SID AGGER AR.

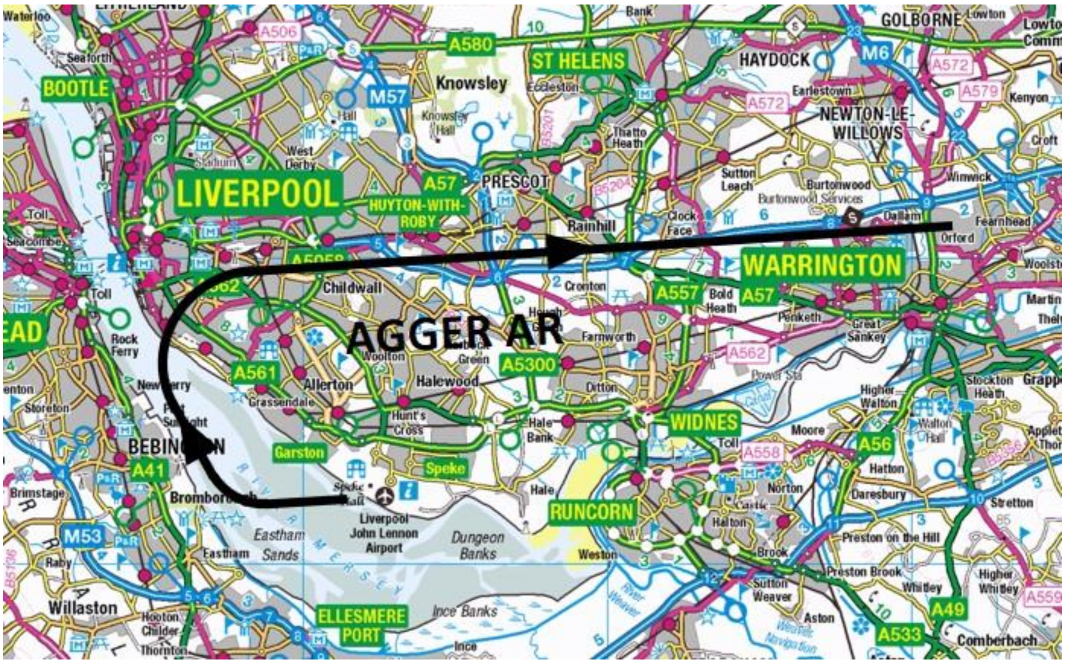


Figure 16 - Runway 27 SID AGGER AR

4.3.2 Runway 27 SID AGGER

The 27 SID AGGER procedure is the alternative option for routing to AGGER. After take-off, aircraft climb straight ahead for a little further versus 27 SID AGGER AR (described above); at 1,000 ft they turn right overhead Bebington onto a northerly heading. Aircraft will continue to climb and then turn right again to route directly to the point AGGER, reaching a height of approximately 11,000 ft at AGGER ready to join the airways.

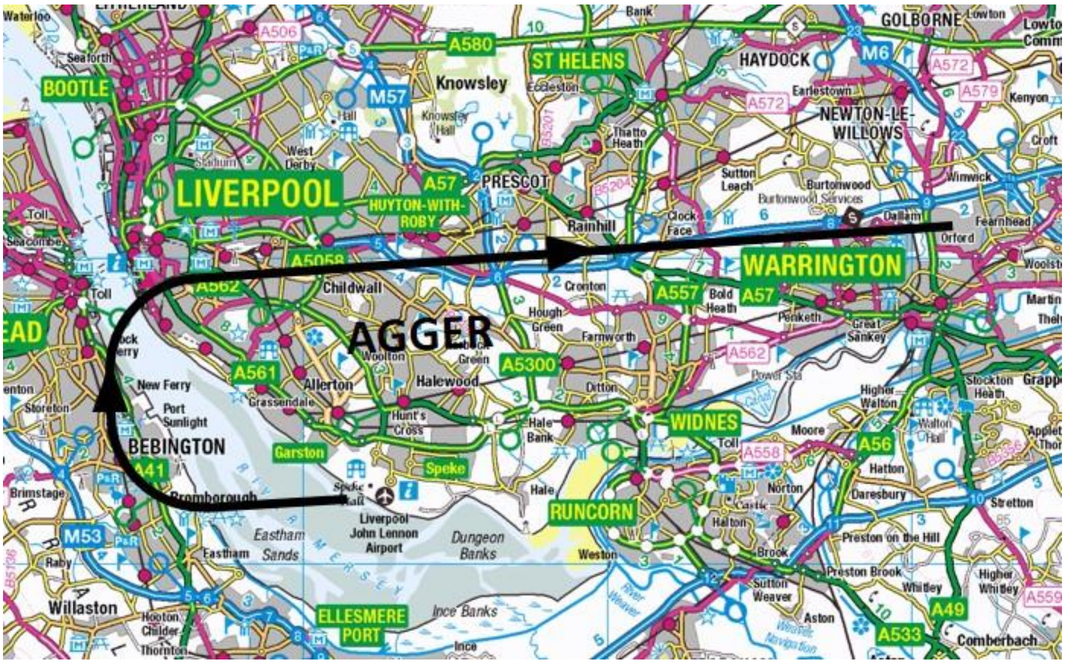


Figure 17 - Runway 27 SID AGGER

4.3.3 Runway 27 SID WAL

WAL is a point close to the north west coast of the Wirral and will generally be used for aircraft with destinations to the west. After take-off, aircraft continue on the runway heading and continuously climb until they are west of the M53 motorway past Bromborough on the Wirral. Aircraft will then turn right and route direct to WAL at a height of approximately 5,000 ft.

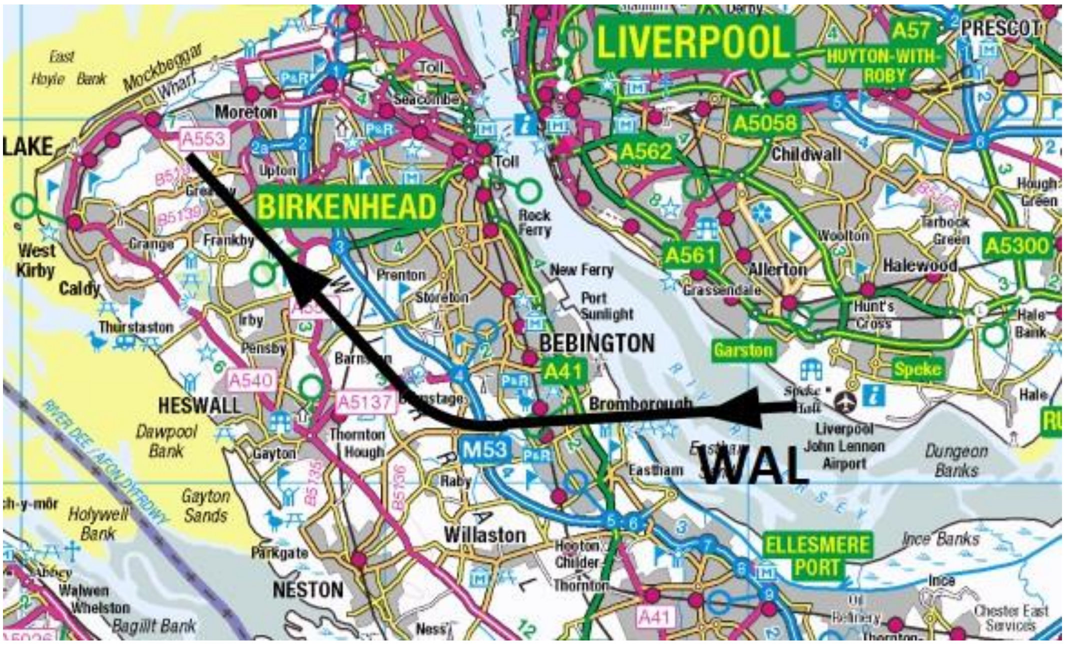


Figure 18 - Runway 27 SID WAL

4.3.4 Runway 27 SID TEMP2

TEMP2 is a point just to the north of the City of Chester and will be used for aircraft departing LJLA to the south. After take-off, aircraft will continue on the runway heading and continuously climb for approximately 4 miles before turning left towards the point TEMP2. Aircraft will reach a height of approximately 8,000 ft by TEMP2.

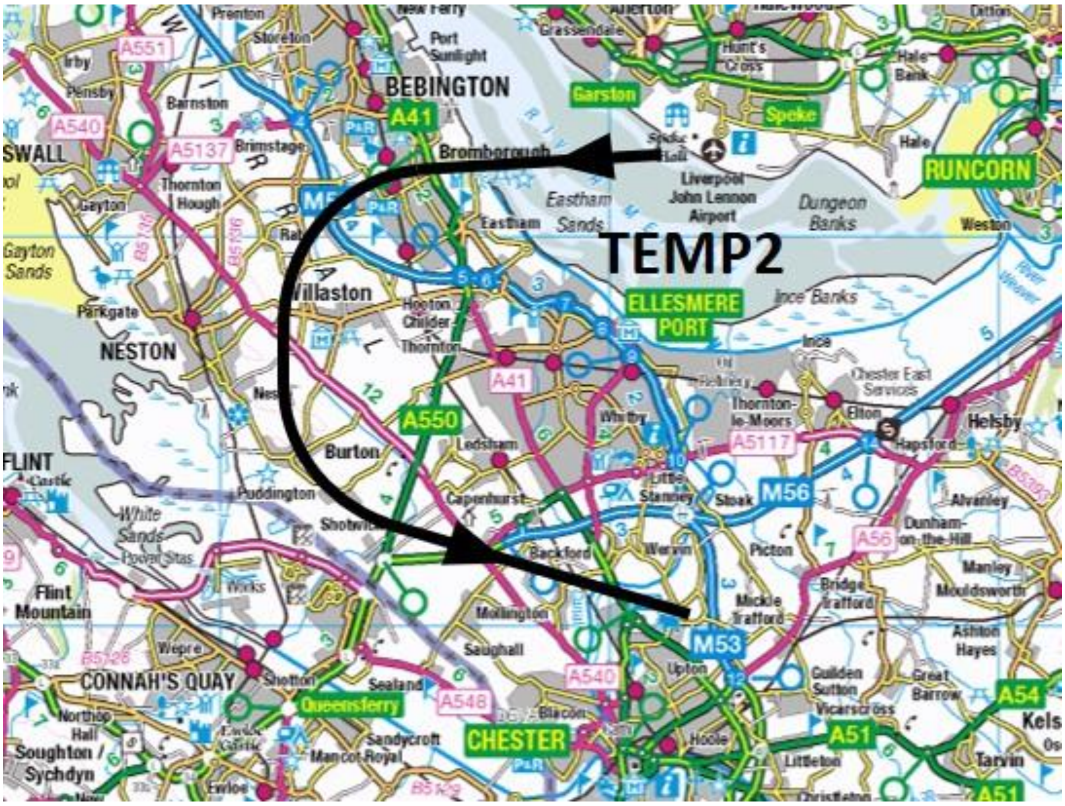


Figure 19 - Runway 27 SID TEMP2

4.3.5 Runway 09 SID AGGER

The position of AGGER will be the same for aircraft departing off either Runway 27 or Runway 09. In order for aircraft to achieve the required height of approximately 11,000 ft by AGGER, it is necessary for aircraft to turn right after take-off (rather than left and fly direct to AGGER), in order to have the time and distance to climb to that height. As soon as reaching 500 ft after take-off, aircraft will commence a right-hand turn, avoiding overflight of built-up areas of Runcorn, onto a south-westerly heading and continue to climb. The route then turns right over Ellesmere Port, where aircraft will be above approximately 5,000 ft. The route continues onto a northerly heading and crosses the River Mersey before turning right again and heading towards AGGER, reaching a height of approximately 11,000 ft at AGGER.

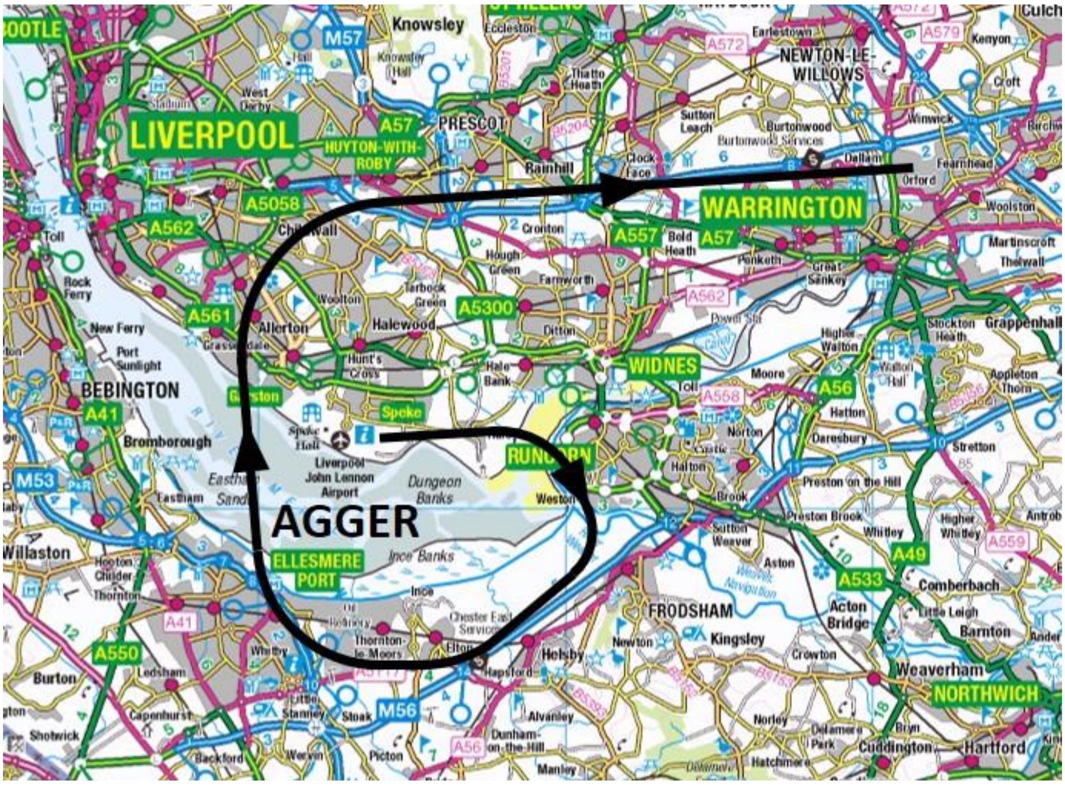


Figure 20 - Runway 09 SID AGGER

4.3.6 Runway 09 SID CAVEN

CAVEN is a point above the Dingle area of Liverpool and will generally be used by aircraft departing to the west. After take-off, aircraft will continue straight ahead for approximately 3 miles before turning left onto a north-easterly heading to follow the approximate route of the River Mersey. Aircraft will continue to climb immediately after take-off but will be restricted initially to a height of 4,000 ft to deconflict from aircraft operating into Manchester Airport. Aircraft will turn left again, fly between the main built up areas of Widnes and Warrington, before turning left again to follow the approximate route of the M62 motorway. Once established on this westerly heading, aircraft will continue the climb to be at approximately 5,000 ft by CAVEN.

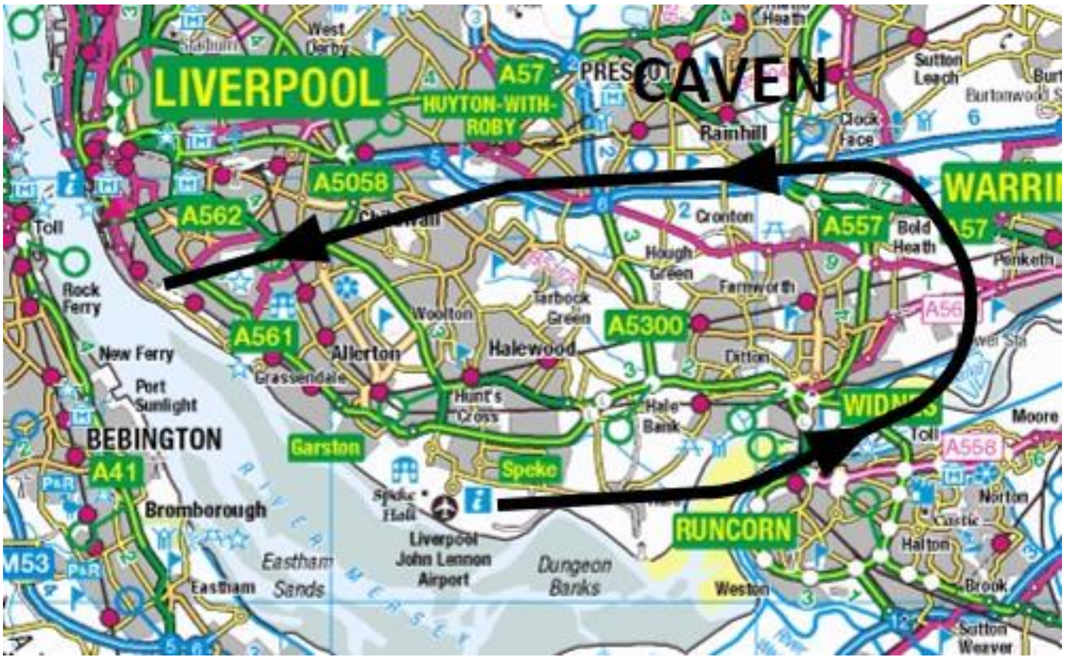


Figure 21 - Runway 09 SID CAVEN

4.3.7 Runway 09 SID CAVEN Option

This alternate option for CAVEN routes traffic to the south of LJLA. As soon as reaching 500 ft after take-off, aircraft will commence a right-hand turn, avoiding overflight of built-up areas of Runcorn, onto a south-westerly heading and continue to climb, following the same initial route as Runway 09 SID AGGER. The route then turns right over Ellesmere Port, where aircraft will be approximately 5,000 ft, and routes direct to CAVEN.

Figure 22 - Runway 09 SID CAVEN Option

4.3.8 Runway 09 SID CORKA

The position of CORKA is the same point as TEMP2, just to the north of the City of Chester. As soon as reaching 500 ft after take-off, aircraft will commence a right-hand turn, avoiding overflight of built-up areas of Runcorn, onto a south-westerly heading direct to CORKA, reaching a height of approximately 8,000 ft by CORKA.

Figure 23 - Runway 09 SID CORKA

4.3.9 Runway 09 SID CORKA Option

This alternate option to CORKA routes aircraft to the north of LJLA. After take-off, aircraft continue on runway heading for approximately 3 miles before turning left onto a northerly heading. Aircraft will continue to climb and, once north of Widnes, will turn left to follow the approximate route of the M62 motorway, towards CAVEN. Aircraft will continue to climb, before turning left again to route direct to CORKA, reaching a height of approximately 8,000 ft by CORKA.

Figure 24 - Runway 09 SID CORKA Option

4.4 The New Transitions

The Transitions describes the route that the aircraft will take when arriving at an airport from the en-route network or termination of a Standard Instrument Arrival procedure (STAR) to the Initial Approach Fix (see paragraph 4.5) for an Instrument Approach Procedure. LJLA is planning on introducing 4 Transition procedures for aircraft arriving for Runway 27, and 3 Transition procedures for aircraft arriving for Runway 09. The individual procedures are outlined in the following paragraphs.

4.4.1 Runway 27 Transition DIOUF

DIOUF is a position approximately 3 miles to the east of Wigan. Aircraft arriving at LJLA from the north or east will leave the en-route network at DIOUF at approximately 12,000 ft. Aircraft will route in a westerly direction towards Crosby, before turning left onto a southerly heading and then left again onto an easterly heading to join the approach procedure. The elongated routing is necessary for the aircraft to descend to the appropriate heights for the approach procedure. Aircraft will need to be at 4,000 ft in the Huyton and Roby area in order to deconflict with aircraft operating with Manchester Airport.

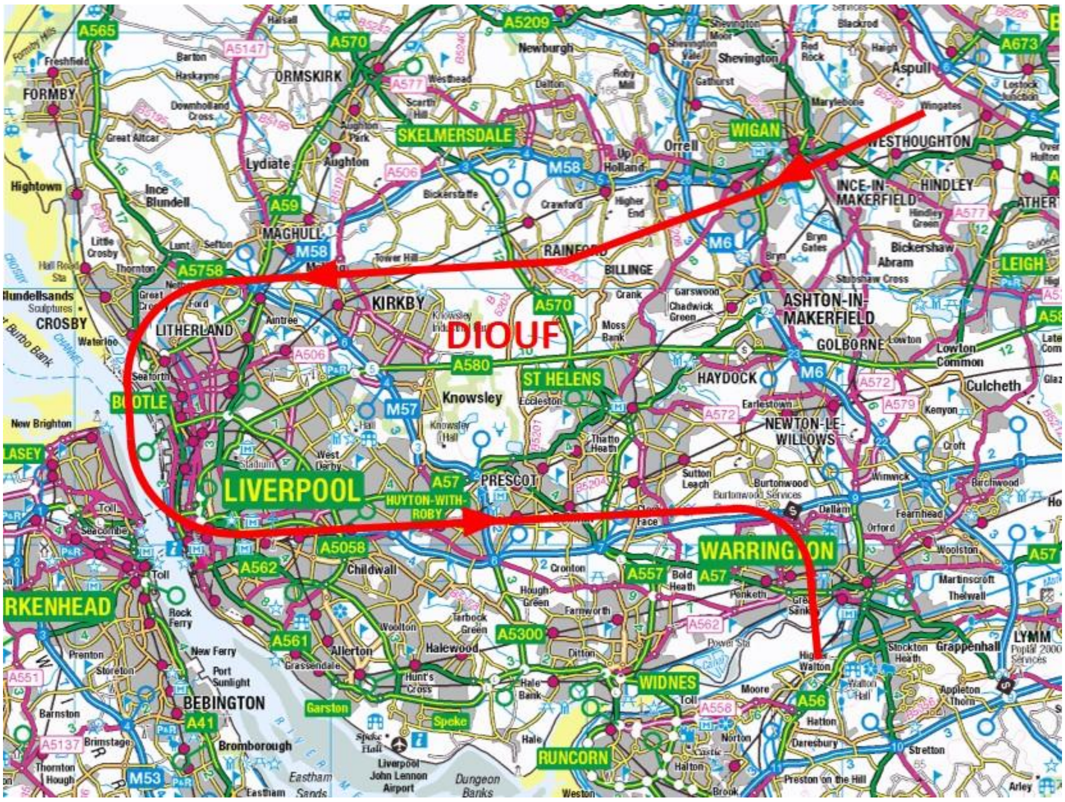


Figure 25 - Runway 27 Transition DIOUF

4.4.2 Runway 27 Transition NOMSU

NOMSU is a position over the sea approximately 10 miles west of Wallasey. Aircraft arriving at LJLA from the west will generally route via NOMSU. Aircraft will route towards Birkenhead Docks before turning left and following the same east bound track and height restriction as Runway 27 Transition DIOUF.

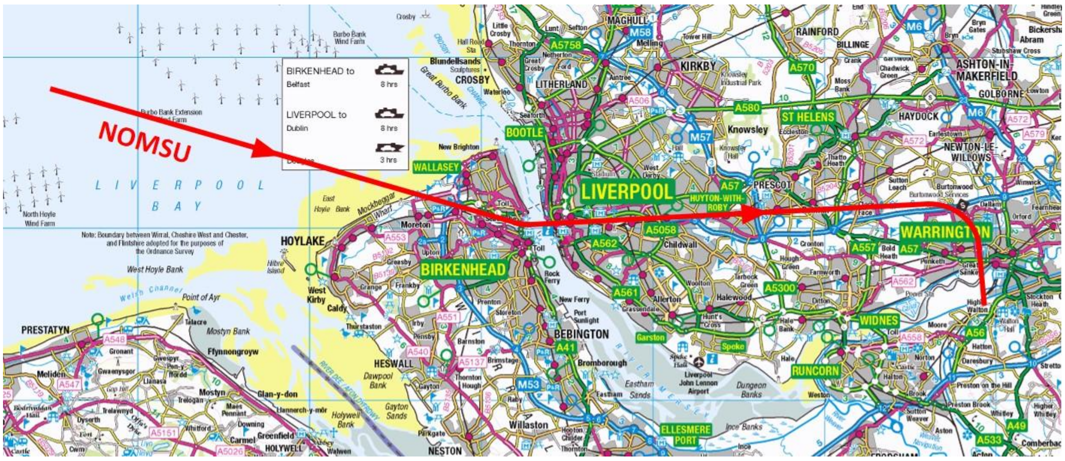


Figure 26 - Runway 27 Transition NOMSU

4.4.3 Runway 27 Transition VEGUN

VEGUN is a position approximately 9 miles south west of Chester and will be used by aircraft arriving at LJLA from the south. Aircraft will route in a north easterly direction to join the approach procedure from the south. Aircraft will need to be at 3,000 ft by the time it passes south of Chester, in order to deconflict from aircraft taking off from Manchester Airport.

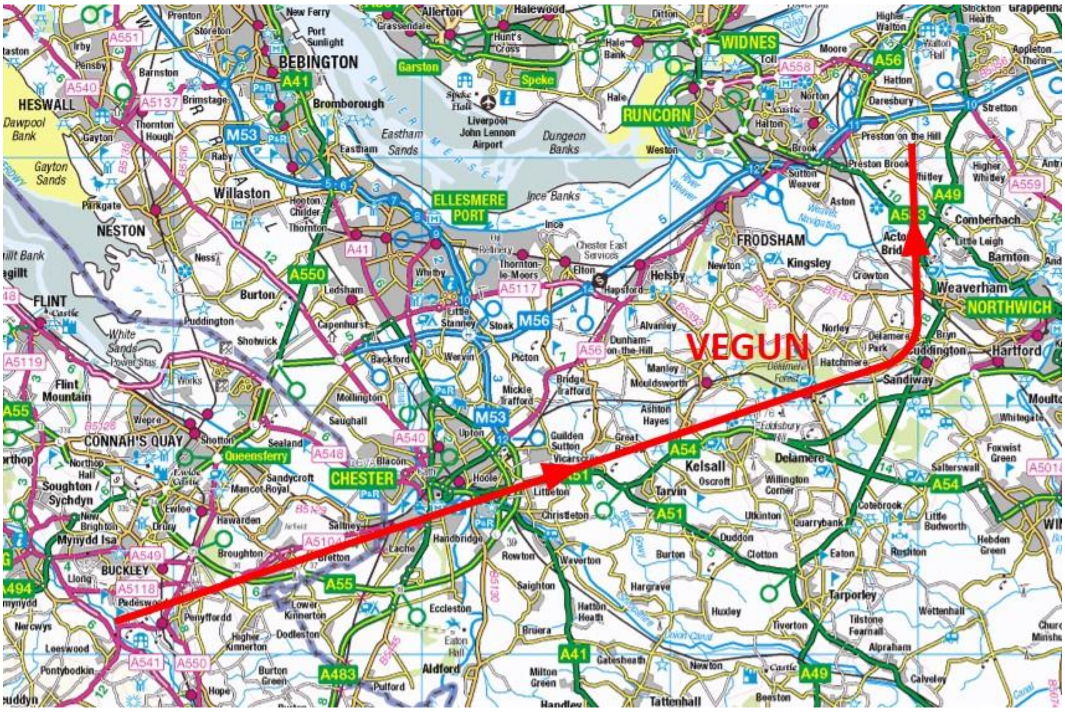


Figure 27 - Runway 27 Transition VEGUN

4.4.4 Runway 27 Transition VEGUN (CC05)

This alternate option for aircraft arriving from VEGUN is required when LJLA are operating on Runway 27 and Manchester Airport are operating on Runway 05. Aircraft arriving at LJLA will be unable to fly the Runway 27 Transition VEGUN procedure described above due to the proximity to aircraft arriving at Manchester Airport. Aircraft will route in a northerly direction towards Birkenhead Docks, at which point aircraft will turn right and following the same east bound track and height restriction as Runway 27 Transition DIOUF.

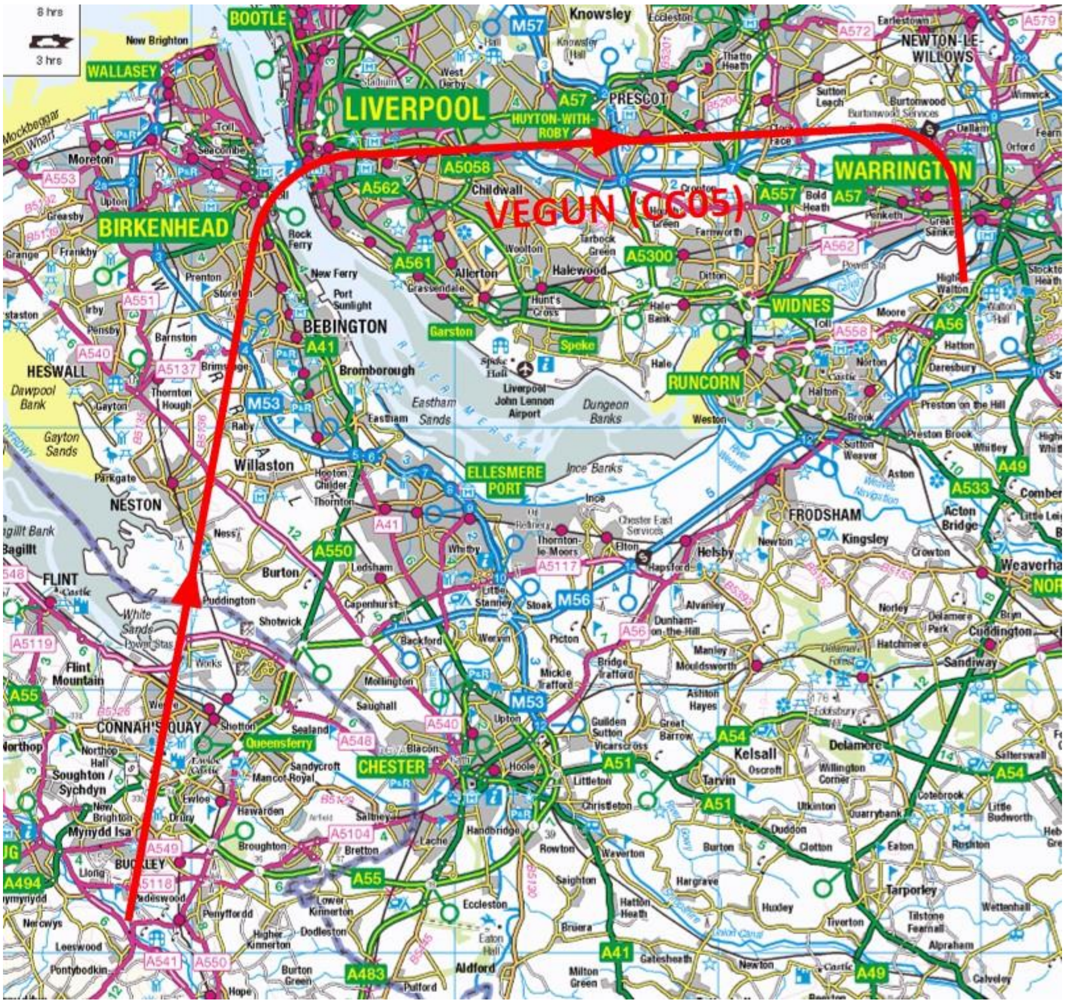


Figure 28 - Runway 27 Transition VEGUN (CC05)

4.4.5 Runway 09 Transition DIOUF

When operating on Runway 09, aircraft approaching LJLA from the north or east will initially follow the same route Runway 27 Transition DIOUF. On reaching the Crosby area, aircraft will continue to track in a westerly direction over the sea before turning left onto south to route oversea towards the River Dee estuary. Aircraft will descend from approximately 12,000 ft at DIOUF join the approach procedure at 2,500 ft whilst still oversea.

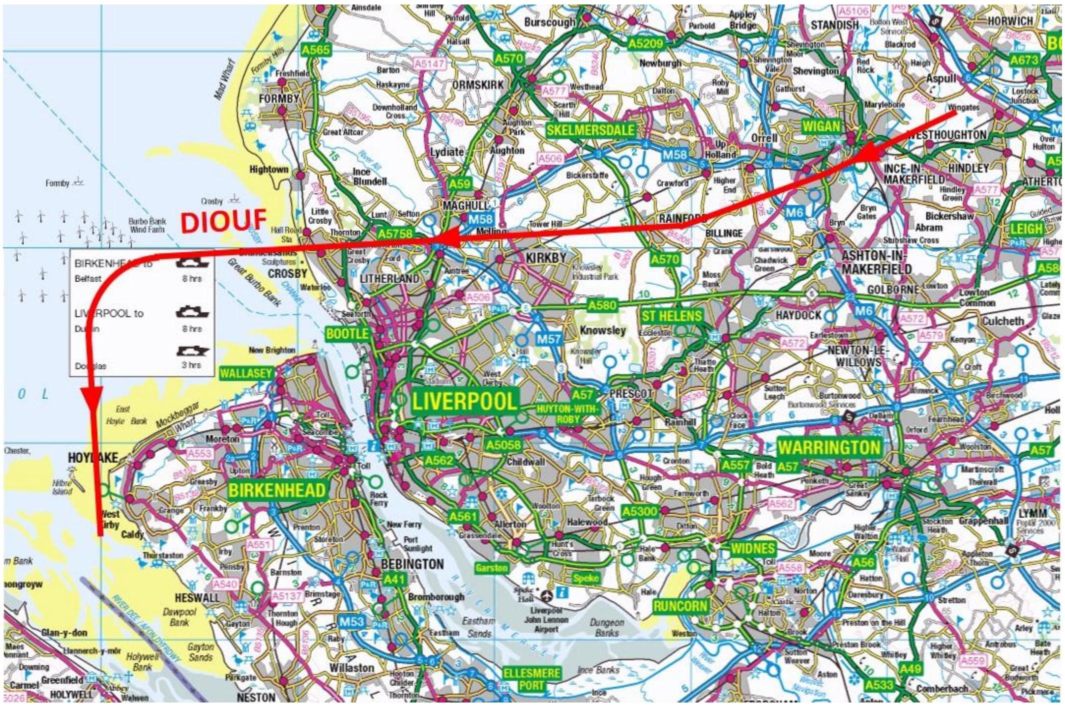


Figure 29 - Runway 09 Transition DIOUF

4.4.6 Runway 09 Transition NOMSU

Aircraft will remain over the sea throughout this transition procedure, routing in a south easterly direction to join the approach procedure at 2,500 ft over the River Dee estuary.

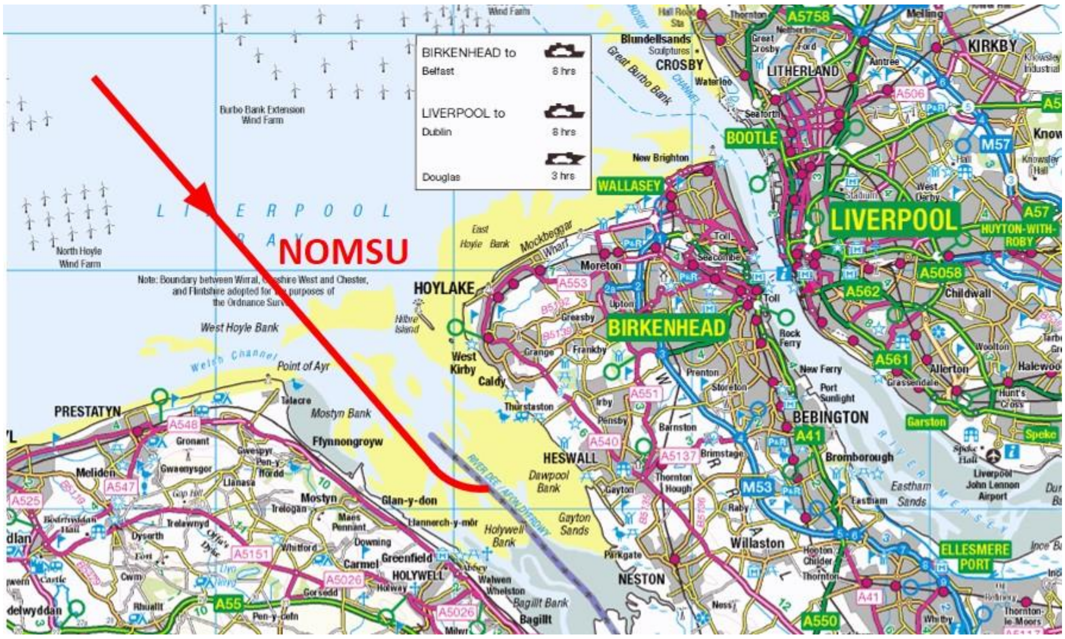


Figure 30 - Runway 09 Transition NOMSU

4.4.7 Runway 09 Transition VEGUN

Aircraft will route in a north westerly direction initially before turning right onto a northerly heading to join the approach procedure at 2,500 ft.

Figure 31 - Runway 09 Transition VEGUN

4.5 Instrument Approach Procedure

The Instrument Approach Procedure (IAP) is the final stage of flight as an aircraft arrives at the airport to land, detailing the route and descent profile that an aircraft must follow to safely avoid ground obstacles in the final, critical stages of flight. It also includes a Missed Approach Procedure (MAP), and an associated Hold position, that defines what the aircraft should do in the event of not being able to land. A MAP is the flightpath an aircraft will follow if, for some reason, it is not able to complete its approach to the runway; it is sometimes referred to as a 'go-around'. It should be noted that the number of aircraft that actually perform a MAP is very low (less than 10 per week) and this is usually the result of poor weather at the airport.

An IAP is designed to align an aircraft in a direction that will enable it to make a safe approach to land at the designated runway at the airport. From approximately 8-10 miles from landing, only minor adjustments to the aircraft's direction can be made. The route that the aircraft fly in these final stages of flight will remain the same as today albeit the track will now be described and used with reference to GNSS rather than ground-based technology.

The Initial Approach Fix (IAF)[12] for these procedural approaches are points generally 4-5 miles and 90° away from the extended centreline (the route the aircraft will fly to land), so that the aircraft can safely manoeuvre onto the required direction to make

[12] Initial Approach Fix (IAF) is the point where the Approach procedure begins – if the approach is T-bar shaped then it will have two IAFs, one on either end of the crossbar of the 'T'. An aircraft will fly to one of the IAFs depending on the direction they are coming from (north or south in the case of LJLA) and then make a turn to fly down the long segment of the 'T' which is lined up to the runway.

an approach. LJLA are planning to introduce one approach procedure for each of the runway directions and these procedures are outlined in the following paragraphs.

4.5.1 Approach Runway 27

Aircraft will join the approach procedure at an altitude anticipated to be in the region of 2,000-2,500 ft, from the Transition procedure to the north or south, depending on the direction that they have arrived from. Aircraft will turn onto the runway heading and be lined up with the runway from approximately 8 miles away.

In the event that a successful landing cannot be made, the aircraft may be given ATC vectors to immediately perform another approach to land, or may be required to follow the MAP. If following the MAP, aircraft will continue on runway heading and climb to 2,500 ft. Once west of the M53 motorway past Bromborough on the Wirral, aircraft will turn right and route direct to the Hold position, which is located over the sea, approximately 2 miles north west of Hoylake. From the Hold position, shown in Figure 32 below as the 'racetrack' shape over the sea, aircraft will be directed by ATC to re-join the approach procedure to carry out a further attempt to land.

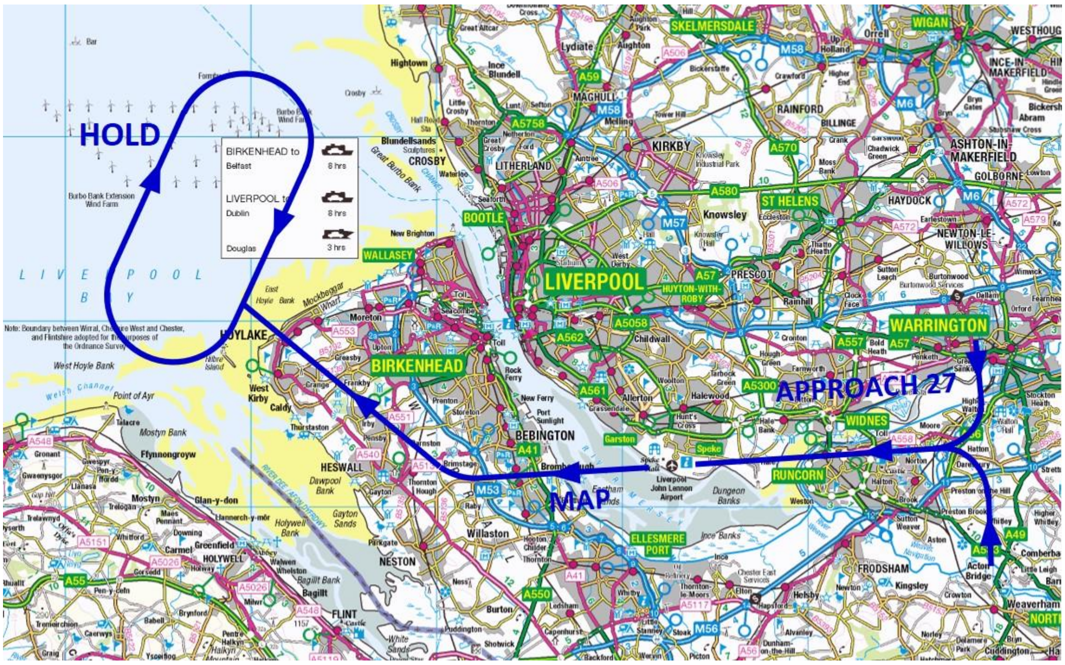


Figure 32 - Approach Runway 27

4.5.2 Approach Runway 09

Aircraft will join the approach procedure at an altitude anticipated to be in the region of 2,000-2,500ft, from the Transition procedure to the north, south or west, depending on the direction that they have arrived from. Aircraft will turn onto the runway heading and be lined up with the runway from approximately 8 miles away.

In the event that a successful landing cannot be made, the aircraft may be given ATC vectors to immediately perform another approach to land, or may be required to follow the MAP. If following the MAP, aircraft will continue on runway heading for approximately 3 miles, commencing a climb to 2,500 ft. Aircraft will make a continuous left-hand turn and route direct to the Hold position (racetrack shape in Figure 33), which is located over the sea, approximately 2 miles north west of Hoylake. From the Hold position, aircraft will be directed by ATC to re-join the approach procedure to carry out a further attempt to land.

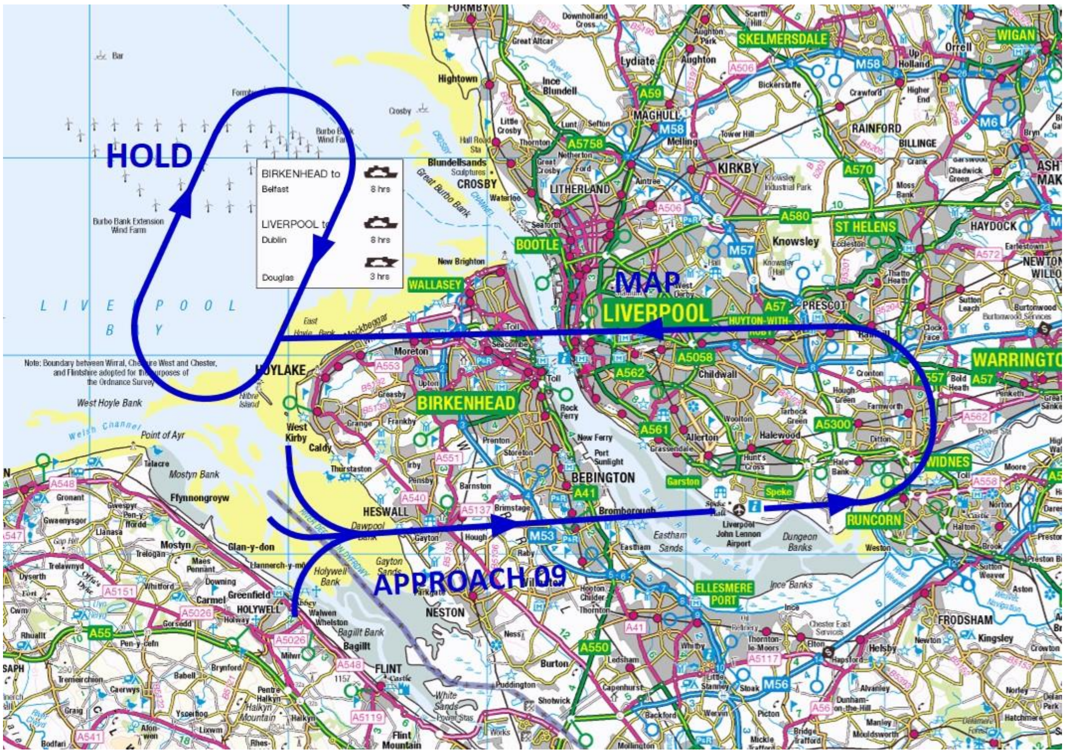


Figure 33 - Approach Runway 09

4.6 Combination Options

The SIDs, Transitions and Approach IFPs are combined in various ways to create an 'operational picture' of where aircraft arriving and departing LJLA will fly. An illustrated example of this is given below in Figure 34. At any given time, and depending on the runway in use, aircraft could be flying any of the promulgated SID procedures to depart from LJLA, and any of the promulgated Transition procedures towards the Approach procedure or aircraft arriving at the airport.

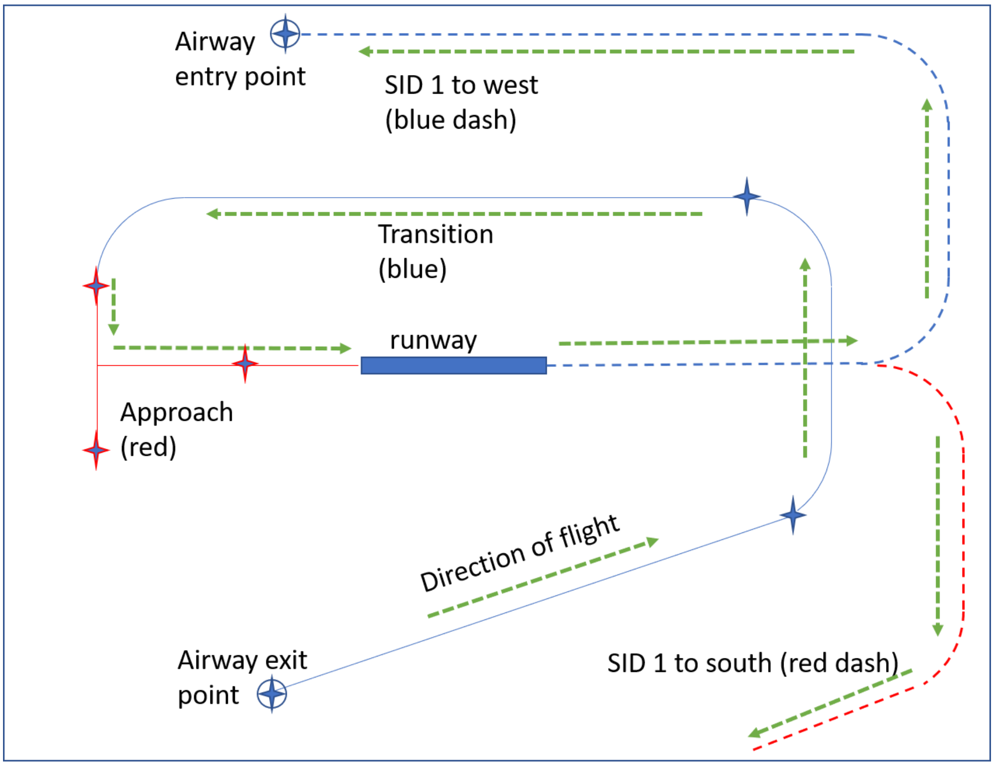


Figure 34 - Example combination of SIDs, Transitions and Approaches

4.7 Preferred Design Combination A for Runway 27

Design Combination A for Runway 27 is our preferred option for the arrival and departure procedures when the wind direction means we are using Runway 27 (taking off to the West). We chose this option following our environmental and operational assessments of all the options. You can view our Full Options Appraisal Summary at Annex A1 to this report, and the complete documentation can be found at Stage 3C on the CAA airspace portal. See the link to our portal entry in Section 12.

Table 1 below shows which of the individual procedures for Runway 27 will be combined to form the Preferred Design Combination A.

SID	Runway 27 SID AGGER AR	Runway 27 SID WAL	Runway 27 SID TEMP2	
Transition	Runway 27 Transition DIOUF	Runway 27 Transition NOMSU	Runway 27 Transition VEGUN	Runway 27 Transition VEGUN (CC05)
Approach	Approach Runway 27			

Table 1 - Runway 27 Preferred Design Combination A

4.8 Alternative Design Combination C for Runway 27

Table 2 below shows which of the individual procedures for Runway 27 will be combined to form the Alternative Design Combination C. This is the only alternative for our procedures when using Runway 27.

SID	Runway 27 SID AGGER	Runway 27 SID WAL	Runway 27 SID TEMP2	
Transition	Runway 27 Transition DIOUF	Runway 27 Transition NOMSU	Runway 27 Transition VEGUN	Runway 27 Transition VEGUN (CC05)
Approach	Approach Runway 27			

Table 2 - Runway 27 Alternative Design Combination C

The procedure that has been changed from the previous combination (A) is replacing the Runway 27 SID AGGER AR with Runway 27 SID AGGER.

4.9 Preferred Design Combination N for Runway 09

Design Combination N for Runway 09 is our preferred option for the arrival and departure procedures when the wind direction means we are using Runway 09 (taking off to the East). We chose this option following our environmental and operational assessments of all the options. You can view our Full Options Appraisal Summary at Annex A1 to this report, and the complete documentation can be found at Stage 3C on the airspace portal. See the link to our portal entry in Section 12.

Table 3 below shows which of the individual procedures for Runway 09 will be combined to form the Preferred Design Combination N.

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN	Runway 09 SID CORKA
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Table 3 - Runway 09 Preferred Design Combination N

There are two alternative combinations for when we are using Runway 09 and these are named 'P' and 'R' and described in paragraphs 4.10 and 4.11 respectively.

4.10 Alternative Design Combination P for Runway 09

Table 4 below shows which of the individual procedures for Runway 09 will be combined to form the Alternative Design Combination P.

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN	Runway 09 SID CORKA Option
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Table 4 - Runway 09 Alternative Design Combination P

The procedure that makes this combination different to the preferred combination described in paragraph 4.9 above is the replacement of the Runway 09 SID CORKA with Runway 09 SID CORKA Option.

4.11 Alternative Design Combination R for Runway 09

Table 5 below shows which of the individual procedures for Runway 09 will be combined to form a further Alternative Design Combination R.

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN Option	Runway 09 SID CORKA
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Table 5 - Runway 09 Alternative Design Combination Option 2 R

The procedure that has been changed from the preferred combination described in paragraph 4.9 above is replacing the Runway 09 SID CAVEN with Runway 09 SID CAVEN Option.

4.12 Further Combining of Options for Assessment

Remember that we will sometimes be using Runway 27 and sometimes be using Runway 09 – this is typically split 70% to 30% of the time due to the prevailing winds favouring Runway 27 for most of the time.

In order to carry out a Full Options Appraisal (including Environmental Assessment) in accordance with CAP 1616, we have to take into account that operations could occur from either end of the runway (although obviously not at the same time) and therefore the combinations of procedures described above for each runway direction are further combined to take into account that operations will occur from both Runway 27 and Runway 09. Sections 5 through 10 of this report describes each combination and shows the environmental impact when the procedures from Runway 27 (A and C above) are combined with procedures from Runway 09 (N, P and R above).

Each of these is then assessed in terms of the difference between the given combinations and the original baseline. The Full Options Appraisal includes an assessment of the environmental impacts including the change in noise, emissions and fuel burn, and shows how we arrived at our preferred combination.

You can view our Full Options Appraisal documentation at Stage 3C on the airspace portal. See the link to our portal entry in Section 12.

4.13 Proposed Implementation Plan

4.13.1 Earliest Implementation Date

Subject to CAA approval, and to further engagement with Manchester and Hawarden Airport's, we would like to implement the final version of this proposal in August 2021. However, this could potentially be later if it helps other airspace users synchronise projects going forward.

4.13.2 Assumptions and Dependencies

We recognise that the proposed changes may have an impact on operations in and out of Manchester Airport hence the ongoing engagement between the two airports. Manchester have also embarked on an ACP to make changes to their routes and at the time of writing this document, they are currently at Stage 1. We anticipate that alignment of the implementation of the proposed routes for LJLA and Manchester Airport would have benefits for both airports.

LJLA recognises that some stakeholders will be affected either positively or negatively by the proposals at both LJLA and Manchester Airport. However, Manchester Airport is currently at an early stage of the airspace design process and it is not currently possible for LJLA to assess the cumulative impact of our proposal against Manchester's. Manchester will follow the same CAP 1616 process as LJLA, engaging and consulting affected stakeholders at the relevant stages. LJLA continues to engage with Manchester Airport to ensure that the proposed changes at LJLA can be introduced safely and in consideration of the operational interdependencies with our neighbouring airport.

4.14 So what would we like you to consider?

Over the next few sections of this document (Sections 5 through 10), we will present you with images containing six combinations of the design options (A, C, N, P and R) described in paragraphs 4.7 to 4.11 above.

In each combination, we have selected a design combination for Runway 27 (either A or C) and a combination for runway 09 (either N, P or R). Each combination pair are shown on an Ordnance Survey (OS) roadmap background. The same images are also shown in a larger size in Appendix A2. We would like you to consider each option and provide us with your comments.

See Section 12 for further information on how to participate in this consultation.

5 Procedure Combination A-N

5.1 Combination A-N – Our Preferred Option

The combination, A-N, is preferred by LJLA as a result of the findings in our Full Options Appraisal. A reminder of the individual procedures that make up each combination is shown in the tables below. The descriptions of the procedures can be found in paragraphs 4.3 to 4.5.

5.1.1 Combination A

SID	Runway 27 SID AGGER AR	Runway 27 SID WAL	Runway 27 SID TEMP2	
Transition	Runway 27 Transition DIOUF	Runway 27 Transition NOMSU	Runway 27 Transition VEGUN	Runway 27 Transition VEGUN (CC05)
Approach	Approach Runway 27			

5.1.2 Combination N

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN	Runway 09 SID CORKA
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Figure 35 below shows combination A for Runway 27. Figure 36 shows combination N for Runway 09.

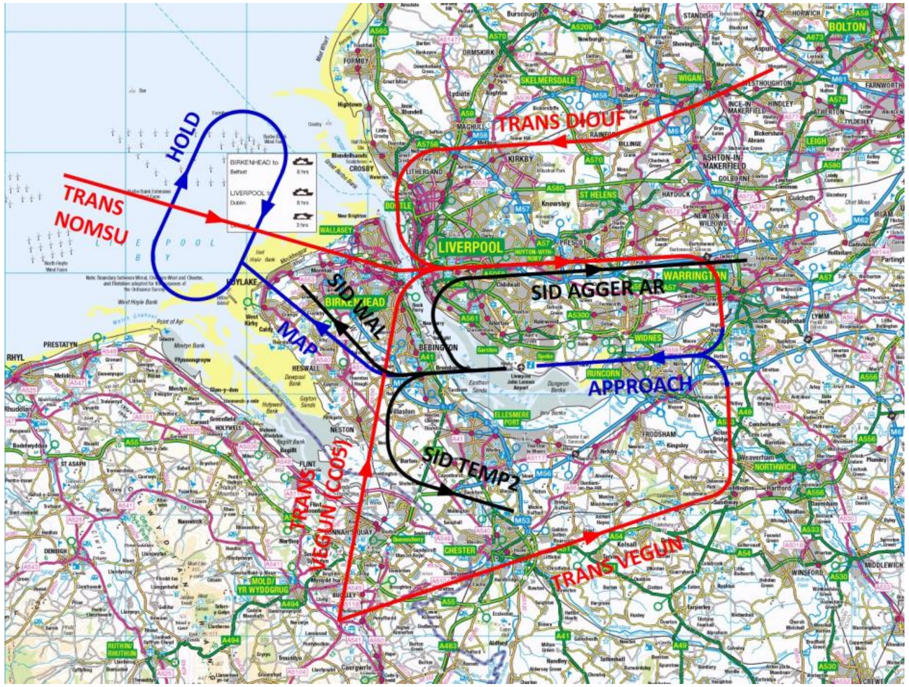


Figure 35 - Runway 27 Preferred Design Combination A

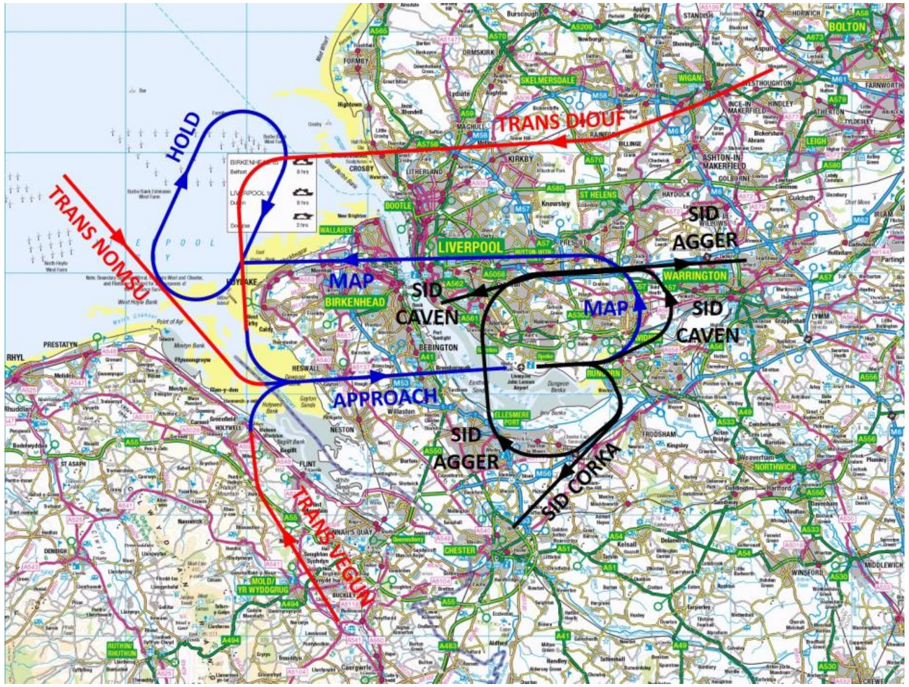


Figure 36 - Runway 09 Preferred Design Combination N

5.2 Procedure Combination A-N Noise Contours

Figure 37 below shows the calculated noise contour, for the forecast year 2031, for combination A-N representing the areas around the airport within which average noise levels can be expected to exceed 51dBA $L_{Aeq\ 16hr}$; this represents the average noise levels for the 16-hour period between 0700 and 2300 hrs during the summer season.

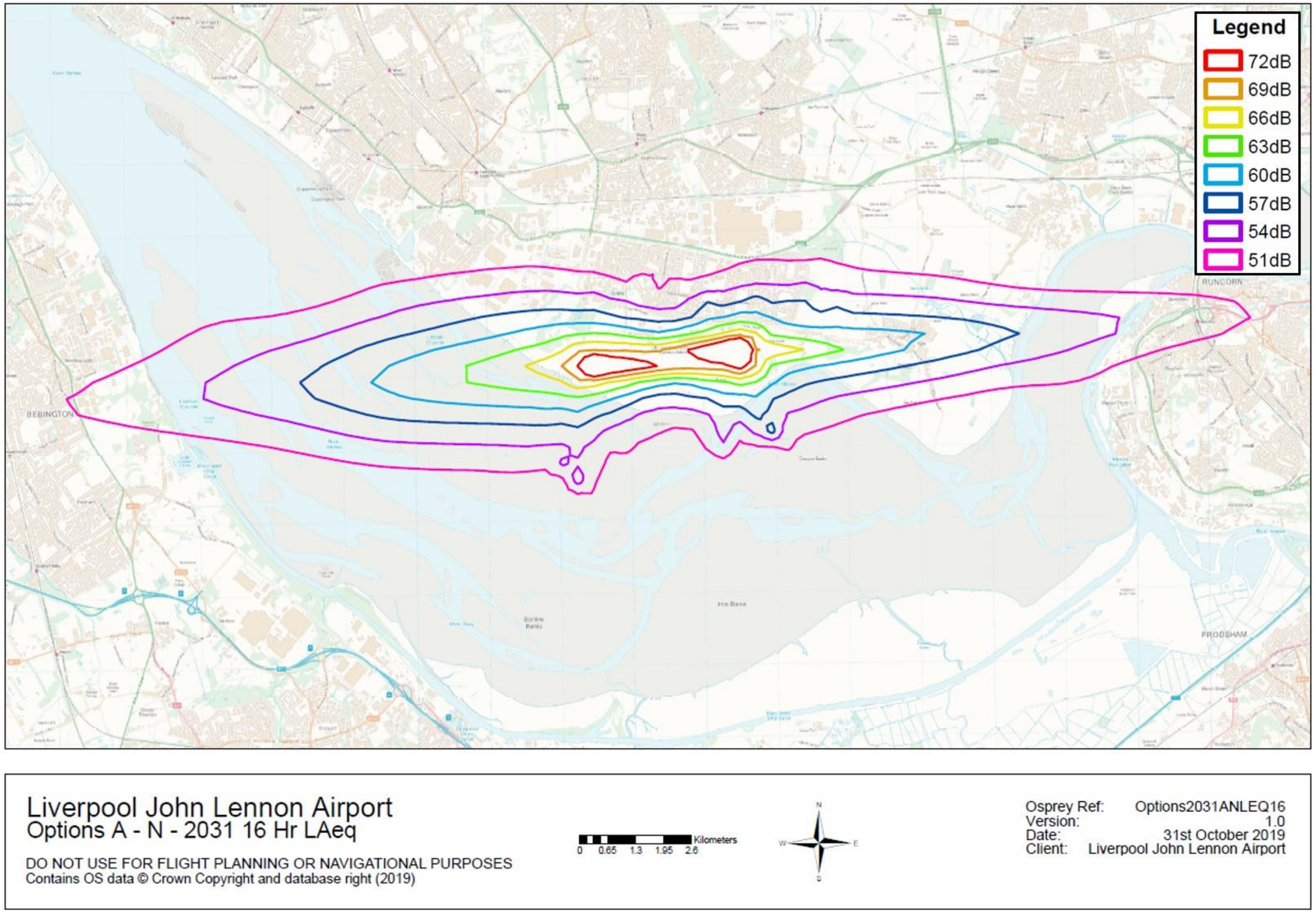


Figure 37 - Procedure Combination A-N 2031 Noise Contour 51dBA $L_{Aeq\ 16hr}$

Figure 38 is the calculated noise contours, for the forecast year 2031, showing the area around the airport within which noise levels can be expected to exceed 45dBA $L_{Aeq\ 16hr}$; this represents the average noise levels for the 8-hour night time period between 2300 and 0700 hrs during the summer season.

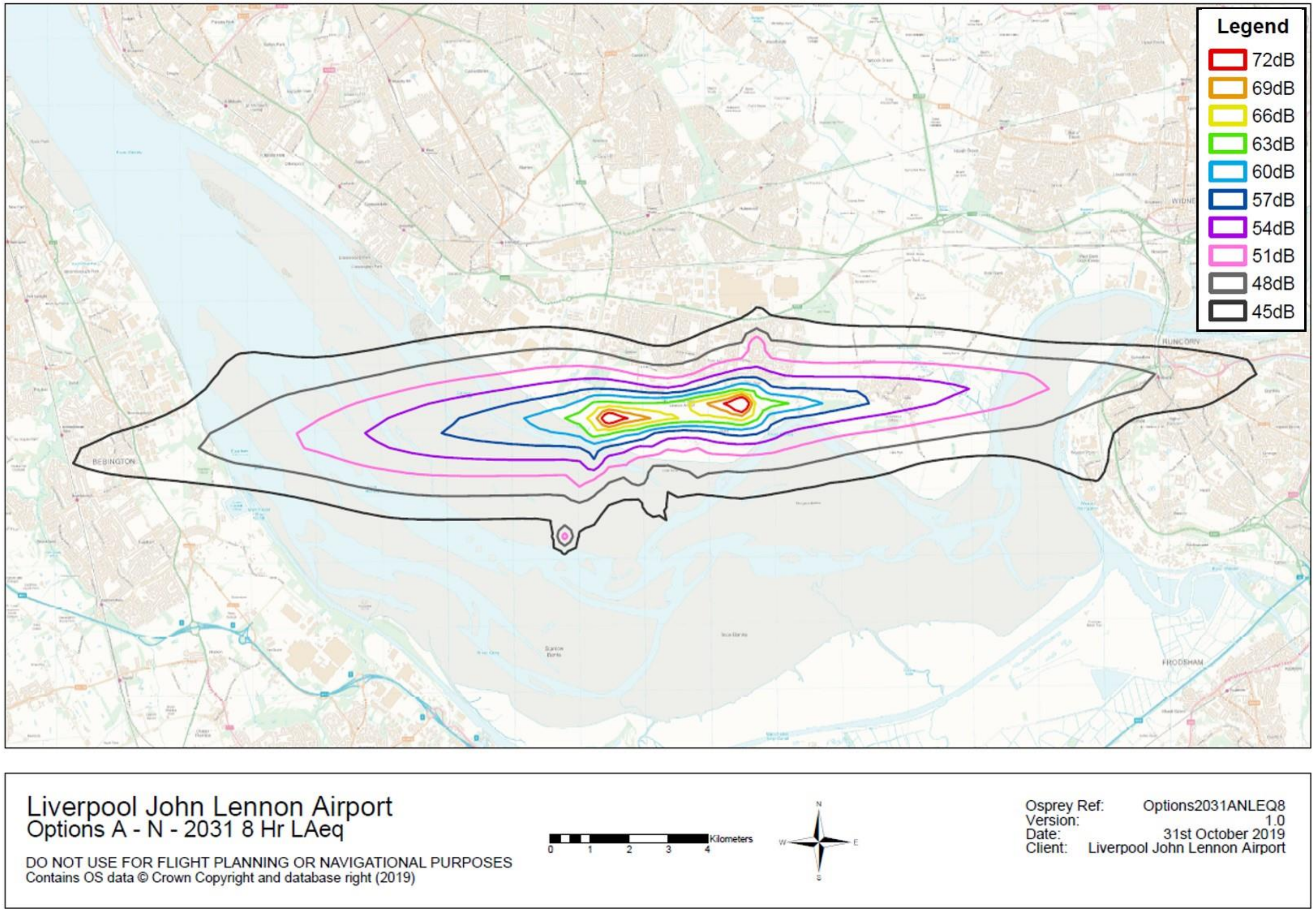


Figure 38 - Procedure Combination A-N 2031 Noise Contour 45dBA $L_{Aeq\ 8hr}$

5.3 Procedure Combination A-N Noise Assessments

Figure 39 and Figure 40 below show the N65 (day) and N60 (night) assessments respectively for combination A-N, predicted for the forecast year 2031. Each contour represents the area around the airport within which the number of events of noise exceeding 65dbA

(N65) in the daytime and exceeding 60dbA (N60) during the night, for an average 24 hours in the summer, would be experienced by people living within the contour.

Night time is defined as between 2300 hrs (11pm) and 0700 hrs (7am).

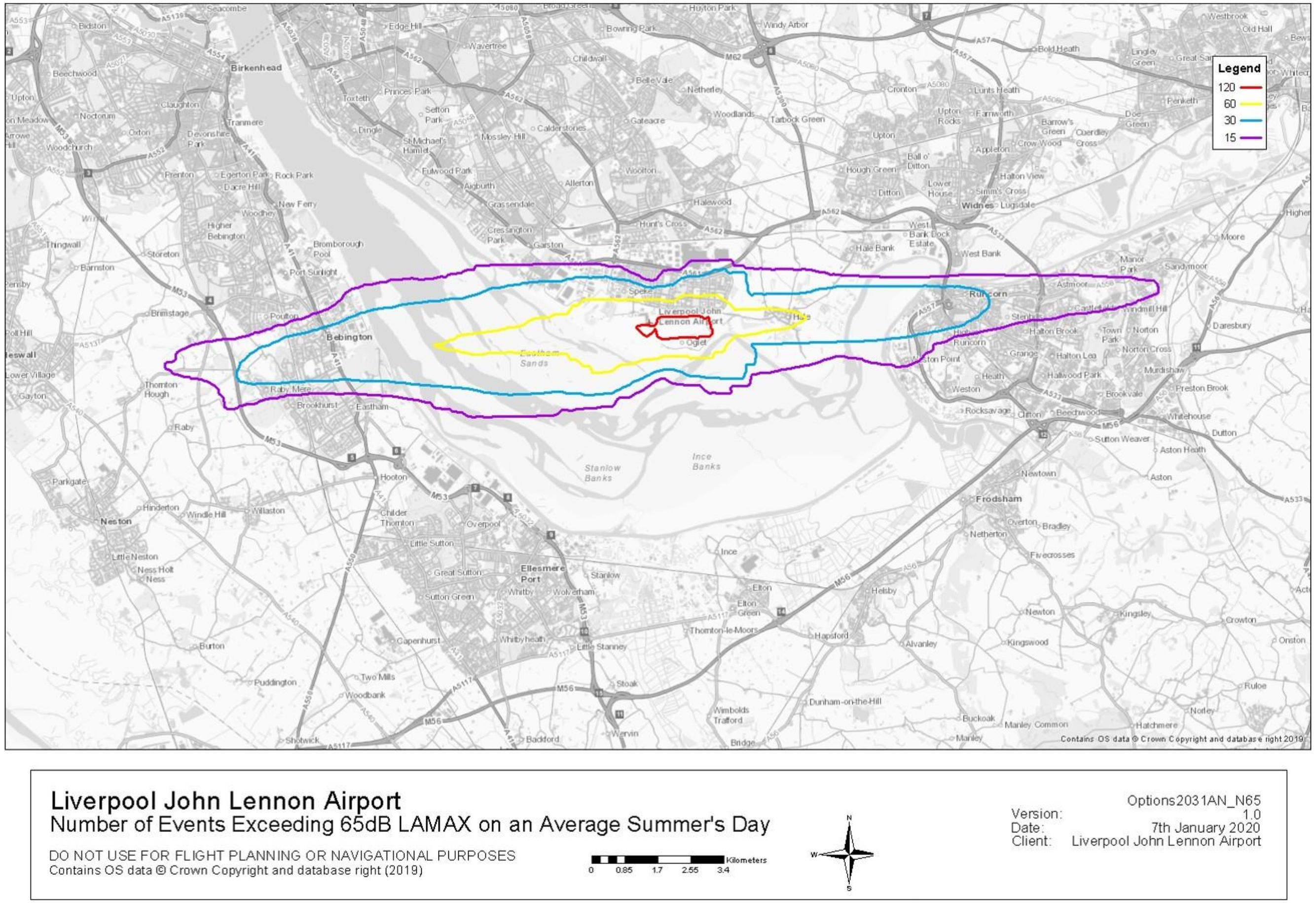


Figure 39 - Procedure A-N Projected Day Operations 2031, events exceeding 65dBA (N65)

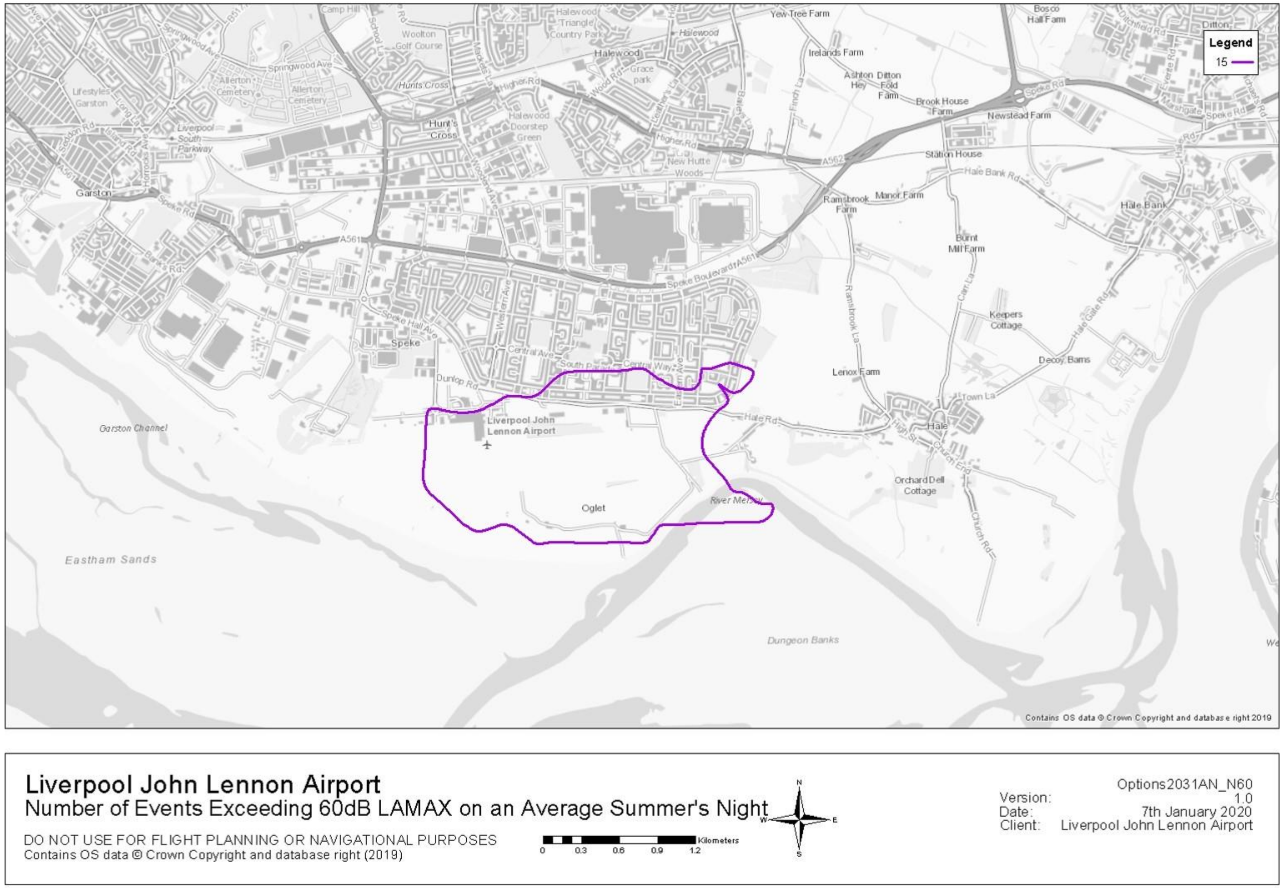


Figure 40 - Procedure A-N Projected Night Operations 2031 events exceeding 60dBA (N60)

6 Procedure Combination C-N

6.1 Combination C-N – Our Preferred Alternative Option

The combination of options C and N is an alternative and is ranked second to the preferred option. A reminder of the individual procedures that make up each combination is shown in the tables below. The descriptions of the procedures can be found in paragraphs 4.3 to 4.5.

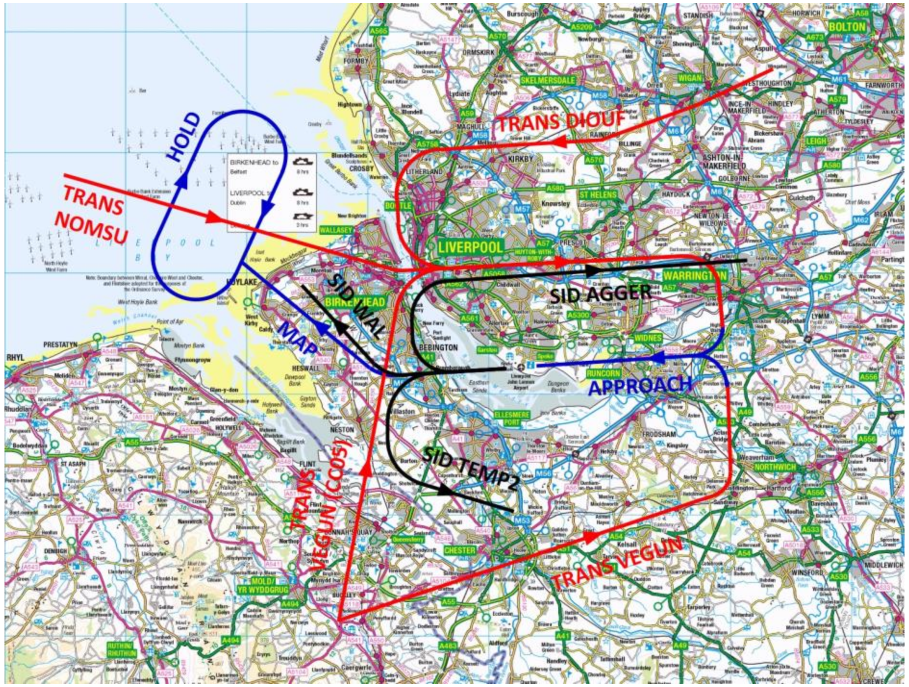
6.1.1 Combination C

SID	Runway 27 SID AGGER	Runway 27 SID WAL	Runway 27 SID TEMP2	
Transition	Runway 27 Transition DIOUF	Runway 27 Transition NOMSU	Runway 27 Transition VEGUN	Runway 27 Transition VEGUN (CC05)
Approach	Approach Runway 27			

6.1.2 Combination N

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN	Runway 09 SID CORKA
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Figure 41 below shows combination C of procedures for Runway 27. SID AGGER is the only procedure to Runway 27 that has changed from combination A. Figure 42 shows the same combination N of procedures for Runway 09 as seen in Section 5 above.



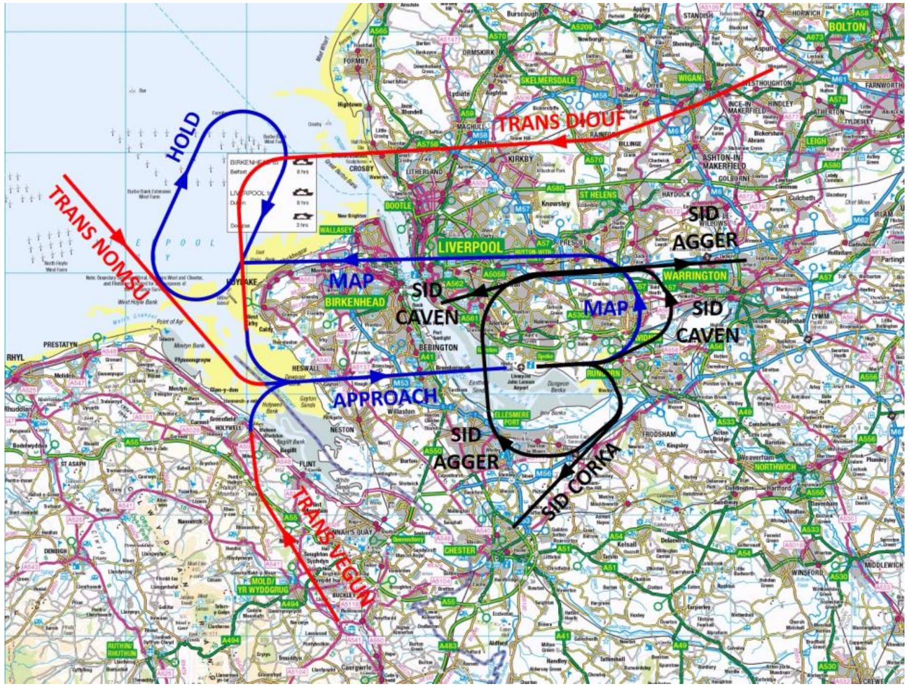


Figure 41 - Runway 27 Alternate Design Combination C

Figure 42 - Runway 09 Preferred Design Combination N

6.2 Procedure Combination C-N Noise Contours

Figure 43 below shows the calculated noise contour for Combination C-N showing the area around the airport within which average noise levels can be expected to exceed 51dBA LAeq 16hr; average noise levels for the 16-hour period between 0700 and 2300 hrs during the summer season.

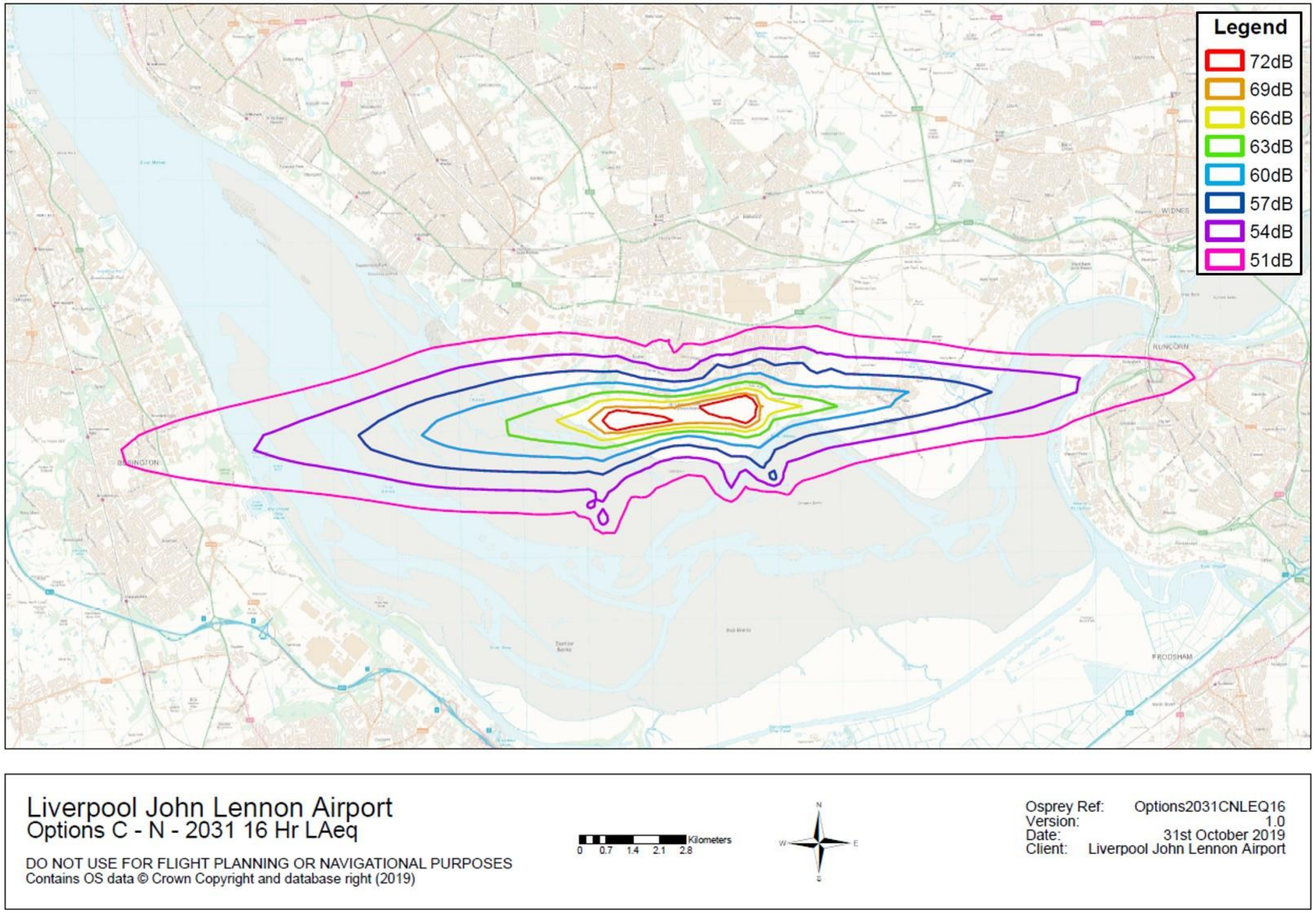


Figure 43 - Procedure Combination C-N 2031 Noise Contour 51dBA $L_{Aeq\ 16hr}$

Figure 44 shows the calculated noise contour for Combination C-N. These are the areas around the airport within which average noise levels can be expected to exceed 45dBA $_{LAeq\ 16hr}$; average noise levels for the 8-hour night time period between 2300 and 0700 hrs during the summer season.

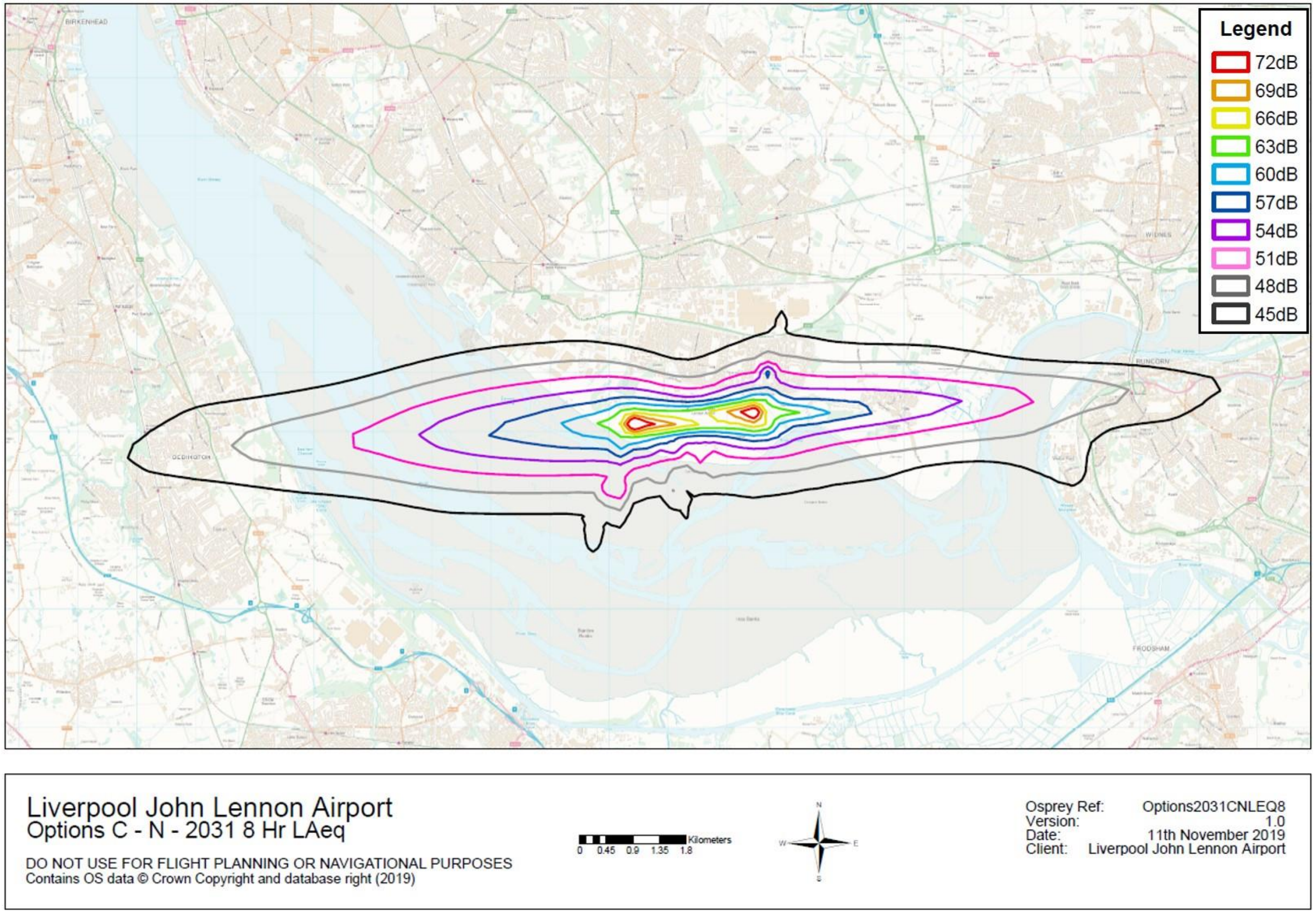


Figure 44 - Procedure Combination C-N 2031 Noise Contour 45dBA $L_{Aeq\ 8hr}$

6.3 Procedure Combination C-N Noise Assessments

Figure 45 and Figure 46 below show the N65 (day) and N60 (night) assessments respectively for combination C-N, predicted for the forecast year 2031. Each contour represents the area around the airport within which the number of events of noise exceeding 65dbA

(N65) in the daytime and exceeding 60dbA (N60) during the night, for an average 24 hours in the summer, would be experienced by people living within the contour.

Night time is defined as between 2300 hrs (11pm) and 0700 hrs (7am).

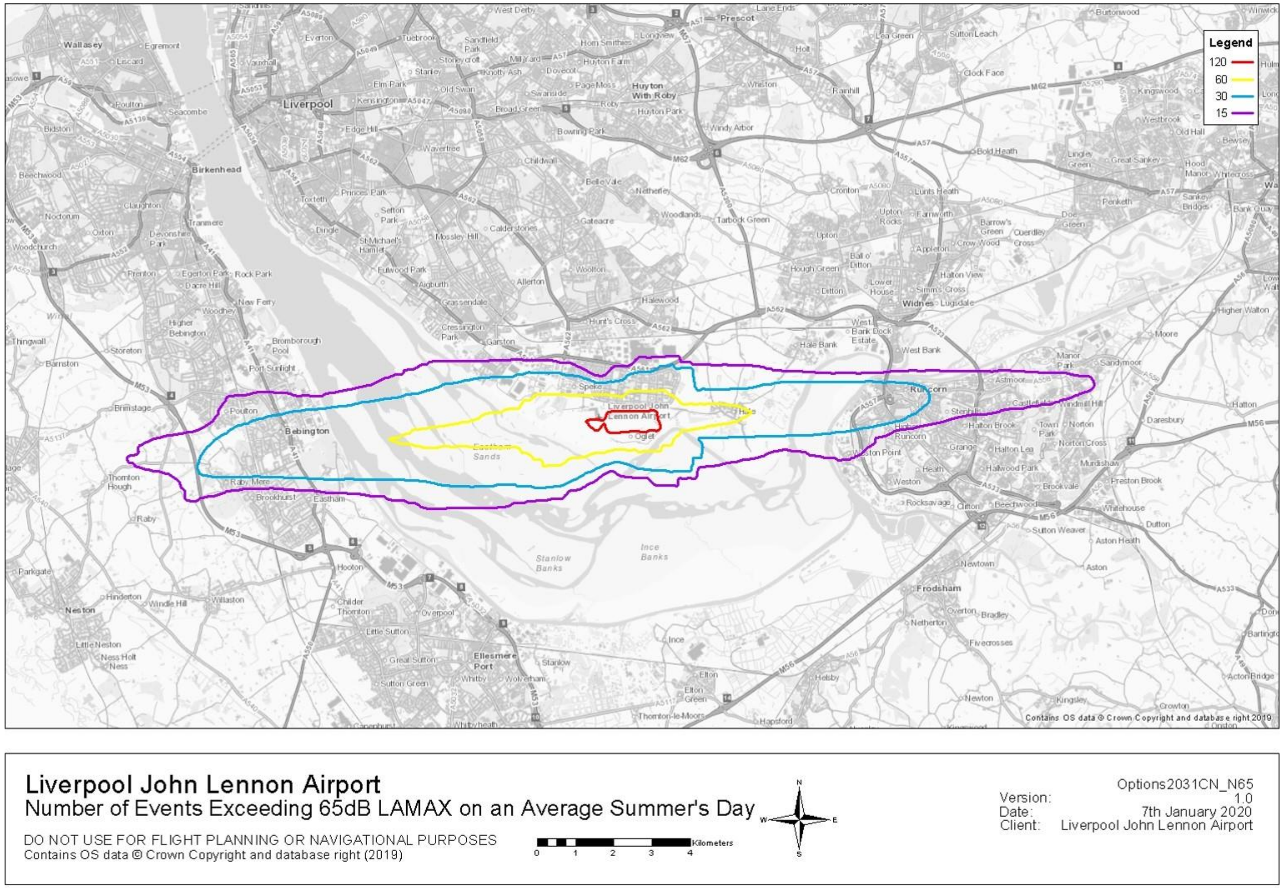


Figure 45 - Procedure C-N Projected Day Operations 2031 Exceeding 65dBA (N65)

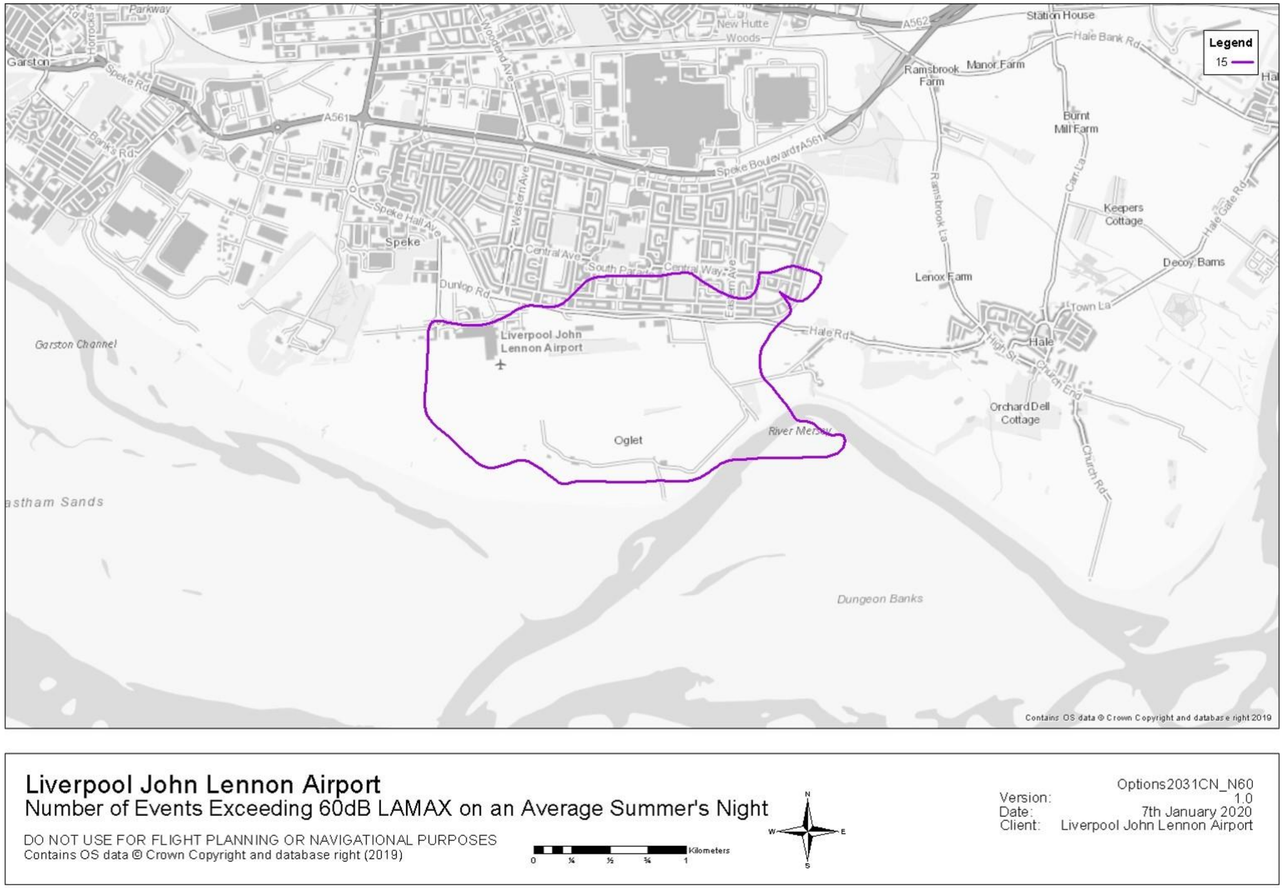


Figure 46 - Procedure C-N Projected Night Operations 2031 Exceeding 60dBA (N60)

7 Procedure Combination A-P

7.1 Combination A-P – An Alternative Option

A reminder of the individual procedures that make up each combination is shown in the tables below. The descriptions of the procedures can be found in paragraphs 4.3 to 4.5.

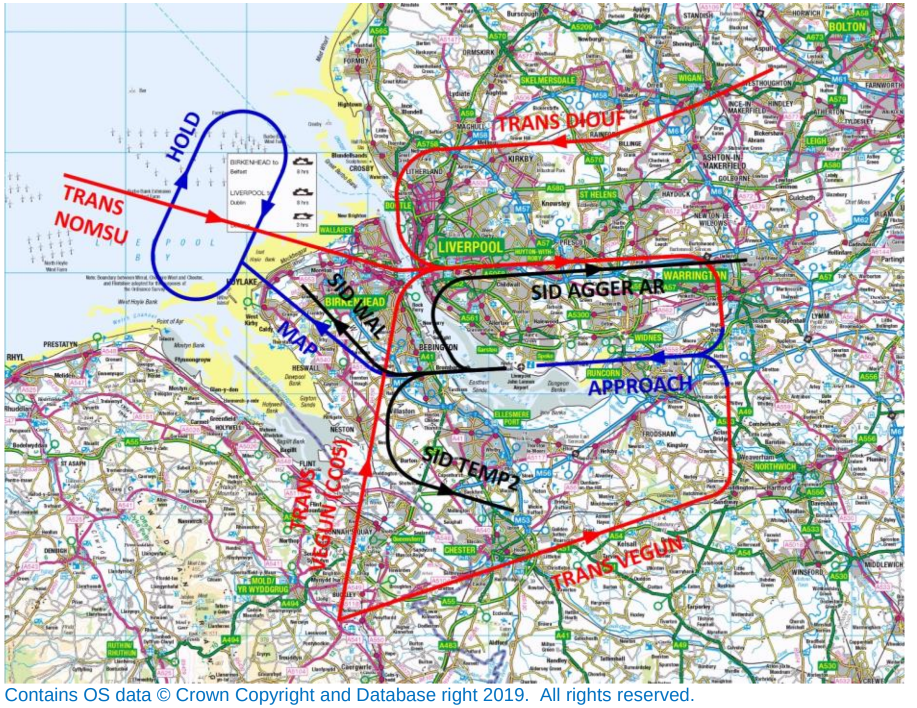
7.1.1 Combination A

SID	Runway 27 SID AGGER AR	Runway 27 SID WAL	Runway 27 SID TEMP2	
Transition	Runway 27 Transition DIOUF	Runway 27 Transition NOMSU	Runway 27 Transition VEGUN	Runway 27 Transition VEGUN (CC05)
Approach	Approach Runway 27			

7.1.2 Combination P

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN	Runway 09 SID CORKA Option
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Figure 47 below shows combination A of procedures for Runway 27 that were previously shown in Section 5. Figure 48 shows combination P of procedures for Runway 09. SID CORKA Option is the only procedure to Runway 09 that has changed from combination N.



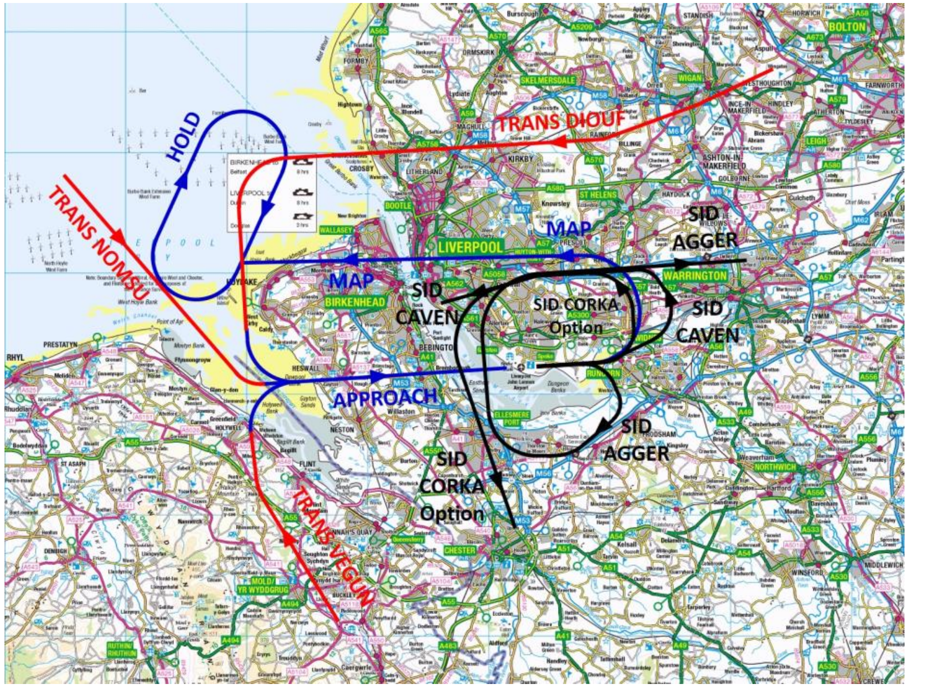


Figure 47 - Runway 27 Preferred Design Combination A

Figure 48 - Runway 09 Alternative Design Combination P

7.2 Procedure Combination A-P Noise Contours

Figure 49 below shows the calculated noise contour for Option A-P showing the areas around the airport within which average noise levels can be expected to exceed 51dBA $_{\text{LAeq 16hr}}$; average noise levels for the 16-hour period between 0700 and 2300 hrs during the summer season.

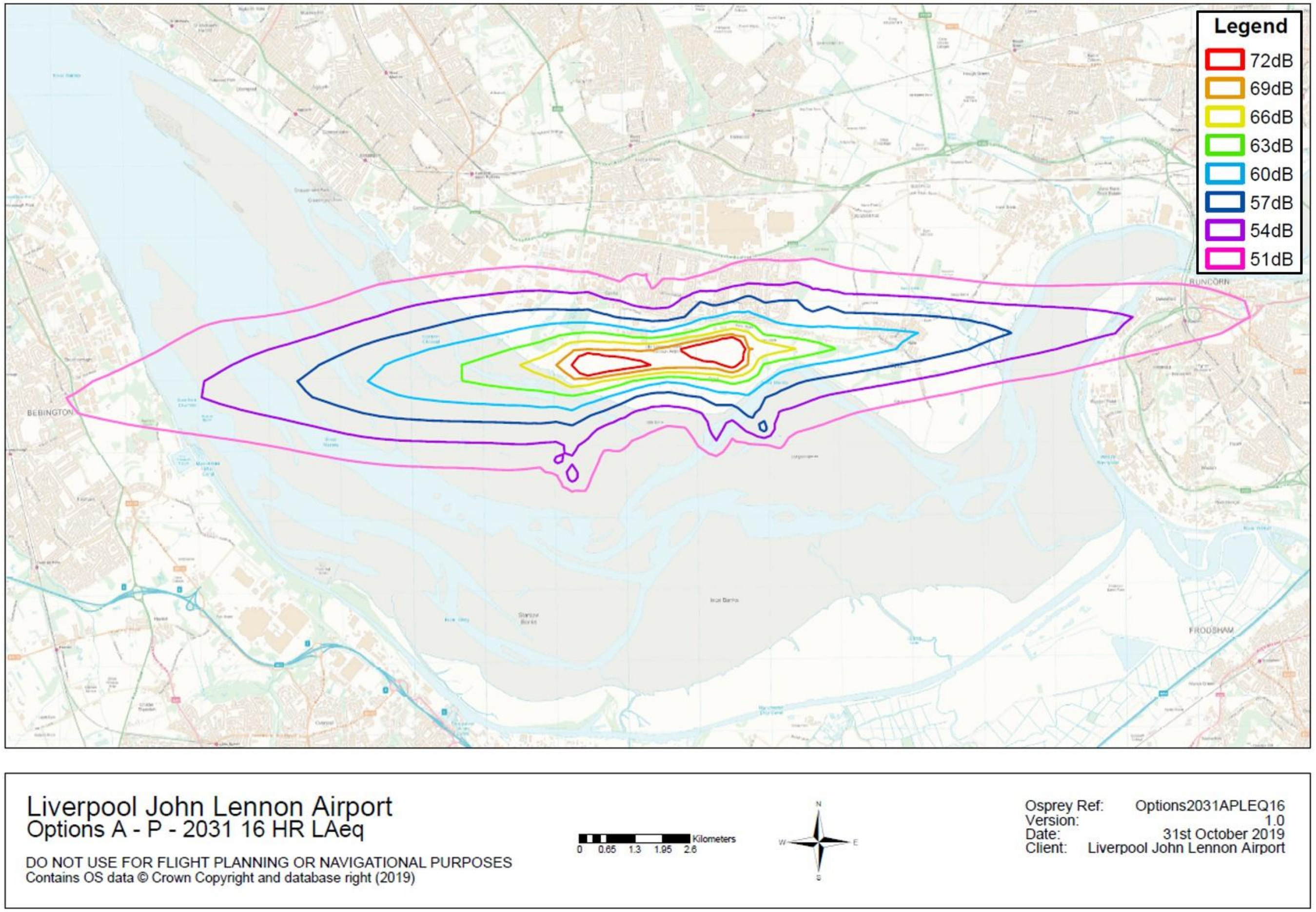


Figure 49 - Procedure Combination A-P 2031 Noise Contour 51dBA $L_{Aeq\ 16hr}$

Figure 50 shows the calculated noise contour for A-P defining the areas around the airport within which average noise levels can be expected to exceed 45dBA $L_{Aeq\ 16hr}$; average noise levels for the 8-hour night time period between 2300 and 0700 hrs during the summer season.

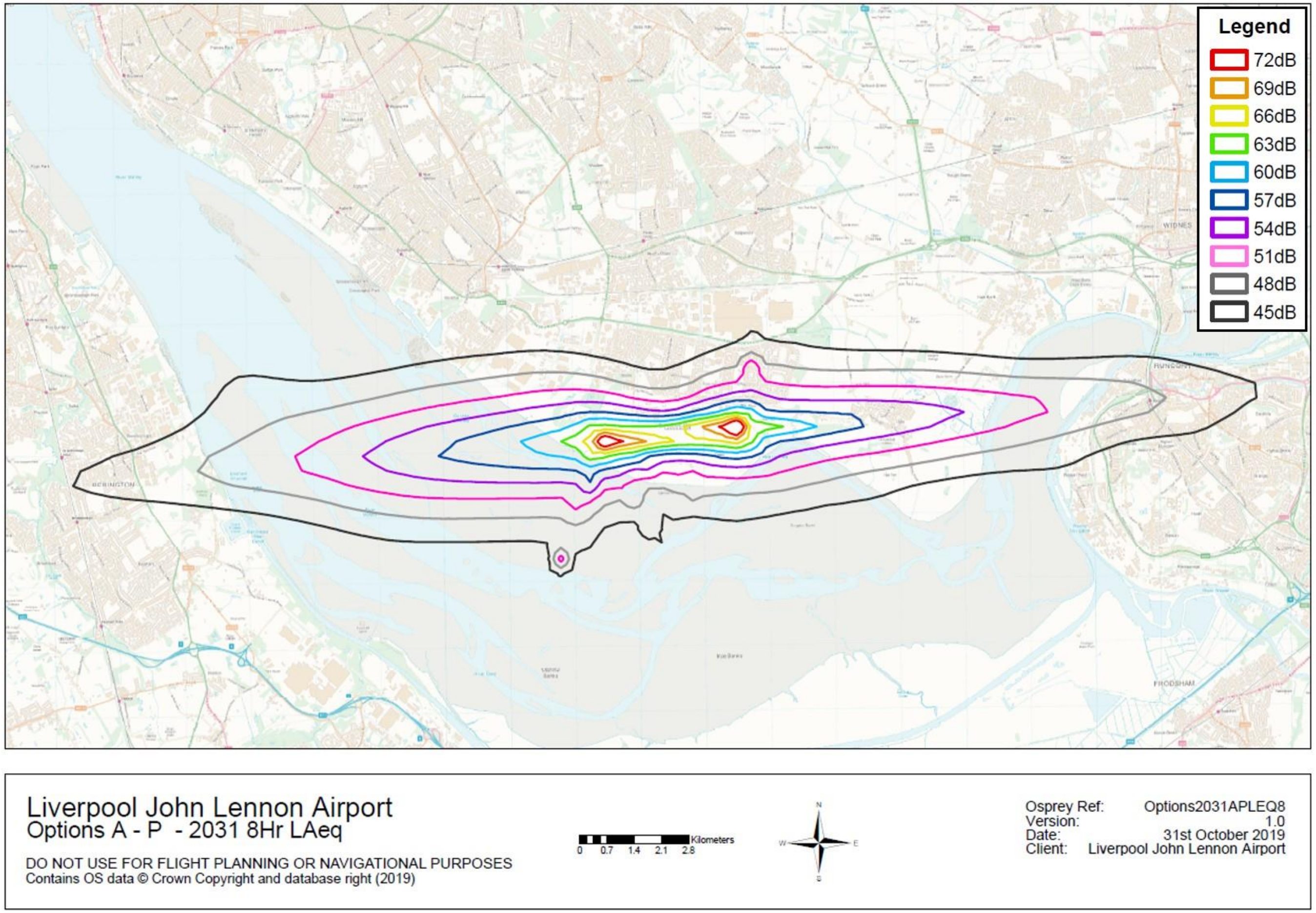


Figure 50 - Procedure Combination A-P 2031 Noise Contour 45dBA $L_{Aeq\ 8hr}$

7.3 Procedure Combination A-P Noise Assessments

Figure 51 and Figure 52 below show the N65 (day) and N60 (night) assessments respectively for combination A-P, , predicted for the forecast year 2031. Each contour represents the area around the airport within which the number of events of noise exceeding 65dbA

(N65) in the daytime and exceeding 60dbA (N60) during the night, for an average 24 hours in the summer, would be experienced by people living within the contour.

Night time is defined as between 2300 hrs (11pm) and 0700 hrs (7am).

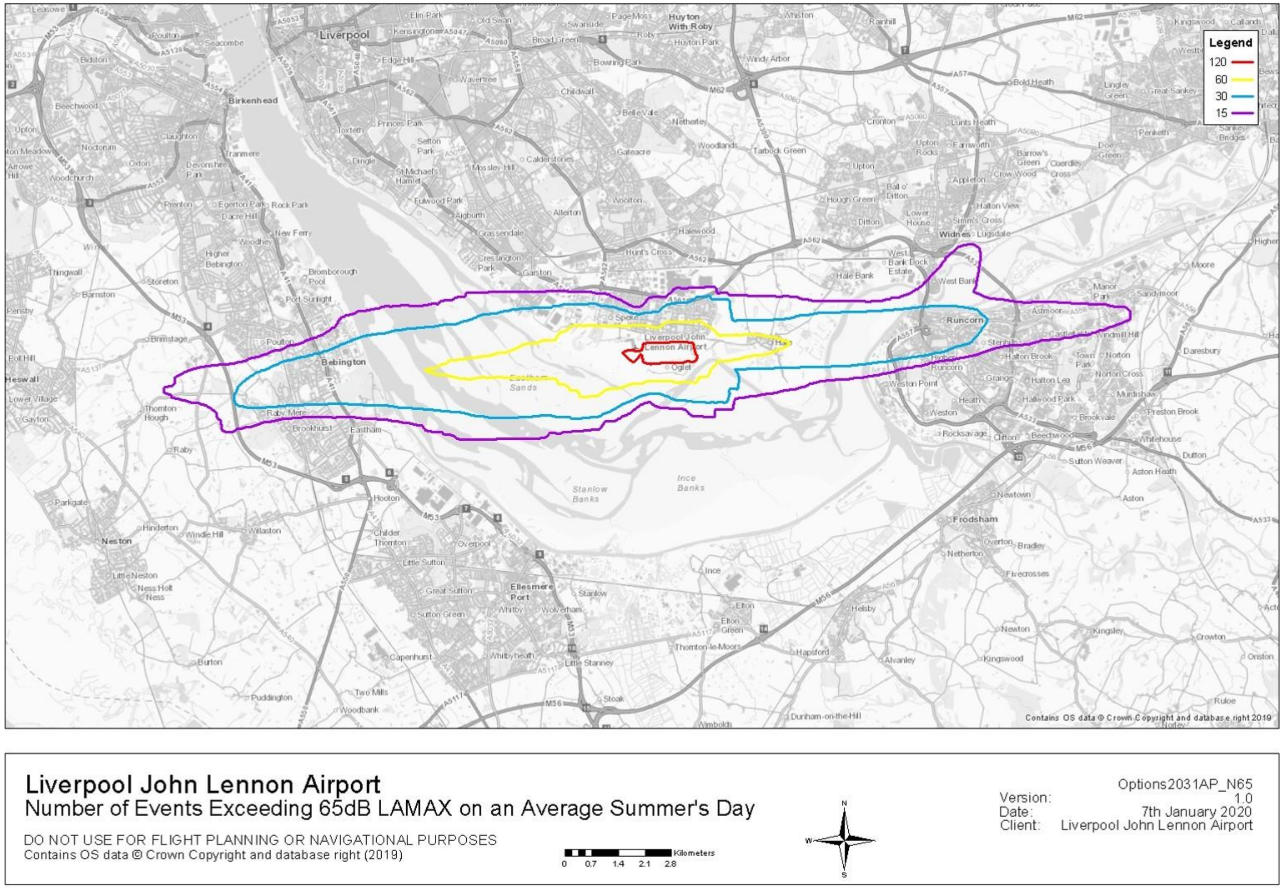


Figure 51 - Procedure A-P Projected Day Operations 2031 Exceeding 65dBA (N65)

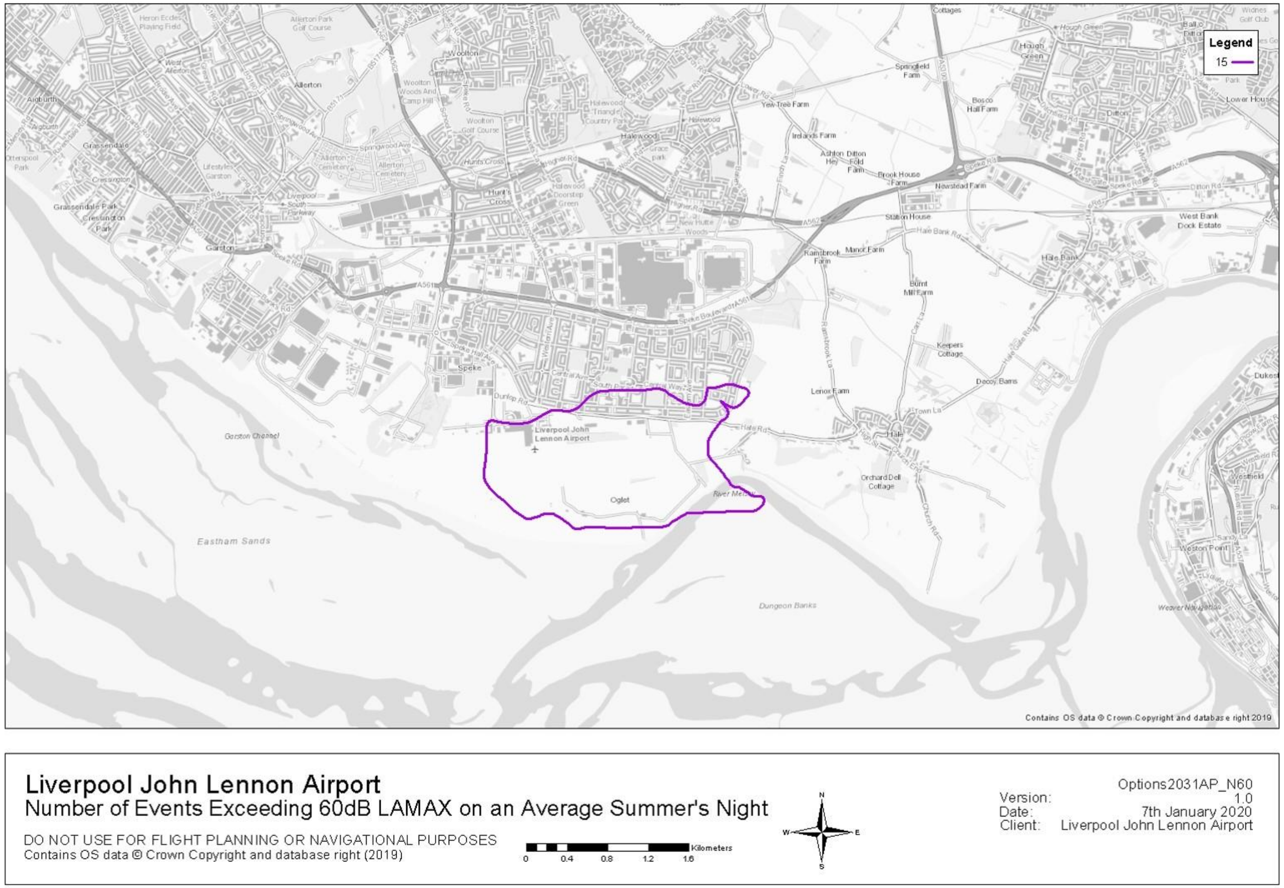


Figure 52 - Procedure A-P Projected Night Operations 2031 Exceeding 60dBA (N60)

8 Procedure Combination C-P

8.1 Combination C-P – an Alternative Option

A reminder of the individual procedures that make up each combination is shown in the tables below. The descriptions of the procedures can be found in paragraphs 4.3 to 4.5.

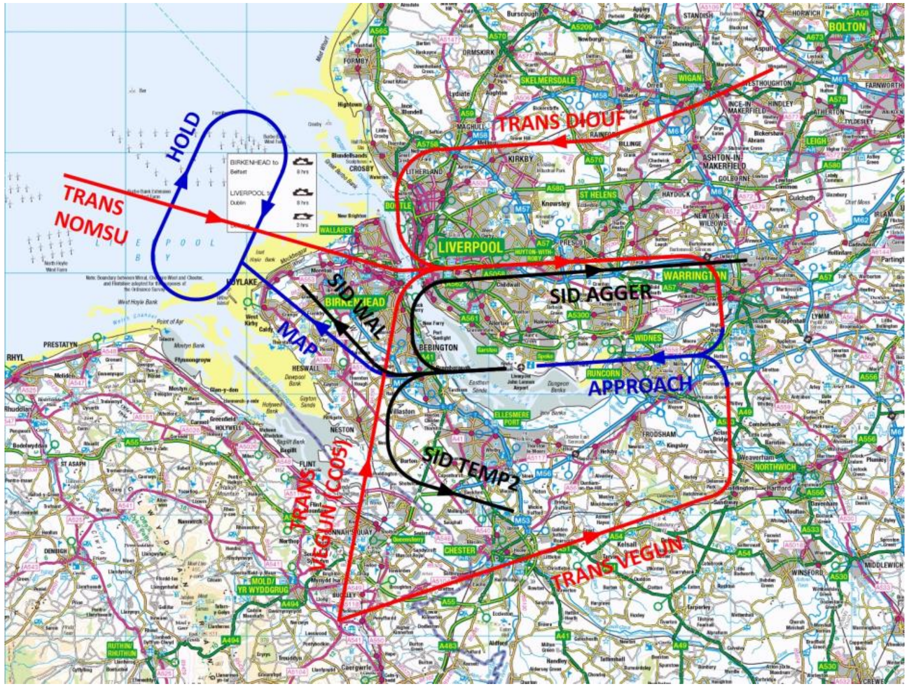
8.1.1 Combination C

SID	Runway 27 SID AGGER	Runway 27 SID WAL	Runway 27 SID TEMP2	
Transition	Runway 27 Transition DIOUF	Runway 27 Transition NOMSU	Runway 27 Transition VEGUN	Runway 27 Transition VEGUN (CC05)
Approach	Approach Runway 27			

8.1.2 Combination P

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN	Runway 09 SID CORKA Option
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Figure 53 below shows combination C of procedures for Runway 27 that were previously shown in Section 6. Figure 54 shows the same combination P of procedures for Runway 09 as seen in Section 7 above.



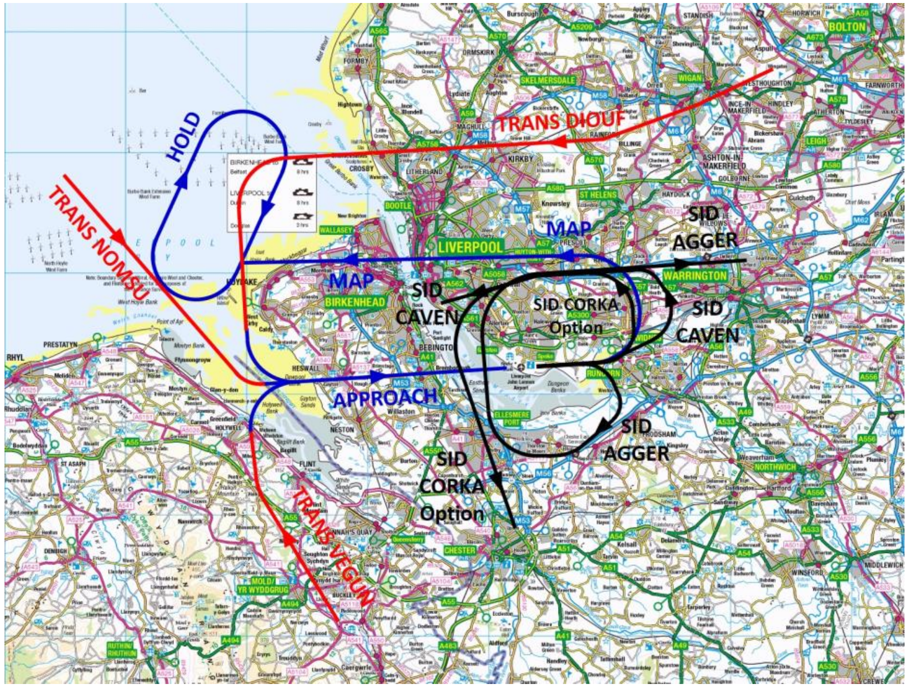


Figure 53 - Runway 27 Alternative Design Combination C

Figure 54 - Runway 09 Alternative Design Combination P

8.2 Procedure Combination C-P Noise Contours

Figure 55 below shows the calculated noise contour for combination C-P defining the areas around the airport within which average noise levels can be expected to exceed 51dBA $_{LAeq\ 16hr}$; average noise levels for the 16-hour period between 0700 and 2300 hrs during the summer season.

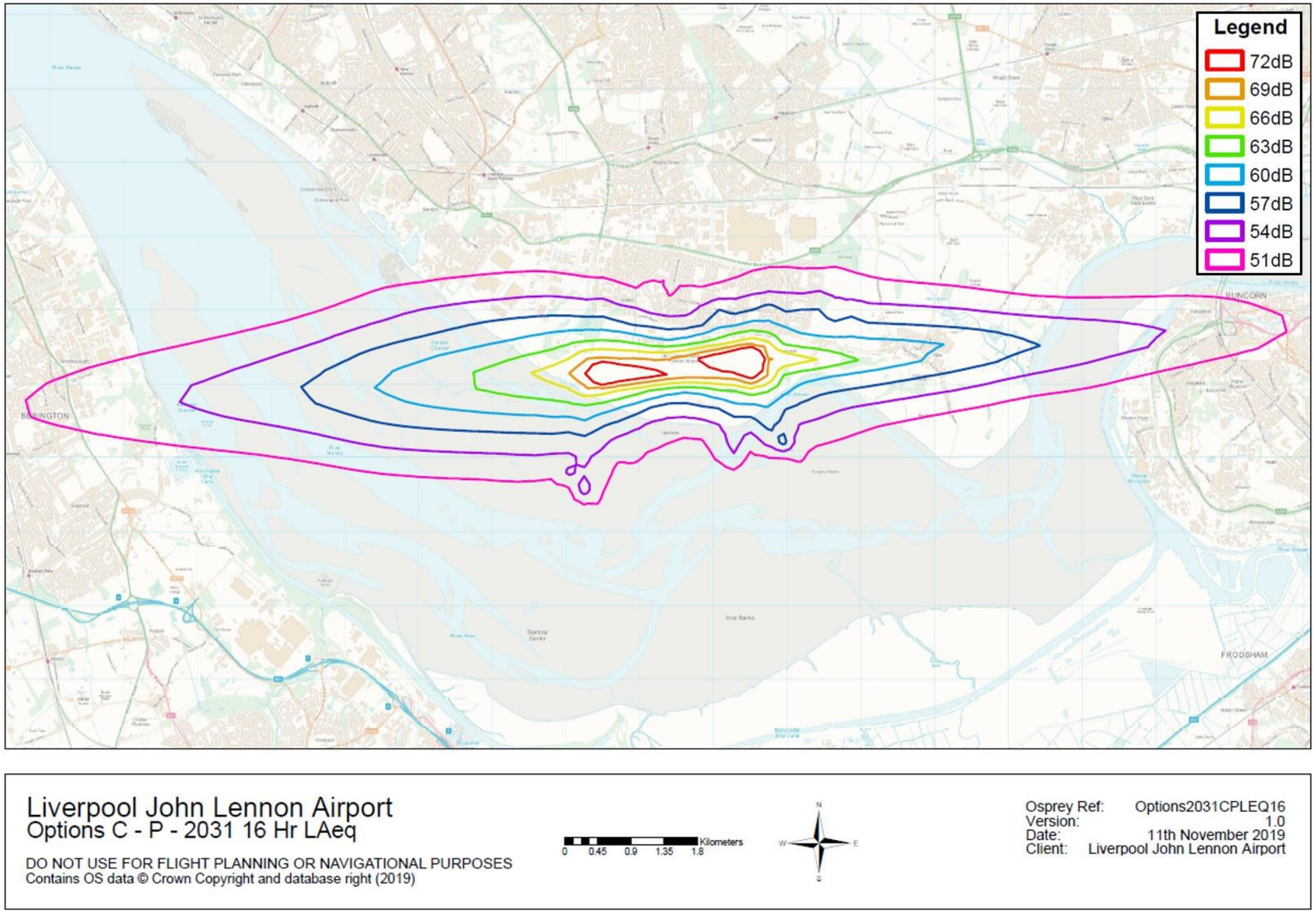


Figure 55 - Procedure Combination C-P 2031 Noise Contour 51dBA $L_{Aeq\ 16hr}$

Figure 56 shows the calculated noise contours for C-P defining the areas around the airport within which average noise levels can be expected to exceed 45dBA $L_{Aeq\ 16hr}$; average noise levels for the 8-hour night time period between 2300 and 0700 hrs during the summer season.

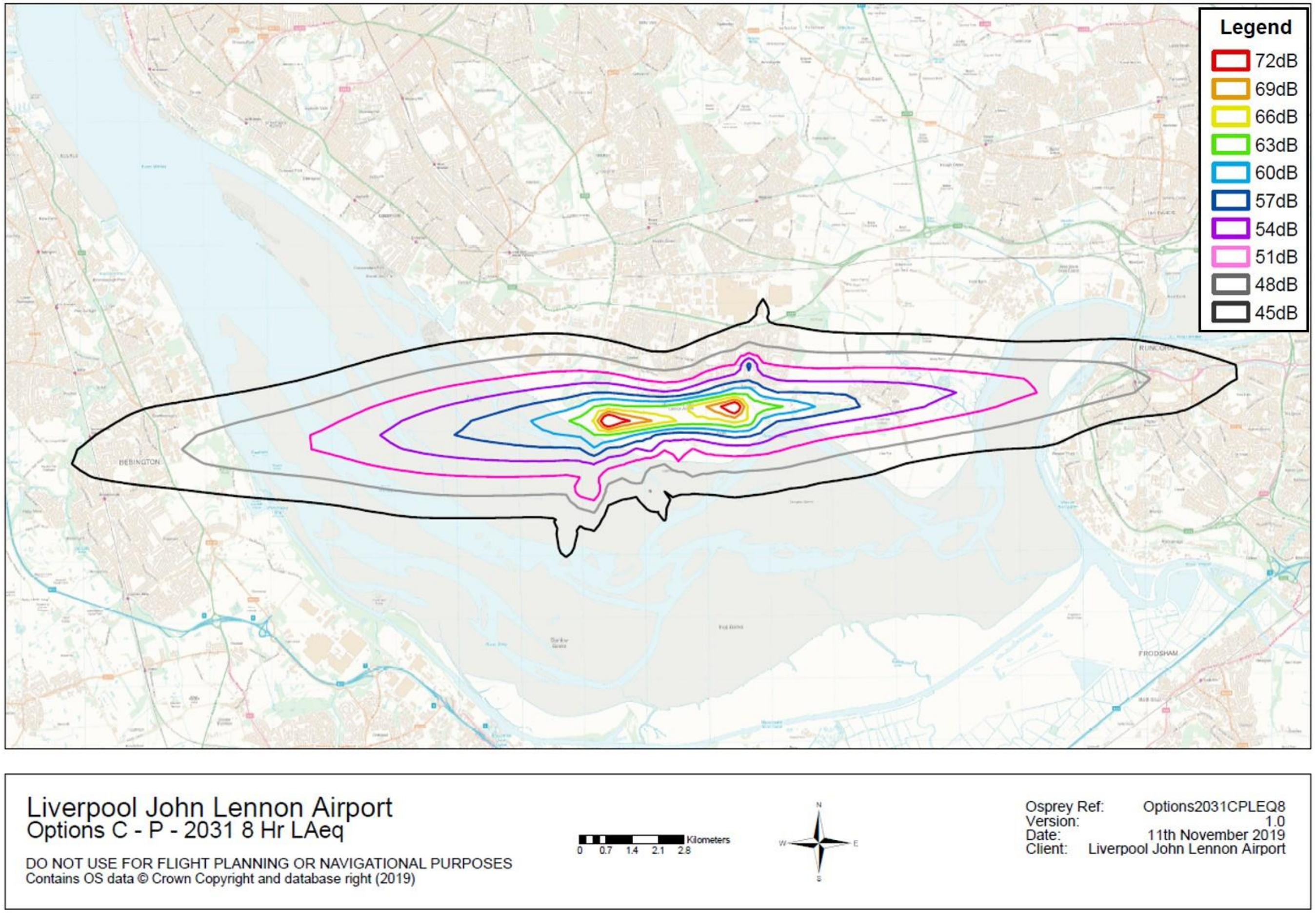


Figure 56 - Procedure Combination C-P 2031 Noise Contour 45dBA $L_{Aeq\ 8hr}$

8.3 Procedure Combination C-P Noise Assessments

Figure 57 and Figure 58 below show the N65 (day) and N60 (night) assessments respectively for combination C-P, , predicted for the forecast year 2031. Each contour represents the area around the airport within which the number of events of noise exceeding 65dbA

(N65) in the daytime and exceeding 60dbA (N60) during the night, for an average 24 hours in the summer, would be experienced by people living within the contour.

Night time is defined as between 2300 hrs (11pm) and 0700 hrs (7am).

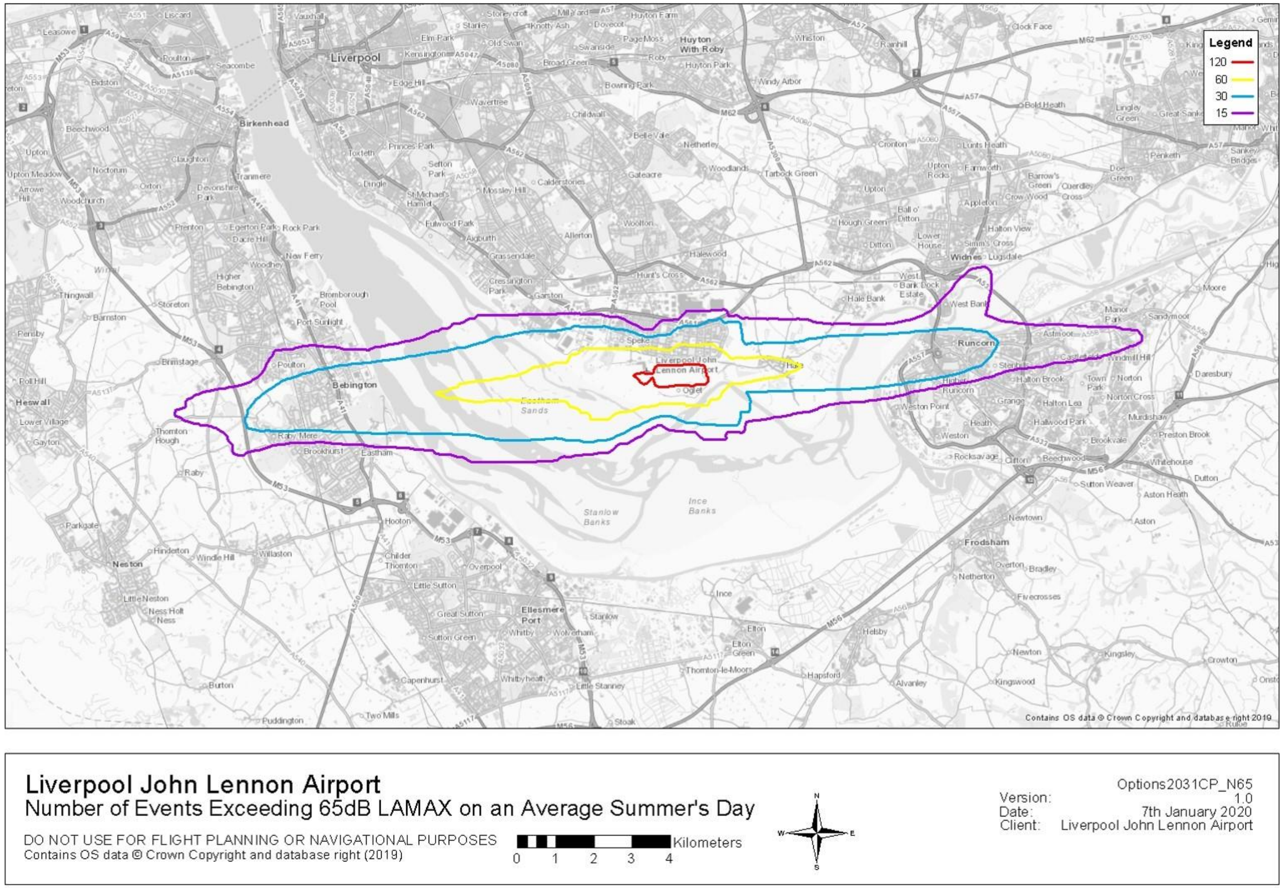
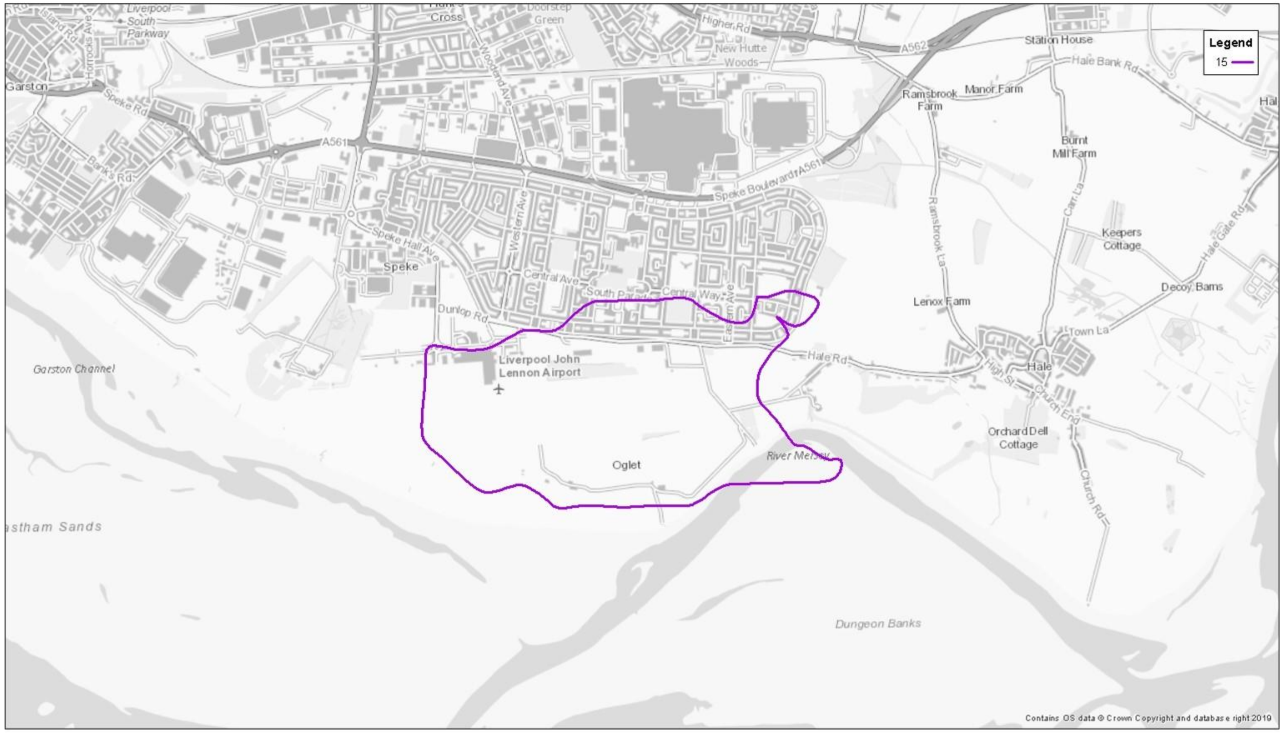


Figure 57 - Procedure C-P Projected Day Operations 2031 Exceeding 65dBA (N65)



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Number of Events Exceeding 60dB LAMAX on an Average Summer's Night

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Figure 58 - Procedure C-P Projected Night Operations 2031 Exceeding 60dBA (N60)

9 Procedure Combination A-R

9.1 Combination A-R – an Alternative Option

A reminder of the individual procedures that make up each combination is shown in the tables below. The descriptions of the procedures can be found in paragraphs 4.3 to 4.5.

9.1.1 Combination A

SID	Runway 27 SID AGGER AR	Runway 27 SID WAL	Runway 27 SID TEMP2	
Transition	Runway 27 Transition DIOUF	Runway 27 Transition NOMSU	Runway 27 Transition VEGUN	Runway 27 Transition VEGUN (CC05)
Approach	Approach Runway 27			

9.1.2 Combination R

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN Option	Runway 09 SID CORKA
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Figure 59 below shows combination A of procedures for Runway 27 that were previously shown in Section 5. Figure 60 shows combination R of procedures for Runway 09. SID CAVEN Option is the only procedure to Runway 09 that has changed from combination N.

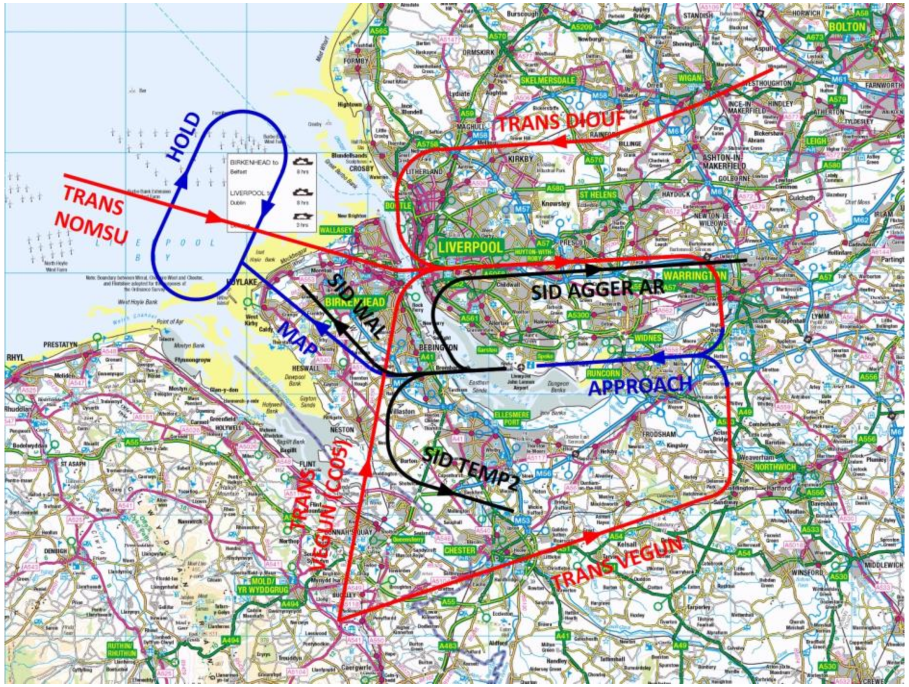

Figure 59 - Runway 27 Preferred Design Combination A

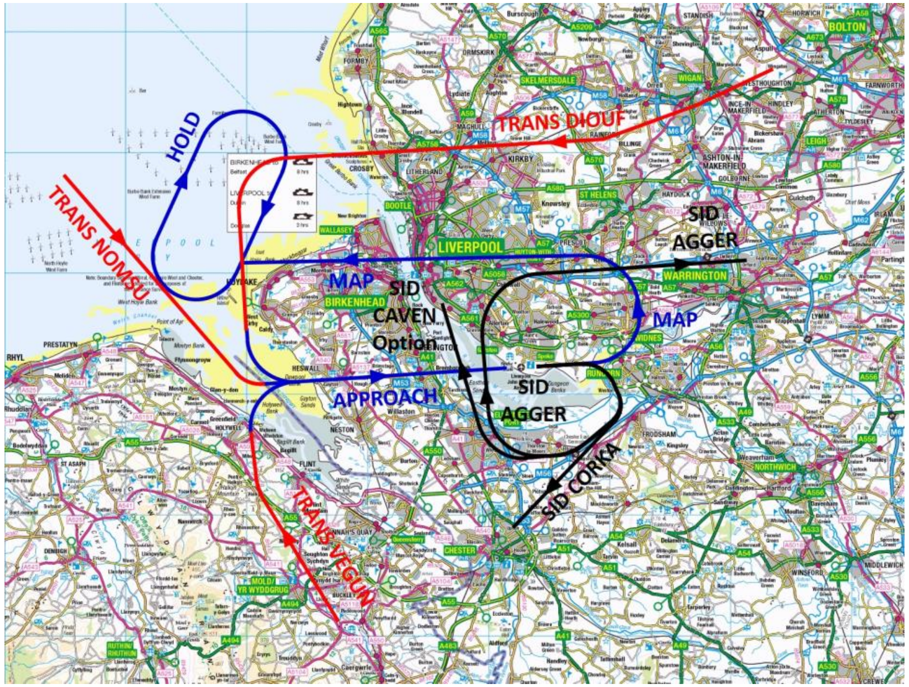

Figure 60 - Runway 09 Alternative Design Combination R

9.2 Procedure Combination A-R Noise Contours

Figure 61 below shows the calculated noise contours for combination A-R defining the areas around the airport within which average noise levels can be expected to exceed 51dBA $_{\text{LAeq 16hr}}$; average noise levels for the 16-hour period between 0700 and 2300 hrs during the summer season.

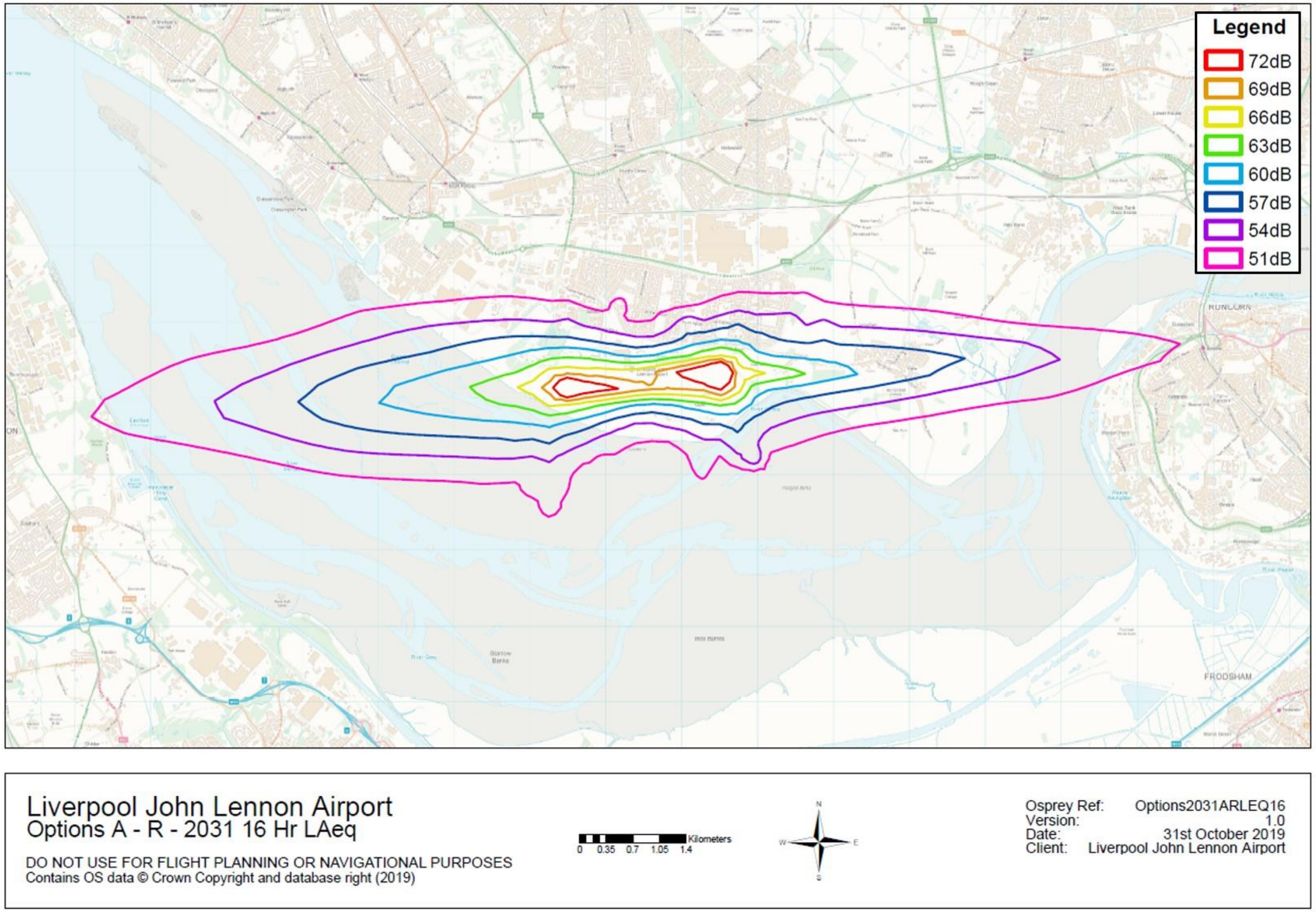

Figure 61 - Procedure Combination A-R 2031 Noise Contour 51dBA $L_{Aeq\ 16hr}$

Figure 62 shows the calculated noise contours for combination C-N defining the areas around the airport within which average noise levels can be expected to exceed 45dBA $L_{Aeq\ 16hr}$; average noise levels for the 8-hour night time period between 2300 and 0700 hrs during the summer season.

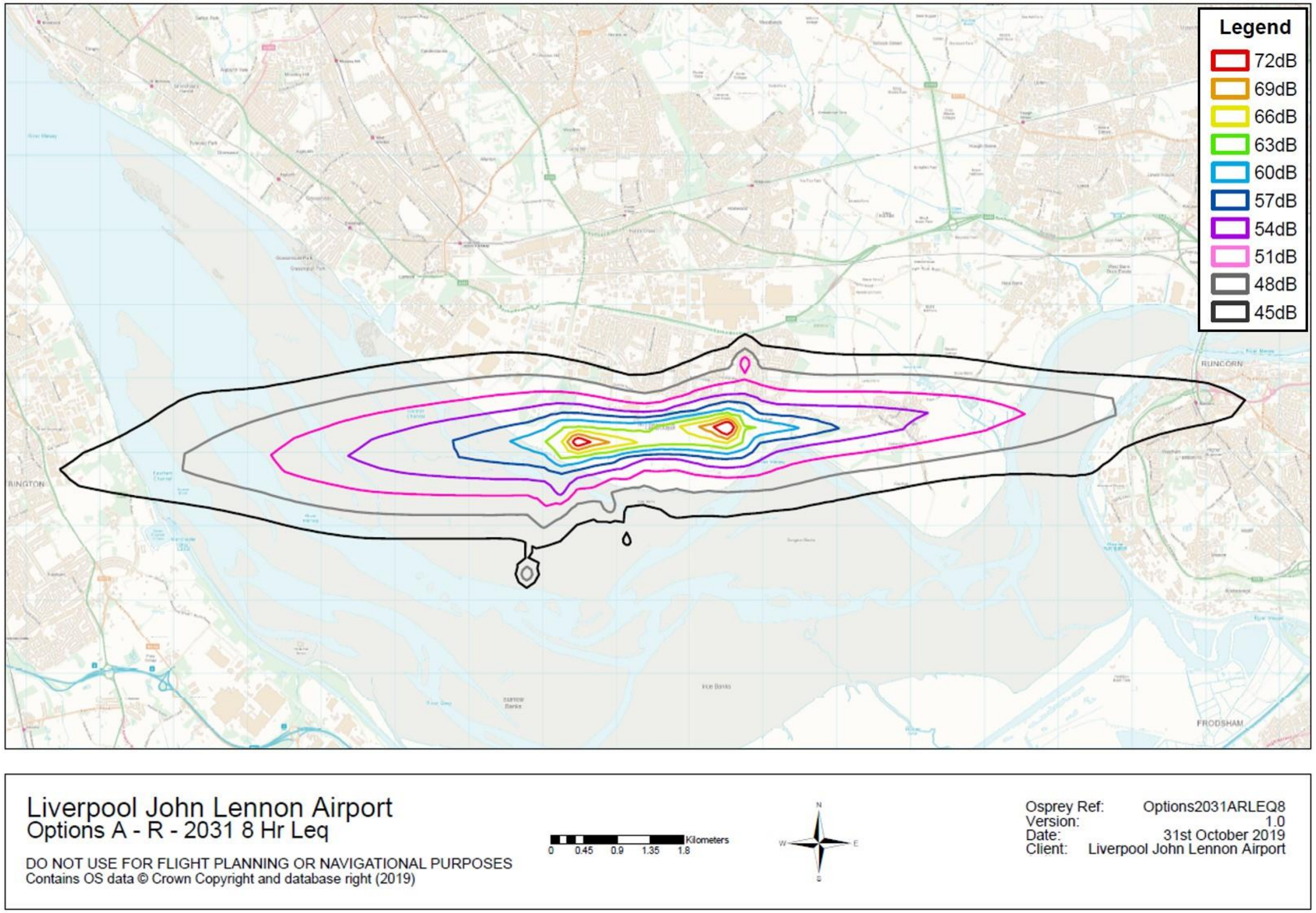

Figure 62 - Procedure Combination A-R 2031 Noise Contour 45dBA $L_{Aeq\ 8hr}$

9.3 Procedure Combination A-R Noise Assessments

Figure 63 and Figure 64 below show the N65 (day) and N60 (night) assessments respectively for combination A-R, , predicted for the forecast year 2031. Each contour represents the area around the airport within which the number of events of noise exceeding 65dbA

(N65) in the daytime and exceeding 60dbA (N60) during the night, for an average 24 hours in the summer, would be experienced by people living within the contour.

Night time is defined as between 2300 hrs (11pm) and 0700 hrs (7am).

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Number of Events Exceeding 65dB LAMAX on an Average Summer's Day

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Version: 1.0
Date: 7th January 2020
Client: Liverpool John Lennon Airport

Figure 63 - Procedure A-R Projected Day Operations 2031 Exceeding 65dBA (N65)

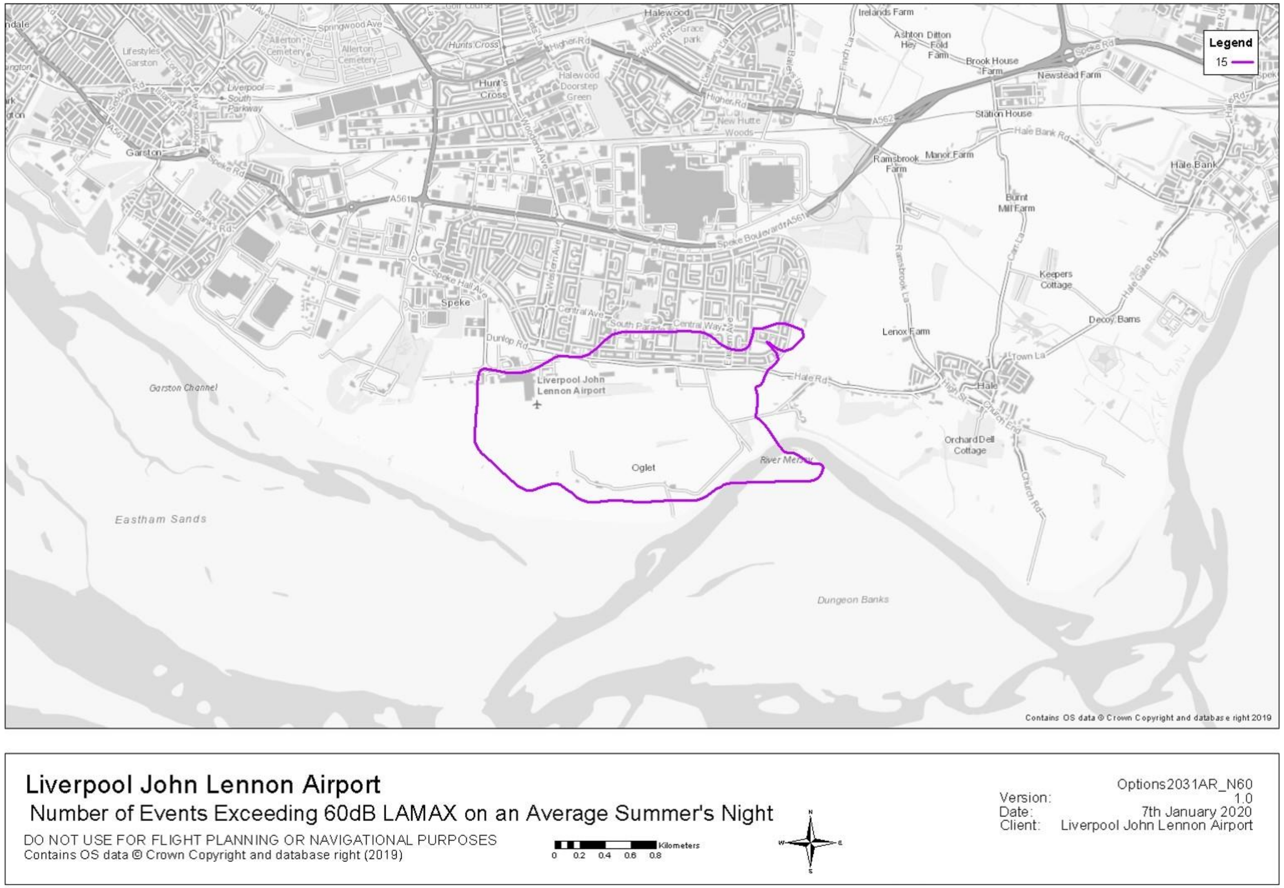


Figure 64 - Procedure A-R Projected Night Operations 2031 Exceeding 60dBA (N60)

10 Procedure Combination C-R

10.1 Combination C-R – an Alternative Option

Finally, our last combination. A reminder of the individual procedures that make up each combination is shown in the tables below. The descriptions of the procedures can be found in paragraphs 4.3 to 4.5.

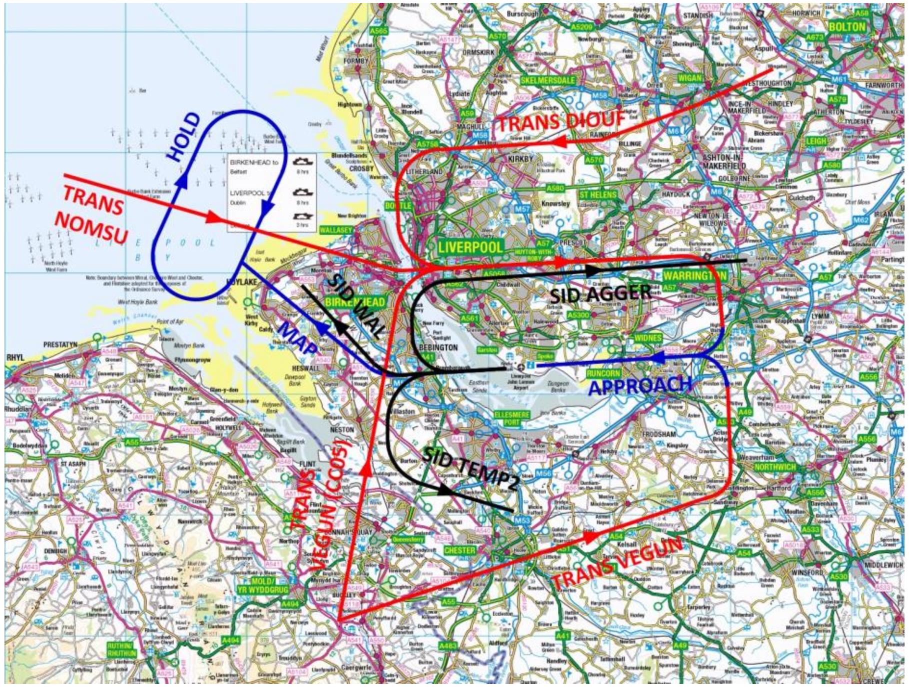
10.1.1 Combination C

SID	Runway 27 SID AGGER	Runway 27 SID WAL	Runway 27 SID TEMP2	
Transition	Runway 27 Transition DIOUF	Runway 27 Transition NOMSU	Runway 27 Transition VEGUN	Runway 27 Transition VEGUN (CC05)
Approach	Approach Runway 27			

10.1.2 Combination R

SID	Runway 09 SID AGGER	Runway 09 SID CAVEN Option	Runway 09 SID CORKA
Transition	Runway 09 Transition DIOUF	Runway 09 Transition NOMSU	Runway 09 Transition VEGUN
Approach	Approach Runway 09		

Figure 65 below shows combination C of procedures for Runway 27 that were previously shown in Section 6. Figure 66 shows the same combination R of procedures for Runway 09 as seen in Section 9 above.



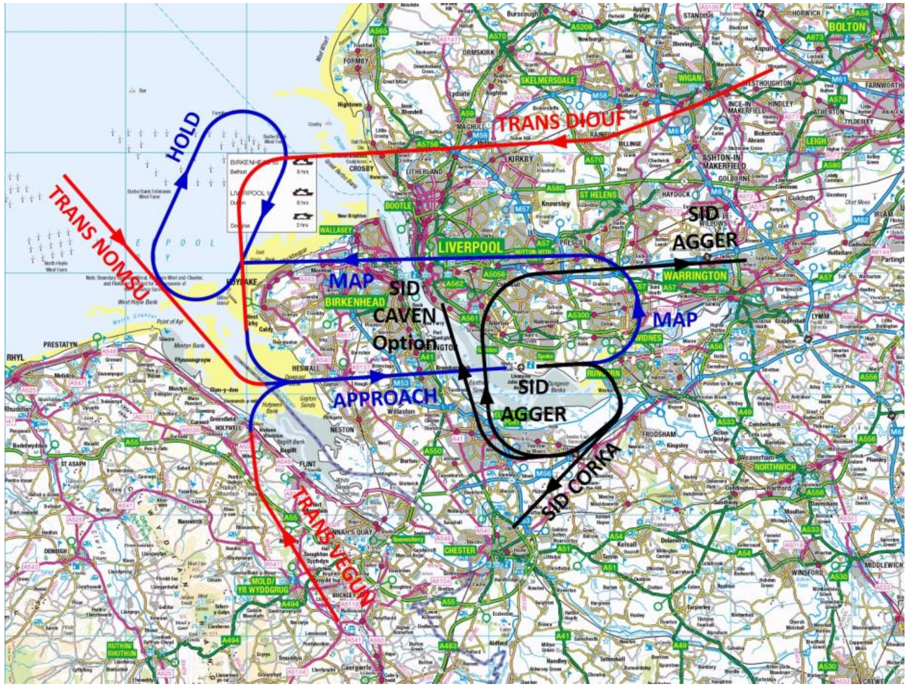


Figure 65 - Runway 27 Alternative Design Combination C

Figure 66 - Runway 09 Alternative Design Combination R

10.2 Procedure Combination C-R Noise Contours

Figure 67 below shows the calculated noise contours for combination C-R defining the area around the airport within which average noise levels can be expected to exceed 51dBA $L_{Aeq\ 16hr}$; average noise levels for the 16-hour period between 0700 and 2300 hrs during the summer season.

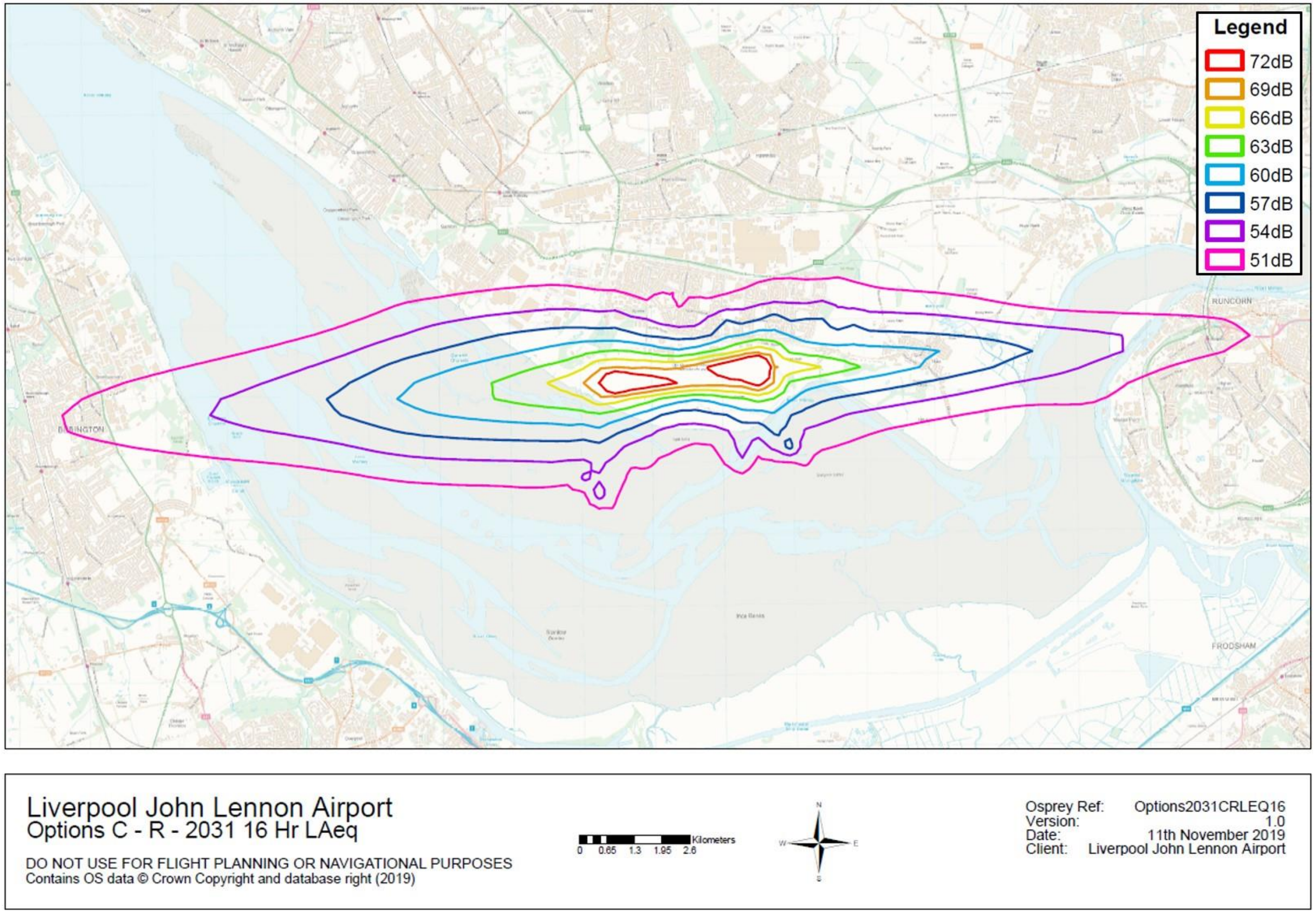


Figure 67 - Procedure Combination C-R 2031 Noise Contour 51dBA $L_{Aeq\ 16hr}$

Figure 68 shows the calculated noise contours for combination C-R defining the areas around the airport within which average noise levels can be expected to exceed 45dBA $L_{Aeq\ 16hr}$; average noise levels for the 8-hour night time period between 2300 and 0700 hrs during the summer season.

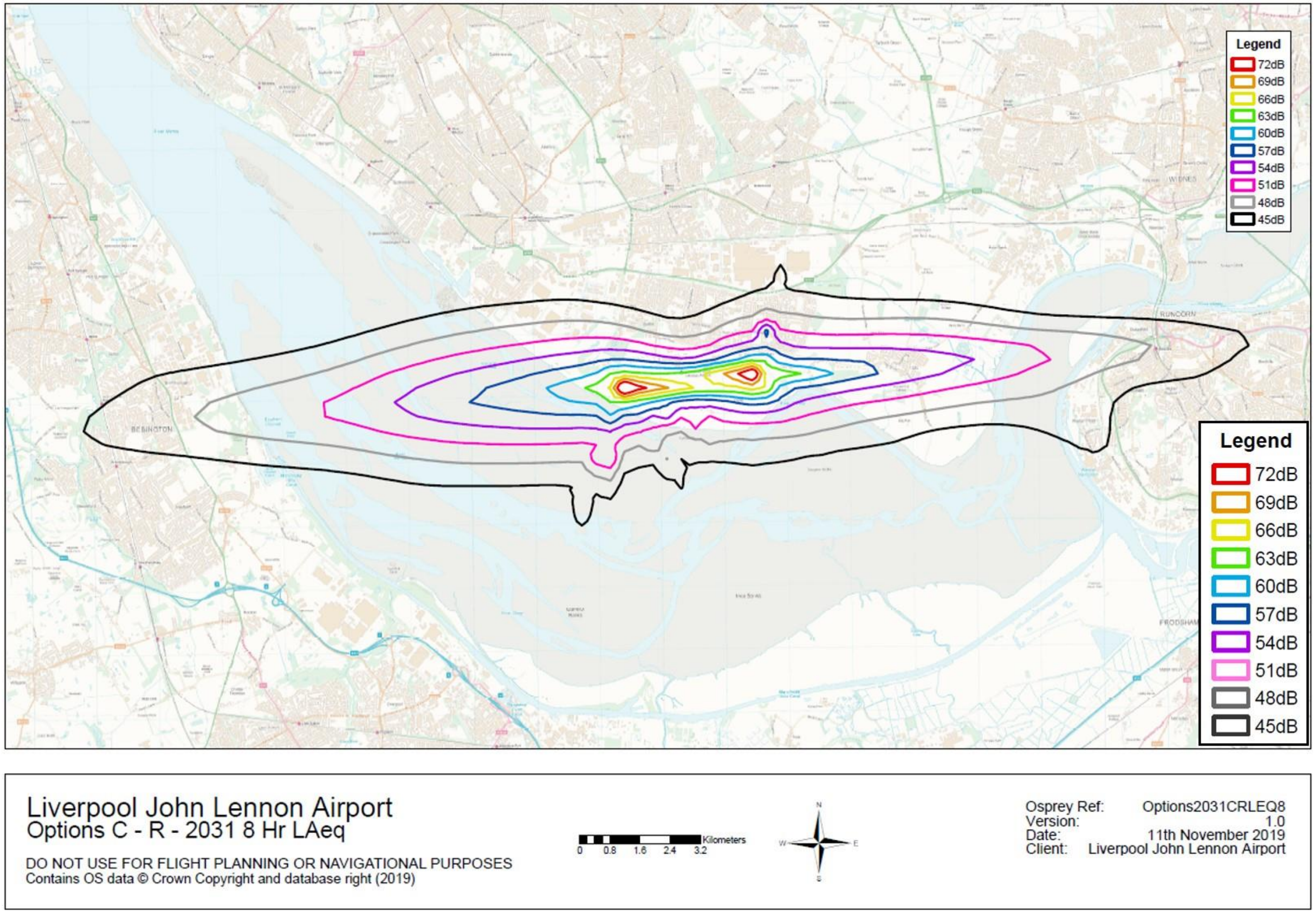


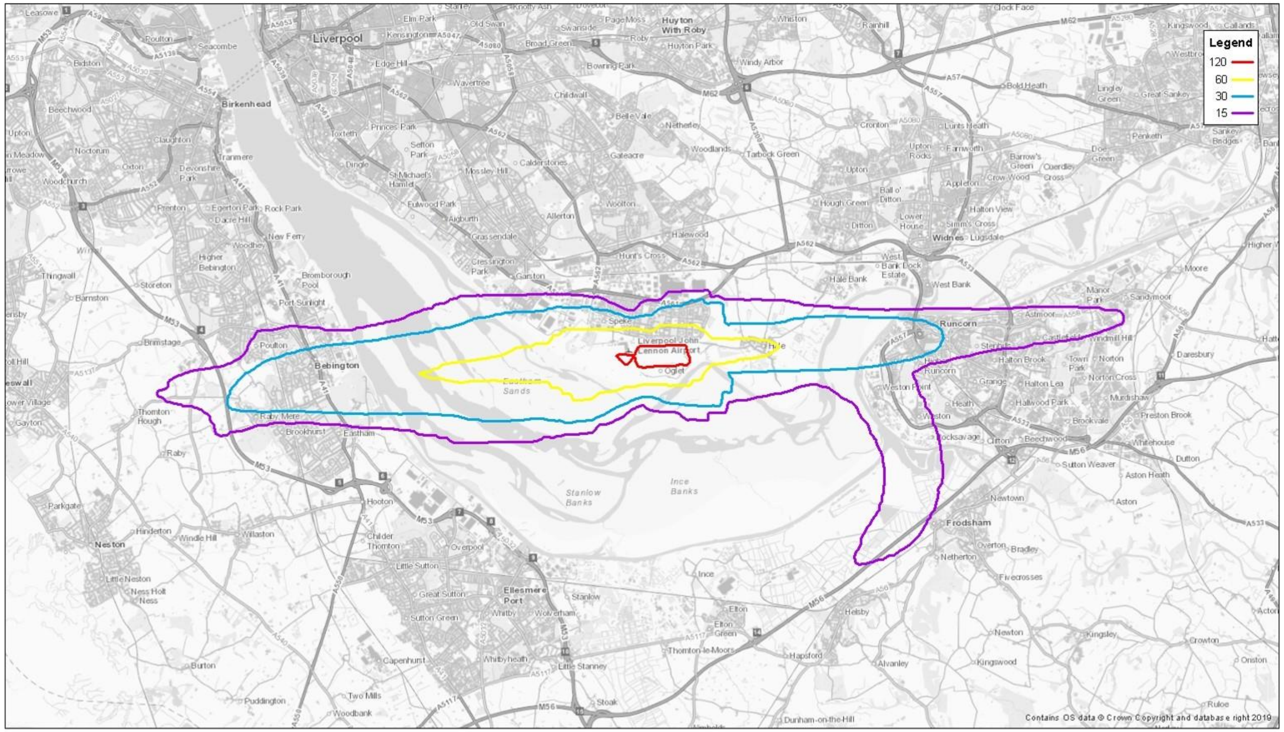
Figure 68 - Procedure Combination C-R 2031 Noise Contour 45dBA $L_{Aeq\ 8hr}$

10.3 Procedure Combination C-R Noise Assessments

Figure 69 and Figure 70 below show the N65 (day) and N60 (night) assessments respectively for combination C-R, , predicted for the forecast year 2031. Each contour represents the area around the airport within which the number of events of noise exceeding 65dbA

(N65) in the daytime and exceeding 60dbA (N60) during the night, for an average 24 hours in the summer, would be experienced by people living within the contour.

Night time is defined as between 2300 hrs (11pm) and 0700 hrs (7am).



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Number of Events Exceeding 65dB LAMAX on an Average Summer's Day

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0 0.95 1.9 2.85 3.8 Kilometers

Options2031CR_N65
Version: 1.0
Date: 7th January 2020
Client: Liverpool John Lennon Airport

Figure 69 - Procedure C-R Projected Day Operations 2031 Exceeding 65dBA (N65)

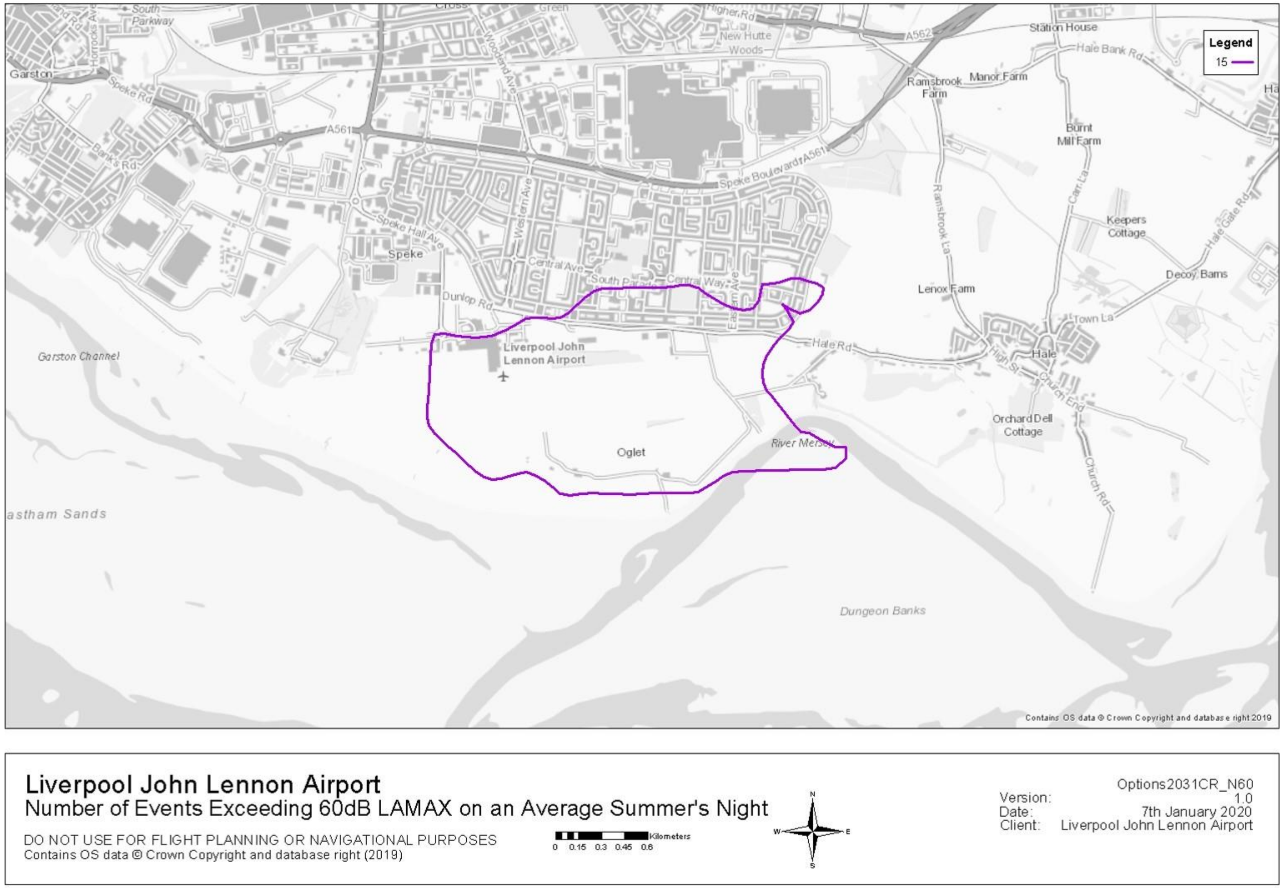


Figure 70 - Procedure C-R Projected Night Operations 2031 Exceeding 60dBA (N60)

11 Further Assessments

11.1 Population Exposure to Average Noise by dBA Level

The number of people deemed to be exposed to day and night noise in each dBA level from high to low in 3dB increments up to 72dBA has been determined during the environmental assessment. In accordance with the requirements of CAP 1616, the environmental assessment included the production of noise contours to portray the noise impact on communicates surrounding LJLA. A cumulative population count is carried out to determine the number of people (to the nearest 50) living within each noise contour. More information on the environmental assessment methods and detailed metrics are described in our Full Options Appraisal document available on the CAA airspace portal. Table 6 below shows the results to the nearest 50 of population exposed to the different noise levels.

Population Exposure	A-N	C-N	A-P	C-P	A-R	C-R	Baseline
Day noise 72dB	<50	<50	<50	<50	<50	<50	<50
Day noise 69dB	<50	<50	<50	<50	<50	<50	<50
Day noise 66dB	<50	<50	<50	<50	<50	<50	<50
Day noise 63dB	100	100	100	100	<51	100	150
Day noise 60dB	1550	1550	1550	1550	300	1400	1650
Day noise 57dB	4000	4000	4000	4000	3000	4000	4500
Day noise 54dB	6050	6050	6050	6050	5000	6050	6900
Day noise 51dB	12500	14000	13950	15450	8350	13650	16600
Night noise 72dB	<50	<50	<50	<50	<50	<50	<50
Night noise 69dB	<50	<50	<50	<50	<50	<50	<50
Night noise 66dB	<50	<50	<50	<50	<50	<50	<50
Night noise 63dB	<50	<50	<50	<50	<50	<50	<50
Night noise 60dB	<50	<50	<50	<50	<50	<50	<50
Night noise 57dB	200	200	200	200	50	200	300
Night noise 54dB	2800	3100	2800	3050	1250	3100	2800
Night noise 51dB	4600	4350	4600	4350	3550	4350	5000

Population Exposure	A-N	C-N	A-P	C-P	A-R	C-R	Baseline
Night noise 48dB	7050	6650	7650	7250	5450	6600	8050
Night noise 45dB	20950	23400	22550	24950	11050	23350	27800

Table 6 - Population Noise Exposure by Level

The number of homes deemed to be exposed to day and night noise in each dBA level from high to low in 3dB increments up to 72dBA has been determined during the environmental assessment. A cumulative count of the number of households within each of the noise contours was carried out to determine the number of households (to the nearest 50) within each noise contour. Table 7 below shows the results to the nearest 50 homes exposed to the different noise levels.

Number of Houses	A-N	C-N	A-P	C-P	A-R	C-R	Baseline
Day noise 72dB	<50	<50	<50	<50	<50	<50	<50
Day noise 69dB	<50	<50	<50	<50	<50	<50	<50
Day noise 66dB	<50	<50	<50	<50	<50	<50	<50
Day noise 63dB	50	50	50	50	<50	50	50
Day noise 60dB	650	650	700	700	150	600	700
Day noise 57dB	1850	1850	1850	1850	1350	1850	2050
Day noise 54dB	2700	2700	2700	2700	2250	2700	3100
Day noise 51dB	5700	6300	6400	7100	3750	6200	7550
Night noise 72dB	<50	<50	<50	<50	<50	<50	<50
Night noise 69dB	<50	<50	<50	<50	<50	<50	<50
Night noise 66dB	<50	<50	<50	<50	<50	<50	<50
Night noise 63dB	<50	<50	<50	<50	<50	<50	<50

Number of Houses	A-N	C-N	A-P	C-P	A-R	C-R	Baseline
Night noise 60dB	<50	<50	<50	<50	<50	<50	<50
Night noise 57dB	100	100	100	100	0	100	150
Night noise 54dB	1200	1350	1200	1350	550	1350	1250
Night noise 51dB	2050	1950	2050	1950	1600	1950	2250
Night noise 48dB	3150	2950	3400	3250	2450	2950	3600
Night noise 45dB	9450	10550	10300	11400	5000	10550	12750

Table 7 - Number of Homes Exposed to Noise Level Increments

11.2 Overflight Assessment

We have carried out an 'overflight' assessment to determine the number of people, homes and large users (schools, hospitals, places of worship) perceived to be overflown by aircraft in the different options. This is not a measure of noise but a demonstration of the pattern and dispersal of traffic i.e. a perception of overflight.

The definition of overflight is based on the angle between an aircraft in the sky and a person viewing it from the ground. CAP 1616a recommends the use of a 48.5° angle either side of the aircraft track to create a swathe on the ground representing the area overflown, as depicted in Figure 71 below; the size of the area on the ground increases according to the altitude of the aircraft.

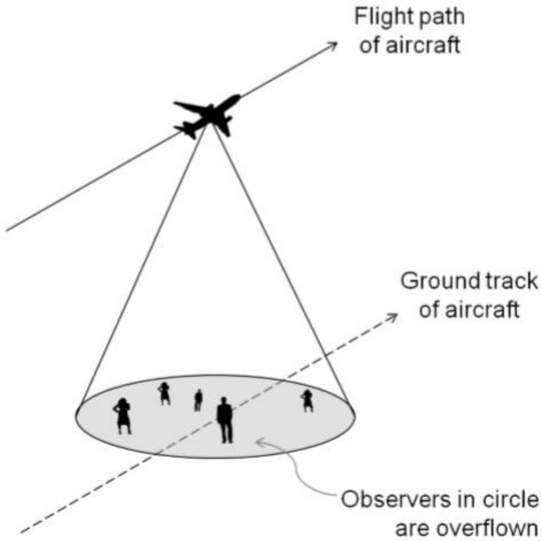


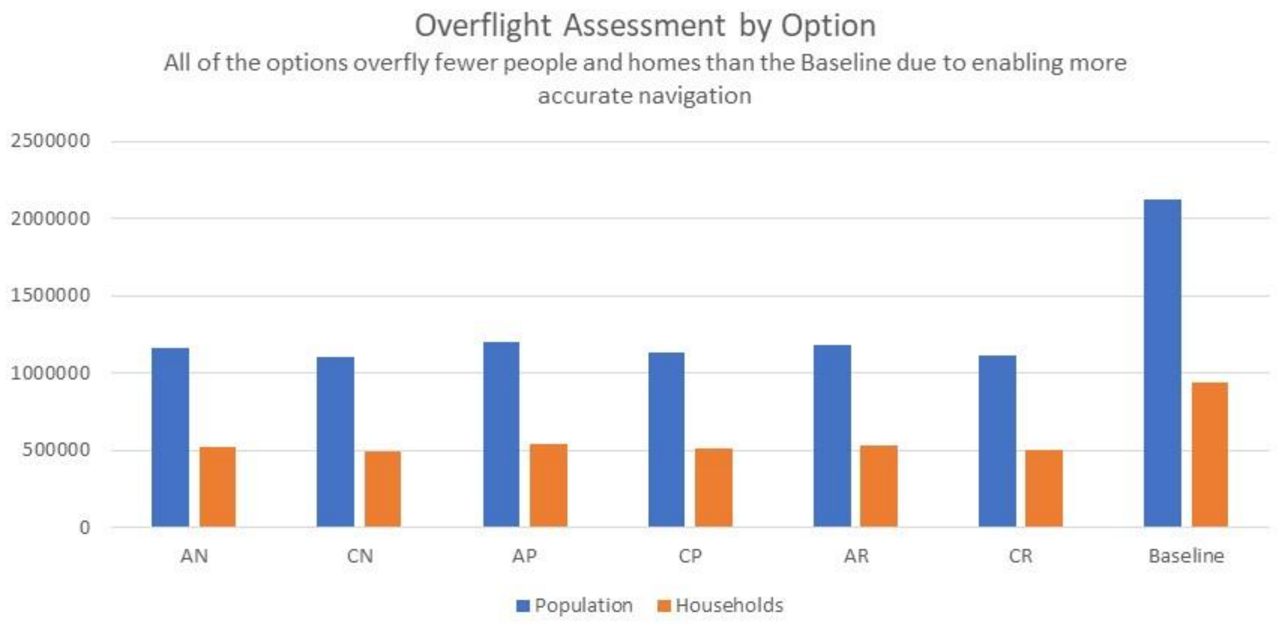
Figure 71 - Example Overflight Swathe

We have measured the areas likely to be overflown and carried out a population and household count, and a count of the number of large users within those areas. More information on the definition of overflight can be found in CAP 1498 here:

https://publicapps.caa.co.uk/docs/33/CAP_1498_V2_APR17.pdf

Please note that in the context of LJLA ACP the overflight metrics do not portray VFR traffic as their activities remain unchanged by the ACP.

Assessment	AN	CN	AP	CP	AR	CR	Baseline
Population overflown	1,166,250	1,098,650	1,199,000	1,136,450	1,184,500	1,116,900	2,127,500
Households overflown	521,550	490,400	536,000	507,600	529,250	498,100	941,900
Large Users overflown	1,950	1,950	2,000	1,950	2,000	1,950	3,250



12 How to Participate

12.1 What is Being Asked?

We are asking you to consider what impact this proposal could have on you as an individual, your community as a whole or your organisation's activities. This is your opportunity to review the proposed procedures and influence the final designs that LJLA will submit to the CAA. We would welcome any feedback and suggestions that you may have.

12.2 How to respond

12.2.1 Consultation Period

This consultation begins on 13th January 2020 and runs for 12 weeks. All comments must be received via the media listed below by 12 noon on 9th April 2020.

12.2.2 Responding via the Airspace Portal

This consultation is being conducted by LJLA, using the CAA's online consultation portal. The page dedicated to this change can be accessed here:

https://airspacechange.caa.co.uk/PublicProposalArea?pID=28

The CAA's Airspace Regulation Department will oversee the consultation and ensure that it adheres to the CAP 1616 process and government guidelines. All comments will appear in the public domain and the CAA will also act as moderator for the comments.

This consultation document and all supporting documents are available on the CAA portal. There is a link to our consultation questionnaire hosted by Citizen Space where you can submit your answers to our specific questions. There is a free-text comments field for you to submit anything you feel is not covered by our questions. Please submit your response directly to us via the CAA portal at the link above.

12.2.3 Responding in Person – or Finding Out More

We invite you to come along to one of our public drop-in sessions to find out more, ask questions or submit a response in person. These are being held at the following times and locations:

- Session 1: Airport Terminal Building: Cavern Suite, on Wednesday 12th February 2020 between 1pm and 8pm
- Session 2: Airport Terminal Building: Cavern Suite on Saturday 7th March 2020 between 10am and 4pm.

The address for the drop-in sessions is:

Airspace Change
Aviation House
Liverpool John Lennon Airport
Liverpool
L24 1YD

Unfortunately, we cannot guarantee availability of parking at the airport for these sessions and recommend the use of public transport where possible. However, you are welcome to use the multi-story car park on a first come first served basis; **there will be no charge for anyone attending our consultation event**. Disabled parking spaces are also available in the multi-story car park.

All in-person responses to our questionnaire or hand-written comments will be uploaded to the CAA Portal for moderation and must be legible and include your full name and contact details to be considered.

12.2.4 Responding by Post

Respondents can submit a postal response to the consultation. We will not commit to respond to all postal responses directly; however, respondents are welcome to include a stamped addressed envelope if they do require a reply. Postal responses can be sent to the following address:

Airspace Change
Aviation House
Liverpool John Lennon Airport
Liverpool
L24 1YD

12.3 What information you will need to provide

Please note that when submitting feedback whether online, in person or by post you will be asked to provide the following information in order for your response to be counted:

- Your full name
- Your role if you are responding on behalf of a stakeholder group or organisation
- Your contact details
- A feedback category: SUPPORT, NO COMMENT, NEUTRAL, OBJECT
- Your feedback on each of the proposed options
- Your general feedback comments, with an opportunity to provide more detail

All feedback will be moderated by the CAA and any anonymous, unaddressed or offensive feedback may not be counted.

We would like to know your views, including whether or not you have a preference for any one option, or whether you have any positive or negative comments to make for any or all of them.

All responses will be analysed, with any common themes extracted and summarised. We may also produce a Frequently Asked Questions update where any common themes emerge during the consultation period. We will actively monitor the consultation portal and will formally respond to queries where possible; all of these responses will also be shared with the CAA.

12.4 What happens at the end of the Consultation?

All responses will be published. Responses will be moderated, managed and uploaded to the consultation portal as appropriate. If any responses contain commercially sensitive data then we would expect the CAA to redact that information as part of its moderating practice. Guidance on the moderation of consultation responses can be found in CAP1619 on the CAA website:

http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=8131

On completion of the consultation, we will analyse the responses received and produce a feedback report, summarising themes arising from the feedback, alongside our response to any issues raised. The feedback report will be uploaded onto the portal. Any new requirements identified will be considered in the on-going design process. If fundamental changes are required to our design options as a result of feedback received during this consultation, then we may need to carry out a second consultation. When all consultation and review activities are complete, we will submit a formal Airspace Change Proposal to the CAA, referring to any changes that have been made to take account of consultation feedback.

Subject to further engagement with Manchester Airport our intention to implement the changes from Summer 2021 onwards.

12.5 Reversion Statement

The sponsor considers this proposal to be the 'do minimum' option. The reversion to the 'do nothing' option would see LJLA continue to rely on ground-based, conventional navigational procedures which would introduce operational risk to business at LJLA. Many of the navigation aids that define these procedures are reaching the end of their productive life and some are due to be phased out over the next few years through the UK-wide programme known as the DVOR[13] Rationalisation and NDB[14] Withdrawal Programme.

Should the proposal be approved and implemented, LJLA will introduce procedures that are compliant with PBN criteria that are designed to be flown with reference to GNSS, making LJLA compliant with Resolution 36/23 ratified by the 36th International Civil Aviation Organisation (ICAO) General Assembly, as well as with the Airspace Modernisation Strategy (AMS)[15] published by the CAA.

12.6 Consultation Timetable

Table 8 below summarises the key dates and activities for our consultation.

Activity	Location	Date
Consultation Launch	CAA airspace change portal	13th January 2020
Stakeholder Reminders	e-mail/Social Media	24th February 2020
Public Drop-In Session	LJLA Terminal Building	Wednesday 12th February 2020
Stakeholder Reminders	e-mail/Social Media	23rd March 2020

13 Doppler VHF (Very-High-Frequency) Omnidirectional Range – a type of ground based radio navigation aid.
14 Non-Directional *[radio]* Beacon.
15 CAP 1711- https://publicapps.caa.co.uk/docs/33/CAP%201711%20Airspace%20Modernisation%20Strategy.pdf

Activity	Location	Date
Public Drop-In Session	LJLA Terminal Building	Saturday 7th March 2020
Consultation Closes		9th April 2020
ACP Submission		9th June 2020

Table 8 - Consultation Period Key Activities and Dates

12.7 Thank You

Thank you for taking the time to consider the information in this document. A reminder that if you, or anyone you know, requires this information in an alternative format, please ask at one of our events or write to us at the following address:

Airspace Change
Aviation House
Liverpool John Lennon Airport
Liverpool
L24 1YD

A1 Full Options Appraisal Results Summary

A1.1 A-N Preferred Options

Offers greatest noise benefit including significant reduction in night noise. Operationally, having left hand turn SID 09 CAVEN reduces the impact of coordination with Hawarden Airport traffic which causes delays at LJLA. Marginal increase in fuel/$C0_2$ over baseline; ranked 2nd overall on Fuel/ $C0_2$ but A-R scores are operationally unrealistic (due to delays) so A-N moves into 1st place – see paragraph A1.6.

A-N Preferred Option	Quantitative noise assessment results compared to baseline	Assessment result
Opening Year 2021	Individuals experiencing **increased** daytime noise in forecast year:	4667
Forecast Year 2031	Individuals experiencing **reduced** daytime noise in forecast year:	45079
	Individuals experiencing **increased** night time noise in forecast year:	4667
	Individuals experiencing **reduced** night time noise in forecast year:	45128
Other Impact	**Assessment compared to baseline**	**Assessment result**
Air Quality	No change versus baseline as no changes are taking place to aircraft tracks below 1000ft	none
Greenhouse Gas impact *Negative figure = decrease versus baseline	Change in annual $C0_2$ in opening year versus baseline 45,520 Tonnes	-277
	Change in annual $C0_2$ in forecast year versus baseline 66,019 Tonnes	-321
Capacity and resilience	Impact on capacity and resilience (aligns with AMS)	Benefit
Access	Change to access arrangements for GA	No change
Economic impact from increased effective capacity	Impact on delays versus baseline	Benefit
Fuel burn	Change in annual fuel burn in opening year (metric tonnes) 14,315 tonnes	-87
	Change in annual fuel burn in forecast year (metric tonnes) 20, 761 tonnes	-101

Training costs	N/A	N/A
Other costs	Change in en-route and taxi delay costs (U of W Research)	Benefit
Infrastructure costs	Infrastructure cost/benefit (qualitative)	Benefit
Operational costs	Operational cost/benefit (qualitative)	Benefit
Deployment costs	No change beyond sunk costs associated with ACP	none

A1.3 C-N Alternative to Preferred Option

Only difference between AN and CN is the replacement of SID 27 AGGER **AR** with SID 27 AGGER. C-N has a greater noise impact than A-N due to overflight of Bebington. Marginal increase in fuel/ $C0_2$ over baseline. Operationally A-N and C-N are equally acceptable (Runway 09 IFPs are the same) but A-N offers greater reduction in noise especially at night for the communities of Bebington, and a reduction in $C0_2$/Fuel burn.

C-N **2nd Preferred Option**	**Quantitative noise assessment results compared to baseline**	**Assessment result**
Opening Year 2021	Individuals experiencing **increased** daytime noise in forecast year:	11343
Forecast Year 2031	Individuals experiencing **reduced** daytime noise in forecast year:	39560
	Individuals experiencing **increased** night time noise in forecast year:	1629
	Individuals experiencing **reduced** night time noise in forecast year:	19973
Other Impact	**Assessment compared to baseline**	**Assessment result**
Air Quality	No change versus baseline as no changes are taking place to aircraft tracks below 1000ft	none
Greenhouse Gas impact *Negative figure = decrease versus baseline	Change in annual $C0_2$ in opening year versus baseline	+78
	Change in annual $C0_2$ in forecast year versus baseline	+195
Capacity and resilience	Impact on capacity and resilience (aligns with AMS)	Benefit
Access	Change to access arrangements for GA	No change
Economic impact from increased effective capacity	Impact on delays versus baseline	Benefit
Fuel burn	Change in annual fuel burn in opening year (metric tonnes)	+25
	Change in annual fuel burn in forecast year (metric tonnes)	+61
Training costs	N/A	-

Other costs	Change in en-route and taxi delay costs (U of W Research)	Benefit
Infrastructure costs	Infrastructure cost/benefit (qualitative)	Benefit
Operational costs	Operational cost/benefit (qualitative)	Benefit
Deployment costs	No change beyond sunk costs associated with ACP	none

A1.4 A-P Alternative Option

A-P is slightly better than C-N on noise due avoidance of Bebington but is less beneficial in terms of Fuel/ $C0_2$ with longer left-hand turn to CORKA. A-P has 2nd largest $C0_2$/Fuel increase overall versus the baseline.

A-P	Quantitative noise assessment results compared to baseline	Assessment result
Opening Year 2021	Individuals experiencing increased daytime noise in forecast year:	5365
Forecast Year 2031	Individuals experiencing reduced daytime noise in forecast year:	42719
	Individuals experiencing increased night time noise in forecast year:	176
	Individuals experiencing reduced night time noise in forecast year:	21558
Other Impact	Assessment compared to baseline	Assessment result
Air Quality	No change versus baseline as no changes are taking place to aircraft tracks below 1000ft	none
Greenhouse Gas impact *Negative figure = decrease versus baseline	Change in annual $C0_2$ in opening year versus baseline	+224
	Change in annual $C0_2$ in forecast year versus baseline	+406
Capacity and resilience	Impact on capacity and resilience (aligns with AMS)	Benefit
Access	Change to access arrangements for GA	No change
Economic impact from increased effective capacity	Impact on delays versus baseline	Benefit
Fuel burn	Change in annual fuel burn in opening year (metric tonnes)	+70
	Change in annual fuel burn in forecast year (metric tonnes)	+128
Training costs	N/A	-

Other costs	Change in en-route and taxi delay costs (U of W Research)	Benefit
Infrastructure costs	Infrastructure cost/benefit (qualitative)	Benefit
Operational costs	Operational cost/benefit (qualitative)	Benefit
Deployment costs	No change beyond sunk costs associated with ACP	none

A1.5 C-P Alternative Option

C-P is the worst performing option on noise and is assessed as having the largest increase in CO2/Fuel over the baseline.

C-P	Quantitative noise assessment results compared to baseline	Assessment result
Opening Year 2021	Individuals experiencing **increased** daytime noise in forecast year:	12041
Forecast Year 2031	Individuals experiencing **reduced** daytime noise in forecast year:	37199
	Individuals experiencing **increased** night time noise in forecast year:	776
	Individuals experiencing **reduced** night time noise in forecast year:	18072
Other Impact	**Assessment compared to baseline**	**Assessment result**
Air Quality	No change versus baseline as no changes are taking place to aircraft tracks below 1000ft	none
Greenhouse Gas impact *Negative figure = decrease versus baseline	Change in annual CO2 in opening year versus baseline	+579
	Change in annual CO2 in forecast year versus baseline	+923
Capacity and resilience	Impact on capacity and resilience (aligns with AMS)	Benefit
Access	Change to access arrangements for GA	No change
Economic impact from increased effective capacity	Impact on delays versus baseline	Positive
Fuel burn	Change in annual fuel burn in opening year (metric tonnes)	+182
	Change in annual fuel burn in forecast year (metric tonnes)	+290
Training costs	N/A	-
Other costs	Change in en-route and taxi delay costs (U of W Research)	Benefit
Infrastructure costs	Infrastructure cost/benefit (qualitative)	Benefit

Operational costs	Operational cost/benefit (qualitative)	Benefit
Deployment costs	No change beyond sunk costs associated with ACP	none

A1.6 A-R Alternative Option

Despite appearing to offer the greatest overall reduction $C0_2$/Fuel, operationally it is the option most at risk of delays due to all Runway 09 SIDs turning right hand after departure; these tracks will conflict with aircraft taking off from Hawarden Airport to the southwest. There is a concern that these assessed $C0_2$/Fuel benefits will not be realised as the assessment doesn't take into account delays on apron/taxiing (and hence using additional electricity and fuel) to coordinate traffic with Hawarden Airport.

A-R	Quantitative noise assessment results compared to baseline	Assessment result
Opening Year 2021	Individuals experiencing **increased** daytime noise in forecast year:	4330
Forecast Year 2031	Individuals experiencing **reduced** daytime noise in forecast year:	45791
	Individuals experiencing **increased** night time noise in forecast year:	1179
	Individuals experiencing **reduced** night time noise in forecast year:	24135
Other Impact	**Assessment compared to baseline**	**Assessment result**
Air Quality	No change versus baseline as no changes are taking place to aircraft tracks below 1000ft	none
Greenhouse Gas impact *Negative figure = decrease versus baseline	Change in annual $C0_2$ in opening year versus baseline	-705
	Change in annual $C0_2$ in forecast year versus baseline	-1099
Capacity and resilience	Impact on capacity and resilience (aligns with AMS)	Benefit
Access	Change to access arrangements for GA	No change
Economic impact from increased effective capacity	Impact on delays versus baseline	Limited Change
Fuel burn	Change in annual fuel burn in opening year (metric tonnes)	-222
	Change in annual fuel burn in forecast year (metric tonnes)	-346
Training costs	N/A	-

Other costs	Change in en-route and taxi delay costs (U of W Research)	Benefit
Infrastructure costs	Infrastructure cost/benefit (qualitative)	Benefit
Operational costs	Operational cost/benefit (qualitative)	Benefit
Deployment costs	No change beyond sunk costs associated with ACP	none

A1.7 C-R Alternative Option

As with A-R above, C-R Runway 09 departures at risk of delays due to all Runway 09 SIDs turning right hand after departure; the assessed $C0_2$/Fuel benefits will not be realised as the assessment does not take into account wasted fuel/electricity due to delays on apron/taxiing to coordinate traffic with Hawarden Airport. C-R presents greater noise than A-R due to overflight of Bebington. Least attractive option in terms of noise and likelihood of delays.

C-R	**Quantitative noise assessment results compared to baseline**	**Assessment result**
Opening Year 2021	Individuals experiencing **increased** daytime noise in forecast year:	10944
Forecast Year 2031	Individuals experiencing **reduced** daytime noise in forecast year:	39925
	Individuals experiencing **increased** night time noise in forecast year:	1779
	Individuals experiencing **reduced** night time noise in forecast year:	19980
Other Impact	**Assessment compared to baseline**	**Assessment result**
Air Quality	No change versus baseline as no changes are taking place to aircraft tracks below 1000ft	none
Greenhouse Gas impact *Negative figure = decrease versus baseline	Change in annual $C0_2$ in opening year versus baseline	-349
	Change in annual $C0_2$ in forecast year versus baseline	-424
Capacity and resilience	Impact on capacity and resilience (aligns with AMS)	Benefit
Access	Change to access arrangements for GA	No change
Economic impact from increased effective capacity	Impact on delays versus baseline	Limited Change
Fuel burn	Change in annual fuel burn in opening year (metric tonnes)	-110
	Change in annual fuel burn in forecast year (metric tonnes)	-133
Training costs	N/A	-

Other costs	Change in en-route and taxi delay costs (U of W Research)	Benefit
Infrastructure costs	Infrastructure cost/benefit (qualitative)	Benefit
Operational costs	Operational cost/benefit (qualitative)	Benefit
Deployment costs	No change beyond sunk costs associated with ACP	none

A2 Procedure Combination Images

A2.1 Introduction

The images in this section are the same images on an Ordnance Survey (OS) background map as used in the main text of the document but enlarged for greater clarity. See Section A2.2 for illustrative images of the IFPs overlaid on an aviation chart (Visual Flight Rules chart) for the benefit of pilots and other aviation stakeholders who may be interested in these maps.

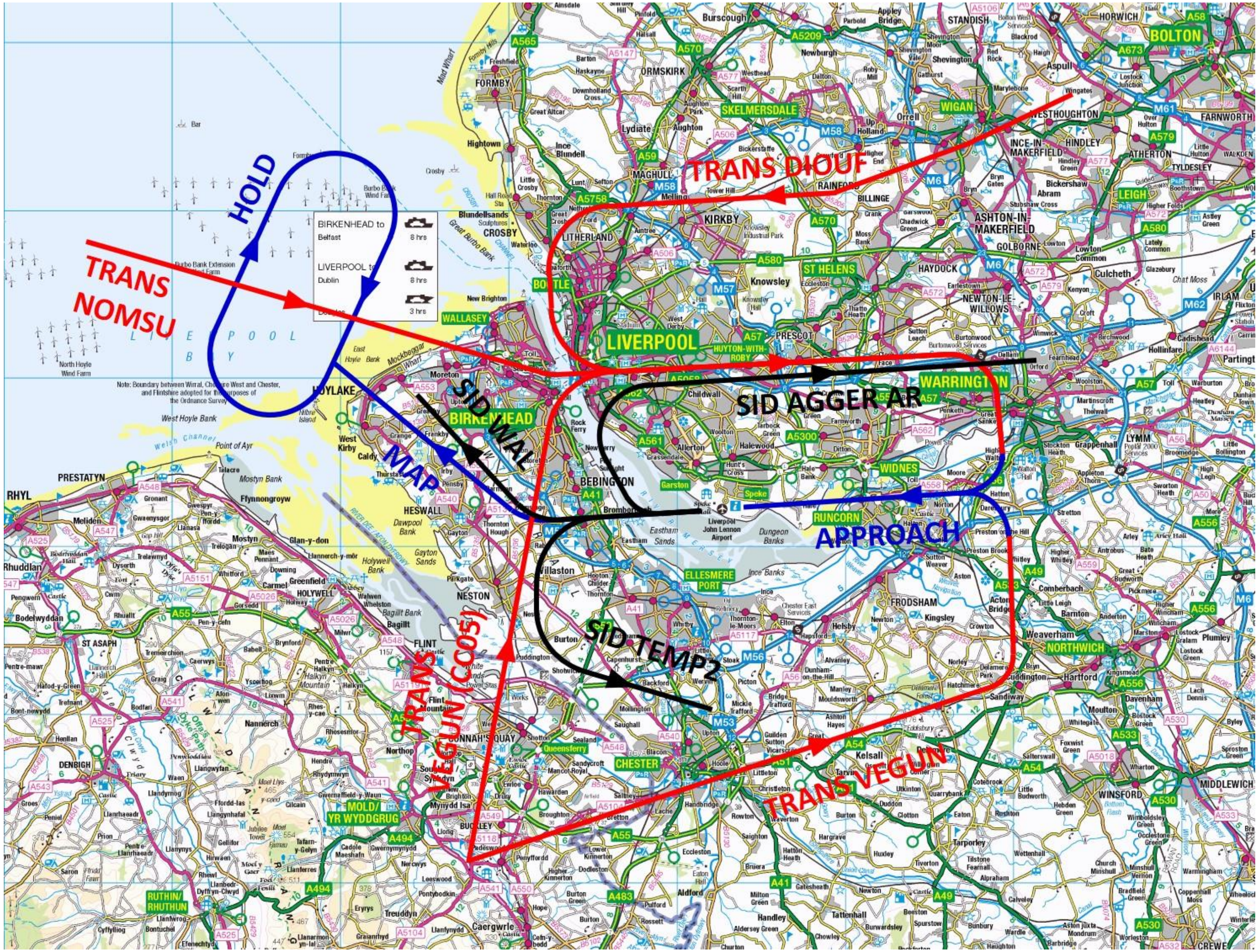


Figure 72 - Runway 27 Preferred Design Combination A – OS Roadmap

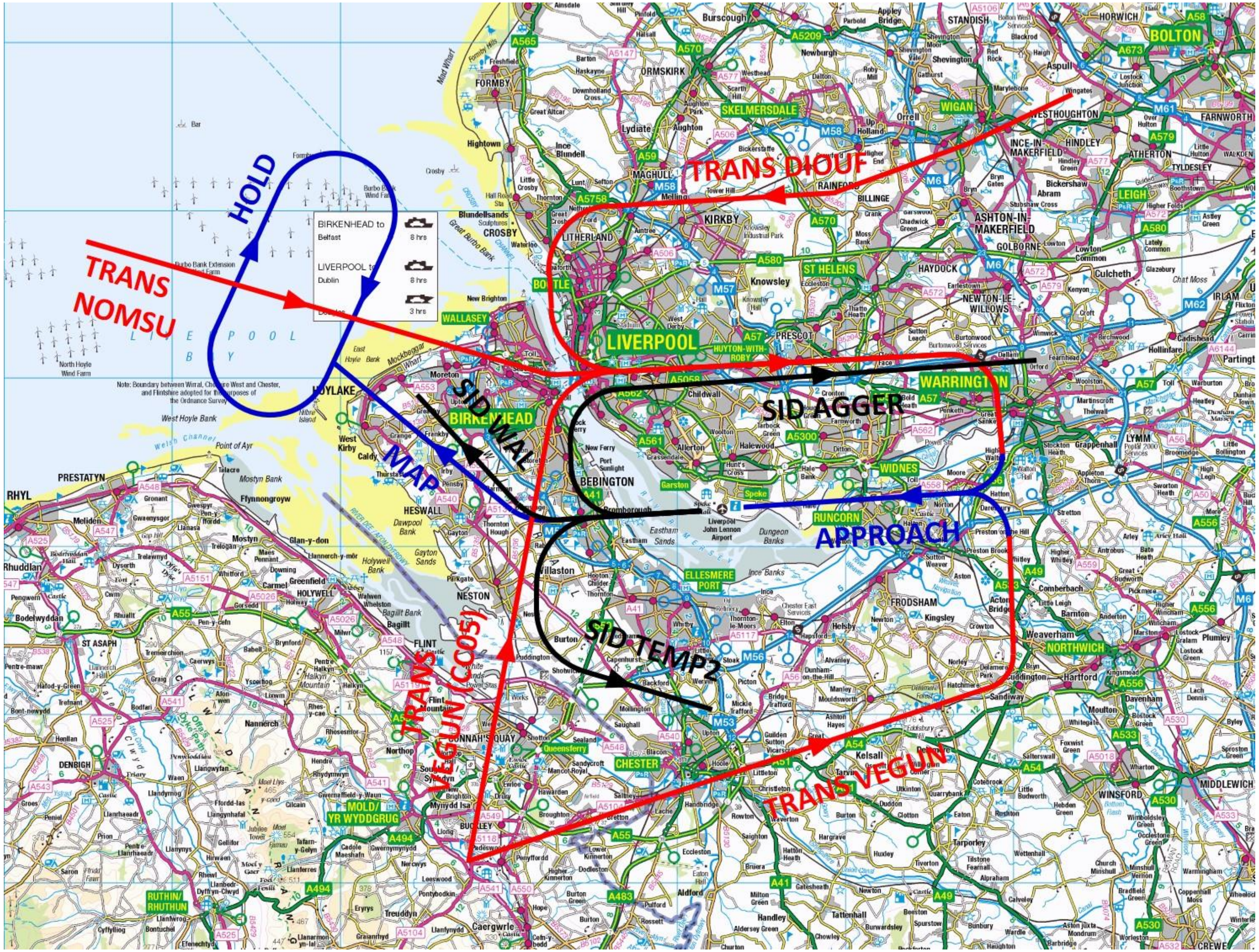


Figure 73 - Runway 27 Alternative Design Combination C – OS Roadmap

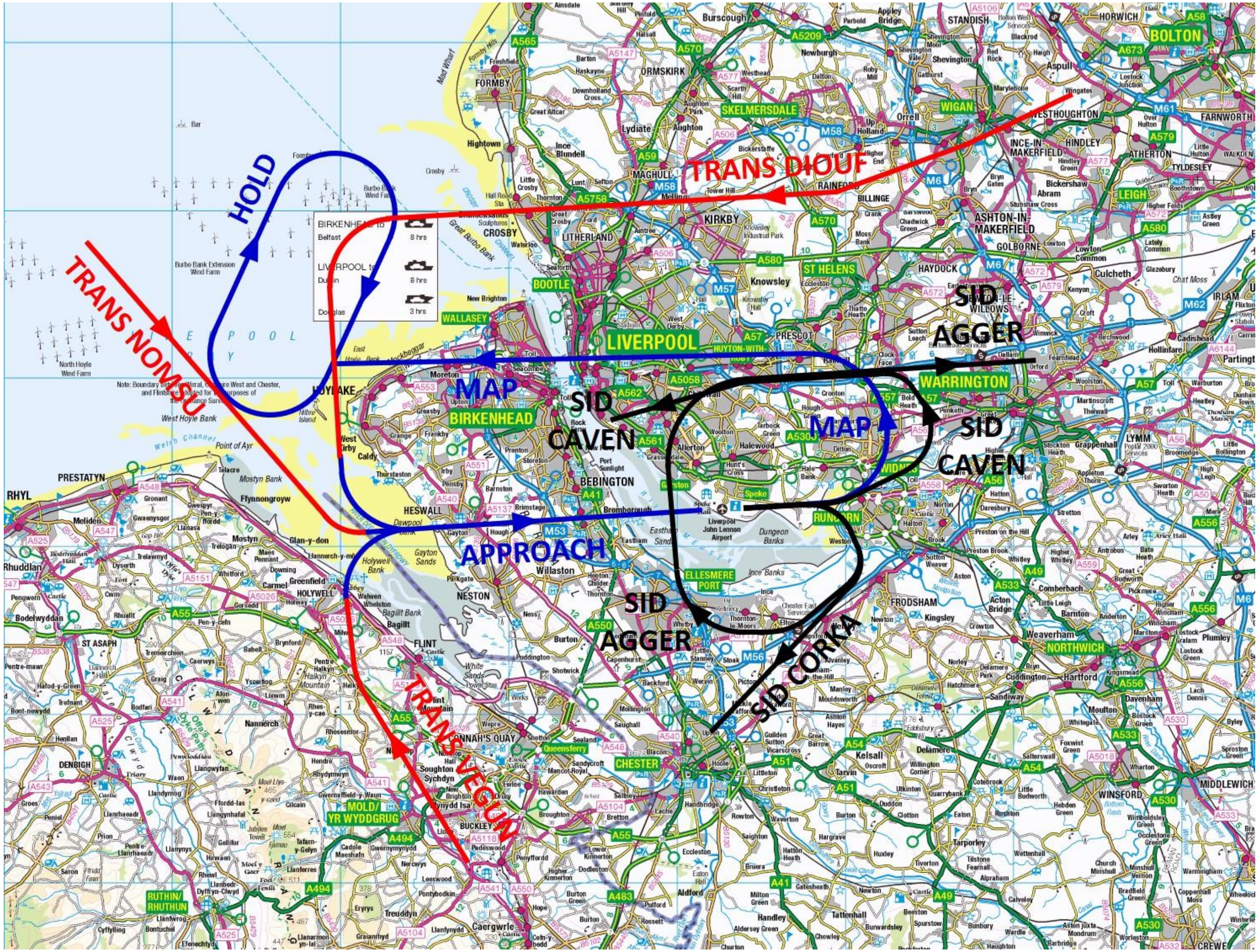


Figure 74 - Runway 09 Preferred Design Combination N – OS Roadmap

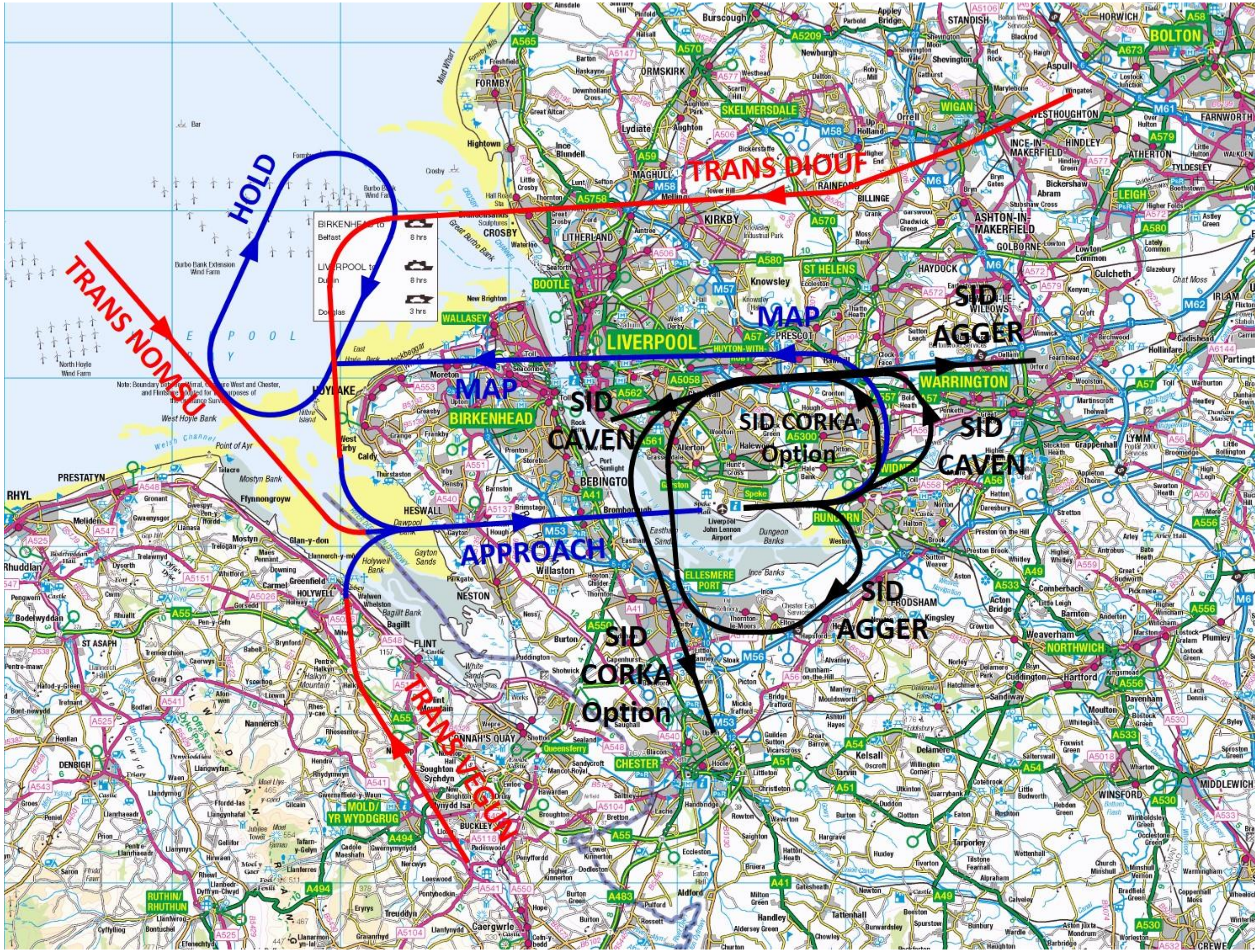


Figure 75 - Runway 09 Alternative Design Combination P – OS Roadmap

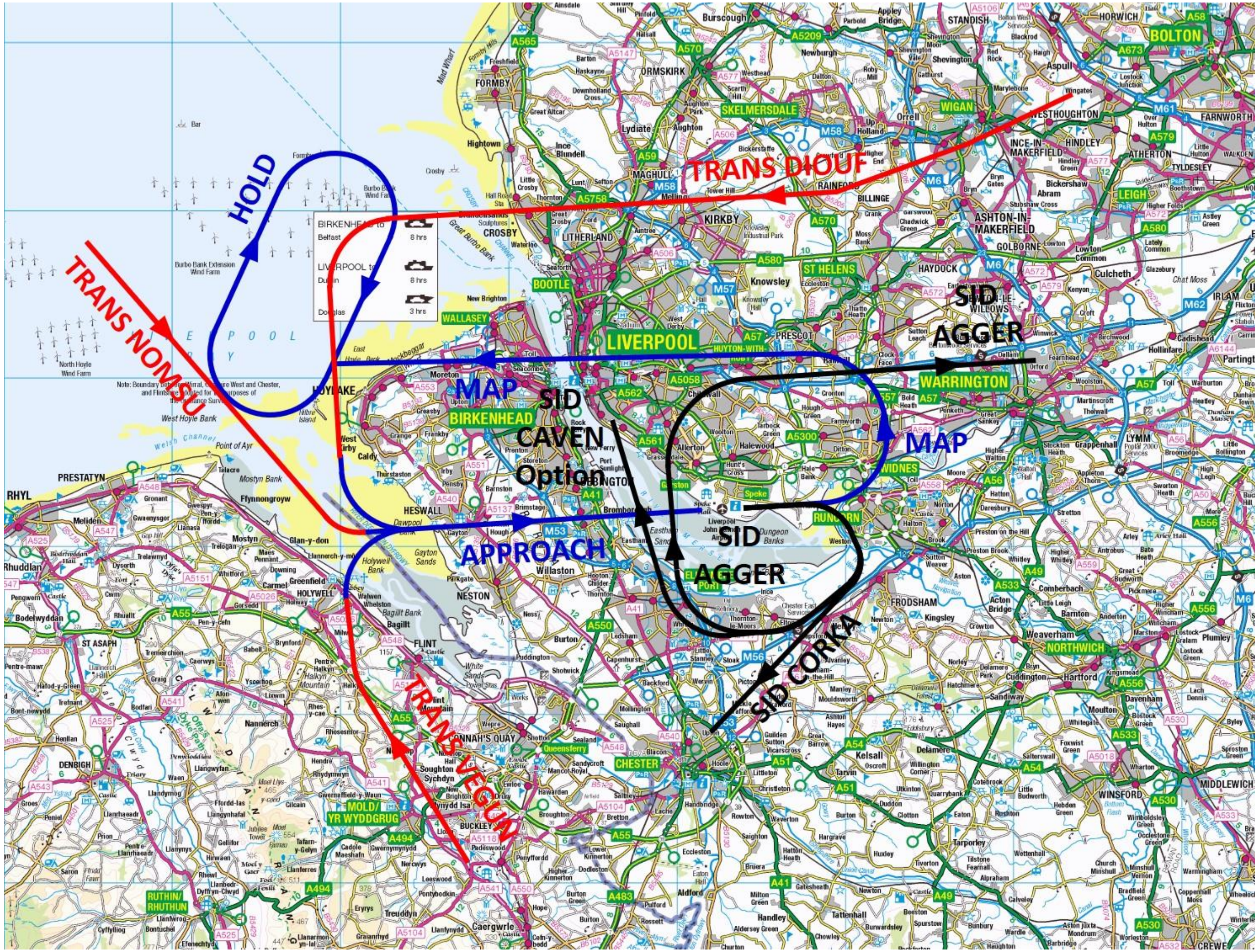


Figure 76 - Runway 09 Alternative Design Combination Option 2 R – OS Roadmap

A2.2 Aeronautical Chart Images

The following images show the options overlaid onto an aeronautical chart suitable for General Aviation and other aviation stakeholders to orient the options.

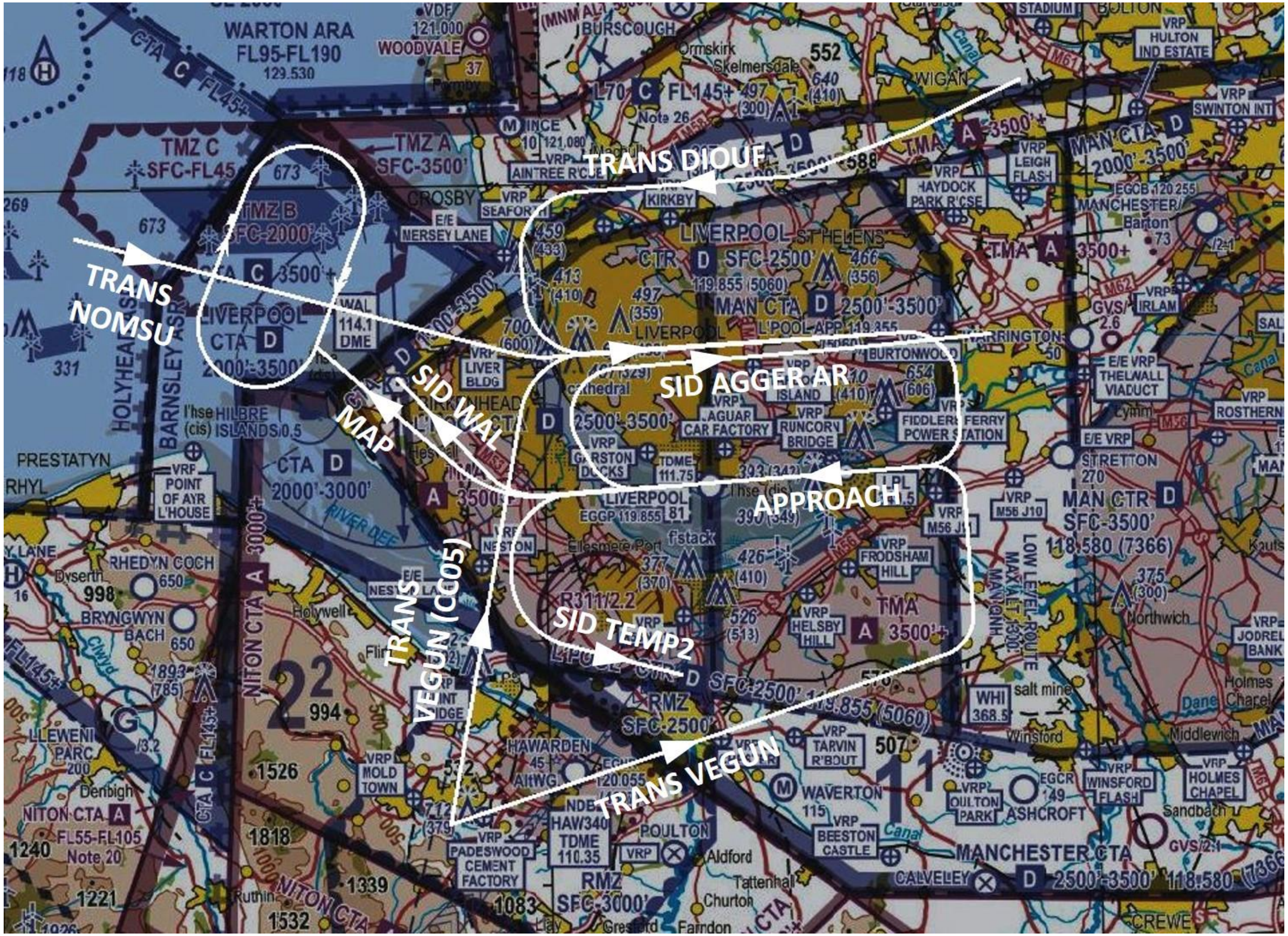


Figure 77 - Runway 27 Preferred Design Combination A – Aeronautical (VFR) Chart

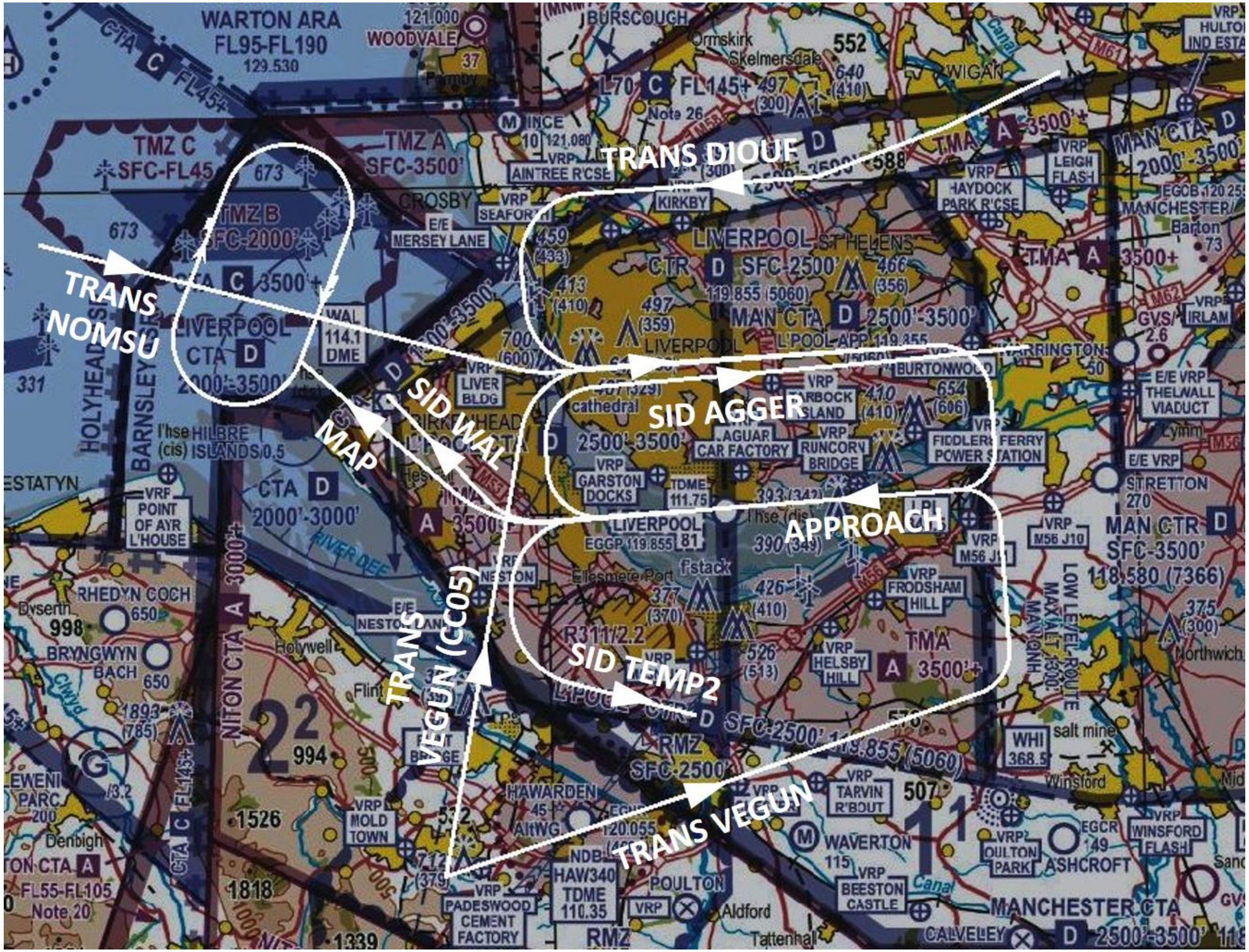


Figure 78 - Runway 27 Alternative Design Combination C – Aeronautical (VFR) Chart

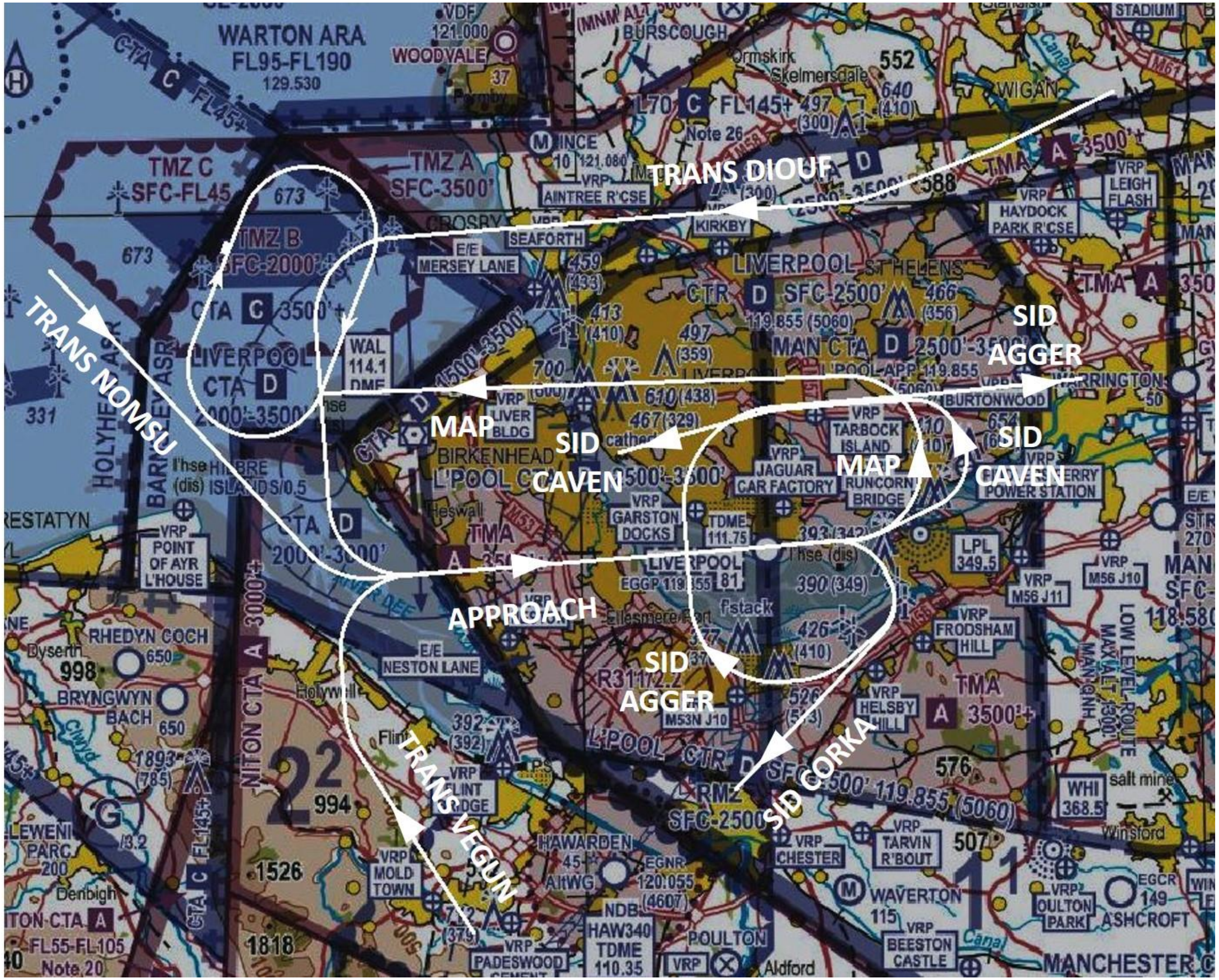


Figure 79 - Runway 09 Preferred Design Combination N – Aeronautical (VFR) Chart

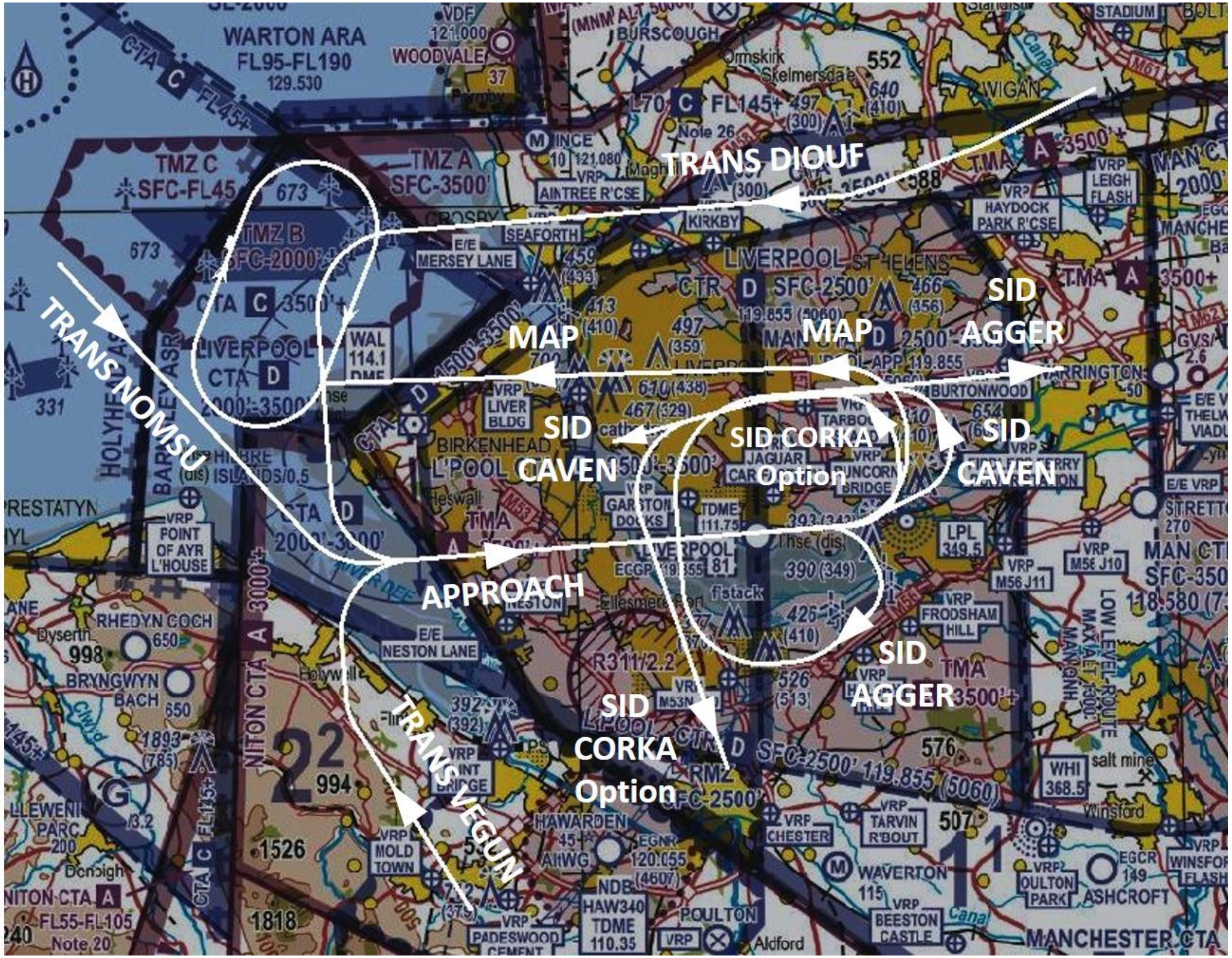


Figure 80 - Runway 09 Alternative Design Combination P – Aeronautical (VFR) Chart

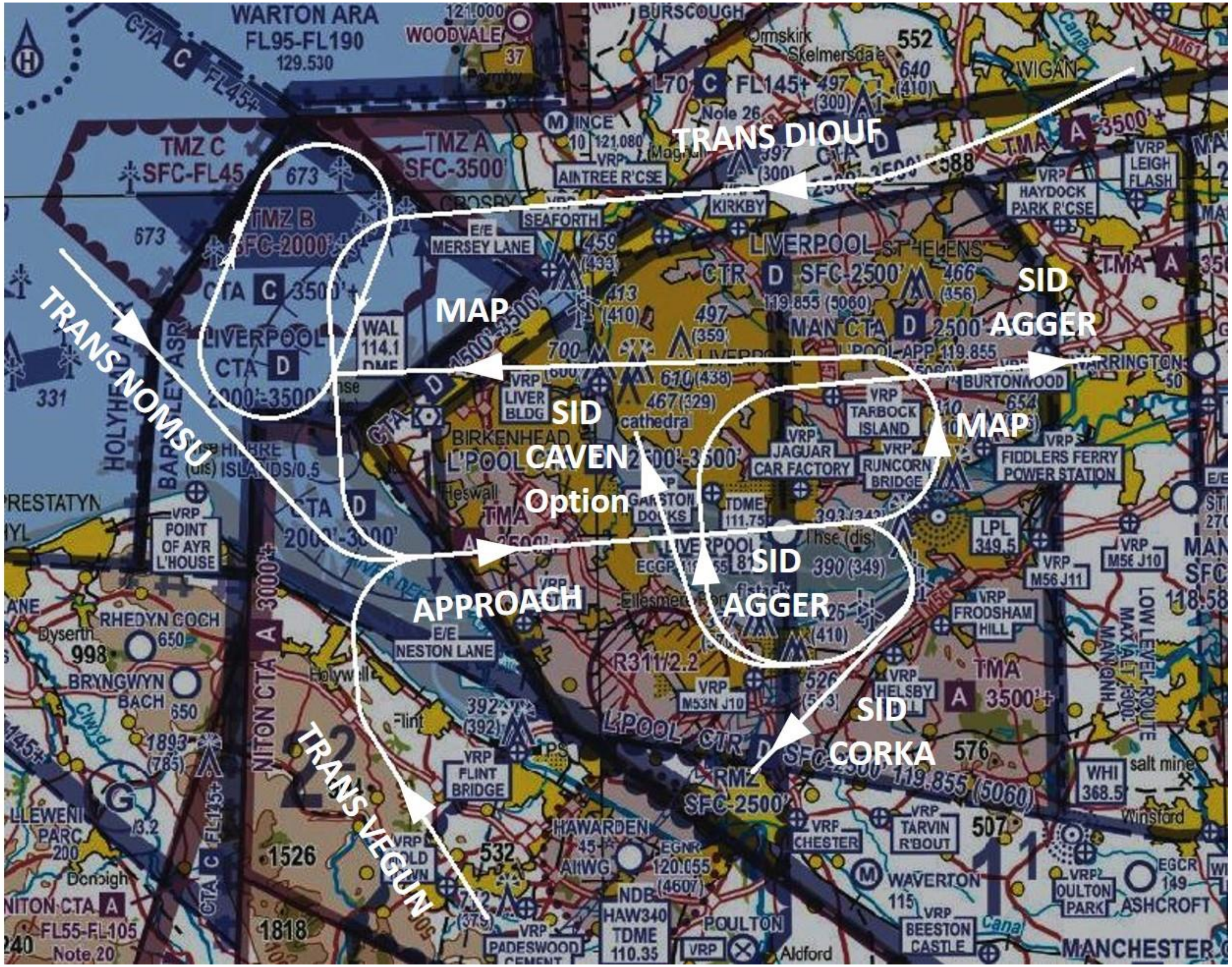


Figure 81 - Runway 09 Alternative Design Combination R – Aeronautical (VFR) Chart