Liverpool John Lennon Airport
Faster. Easier. Friendlier.

Environment

Noise Action Plan

Environmental Noise (England) Regulations 2006 (as amended)

Environment Team – July 2024

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Foreword

by the Chief Executive Officer

Liverpool John Lennon Airport (LJLA) is striving to be the "Fastest, Easiest and Friendliest" Airport for the region and an important part of this is seeking to be a good neighbour by ensuring any future development carefully balances local community concerns regarding noise and other potential environmental impacts with the social and economic benefits a successful growing airport brings to the region.

LJLA is seeking to achieve sustainable growth by minimising and mitigating any environmental concerns wherever practicable to build a successful business as part of the wider community.

When comparing the current Noise Action Plan noise exposure data with those of previous years, the overall noise contours are getting smaller. The 55 dB L_{den} noise contours covered an area of 17.0 km² in 2006, 17.6 km² in 2011, 14.5 km² in 2016, and 7.3 km2 in 2021. This is a welcome trend downwards, which is driven initially by quieter aircraft fleets. However, the dramatic reduction in the size of the noise exposure contour in 2021 was due to a reduction in the number of aircraft movements as a result of the pandemic and associated travel restrictions.

The noise contour maps produced for this Noise Action Plan as required by Defra for compliance are based on aviation activity in 2021, when the airport was impacted by the COVID-19 pandemic travel restrictions. As a result of pandemic related travel restrictions, aircraft movements Liverpool John Lennon Airport reduced dramatically, therefore, the noise contour maps based on activity in 2021 are not typical previous and future years airport operations. The noise contours for 2021 cover a significantly smaller area and with less dwellings exposed then would be with normal levels of operational activity. Hence, when traffic levels grow back to pre-pandemic levels the areas within the respective noise contours will increase, however, we envisage them to be smaller that pre-pandemic levels with the envisaged changes of fleet.

This document is the LJLA Noise Action Plan for the next 5 years, however, we would welcome constructive comments on how the Noise Action Plan could be improved in the future at any time. If you have a suggestion, please send them to the Airport's Environment Team for consultation.

John Irving
Chief Executive Officer
Liverpool John Lennon Airport

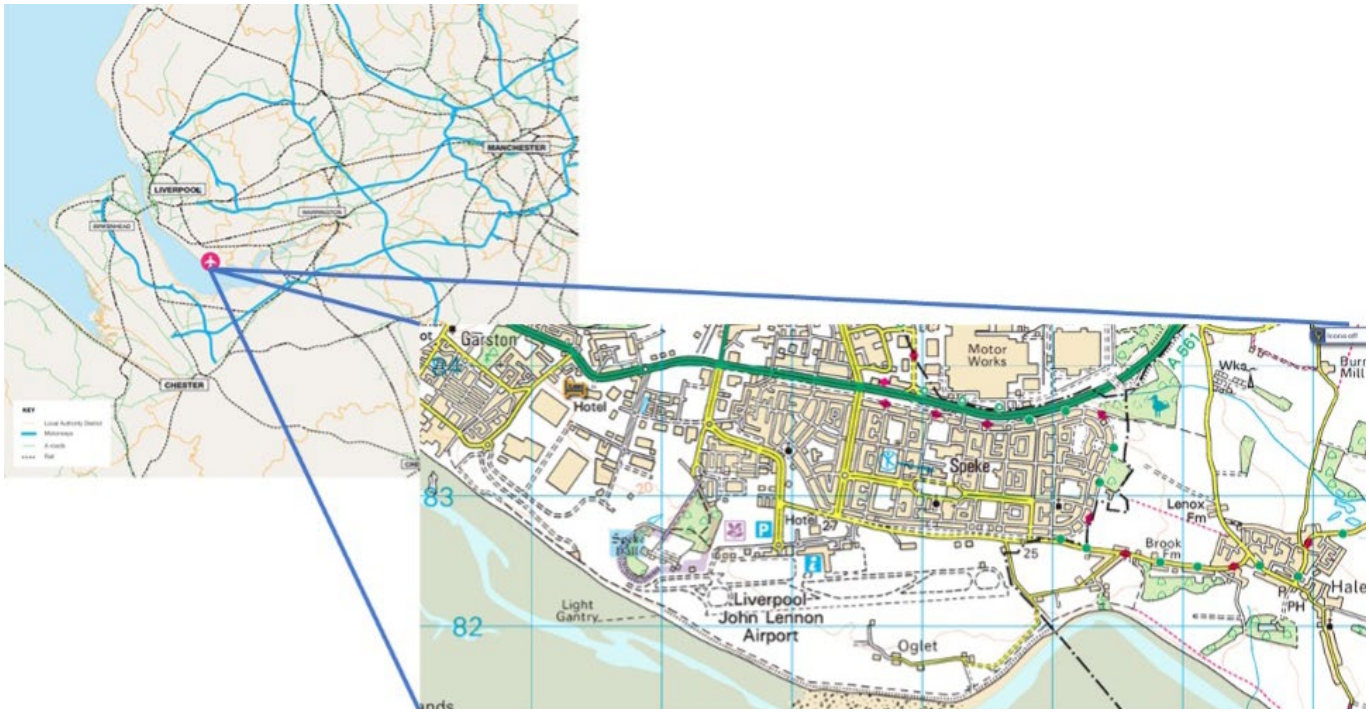
2.0 Introduction

2.1 Airport Location

Liverpool John Lennon Airport is located 6 nautical miles to the southeast of Liverpool City Centre on the northern banks of the Mersey Estuary. The airport's neighbours include the residential communities of Speke to the north and Hale Village to the east, within the Borough of Halton.

To the northwest, LJLA borders Liverpool International Business Park on the old northern airfield, and the grounds of Speke Hall which is a National Trust property with a significant number of visitors. Further to the north are the communities of Garston and Allerton. To the south, between the runway and the estuary, is agricultural land known as the Oglet. The operational Air Traffic Control Tower and radar installation are situated within the Oglet and are accessed separately from Bailey's Lane, which passes close to the eastern end of the runway. To the west of the Airport and to the south of the Oglet are up to 5 kilometres of unpopulated tidal estuary.

Figure 1: The location of Liverpool John Lennon Airport



2.2 Airport Operational Site

The operational site of LJLA extends to around 207 ha (511 acres). The runway and its associated taxiway is aligned east-west across the southern part of the site. All terminal, aprons, cargo buildings and airside facilities are situated on land to the north of the runway and south of Hale Road except the Control Tower and radar installation as noted above.

2.3 Runway 09/27

The current runway (09/27) is 2,285m long and 46m wide. A full-length parallel taxiway to the north of the runway serves all airside facilities. The main aircraft stands provide capacity for 28 aircraft and are situated towards the northwestern part of the site and a separate facility for General Aviation aircraft to the northeastern part of the site.

2.4 Aircraft Movement Numbers

CAA statistics show that in 2021, the year of the noise modelling LJLA had a total of 32,904 aircraft movements aircraft movements, of which 13,404 were air transport movements (commercial aircraft) and small number of military movements and served approximately 1.17 million passengers. This is a 52% reduction compared to 2016 when the Airport had 67,896 aircraft movements.

Table 1 LJLA Number of Aircraft Movements 2007 – 2022

Year	Club	Commercial	Non-Commercial	Other	Total
2007	31,259	46,894	2,188	833	81,147
2008	28,322	44,693	3,605	1,110	77,730
2009	28,219	43,550	1,419	1,026	74,214
2010	27,006	44,084	1,338	946	73,374
2011	25,703	46,141	1,059	1,030	73,933
2012	27,100	36,191	1,065	1,240	65,596
2013	19,866	25,887	1,026	1,023	47,802
2014	25,478	30,102	1,430	1,402	58,412
2015	25,009	33,288	1,297	1,653	61,247
2016	26,444	38,471	1,324	1,657	67,896
2017	22,963	35,684	1,577	1,353	61,577
2018	24,879	36,199	1,891	958	63,921
2019	25,705	35,409	2,062	1,013	64,189
2020	16,307	13,633	1,058	1,344	32,342
2021	17,109	13,404	1,148	1,243	32,904
2022	17,462	28,163	2,371	508	48,504

2.5 Airport Ownership

The is owned by Ancala Partners (47.5%), The Peel Group (47.5%) and Liverpool City Council (5%).

3.0 Responsibilities, Policy, and Procedural Context

3.1 The Environmental Noise (England) Regulations 2006

Noise Action Plans are a legal requirement under Directive 2002/49/EC relating to the Assessment and Management of Environmental Noise. The requirements of the Directive were transposed from the European Commission Directive 2002/49/EC into the Environmental Noise Regulations (England) 2006 (as amended), which also includes a requirement for Airports to produce Strategic Noise Maps. Once produced, the Strategic Noise Maps and Noise Action Plan must be reviewed every five years, or following a major development, affecting the noise situation. The regulations came into force on 5th October 2006 and apply to environmental noise to which humans are exposed. The regulations apply to noise from road, railway and aviation sources, as well as industrial noise. The regulations do not apply to occupational noise, noise from or between domestic premises, or noise from inside a means of transport or due to military activities in military areas.

3.2 Responsible Authority

The responsible authority for composing the Action Plan as defined in the Environmental Noise Regulations (England) 2006 (as amended) (ENR) is the Airport Operator. In the case of LJLA, Liverpool Airport Limited is the responsible authority.

3.3 Legal Requirements

Action Plans are a legal requirement under Directive 2002/49/EC relating to the Assessment and Management of Environmental Noise. The Directive is commonly referred to as the Environmental Noise Directive or END. The requirements of the END are transposed into the Environmental Noise (England) Regulations 2006 (as amended). Since the previous Noise Action Plan, the United Kingdom has formally withdrawn from the European Union. As such, all EU legislation has either been revoked completely or retained and transposed into UK law.

3.4 Requirements of END

The END requires responsible authorities to produce strategic noise maps for the main sources of environmental noise. In practise, this means major roads, major railways, major airports and airports that effect large urban areas (known as agglomerations) with a population of more than 100,000 persons and a population density equal to or greater than 500 people per km2 in 2016 then every five years thereafter. LJLA will next remodel the noise contours in 2026.

3.5 The Agglomerations

The Agglomerations have been identified by Defra; the Agglomerations closest to LJLA are Liverpool and Birkenhead and are shown on the next page.

Figure 2: Liverpool & Birkenhead Agglomerations

3.6 The Noise Descriptors

Noise Action Plans must be drawn up by the Airport Operators that were required to produce strategic noise maps under the Regulations. Noise maps for areas surrounding an airfield are normally assessed in terms of the L_{Aeq},t=16h as the appropriate noise descriptor, calculated using the number of aircraft movements over an average summer day (airports generally have more aircraft movements in summer than winter). The END dictated that LJLA's Noise Maps include noise contours for the L_{Aeq},t=16h descriptor calculated from the number of aircraft movements on an average annual day rather than a summer day. The L_{Aeq},t=16h descriptor is replaced by L_{den}. The key difference is that the L_{den} descriptor has a weighting applied during the evening (19.00 – 23.00) of plus 5 dB (A) and a weighting applied during night-time (23.00 – 07.00) of plus 10 dB (A).

Appendix B has a full glossary of terms and definitions of the different noise descriptors.

3.7 The Competent Authority

Noise Action Plans have been produced using the results of the noise maps depicted representing the noise exposure in 2021. For the purposes of the Regulations, Airport Operators are the competent authorities in relation to Airport Action Plans. Therefore, LJLA is responsible for undertaking this work and will review the Action Plan from time to time and revise if appropriate or necessary at least every 5 years in accordance with END. The next time the Noise Maps are scheduled to be refreshed is for 2026.

3.8 Quiet Areas

A requirement of the Airport Action Plans is the aim to protect quiet areas identified in agglomerations against any increase in noise. Defra have not identified any current quiet areas within the agglomeration that need to be considered.

LJLA will do all that is reasonably practical to safeguard any quiet areas identified in the future, from exposure to aircraft noise that does not compromise the safe and efficient operation of the aerodrome.

Elsewhere there are requirements that seek to protect other quiet areas such as National Parks and Areas of Outstanding National Beauty from over flights provided it does not add to the environmental burden on more densely populated areas. There are currently no National Parks or Areas of Outstanding National Beauty within LJLA controlled airspace or immediate sphere of influence.

3.9 The Local Level – Quiet Operations Policy

At a local level LJLA operates a Quiet Operations Policy (QOP) which is discussed in detail in Chapter 9. The Section 106 Agreement with Liverpool City Council formed the original basis for the QOP after the extension to the passenger terminal was approved in February 2003.

Policies for noise abatement in the Section 106 agreement include:

- Setting up a Noise Monitoring Sub Committee made up of representatives from Local Authorities, councillors and other local groups and individuals. The committee will oversee the Quiet Noise Policy.
- Provision of a Sound Insulation Grant Scheme for homes affected by airborne aircraft noise. The scheme boundary to be agreed with the City Council.
- A Noise Monitoring & Track Keeping System to be installed. This will record track performance and monitor aircraft noise.
- Ground noise provisions such as encouraging the minimum use of reverse thrust, minimise use of APU's and restrict and record all engine testing.
- Night Noise Provisions which include a Quota Count Scheme and restrictions on QC8 and QC16 aircraft operations at night.

3.10 The International Level

The International Civil Aviation Organization (ICAO) is a United Nations agency, established to help countries share their skies to their mutual benefit.

ICAO assists the 193 Contracting States to the Chicago Convention as they cooperate here to adopt standards, practices, and policies for international civilian flight. Industry and civil society groups, in addition to relevant multilateral organisations, contribute importantly to these ICAO outcomes as 'Invited Organisations'.

3.10.1 ICAO Aircraft Chapters

ICAO has set several standards for aircraft noise certification which are contained in Volume 1 of Annex 16 to the Convention on Civil Aviation. This document sets maximum acceptable noise levels for different aircraft during take-off and landing, categorised as Chapter 2, 3, 4 and 14.

Chapter 2 aircraft have been banned from operating within the EU since 2002, unless they are given specific exemptions. Most aircraft fall within Chapter 3, 4 and 14 parameters. These aircraft are quieter than Chapter 2 aircraft.

Chapter 4 standards have applied to all new aircraft manufactured since 2006. These aircraft must meet a standard of being 10 dB quieter than Chapter 3 aircraft.

Chapter 14 was adopted by ICAO in 2014 and represents an increase in stringency of 7 dB compared with Chapter 4 and applies to new aircraft submitted for certification after 31st December 2017.

3.10.2 ICAO Balanced Approach

In 2001 ICAO published the document – A Balanced Approach to Aircraft Noise Management. Known as the 'Balanced Approach', it recommends identifying the noise problem at an airport and analysing the various measures available to reduce noise through the exploration of four principal elements, namely:

- Reduction at source (quieter aircraft).
- Land-use planning and management.
- Noise abatement operational procedures (optimising how aircraft are flown and the routes they follow to limit the noise impacts).
- Operating restrictions (preventing certain noisier types of aircraft from flying at certain times or at any time).

3.11 The EU Level

The European Union (EU), through the European Civil Aviation Conference (ECAC) is increasingly assuming responsibility for the regulation of aircraft noise standards which member a state incorporate into their respective national legislation. Although the UK is no longer in EU it still has a major influence going forwards and as a legacy.

3.11.1 EC Directive 2006/93/EC

EC Directive 2006/93/EC sets out the requirements of EU Member States to regulate Chapter 3 civil subsonic aircraft and replaces the repealed EU Directive 92/14/EEC. The EU Member States are required to ensure that all civil subsonic aircraft operating from airports in their territory comply with the Chapter 3 requirements, excluding specific exemptions.

3.11.2 Environmental Noise Directive (2002/49/EC)

Environmental Noise Directive (2002/49/EC) seeks to define a common approach across Europe to reducing and measuring noise from major sources, particularly road and rail networks, aircraft, outdoor equipment, industry, and mobile machinery. The directive requires member states to publish strategic noise maps and noise action plans for major airports (defined as having more than 50,000 movements a year) every five years or where they affect noise in agglomerations (a continuous area of at least 100,000 people). This is partly transcribed into English legislation as the Environmental Noise (England) Regulation 2006. This European document has been brought into UK legislation as Retained EU Reference Directive 2002/49 on the assessment and management of environmental noise.

3.11.3 EU Regulation No. 598/2014
EU Regulation No. 598/2014 replaced EC Directive 2002/30 and EU Directive 2006/93/EC and covers the establishment of rules and procedures relating to the introduction of noise-related operating restriction consistent with the ICAO Balanced Approach.

These EU Regulations have now been transposed into UK law or have influenced UK law since BREXIT.

3.12 The UK Governments Role

The UK Government's role is one of Regulation and setting and developing the policy framework for aviation for UK airports.

3.12.1 UK Regulation

3.12.1.1 Civil Aviation Act 1982, 2006 and 2012
Civil Aviation Act 1982 and 2006 grant the Government powers to introduce noise control measures, including mitigation and financial incentives for the use of quieter aircraft landing or taking off at designated airports, currently London Heathrow, Gatwick, and Stansted airports. The 2006 Act permits any airport authority to establish a 'noise control scheme' which may limit the numbers or types of aircraft that can be used in any given period. It also gives airport authorities the power to introduce charges and penalties that are designed to encourage the use of quieter or less-polluting aircraft. The 2012 Act was designed to modernise key elements of the regulatory framework for civil aviation in the UK and it offers a package of reforms to make regulation, and the sanctions which support it, flexible, proportionate, targeted, and effective.

3.12.1.2 The Environment Protection Act 1990
Section 79(6) of the Environmental Protection Act 1990 (as amended) exempts aircraft noise from the general noise nuisance controls which exist under the Environmental Protection Act 1990.

3.12.1.3 The Aeroplane Noise Regulations 1999
The Aeroplane Noise Regulations 1999 set out that aircraft landing and departing the UK have a valid noise certificate issued by their competent authority complying with ICAO noise certification requirements.

3.12.1.4 Environmental Noise (England) Regulations 2006, as Amended
Noise Action Plans are a legal requirement under Directive 2002/49/EC relating to the Assessment and Management of Environmental Noise. The requirements of the Directive were transposed into the Environmental Noise Regulations (England) 2006 (as amended), which also includes a requirement for Airports to produce Strategic Noise Maps. Once produced, the Strategic Noise Maps and Noise Action Plan must be reviewed every five years, or following a major development, affecting the noise situation.

3.12.1.5 The Aerodromes (Noise restrictions) (Rules and Procedures) Regulations 2003
These regulations introduced powers to Airports to restrict operation of marginally compliant aircraft, the measure of which is determined by a certification procedure. Prior to adopting measures under these regulations, the airport must establish and publish and environmental objective. These also require Airports to adopt a balanced approach to noise management.

3.12.1.6 Airports (Noise-related Operating Restrictions) (England and Wales) Regulations 2018
These Regulations implement, in relation to England and Wales, the requirement to designate competent authorities for the purposes of Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16th April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC ("the 2014 Regulation"). The regulation gave power to the Local Planning Authorities (LPA) to ensure application of the 'Balanced Approach' and compliance with operating restrictions when determining a planning matter in that area.

3.12.1.7 The Air Navigation Order 2016
Part 5 sets out requirements for the operation of aircraft. This imposes specific obligations on the pilot in command of an aircraft, and sets out requirements for aircraft equipment and crew, as well as restrictions on certain types of aerial activity. There are additional requirements for public transport operations. Reviewed and updated in 2022 to reflect changes following the UK's withdrawal from the EU.

3.12.1.8 UK AIP
Full details of the range of aircraft operations related noise controls are set out in statutory notices and published in the UK Aeronautical Information Package (UK AIP) and elsewhere as appropriate. These controls include aspects such as noise abatement procedures and night flight limits and controls LJLA and Other UK Airports.

3.12.2 UK Policy

3.12.2.1 Aviation Policy Framework
The current Aviation Policy Framework (APF) (2013) set out the government's policy to allow the aviation sector to continue to make a significant contribution to economic growth across the country.

The APF set out the Government's high-level strategy for overall aviation objectives and policies. Its key objective for the management of aviation noise impacts is "to limit and where possible reduce the number of people in the UK significantly affected by aircraft noise". As published in the Aviation Policy Framework 2013, the 57 dB(A) L_{Aeq} 16-hour contour shall be treated as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance

The APF expects that any growth in aviation shall be mitigated by the aviation industry at all levels in terms of noise impacts. Another APF objective is for the aviation industry and local stakeholders to strengthen and streamline the way in which they work together.

The APF formally recognises the ICAO assembly's 'Balanced Approach' principle to aircraft noise management through the following requirements:

- Reduction of noise at the source (aircraft).
- Land-use planning and management with noise considerations.
- Noise abatement procedures (optimising how aircraft are flown and the routes they follow).
- Operating restrictions (preventing noisier types of aircraft from flying at certain times).

3.12.2.2 Noise Policy Statement for England (2010)
The Noise Policy Statement for England (NPSE) provides the framework for noise management decisions to be made that ensure noise levels do not place an unacceptable burden on society.

The stated aims of the NPSE are to:

- Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise.

All the above are within the context of Government policy on sustainable development.

The NPSE introduces the concepts of NOEL (No Observed Effect Level), LOAEL (Lowest Observed Adverse Effect Level) and SOAEL (Significant Observed Adverse Effect level) however it doesn't define values for these.

3.12.2.3 UK Airspace Policy: A framework for balanced decisions on the design and use of airspace – (Consultation – February 2017)

This consultation and its subsequent results led to proposals to support airspace modernisation in order to deliver benefits for the UK economy, for passengers and for communities affected by aircraft noise.

3.12.2.4 UK Air Navigation Guidance 2017
In October 2017 the Government published its Air Navigation Guidance (ANG) setting out how it will implement its environmental, airspace and noise management policies in relation to air navigation.

The Air Navigation Guidance provides guidance to:

- The Civil Aviation Authority (CAA) on its environmental objectives when carrying out its air navigation functions; and
- The CAA and the wider aviation industry on airspace and noise management, including in relation to the role of the Secretary of State in the UK's airspace change process.

3.12.2.5 Aviation 2050: The Future of UK Aviation (December 2018)
This policy consultation outlines proposals for a new aviation strategy and addresses a wide range of associated issues. The Strategy sets out that the government intends to put in place a stronger and clearer framework in order to ensure the sector is sufficiently incentivised to reduce noise, or to put mitigation measures in place where reductions are not possible.

To support this the Government implemented a range of proposals including:

- New Secretary of State Call In power on airspace modernisations that are of national importance.
- Important changes to aviation noise compensation policy to improve fairness and transparency.
- The creation of an Independent Commission on Civil Aviation Noise (ICCAN). The body would help ensure that the noise impacts of airspace modernisations are properly considered and give communities a greater stake in noise management.
- A new requirement for options analysis in airspace modernisation to enable communities to engage with a transparent airspace modernisation process and ensure options such as multiple routes are considered.
- New metrics and appraisal guidance to assess noise impacts and their effects on health and quality of life. This will ensure noise impacts are considered much further away from airports than at present.

3.12.2.6 Flightpath to the Future (May 2022)
In May 2022 the government published a strategic framework for the aviation sector called "Flightpath to the Future (FttF)". FttF is a strategic framework for the aviation sector that sets out the government's ambitions and commitments for aviation over the next 10 years. FttF builds upon the consultation responses received in Aviation 2050: The Future of UK Aviation (December 2018).

Point 4 of a 10-point plan includes that the government will "continue to work with the sector to reduce the localised impacts of aviation from noise and air pollution".

ICCAN was disbanded in July 2021 when the Government split its work between the DfT and the Civil Aviation Authority (CAA). FttF details how the CAA has assumed most of the functions previously performed by ICCAN and that the government will work closely with the CAA on these issues. The CAA has subsequently published an Environmental Strategy and set up an Environmental Sustainability Panel in April 2022.

3.12.2.7 Overarching aviation noise policy Published (March 2023)
In March 2023 the Government published its revised overarching aviation noise policy statement:

"The government's overall policy on aviation noise is to balance the economic and consumer benefits of aviation against their social and health implications in line with the International Civil Aviation Organisation's Balanced Approach to Aircraft Noise Management. This should take into account the local and national context of both passenger and freight operations and recognise the additional health impacts of night flights".

"The impact of aviation noise must be mitigated as much as is practicable and realistic to do so, limiting, and where possible reducing, the total adverse impacts on health and quality of life from aviation noise".

The Government intends to publish a noise policy paper late 2023 which will set out their plan to monitor their progress against the objective and what specific actions the Government are taking in this respect and how the Government will evaluate whether the policy aims are being met.

3.13 The LJLA Master Plan

The Airport Master Plan sets out plans for future development and growth until 2050, confirms a long-term vision for the future of LJLA and describes further investment proposals for the Airport and its surrounding landholdings. It considers proposals for the Airport to 2030 in detail and provides a broad indication of potential development to 2050. It also sets out proposals for further growth and development of the Airport as a key transport and strategic economic asset. These proposals include expanding the range of destinations served, adding long haul services to key business and leisure destinations, and developing the Airport and its landholdings as a strategic economic asset by maximising its potential to create jobs and support ongoing regeneration across the Liverpool City Region.

More details can be found at:
https://www.liverpoolairport.com/about-ljla/liverpool-john-lennon-airport-master-plan-to-2050

3.14 Airspace Change

3.14.1 LJLA Current Airspace

In July 2016, after following the CAP725 Airspace Change Process (ACP) that included a 12-week consultation period, LJLA introduced an alternative satellite based final approach procedure. The procedure was designed to match the ground-based Instrument Landing System (ILS) approach from approximately 8 nm to touch down. The new procedure is used as a backup if the ILS is not available. The GNSS approach procedures are important because it ensured that a precision approach for appropriately equipped aircraft was always available, therefore, minimising the noise and additional emission associated with an efficient or missed approach. The GNSS approach has been in place for approximately 7 years and is usually only used for training or as an alternative if the ILS was not available.

3.14.2 Airspace Change Proposal

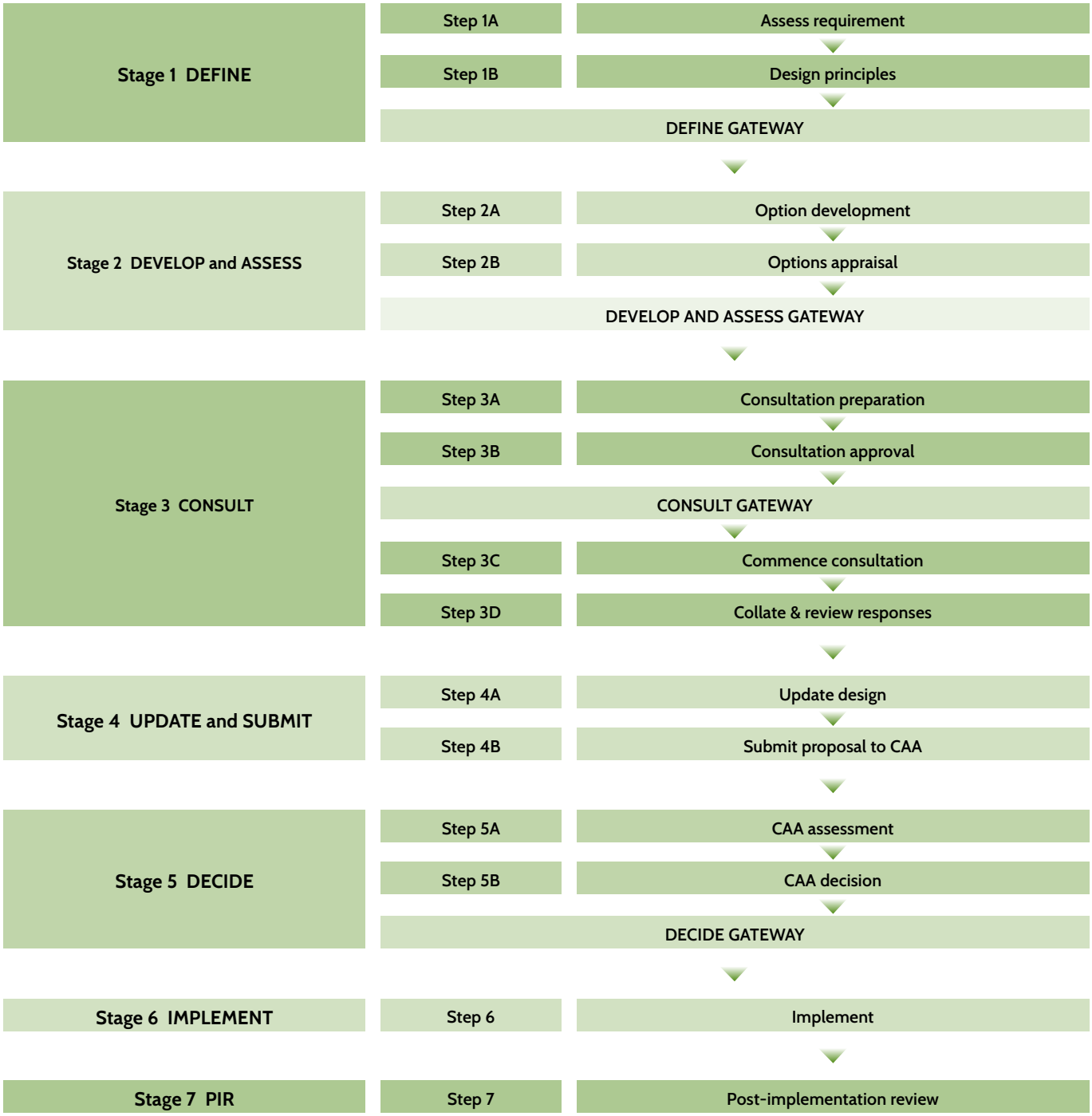
3.14.2.1 CAP 1616 & ACOG

The UK's airspace is some of the most complex in the world, yet it has not undergone significant change since the 1950s. The Department for Transport and the Civil Aviation Authority (CAA) plan to modernise UK airspace to deliver quicker, quieter, and cleaner journeys by air in and around the UK and to accommodate future aviation growth, with flight paths having to be redrawn in a coordinated way. Therefore, airports and other airspace change sponsors across the UK are undertaking similar Airspace Changes that will potentially see changes to their departure and arrival routes, and en-route airways.

To support the delivery of Air Navigation Guidance 2017, the CAA issued new guidance for changing UK airspace – CAP1616. This is designed to ensure that it meets modern standards for regulatory decision-making, and is fair, transparent, consistent and proportionate. The process must be impartial, evidence-based and must take account of the needs and interests of all affected stakeholders. Seven stages are defined for carrying out an airspace change, with a focus on early engagement with communities to explore a range of possible options. The CAA have reviewed and update their guidance in October 2023.

CAP 1616 process for airspace change is carried out in 7 stages, with 14 very precise steps. It also includes four formal process 'gateways' beyond which you are not allowed to proceed until approved by the CAA.

Figure 3: CAP 1616 Seven Stage Process



Following CAP1616, the CAA also published an airspace modernisation strategy in December 2018 to outline recommended industry initiatives, and a governance structure for the modernisation programme. CAP 1616 is currently at its fourth edition in 2023.

The DfT and CAA co-sponsor airspace modernisation. The Airspace Change Organisation Group (ACOG) was established and is responsible for producing the UK airspace change master plan. This master plan is currently moving from its second to third iteration.

3.14.2.2 LJLA Airspace Change Proposal (ACP)

LJLA ACP initially started in January 2018, with the submission of a Statement of Need to the Civil Aviation Authority (CAA). LJLA as the ACP Sponsor followed the then 7-Stage CAA guidance on airspace change CAP1616.

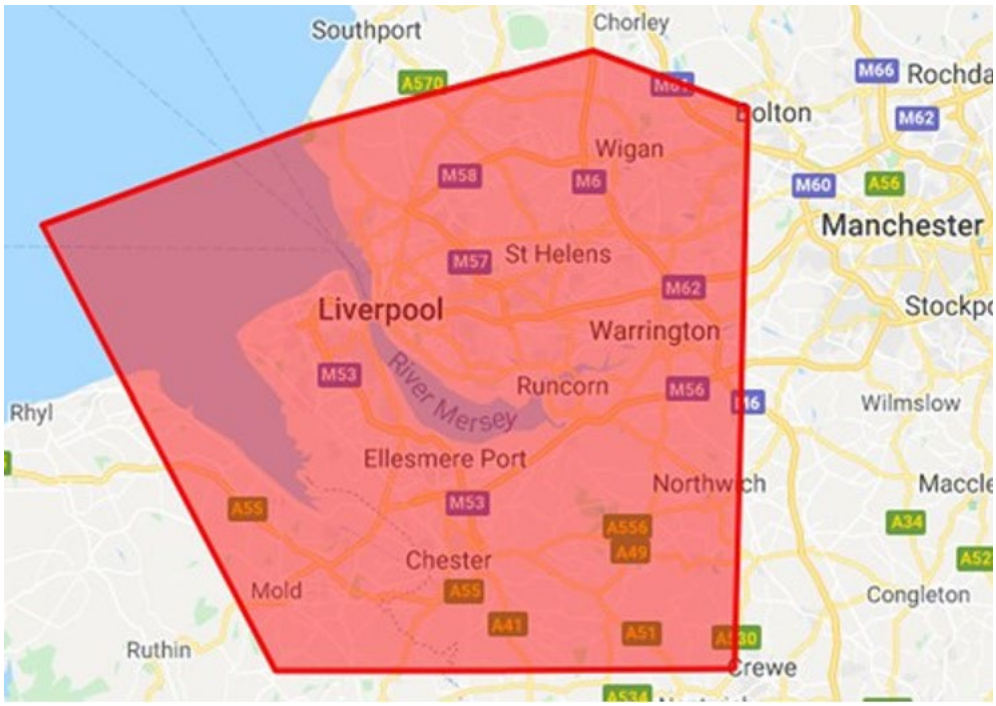
In November 2020, the Airport submitted the Stage 3 documentation to the CAA relating to the Airport's public consultation which took place between January 2020 and April 2020. This meant the LJLA ACP immediately progressed to Stage 4a and the LJLA ACP was then paused. The LJLA ACP has now restarted having remained paused until early 2023

During the 2 years the LJLA ACP was paused, there had been significant developments within the national and regional Airspace Change arena. These changes included the formation of the Airspace Change Organising Group (ACOG) and development of the National Airspace Masterplan, in addition to the maturing of neighbouring Airspace Change Sponsors' designs (Manchester Airport and NERL). LJLA were encouraged by the CAA and ACOG to re-inject into the CAP1616 process with a review of what has changed, undertaking an assessment to ensure which new design options need to be considered.

The LJLA ACP is an application to the CAA to change the flight paths or routes of aircraft arriving and departing from our airport. An ACP is like a planning application and prior to COVID and the Airspace Masterplan an ACP was typically taking 2-3 years, now it is envisaged even if everything goes smoothly and it is approved by the CAA, implementation would not be until winter 2027/8. The LJLA ACP will progress through the CAP1616 process and this can be observed on the CAA Airspace Change portal: https://airspacechange.caa.co.uk/PublicProposalArea?pID=28.

The initial primary motivation for LJLA to undertake the proposed airspace change was to migrate the means of navigation from land-based navigational aids to satellite based technology, whilst seeking to systemise the use of the airspace.

Figure 4: Area which may be affected by LJLA ACP



4.0 Current Operating Restrictions

4.1 Summary of Current Limitations

Current limitations on aircraft movements are those covered in the Section 106 Planning agreement with Liverpool City Council. Below is a summary of aircraft which are restricted at LJLA:

- Between 2300-2330, aircraft with quota count of QC/8 and QC/16 must not be scheduled to take-off or land;
- Between 2330-0600, aircraft with quota count of QC/8 and QC/16 must not take-off or be scheduled to land;
- Between 0600-0700, aircraft with quota count of QC/16 must not take-off or be scheduled to land.

4.2 Engine Testing

Aircraft engine testing is subject to the approval of the Airport Authority and shall only be permitted between the hours of 0700 and 2300. Outside these hours engine testing will not be permitted other than in exceptional operational circumstances.

5.0 The Noise Mapping Process

5.1 Instructions to Consultants

LJLA instructed Bickerdike Allen Partners (BAP) as independent aviation acoustic experts to undertake the Strategic Noise Mapping for LJLA as outlined in Statutory Instrument 2006 No. 2238 The Environmental Noise (England) Regulations 2006.

5.2 Aviation Environmental Design Tool

Noise mapping has been carried out based on the actual aircraft movements for 2021 and using version (3d) of the Aviation Environmental Design Tool (AEDT) software, developed by the Federal Aviation Administration (FAA). The first round of modelling undertaken for 2006 used INM version 6.2a whilst the modelling for 2011 used INM version 7.0d. The use of the different versions of INM and AEDT the way the method used to calculate the number of properties affected will account for a proportion of the variation between 2006, 2011 and 2021.

5.3 The Noise Map Descriptors

The noise maps have been produced for, $L_{Aeq,16h}$, L_{day}, $L_{evening}$, L_{night} and L_{den}. The contours are presented in 3 dB steps for:

- 54 dB to 72 dB for L_{day}.
- 54 dB to 62 dB for $L_{evening}$.
- 54dB to 69 dB for $L_{Aeq,16h}$.
- 48 dB to 63 dB for L_{night}.
- and 5 dB steps for:
- 55 dB to 75 dB for L_{den}.

5.4 The Mapping Results

The mapping results show, as expected those exposed to the most aircraft noise are the areas of Hale Village, the Southeast of Speke and an area of northern Runcorn. A large area covered by the contours is uninhabited such as Business Parks, farmland, and a large expanse of the tidal Mersey Estuary.

6.0 Noise Level Contour Maps

6.1 Noise Indicators

The harmonisation of the noise indicators across Europe mean that a new noise indicator and respective time periods have been created for the Regulations and Noise Maps. L_{den} and L_{night} are the two noise indicators selected by the European Commission for use in noise policy and the new regulations use both indicators.

6.2 The L_{den}

Aircraft noise mapping has been produced for an annual average day and has to be produced in terms of a new noise indicator (the L_{den}) and for an annual average night (2300-0700). The new indicator takes account of all aircraft movements throughout an average 24-hour period but adds 'penalties' to the noise arising in the evening (+ 5 dB) and the night (+10 dB). Evening is defined as 1900-2300.

6.2.1 The L_{den} Formula

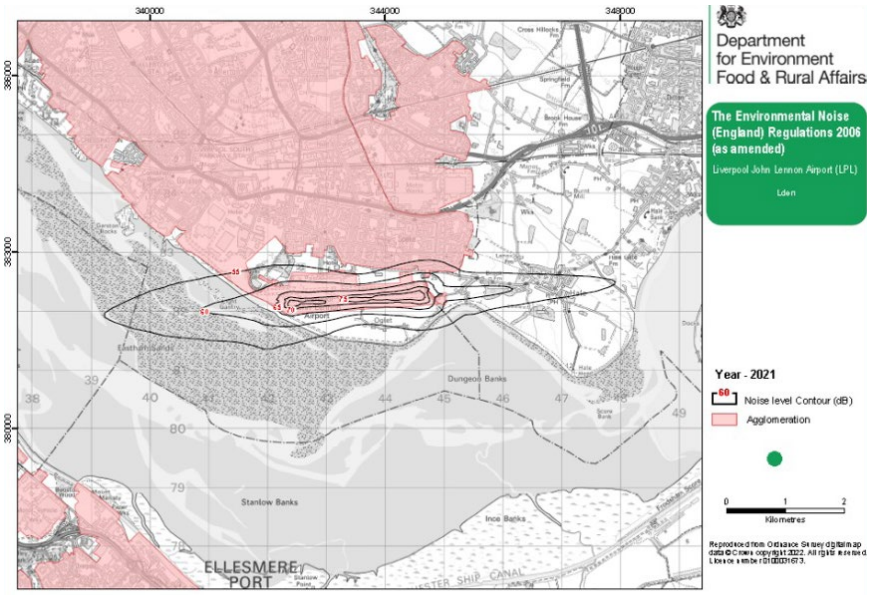
The day-evening-night level L_{den} in decibels (dB) is defined by the following formula:

$$L_{den} = 10\lg\frac{1}{24}\left(12*10^{\frac{L_{day}}{10}} + 4*10^{\frac{L_{evening}+5}{10}} + 8*10^{\frac{L_{night}+10}{10}}\right)$$

6.3 Publication of the Maps

The LJLA maps were published by Defra along with those from 18 other UK Airports. These were submitted by the respective airports and have been amalgamated by Defra with similar noise maps for road and rail noise to give an overall picture of the noise impact from transport sources. These can be reviewed on the Defra website (http://www.extrium.co.uk/noiseviewer.html).

Figure 5: L_{den} Noise Contours for Liverpool John Lennon Airport



Source: Defra Airport Noise Action Planning Data Pack 2021 Liverpool John Lennon Airport (EGGP) July 2021.

All the Defra noise maps for LJLA can be seen in Appendix A.

7.0 Noise Impacts and Exposure

7.1 Population and Dwelling Exposure Statistics Tables

The estimated total number of people and dwellings exposed above various noise levels from the strategic mapping of noise from aircraft using this airport are shown in the tables 2 to 6 on the next pages.

7.2 Population and Dwelling Counts

The estimated total number of people and dwellings exposed above various noise levels in 2021 derived from the strategic mapping of noise from aircraft using this airport are shown in the tables below. Population and dwelling counts have been rounded as follows:

- The number of dwellings has been rounded to the nearest 50, except when the number of dwellings is greater than zero but less than 50, in which case the total has been shown as "< 50".
- The associated population has been rounded to the nearest 100, except when the associated population is greater than zero but less than 100, in which case the total has been shown as "< 100".

The FAA INM Noise Model was used in 2006, 2011 and the AEDT Noise Model was used in 2016 and 2021, which means there may be slightly different results. There are also variations in the way the number of dwellings and people have been calculated by Defra, which appears to have elevated the numbers (e.g. different census data).

Table 2 Estimated total number of people and dwellings above various noise levels, L_{den}

Noise Level (dB)	Number of Dwellings				Number of People				Area enclosed (km2)				Noise Sensitive Buildings 2021*
	2006	2011	2016	2021	2006	2011	2016	2021	2006	2011	2016	2021	
≥ 55	2,450	3,100	2,000	950	5,700	6,900	4,500	2100	17	17.6	14.5	7.3	A.B.
≥ 60	900	900	650	<50	2,200	2,000	1,500	<100	7.04	7	5.9	2.5	None
≥ 65	< 50	<100	<50	0	< 100	<100	<100	0	2.64	2.6	2.1	1.0	None
≥ 70	< 50	0	0	0	< 100	0	0	0	1.07	1	0.8	0.4	None
≥ 75	0	0	0	0	0	0	0	0	0.54	0.4	0.4	0.2	None

Table 3 Estimated total number of people and dwellings above various noise levels, L_{day}

Noise Level (dB)	Number of Dwellings				Number of People				Area enclosed (km2)				Noise Sensitive Buildings 2021*
	2006	2011	2016	2021	2006	2011	2016	2021	2006	2011	2016	2021	
≥ 54	1,750	2,200	1,800	700	4,200	5,100	4,000	1500	13.87	15.5	11.9	6.2	A.B
≥ 57	1100	1300	950	<50	2,700	2,900	2,200	<100	8.25	9.1	7	3.3	None
≥ 60	350	400	150	<50	800	900	300	<100	4.75	5.2	3.9	1.8	None
≥ 63	<50	<100	<50	0	<100	<100	<100	0	2.6	2.9	2.1	1.0	None
≥ 66	<50	<100	<50	0	<100	<100	<100	0	1.49	1.5	1.2	0.7	None
≥ 69	0	0	0	0	0	0	0	0	0.93	0.9	0.7	0.4	None

Table 4 Estimated total number of people and dwellings above various noise levels, $L_{evening}$

Noise Level (dB)	Number of Dwellings				Number of People				Area enclosed (km2)				Noise Sensitive Buildings 2021*
	2006	2011	2016	2021	2006	2011	2016	2021	2006	2011	2016	2021	
≥ 54	1,200	1,200	1,550	200	2,900	2,800	3,500	400	9.88	9.9	10.6	4.2	A.B
≥ 57	550	600	750	<50	1,400	1,200	1,600	<100	5.72	5.5	6.1	2.2	None
≥ 60	100	100	100	<50	200	200	200	<100	3.17	2.9	3.3	1.2	None
≥ 63	<50	<100	<50	0	<100	<100	<100	0	1.78	1.6	1.7	0.7	None
≥ 66	<50	0	<50	0	<100	0	<100	0	1.07	0.9	1	0.4	None
≥ 69	0	0	0	0	0	0	0	0	0.7	0.5	0.6	0.3	None

Table 5 Estimated total number of people and dwellings above various noise levels, $L_{Aeq,16h}$

Noise Level (dB)	Number of Dwellings				Number of People				Area enclosed (km2)				Noise Sensitive Buildings 2021*
	2006	2011	2016	2021	2006	2011	2016	2021	2006	2011	2016	2021	
≥ 54	1,600	2,000	1,750	550	4,000	4,700	3,900	1200	12.93	14.2	11.6	5.7	A.B
≥ 57	1000	1100	900	<50	2,400	2,500	2,000	<100	7.65	8.3	6.8	3.1	None
≥ 60	300	300	150	<50	700	700	300	<100	4.37	4.7	3.8	1.7	None
≥ 63	<50	<100	<50	0	<100	<100	<100	0	2.4	2.5	2.1	1.0	None
≥ 66	<50	<100	<50	0	<100	<100	<100	0	1.39	1.4	1.1	0.6	None
≥ 69	0	0	0	0	0	0	0	0	0.88	0.8	0.7	0.4	None

Table 6 Estimated total number of people and dwellings above various noise levels, L_{night}

Noise Level (dB)	Number of Dwellings				Number of People				Area enclosed (km2)				Noise Sensitive Buildings 2021*
	2006	2011	2016	2021	2006	2011	2016	2021	2006	2011	2016	2021	
≥ 48	1,750	1,900	1,500	350	4,200	4,300	3,300	800	13.65	13.1	10.2	5.2	A.B
≥ 51	1000	1000	650	<50	2,500	2,300	1,400	<100	7.98	7.6	6	2.7	None
≥ 54	400	200	<50	<50	1000	500	<100	<100	4.51	4.3	3.2	1.4	None
≥ 57	<50	<100	<50	0	<100	<100	<100	0	2.45	2.3	1.7	0.8	None
≥ 60	<50	<100	0	0	<100	<100	0	0	1.39	1.3	1	0.5	None
≥ 63	<50	0	0	0	<100	0	0	0	0.85	0.7	0.6	0.3	None
≥ 66	0	0	0	0	0	0	0	0	0.56	0.5	0.4	0.2	None

Table 7 * Noise Sensitive Buildings

Identifier	Building
A	National Trust Speke Hall, Speke, Liverpool
B	Hale Village Primary School, Hale Village, Halton
C	St Ambrose Primary School, Speke, Liverpool
D	Westfield Primary School, Runcorn, Halton
E	Victoria Road Primary School, Runcorn, Halton

If the values in the tables are compared, the number of dwellings and population predicted to be exposed to certain noise levels has fallen for all in 2021 compared to 2006, 2011 and 2016. This was predicted due to the 52% reduction in aircraft movements due to the Covid Pandemic compared to 2016.

7.2.1 Population Statistics
In order to derive the population statistics, analysis was undertaken to count the population and number of dwellings within the specified noise contours. This assessment was carried out utilising a strategic residential population location dataset.

7.2.2 Identification of Residential Dwellings
Residential dwellings and buildings containing residential dwellings were identified through the 2015 (OS) Address Base Premium and Topography layer respectively. An average population per residential dwelling was calculated for each discrete dwelling utilising population data attained from the mid-year population estimates from the Office of National Statistics (ONS), June 2015.

7.2.3 Building Polygons
The total number of residential dwellings and the total associated population were calculated for each residential building polygon, considering building polygons with multiple dwellings. Examples of building polygons containing multiple dwellings located within a single polygon include tower blocks and apartments.

Data Source: Airport Noise Action Planning Data Pack 2023 Liverpool Airport (EGGP) Date: January 2023.

7.2.4 Estimates of Reduction of Number of People Effected
As previously discussed, 2021 was not a normal year for LJLA or aviation in general. Aviation activity was influenced by the continuing impact of the global COVID pandemic and the associated imposed travel restrictions. The travel restrictions had a dramatic impact on the number of people traveling and as a result a reduction in number of aircraft flying (noise sources).

The reduction in the number of noise sources was a direct consequence of the pandemic which artificially created a reduction in the size of the noise exposure contours, therefore, the number of dwellings affected with each contour. In 2021, there was an unnatural number of aircraft movements (noise sources), so the size of the noise exposure contours does not reflect a reduction that is sustainable are practical to achieve in the near future.

The pandemic was 2020/21 but its influence continued well beyond this period for LJLA. It will take until 2024 for aviation activity at LJLA to get back to pre-pandemic levels. For context in 2021, there was 13,404 commercial aircraft movements compared with 38,471 in 2016 the previous year used for NAP noise modelling. The expectation is by 2026, LJLA will have more passengers than in 2016 and there will be more commercial aircraft movements. However, the noise exposure contours are expected to be broadly similar in overall shape and area to those of 2016, because there will be an evolution to next generation of aircraft and the overall fleet mix will be quieter and more efficient.

Therefore, on these concepts LJLA estimates the number of people within the L_{den} 55dB(A) noise exposure contour when comparing 2016 and 2026 will be similar at 4,500. The number of passengers using the airport will increase but there will be more on each aircraft and the overall fleet mix will be quieter. Further modelling work will be undertaken on this matter during the life of this NAP to clarify as part of the ongoing SIGS review.

It is difficult to meaningfully forecast the numbers of dwellings that may benefit from the actions on the NAP, because the modelling of 2021 used an artificially small number of noise sources because of the global pandemics impact on international travel. The expected benefits of the NAP (specifically the ACP) will go beyond the local noise exposure contours – the envisage date for the implementation of the ACP is as part of the MTMA cluster in winter 2027/28.

7.2.5 Identification of problems and situations that need to be improved
In terms of the main problems and situations that can be improved The Aviation Policy Framework (APF) published in March 2013 gives guidance in regard to the main issues of aircraft noise and how they should be improved.

7.2.5.1 Relocation Assistance
"The Government continues to expect airport operators to offer households exposed to levels of noise of 69 dB $L_{Aeq,16h}$ or more, assistance with the costs of moving." In this round of mapping there are no dwellings within the 69 dB $L_{Aeq,16h}$.

7.2.5.2 Schools and Hospitals

"The Government also expects airport operators to offer acoustic insulation to noise-sensitive buildings, such as schools and hospitals, exposed to levels of noise of 63 dB $L_{Aeq,16h}$ or more. Where acoustic insulation cannot provide an appropriate or cost-effective solution, alternative mitigation measures should be offered" In this round of mapping there are no schools or hospitals within the 63 dB $L_{Aeq,16h}$.

7.2.5.3 Acoustic Insulation

"If no such schemes already exist, airport operators should consider financial assistance towards acoustic insulation for households. Where compensation schemes have been in place for many years and there are few properties still eligible for compensation, airport operators should review their schemes to ensure they remain reasonable and proportionate." LJLA will increase the level of grant available for eligible properties – the qualification will remain the same 63 dB(A) daytime and 59 dB(A) night-time by 2025.

8.0 Current & Future Noise Mitigation Measures

8.1 ICAO

ICAO's current environmental activities are largely undertaken through the Committee on Aviation Environmental Protection (CAEP). CAEP drives the ICAO agenda formulating new policies and adopting new Standards on aircraft noise and aircraft engine emissions.

Future International recommendations and guidance on technical and operational aspects of noise reduction and mitigation, with the aircraft noise and emissions issues linked to airports and operations will be through CAEP. CAEP meets as a Steering Group annually to review and provide guidance on the progress of the activities of the working groups. So far, CAEP has held eight formal meetings: in 1986 (CAEP/1), 1991 (CAEP/2), 1995 (CAEP/3), 1998 (CAEP/4,) 2001 (CAEP/5), 2004 (CAEP/6), 2007 (CAEP/7), 2010 (CAEP/8), 2013 (CAPE/9) and 2016 (CAPE/10. Each formal CAEP meeting produces a report with specific recommendations for the consideration of the ICAO Council. ICAO acts on recommendations from CAEP in the light of any comments received from the Air Navigation Commission and, if there are economic aspects, from the Air Transport Committee.

The Full CAEP Assembly, which meets every 3 years, considers major policy issues in the environmental field that are brought to its attention by the Member States, hence there are 3 year phased progress on environmental aviation issues.

8.1.1 Chapter 3

The aviation industry has an unparalleled record of successful innovation over the past 40 years. Improvements in aircraft technology and design have resulted in a reduction of an aircraft's noise of greater than 20 dB. All commercial aircraft currently operating in the EU must comply with the ICAO Chapter 3 noise standard.

8.1.2 ICAO Chapter 4

From 2006, all newly designed or manufactured aircraft must comply with the tighter Chapter 4 standard, which represents a 10 dB reduction on measurements for Chapter 3 aircraft. As older noisier aircraft are phased out of use and replaced by modern, quieter aircraft, this will bring further noise improvements for each individual aircraft movement.

8.2 The Rules of the Air

8.2.1 Air Navigation Orders (ANO) and the Rules of the Air Regulations (RoA)

At 23:00 on 31 December 2020 the UK left the European Union aviation system, and as such is no longer part of European Union aviation institutions, including the European Union Aviation Safety Agency (EASA). At the end of the UK/EU Agreement transitional period, the Withdrawal Acts brought all EU law that was in force and applicable at that point under UK jurisdiction.

Regarding the Standardised European Rules of the Air (SERA) Regulation, this is now the law as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018. The supporting Acceptable Means of Compliance and Guidance Material that were published by EASA and in force on 31 Dec 2021 have been adopted by the CAA. View the UK SERA Regulation and the AMC and GM for more information.

The UK's Air Navigation Order and Rules of the Air Regulations are replicated within CAP393.

The CAA is establishing a rule making and policy development process to address any changes to legislation, Acceptable Means of Compliance or Guidance material caused by changes to the 'parent' ICAO material, or any other requirement to amend the content of SERA.

All civil aircraft must fly within the guidelines of the Air Navigation Orders (ANO) and the Rules of the Air Regulations (RoA) which are the responsibility of the Civil Aviation Authority's Aviation Regulation Enforcement team. The RoA are diverse, complex and the vast majority are not related to noise impacts of aircraft. The section most relevant is that which relates to low flying aircraft. Rule 5 – in the RoA gives the indications of the expected minimum height restrictions placed upon aircraft operators:

Except when necessary for take-off or landing, or except by permission from the competent authority, a VFR flight shall not be flown:

- Over the congested areas of cities, towns or settlements or over an open-air assembly of persons at a height less than 300 m (1000 ft) above the highest obstacle within a radius of 600 m from the aircraft;
- Elsewhere than as specified above, at a height less than 150 m (500 ft) above the ground or water, or 150 m (500 ft) above the highest obstacle within a radius of 150 m (500 ft) from the aircraft.

8.2.2 Exemptions of Rules of the Air
A number of aviation activities can be exempted from the RoA and these include Police operations, flying displays and aerial surveys. LJLA regularly receive noise complaints about the operations of the Merseyside and Cheshire Police's Air Support Units, plus the ad-hoc aerial surveys.

8.2.3 Noise Reduction Measures at LJLA
As well as the Rules of the Air which give general guidance to aircraft pilots LJLA also have a number of noise reduction measures already in place.

8.3 The UK AIP Instructions

8.3.1 UK AIP Noise Abatement Procedures
The UK AIP is the prime official source of information on the UK's airspace and airports. The AIP is made up of three parts: General, En-Route and Aerodromes. LJLA has its own AIP with detailed charts and data. Part of the textual data is Noise Abatement Procedures. These Noise Abatement Procedures are shown below in italic text. Some slight changes have been made to the text to help ease of reading.

8.3.2 UK AIP Text

8.3.2.1 Least Disturbance
Every operator of aircraft using the aerodrome shall ensure at all times that aircraft are operated in a manner calculated to cause the least disturbance practicable in LPL Controlled Airspace.

8.3.2.2 Inbound Aircraft
Inbound aircraft, other than light aircraft flying under VFR or Special VFR, shall maintain a height of at least 2000 ft. above aerodrome level until cleared to descend for landing. Aircraft approaching without assistance from ILS or radar shall follow a descent path which will not result in its being at any time lower than the approach path which would be followed by aircraft using the ILS glide path, and it is recommended that aircraft join final approach at not less than 3 nm.

8.3.2.3 Runway 27 Departures
After take-off all aircraft of more than 5700 kgs (12,500 lbs) MTWA shall climb straight ahead at maximum rate to 1000 ft aal before turning.

8.3.2.4 Runway 09 Departures
Between 2300 and 0700 (winter) 2200 and 0600 (summer), Runway 09 will only be available for take-off when overriding operational considerations necessitate its use, e.g. performance requirements.

After take-off the initial turn onto outbound heading shall be commenced as soon as practicable, but not below 500 ft aal and not before passing the end of the runway.

8.3.2.5 All Departures
After completion of the initial turn onto outbound heading, all turbo-jet powered aircraft shall reduce power for noise abatement purposes so as to maintain a rate of climb of at least 500 ft per minute at power settings which will ensure progressively decreasing noise levels at points on the ground under the flight path.

8.3.2.6 Definition of the Summer Period
Summer for the purpose of this report is the period of British Summer Time whist winter is the period between the end of British Summer Time in one year and the start of British Summer Time in the next.

8.3.2.7 Continuous Descent Approach

Turbo-fan and turbo-prop aircraft are expected to apply continuous descent, low power; low drag approach techniques where practical to do so. Subject to ATC instructions, inbound aircraft are to maintain as high an altitude as practical and adopt a low power, low drag, continuous descent approach profile. ATC will provide estimated track distance to touchdown to allow pilots to descend at a rate they judge best suited to achieve continuous descent without using more power or drag than necessary. The object will be to join the glide path at the appropriate height for the distance without level flight.

8.3.2.8 Approach Speed

To facilitate these techniques aircraft should be flown no faster than 250 kt from the Speed Limiting Points and below FL100 and 250-210 kt during the intermediate approach phase. Thereafter speed should be managed so as to achieve a continuous descent using as little power or drag as possible. ATC may impose speed control if required for separation purposes.

8.3.2.9 Reverse Thrust

To minimise disturbance in areas adjacent to the aerodrome, Flights Crew shall avoid the use of reverse thrust after landing unless necessary for the safe operation of the aircraft, especially between 23:00 and 06:00 (local time).

8.4 Quota Count

8.4.1 Quota Count Points and Common Aircraft Types at LJLA

As part of its Section 106 Planning Agreement with Liverpool City Council LJLA also manages a Night Quota Count System (QCS). Each type of aircraft is given a separate 'Quota Count' value for landing and take-off, based upon the noise levels measured at the time when that aircraft type was first certified. There are seven QC categories and these double with each increase of 3 decibels. Aircraft are assigned Quota Counts (QC) for arrival and departure as shown in Table 7. Quota Counts for Aircraft that regularly arrive and depart at LJLA are shown in Table 9.

Table 8 Quota Count given to aircraft according to its certified noise level (EPNdB)

Certified Noise Level (EPNdB)	Quota Count
> 101.9	QC 16
99 – 101.9	QC 8
96 – 98.9	QC 4
93 – 95.9	QC 2
90 – 92.9	QC 1
87 – 89.9	QC 0.5
84 – 86.9	QC 0.25
81 – 83.9	QC 0.125
<81	QC 0

Table 9 Quota Counts for Aircraft that regularly arrive and depart at LJLA

Operator	Aircraft Type	Arrival QC	Departure QC
easyJet	Airbus A319	0.25	0.5
easyJet	Airbus A320	0.25	0.5
easyJet	Airbus A320 Neo	0.125	0.125
Ryanair	Boeing 737-800	0.5	0.5
Wizz Air	Airbus A320	0.25	0.5

8.4.2 Recording of Quota Count

LJLA monitors and records all quota count points accrued by aircraft movements in the quota period. The annual limit of quota points is 18,000 per annum. The Night Quota Period is from 2330 hours to 0600 hours and is based on the historical Quota Count system developed for the designated London airports. The LJLA Night Quota period is different from the END night period which is 23:00 to 07:00.

8.4.2.1 Military Aircraft

Military aircraft which regularly visit LJLA are exempt from the Quota Count Scheme.

8.4.3 Aircraft movement restrictions

A further element of the Quota Count Scheme is the restriction on movements of aircraft with QCS of QC/8 and QC/16. The restrictions are as follows:

- Between 2300-2330, aircraft with quota count of QC/8 and QC/16 must not be scheduled to take-off or land;
- Between 2330-0600, aircraft with quota count of QC/8 and QC/16 must not take-off or be scheduled to land;
- Between 0600-0700, aircraft with quota count of QC/16 must not take-off or be scheduled to land.

8.5 Engine Testing

Aircraft engine testing is subject to the approval of the Airport Authority and shall only be permitted between the hours of 0700 and 2300 (local). Outside these hours, engine testing will not be permitted other than in exceptional operational circumstances. Engine test for main apron aircraft above 50% must be undertaken at “Yankee” to maximise the distance from the communities of Speke and Hale Heath.

8.6 Preferred runway

LJLA has one runway that can be used in two directions, i.e. the aircraft can approach from the east and depart towards the west (Runway 27) or diametrically opposed (Runway 09). The orientation of runway use is selected by Air Traffic Control (ATC) primarily based on wind speed and direction at the Airport to ensure safe, stable operations of aircraft as they approach or depart. When possible, the preferred runway (Runway 27) is used for departing aircraft to minimise noise impact. When aircraft depart towards the west on Runway 27, there is advantage for natural noise mitigation as there are no properties within the first 5.8 kilometres of the aircraft flight, because of the large expanse of the Mersey tidal estuary.

Figure 6: Runway Utilisation for Arrivals & Departures on runways 09/27 from 1999 to 2022

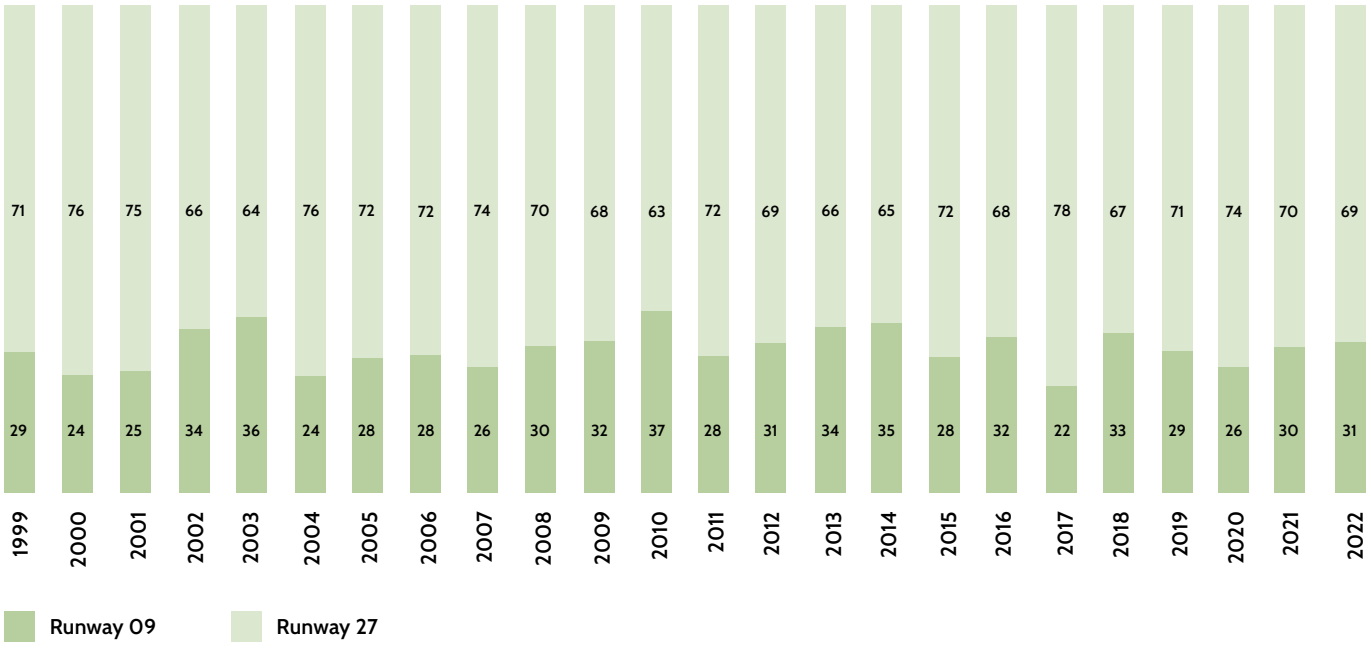
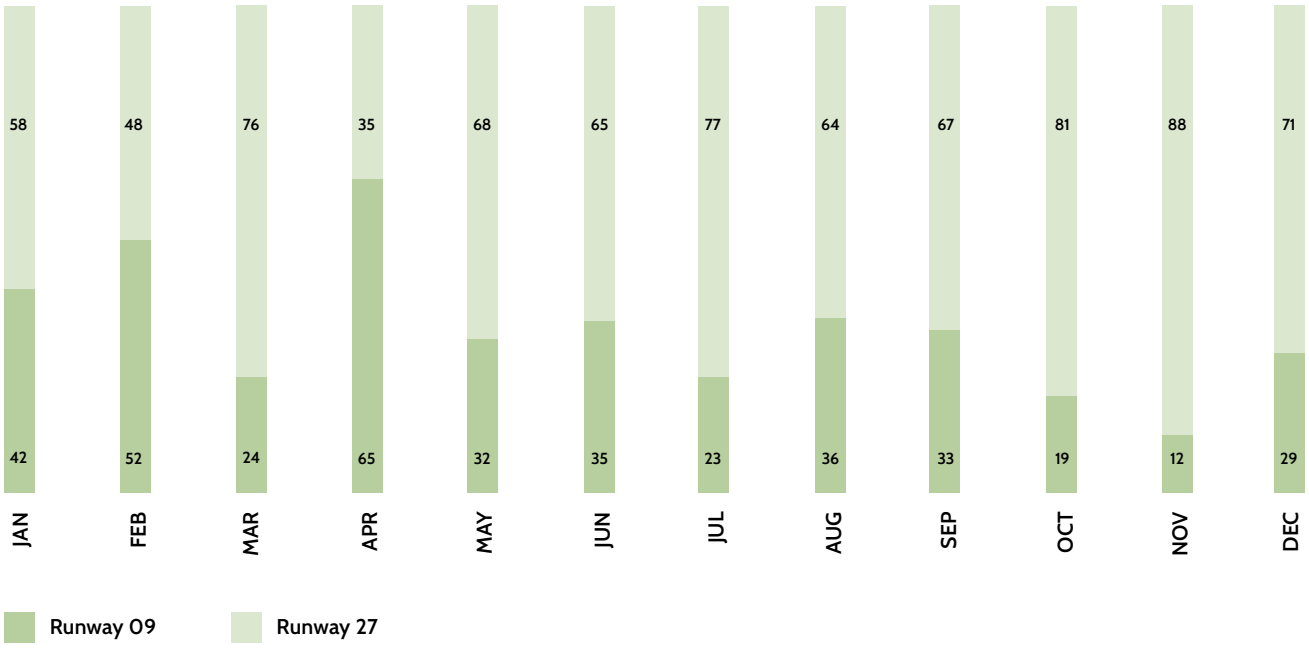


Figure 7: Runway Utilisation for Arrivals & Departures on runways 09/27 for the period Jan 2021 to Dec 2021



The local communities, especially on Hale Village and those on the Wirral peninsula notice a difference in the altitude and frequency of aircraft movements when the runway operation switches from the preferred 27 to 09, which, on occasions triggers noise complaints.

8.7 Noise Monitoring Sub Committee

LJLA has a Noise Monitoring Sub Committee with membership of professional officers, elected members, Airport representatives and community groups, the main role of which is to:

- Be a technical sub-committee of the LJLA Consultative Committee to advise on noise matters.
- Meet when required (but at least quarterly).
- To consider issues related to the Airport's noise impact on the local environs and communities.

The members of the sub-committee are there encourage improvements and question, as well as being a vehicle for two-way communication. The group does not have executive powers.

8.8 Airport Noise and Operations Management System (ANOMS)

The Airport Noise and Operations Management System (ANOMS) enables LJLA to report accurately the altitude, position, aircraft type and noise generated by each aircraft movement. The ANOMS system collects information from three main sources:

- Noise data from the Noise Monitoring Terminals (NMT) at Hale, Eastham and the Portable NMT. The noise data is correlated with aircraft track data to identify specific aircraft noise events.
- Secondary Surveillance Radar (SSR) from NATS at Manchester Airport provides information about the position, altitude and speed of aircraft near LJLA. This enables the Airport Company to identify specific aircraft movements, their altitude at a specific time and correlate a noise event at one of the NMTs. The SSR data is backed up by Automatic Dependent Surveillance–Broadcast (ADS-B) data from Air Nav Systems Radar Box 24 software.
  The Airport has two ADS-B receivers on the airport site.
- The Airport's Operation Database (Hive) provides information about the aircraft using LJLA such as the aircraft type, airline, origin or destination which can be correlated with the track data to make the information easier to interpret.

LJLA updated to the Envirosuite ANMOS system which provide the Airport with new analytical software and new noise monitoring hardware terminals during Summer 2018.

Table 10 Average Annual Noise Monitoring Results (SEL) for Aircraft using LJLA during 2021

Aircraft Type	NMT 1 – Hale		NMT2 – Eastham	
	Arrive Runway 27	Depart Runway 09	Arrive Runway 09	Depart Runway 27
Airbus A319	90.9	83.1	84.1	77.5
Airbus A320	90.5	84.7	83.1	76.0
Airbus A320Neo	89.2	78.0	82.7	74.0
Airbus A321	90.0	89.8	83.0	74.3
Airbus A321Neo	90.0	86.5	83.7	73.2
Boeing 737-800	91.1	86.4	84.3	77.4
ATR-42-500	90.3	75.7	81.9	73.8
ATR-76-600	89.8	80.9	80.2	NA
Embraer ERJ 145	85.5	76.9	77.6	72.9

8.8.1 Standard Instrument Departure routes (SIDs)

LJLA recognises that a balance of social and environmental benefits is gained by concentrating aircraft along the least possible number of routes. The practice of concentrating departures along a limited number of routes is consistent with airspace management best practice. The overriding need is to ensure the safe separation of aircraft which is assisted by concentrating air traffic along a limited number of routes. Departing aircraft from LJLA, with the general exception of General Aviation (GA) aircraft fly the Noise Preferred Routes (NPR) which are a swathe up to 1.5 km either side of the nominal centre line of the Standard Instrument Departure routes (SIDs) up to an altitude of 3000 feet.

These are reviewed as part of the Airspace Change proposals as discussed in Section 3.14 of this Noise Action Plan.

Figure 8: Actual LJLA Departure and Arrival Routes (runway 27 operations)

8.9 Manchester Terminal Movement Area

The airspace above and around LJLA Controlled Airspace is part of the Manchester Terminal Movement Area (MTMA) and is operated under the control of NATS at their Prestwick Centre. Manchester Airport is east of LJLA and Hawarden Airport (near Chester) is located southwest of LJLA. The proximity, combined with the differing alignment of the runways at each airport, creates a complex interface between the traffic patterns of the three airports. All aircraft activity at LJLA has to be safely integrated with traffic for Manchester and Hawarden Airports to avoid conflicts in demand for access to the same airspace. Therefore, a full review of MTMA and the LJLA airspace is currently underway in conjunction with airport airspace users, including the airlines. As discussed in Section 3.14 the aim of the proposed change is to increase overall regional resilience and capacity whilst seeking to minimise noise and emissions from arriving and departing aircraft. The process will follow the CAP1616 and will be subject to public consultation. The review will include maximising the use of Continuous Descent Approach (CDA) and continuous climb procedures, where practical to minimise the need for level aircraft flight around LJLA. This has the added benefits of maximising the efficiency of aircraft, e.g. by reducing fuel burn and by maximising the vertical distance between aircraft and the ground thereby minimising noise impact.

8.10 Precision Navigation (P-RNAV) technology

The use of Precision Navigation (P-RNAV) technology for departing and arriving aircraft will be an important consideration in the future development of optimum noise abatement and routing for the community overall. RNAV represents the start of a potential move towards navigation and landing aids being on the aircraft rather than on the ground.

In July 2016 LJLA introduced Global Navigation Satellite System (GNSS) based Area Navigation (RNAV) Instrument Approach Procedures (IAP) for both runways 09 and 27. LJLA implemented the GNSS approaches to provide contingency if the existing navigation equipment needs to be taken out of service for maintenance or due to an outage – for example caused by a lightning strike or component fault.

New procedures were introduced for both Runway 09 and Runway 27, replicating the respective existing ILS designs. Aircraft follow similar tracks from the national airways network to align with the approach path and the approaches are flown at the same altitudes and speeds as for the ILS. In essence, the only difference is the equipment being used to guide the aircraft's final approach to the runway.

8.11 Sound Insulation Grant Scheme (SIGS)

LJLA operates a SIGS for eligible properties determined on noise exposure criteria:

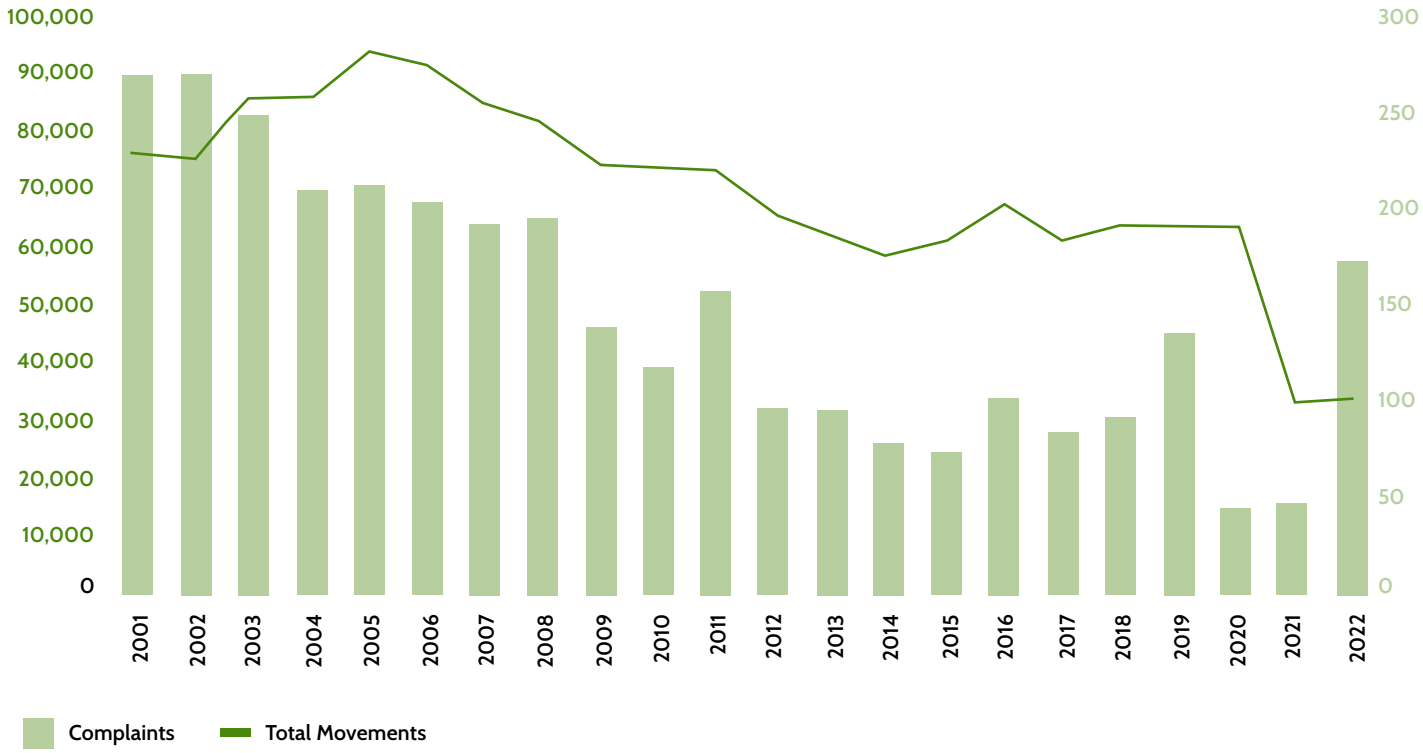
- Within a daytime 63 dB L_{Aeq}, t=16hrs hours noise exposure contour from airborne aircraft noise, or
- Within a night-time 59 dB L_{Aeq}, t=8hrs noise exposure contour from airborne noise reducing to 55 dB in the future subject to further growth and development.
- The SIGS grant is an 80% contribution with the airport company expense capped at £3000 per property for glazing and ventilation, £400 for loft insulation and £135 for blinds.

8.12 Complaints recording and investigations

8.12.1 Noise Complaint Responsibility

LJLA takes all complaints about environmental noise seriously. The Environment Team is responsible for responding to enquires and complaints received from the local community, regulatory authorities, interest groups or other organisations. An enquiry or complaint can be made by telephone, letter, facsimile, email or the complaint form on the website.

Figure 9: The Number of Noise Complaints Received by LJLA & Total Aircraft Movements between 2001 and 2022.



8.12.2 Investigation of Noise Complaints

Every noise complaint received by LJLA is investigated using a range of information sources, but primarily the Noise Monitoring and Track Keeping System. All the noise complaints received by LJLA are collated and reported by the Environmental Team to the Noise Monitoring Sub Committee and Airport Executive Team on a quarterly basis.

8.13 Potential Future Mitigation Measures

8.13.1 Maintain and Improve

LJLA in conjunction with other competent authorities will continue to maintain and seek to improve its noise abatement procedures where practical and safe to do so. The tables in the next section "Actions Liverpool John Lennon Airport will take" set out the future mitigation measures.

8.13.1.1 Impacts of Noise

There are many different experiences and impacts of noise, and each individual's experience and interpretation will be different. Noise can disturb human activity by causing distraction. These include general detection/distraction, speech interference, and disruption of work/mental activity and sleep disturbance. Any of these can lead to annoyance and possibly more overt reactions, including complaints.

8.13.1.2 Benefits of Air Transport

Noise is an inevitable consequence of a mature and vibrant society. People enjoy and benefit from transport (air, rail and road) and this benefit manifests itself in terms of business, leisure, employment, relationships and the movement of goods and services. When managing the environmental noise that arises from aircraft, trains and road vehicles a balance needs to be struck.

Table 11 Actions Liverpool John Lennon Airport are proposing to undertake

Action	Type of Impact	Performance Indicator
Airline fleet improvements	Arrivals Departures	Average aircraft noise movement reduction to be reported against 2021 levels.
Night-time QC4 phase out between 2024 & 2027/8	Arrivals Departures	Introduction of a scheme to phase out QC4 aircraft movements at night with exception of emergencies/humanitarian aid, significant sporting and cultural events by 2027/28.
SIGS enhancement	Arrivals Departures	Increase the level of grant available for eligible properties – the qualification will remain the same 63 dB(A) daytime and 59 dB(A) night-time by 2025.
Formal Annual Workshop with airlines	Arrivals Departures	Practical workshop to share good practice and explore marginal improvements held annually with bases airlines.
Continue to be part of Sustainable Aviation Partners and seek to develop Best Practise to minimise noise impact and investigate implementation options at LJLA.	Arrivals Departures	Individual aircraft noise reduction at LJLA and other airports.
Continue to recognise that a balance of social and environmental benefits is gained by concentrating aircraft along the least possible number of routes (SIDS).	Arrivals Departures	Review national guidance with ATCS every 2 years and co-operate with other local airports and NATS as part of a larger regional review in the future to further enhance performance.
Maintain a quota count system and record all quota count points accrued by aircraft movement in the quota period.	Arrivals Departures	The annual limit of quota points 18,000 per annum. The Airport Company will report its quota usage in an annual report to the NMSC.
Work with Operations Planners to ensure where practical the noisiest aircraft are not scheduled to arrive or depart in the night quota period.	Arrivals Departures	Using Hive/Targit reports a monthly search will be carried out to find any aircraft which contravened these restrictions and investigate the reason why.

Action	Type of Impact	Performance Indicator
Continue to ensure that Runway 27 is the preferred runway of choice.	Arrivals Departures	Monitor runway use and report annually to the NMSC.
Ensure that the Airport Noise & Operations Management System (ANOMS) is maintained and calibrated for credibility.	Arrivals Departures Over Flights	The Airport will ensure regular checks are maintained to ensure the data provided is as accurate as possible. Annual calibration of the system will also be carried out by the manufacturer.
Encourage the avoidance in the use of reverse thrust at night. The part of the Liverpool agglomeration touched by the noise contours is an area of Speke. These areas lie parallel to the runway and as such are rarely directly over flown. A proportion of the disturbance that is caused to these areas will be from ground noise such as reverse thrust on landing.	Arrivals Ground Noise	To minimise disturbance in areas adjacent to the aerodrome, LJLA will encourage pilots to avoid the use of reverse thrust after landing, consistent with safe operation of the aircraft, especially between 23:00 and 06:00 (local time).
Continue to ensure every operator of aircraft using the aerodrome operates in a manner which causes the least disturbance practicable in areas surrounding the aerodrome.	Arrivals Departures Ground Noise	Review the UK AIP every year to ensure it has relevance to any development at the airport and report to the NMSC. Report this to the Airlines through the Flight Safety Committee quarterly.
In the future if any households fall within the airports 69db LAeq noise contour, LJLA will, in line with Government policy, offer a relocation assistance scheme.	Arrivals Departures Ground Noise	No Households currently lie in the 69db Leq,t=16hours noise contour; the airport will continue to review its noise mapping every 2 years.
Increase the altitude of aircraft arriving on a transition between the hold and the base leg for the final approach.	Arriving Noise	ACP delivery in 2028, with an increase in altitude of aircraft profile before joining the base leg for runway 27.
Monitor all aircraft engine testing which shall only be permitted between the hours of 0700 and 2300 (local).	Ground Noise	Records will be kept of the engine tests and the times of these tests will be monitored. Outside these hours engine testing will not be permitted other than in exceptional operational circumstances. The number and power of the test will be reported to the NMSC.
Continue to engage with the Noise Monitoring Sub Committee (NMSC).	Community Responsibility	The NMSC will meet 4 times per year and will have leading role in the development of the Noise Action Plan. The Airport will ensure that at every meeting a Noise Log of all complaints received prior to the meeting is presented for scrutiny and consideration.
Monitor as far as practical any complaints regarding aircraft outside of the Airport's immediate boundary to ensure they operate within the Rules of the Air Regulations.	Community Responsibly	Working with the ATSP and using the NM&TKS ensure aircraft are over the heights specified in the Rules of the Air Regulations when not arriving or departing the airport. Any infringements will be investigated and reported to the CAA as the regulator.
Continue to offer an answer phone number; email address & web form for complaints and enquiries services for aircraft noise and other environmental enquires.	Community Responsibility	Number of complaints received will be recorded and presented to the NMSC. Complainants will receive an appropriate response attempting to answer the enquiry with factual objective information.
LJLA will do all that is reasonably practical to safeguard any quiet areas identified from exposure to aircraft noise due to the operations of LJLA if this does not compromise the safe and efficient operation of the aerodrome.	Community Responsibility	Regulation through END, and directions and guidance provided by Defra and DfT.

Action	Type of Impact	Performance Indicator
LJLA will benchmark our noise mitigation and compensation measures with other comparable airports in 2025.	Community Responsibility	Table showing the ranks of the comparable airport will be produced within an appropriate noise report to the NMSC.
Continue to log all complaints relating to aircraft operations and publish the statistics annually.	Community Responsibility	All complaints will be logged and presented into the NMSC and published statistically in the Annual Noise Report on the LJLA website.
Seek to respond to 100% of all complaints and enquiries within 14 working days.	Community Responsibility	As part of the Report, we will show the percentage of complaints responded to within the 14 days.
Continue to engage with the Local Planning Authorities to ensure awareness of aircraft operations is considered in the development of sensitive land use.	Land Use Planning	Maintain the interactions with the Local Planning Authorities and have a seminar for Local Authority Planners and Environmental Professionals to enhance noise and safeguarding understanding.

8.14 Long term strategy

8.14.1 Master Plan

The Airport's Master Plan was published in March 2018 and is available online. The Master Plan depicts the potential future development of LJLA https://www.liverpoolairport.com/about-ljla/liverpool-john-lennon-airport-master-plan-to-2050. The Master Plan sets out a "Road Map" to assist the delivery of the Airport's Vision and highlights key investments required by 2030 to maximise the Airport's contribution to the region's economy including:

- Enhancing international connectivity
- Supporting infrastructure investment
- Developing the Airport as a growth hub
- Sustainability and the environment

8.14.2 Sustainable Aviation

LJLA in partnership with other members of the aviation industry will approach future noise mitigation on four paths to achieve an overall impact:

- Aircraft frame and engine technology improvements
- Operational improvements (e.g. CCO & CDA)
- Land use planning, undertaken with LPA's
- Noise communication and community engagement

Table 12 Financial Costs of the LJLA Noise Service

Type	Description	Approximate Cost
Staff Costs	Environment Team	£45,000
SIGS	Development & Contributions	£10,000
Equipment	NM&TKS Hardware & Software Maintenance/ Calibration	£20,000
NMSC	Secretariat Cost	£6,000
Noise Mapping & Modelling	External Independent Professional Assistance	£20,000

9.0 Measurements of the Action Plan Progress

9.1 Outcome of the Noise Action Plan

It is very difficult to estimate how the actions will affect people's perception of aircraft noise and thus any concerns they may have over the next 5 years. The estimated total number of people identified by the mapping as living within the L_{den} dB 55 or greater in 2021 is 2100. This is a reduction on the 2016 figure of 4,500 which itself was a reduction of the 2011 figure of 6,900. As mentioned, there was a 52% reduction in aircraft movements in 2021 compared to 2016 due to the COVID Pandemic thus resulting in the reduction of the total number of people identified by the mapping as living within the L_{den} dB 55 or greater. It is hoped the Action Plan will reduce annoyance by aircraft noise from LJLA.

9.2 Objective Measure of the Action Plan

The Airport Operator as the Competent Authority believes the Action Plan delivers a balanced positive set of measures which are realistic and achievable. The objective measure of the Action Plans success will be the area covered by the future noise contours and the number of people encompassed within them proportionate to the airport's activity and benefits to the region.

9.3 Consultation Summary

This action plan has been distributed to the Airport Consultative Committee and the NMSC members before the public consultation.

All opinions and views, both positive and negative, are welcome and will continue to be taken into consideration along with current national and local policy, plus social and economic benefits in order to come to a balanced view on how to take the Noise Action Plan forward before submission to Secretary of State for adoption. The consultation will not end once the Noise Action Plan is submitted and adopted. LJLA will welcome your views and opinions at any time.

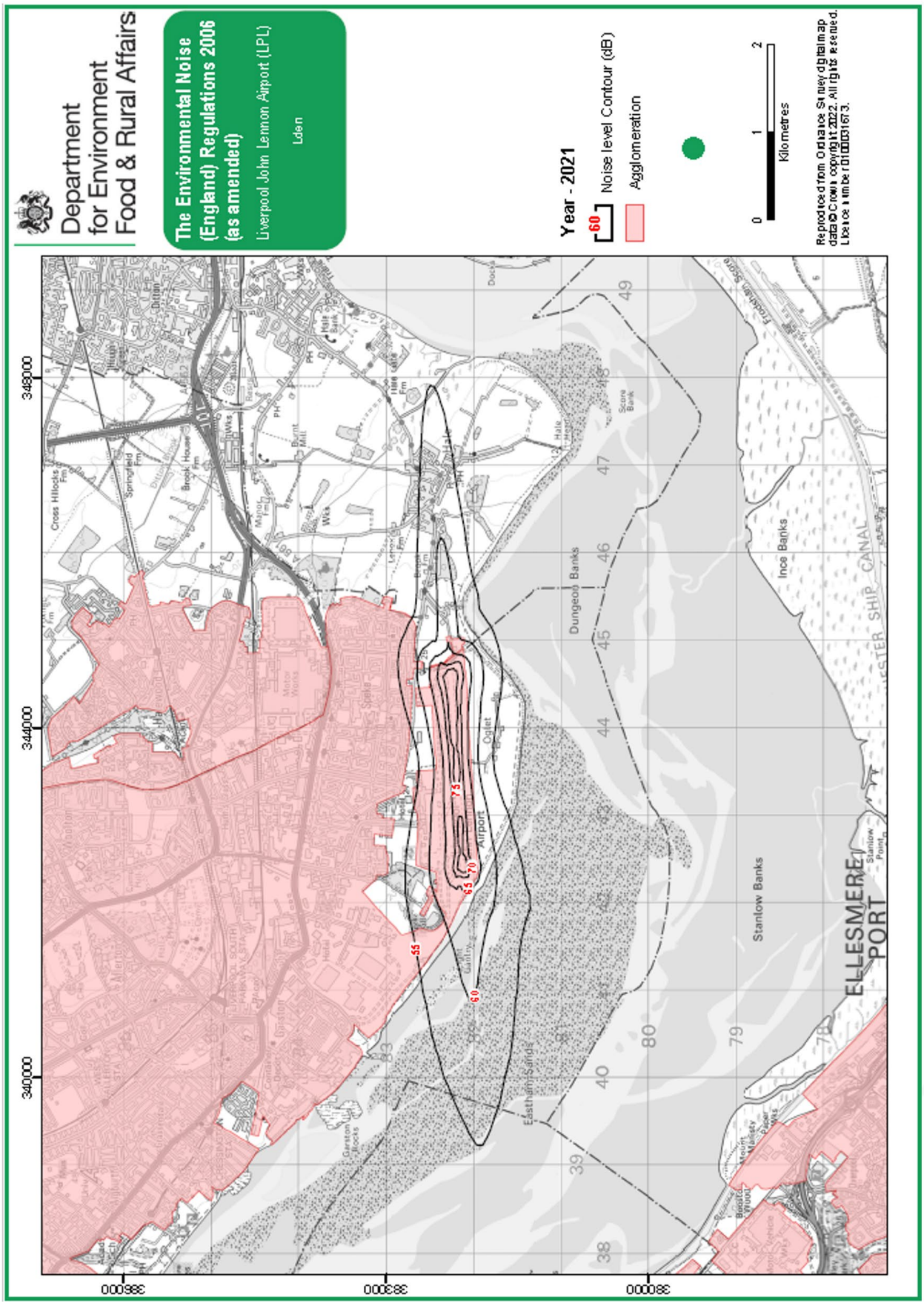
10.0 Conclusions

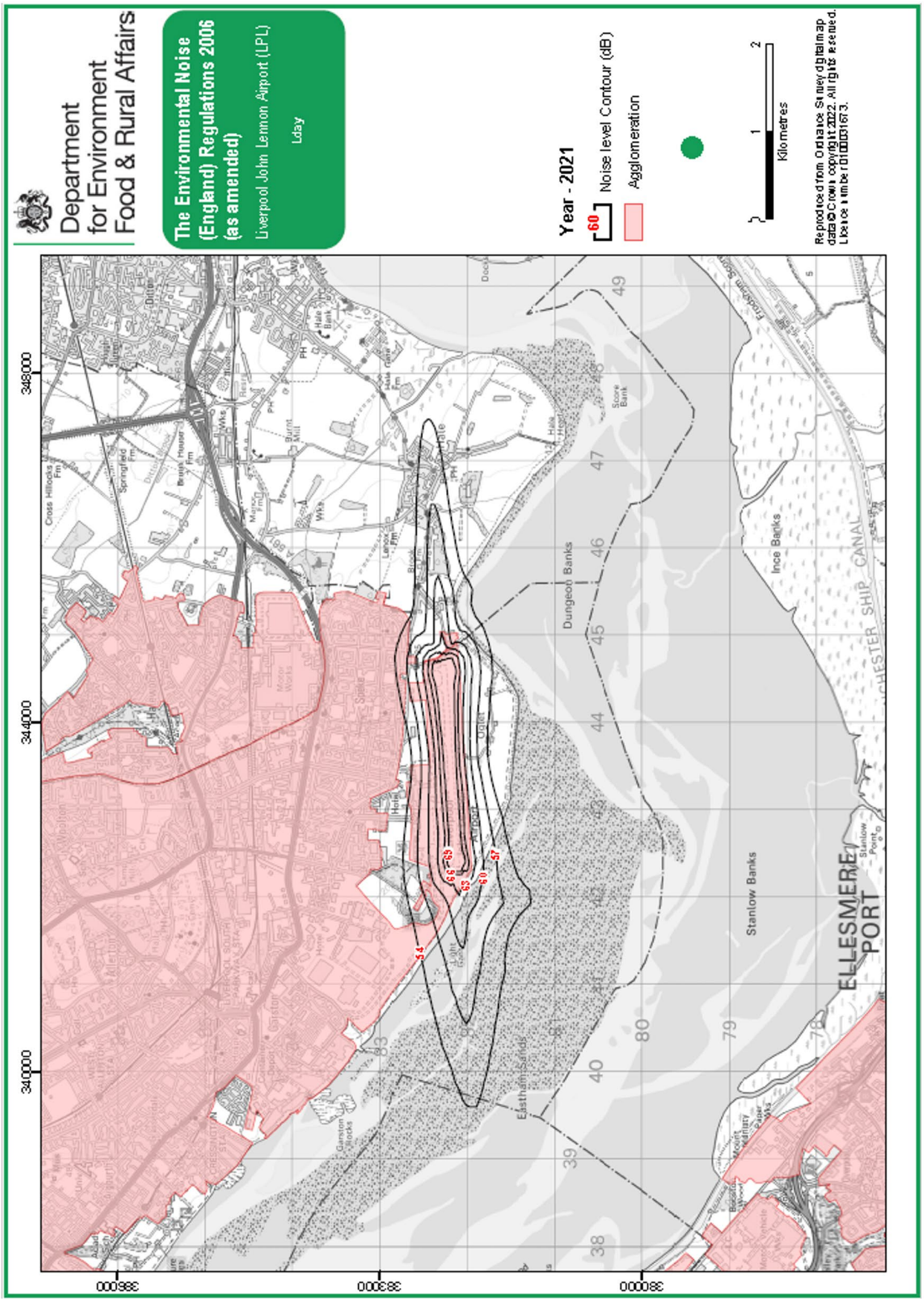
LJLA has prepared this Noise Action Plan as required under the Environmental Noise (England) Regulations 2006 (SI 2006/2238). This Noise Action Plan is produced based on the results of noise mapping for the Airport based on 2021 aircraft movements as required by Defra. The main purpose of the Noise Action Plan is to establish the noise impact of the airport, and to consider whether the current noise control measures are sufficient to adequately protect the local community, particularly those worst affected. An assessment of LJLA's noise impact has been carried out based on:

- Relevant guidance and legislation.
- The current noise impact of operations at LJLA shown by the results of the END Strategic Noise Maps.
- The significant noise control measures already in place at the Airport.

The assessment has found that the environmental noise impact of existing operations at the airport, based on both the noise contours, subject to the implementation of the measures described in the Noise Management Section of this summary are acceptable.

11.0 Appendix A: All Defra Noise Maps

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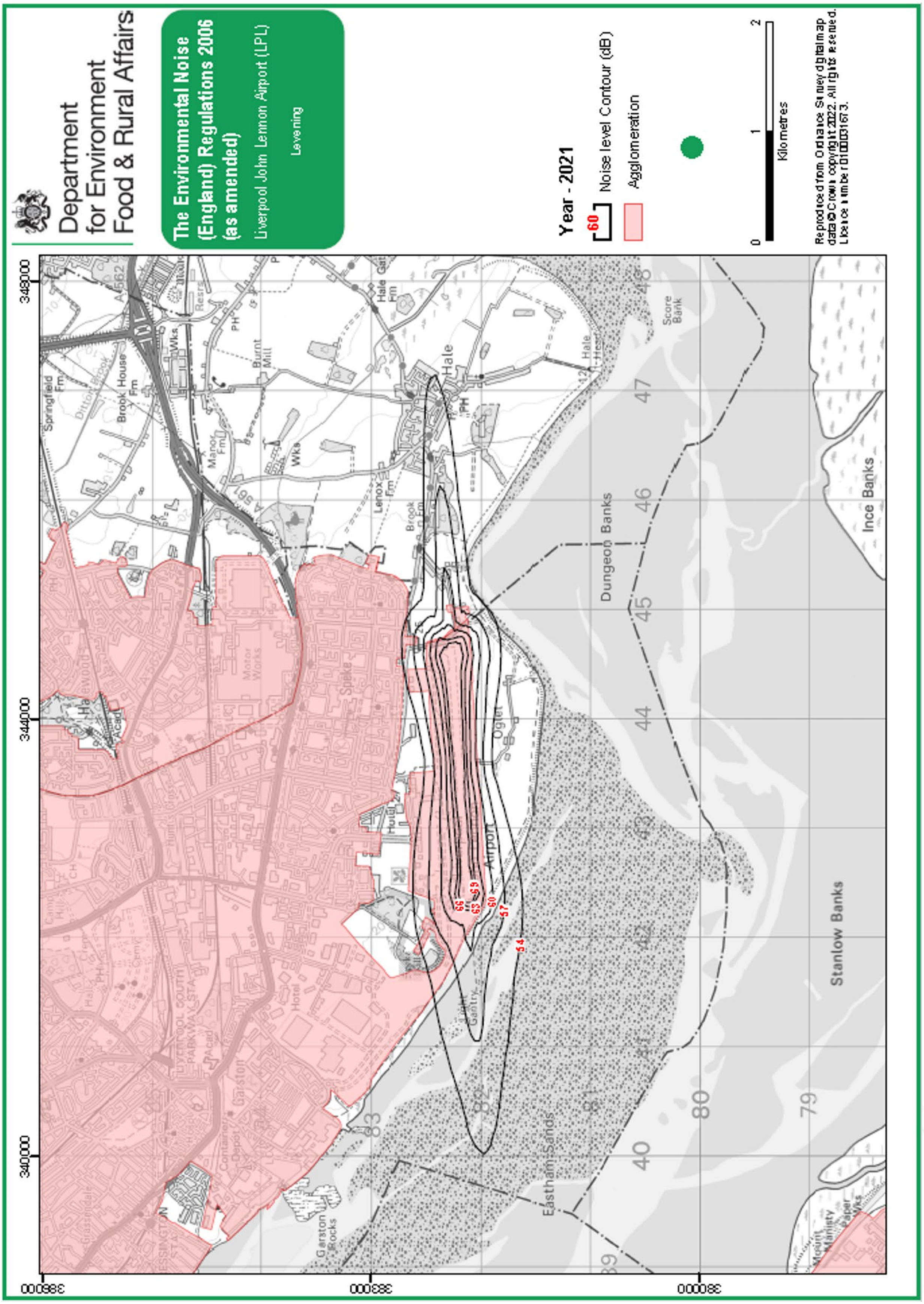
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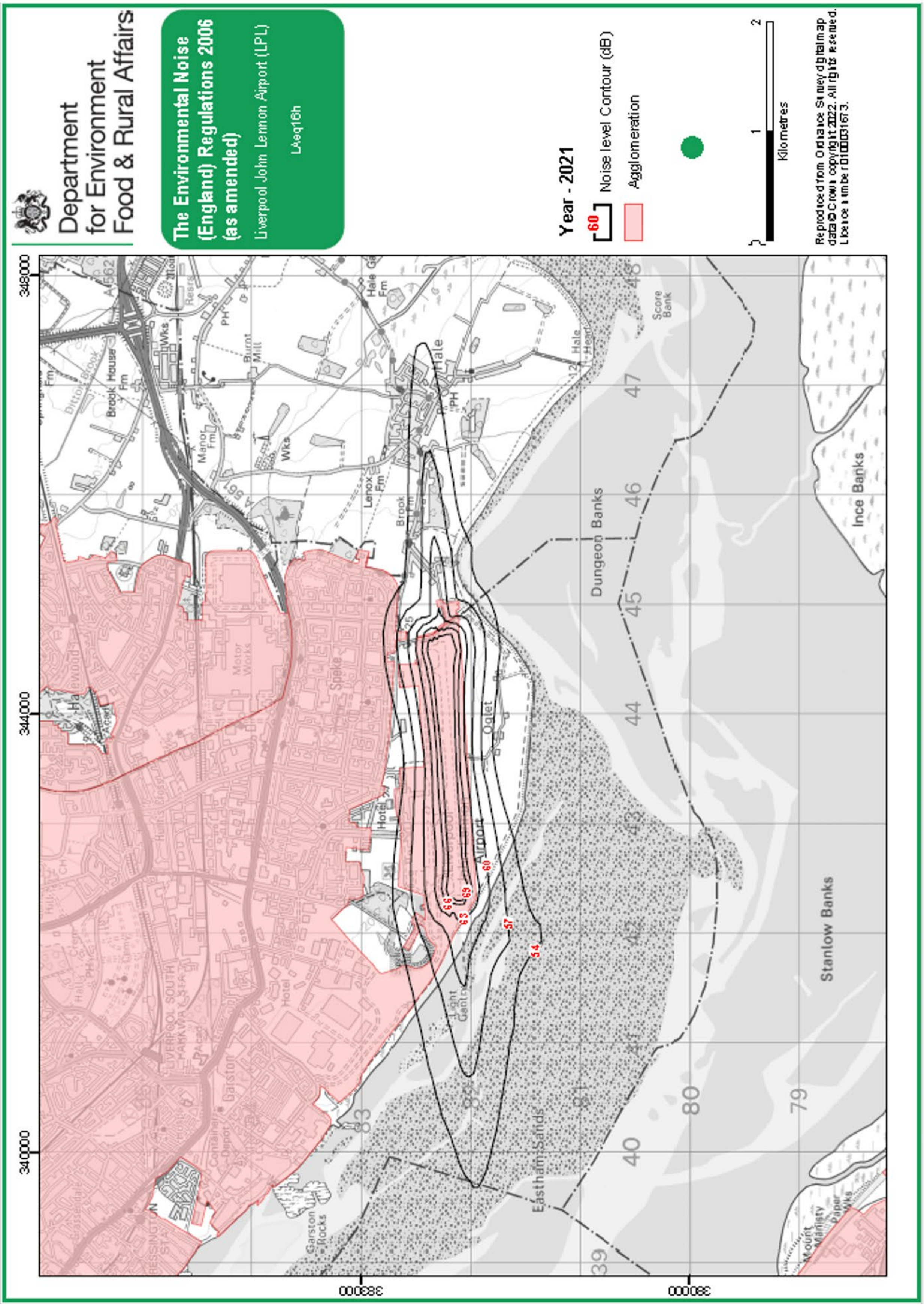
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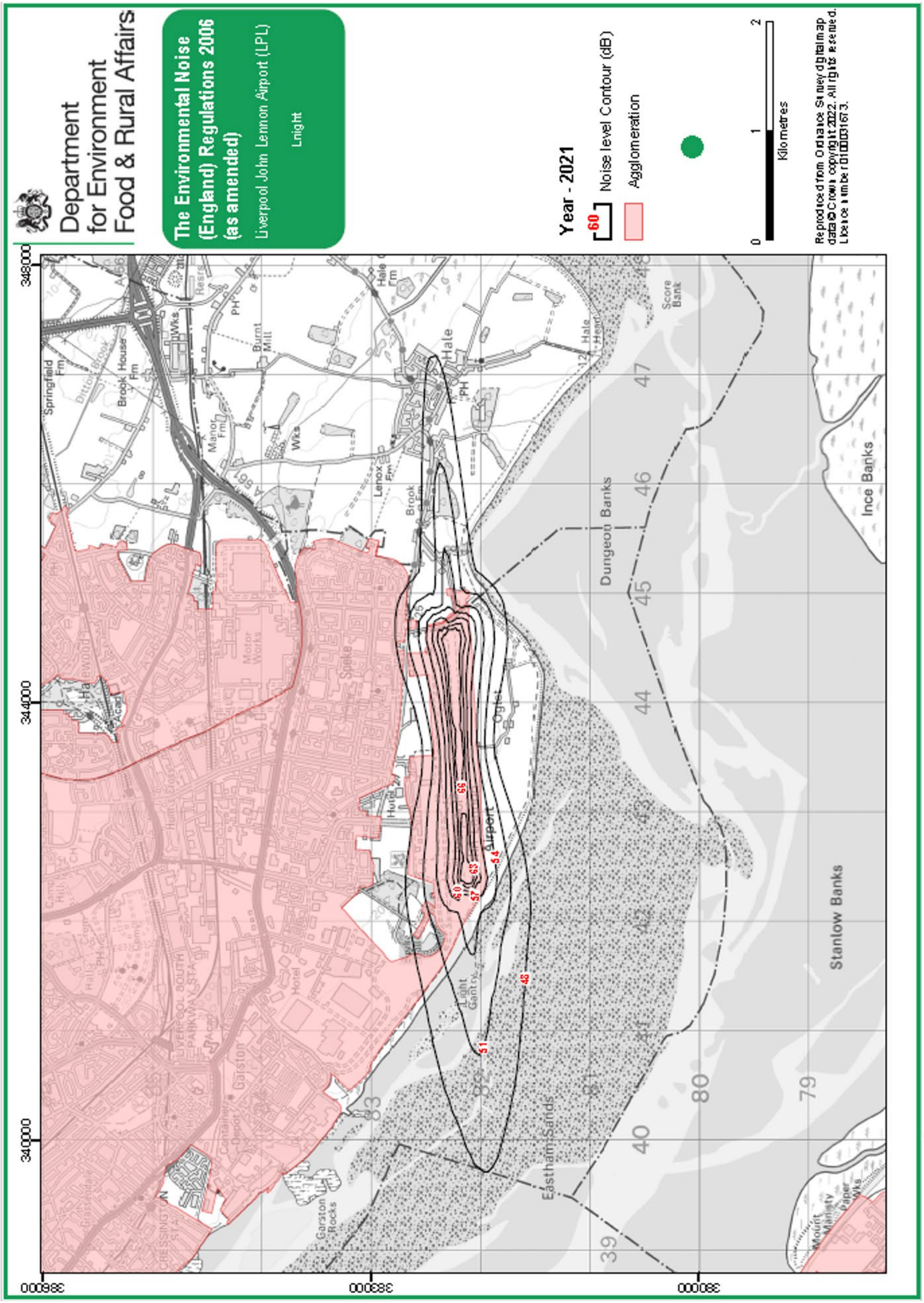

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12.0 Appendix B: Glossary of Terms

Annex 16	ICAO Environmental Protection Documentation (has details of noise certification and limits).
ANOMS	Airport Noise Monitoring System.
APU	Auxiliary Power Unit – a small engine unit located within an aircraft to provide power when aircraft's main engines are not operating i.e. when it is parked on stand.
ATC	Air Traffic Control.
CAA	Civil Aviation Authority – the Government body that regulates civil aviation in the UK.
CDA	Continuous Descent Approach – Approach using a smooth continual descent instead of a stepped approach.
dB	Decibel (dB) – a logarithmic unit of measurement that expresses the magnitude of a physical quantity relative to a specified or implied reference level. Its logarithmic nature allows very large or very small ratios to be represented by a convenient number. Being a ratio, it is a dimensionless unit.
dB(A)	A weighted Decibel which is designed to represent the human ear's response to sound.
DEFRA	Department of Environment, Food and Rural Affairs.
DfT	Department for Transport.
END	Directive 2002/49/EC referred to as the Environmental Noise Directive.
Engine Tests	Where aircraft engines are tested whilst the aircraft is parked on the ground.
ENR	Environmental Noise (England) Regulation 2006 transposes Directive 2002/49/EC on the statute books.
Envirosuite	The company supplying and maintaining the Noise Monitoring & Track Keeping System (ANOMS).
FAA	Federal Aviation Authority – the USA's equivalent of the UK Civil Aviation Authority.
FAS	Future Airspace Strategy.
FASI-N	Future Airspace Strategy Implementation (North) (formerly Prestwick Lower Airspace Systemisation).
FIDs	Flight Information Display – shows arrival and departure times for aircraft flights.
GA	General Aviation – Commercial movements including Air-Taxis, positioning and local movements and all non-commercial movements including private aircraft operations and aero-club instructional flights.
GIS	Geographical Information System – software that displays maps and geographical data.
Hive	Used by the Airport to manage and display aircraft and airport related information.
ICAO	International Civil Aviation Organisation.
ILS	Instrument Landing System – an electronic system used by aircraft to navigate to and land precisely on the runway.
LJLA	Liverpool John Lennon Airport (Liverpool Airport Limited Company Registration Number 2116704).

L_{Aeq}	Equivalent continuous sound level. The steady dB (A) level which would produce the same A-weighted sound energy over the stated period of time as specified time-varying sound.
L_{day}	The average noise for a 12 hour period, 07:00 to 19:00.
L_{den}	The average noise for a 24-hour period but adds 'penalties' to the noise arising in the evening (+ 5 dB) and the night (+10 dB). Daytime is 07:00 to 19:00, evening is 19:00 to 23:00 and night is 23:00 to 07:00 hours.
$L_{evening}$	The average noise for a 4-hour period, 19:00 to 23:00.
L_{night}	The average noise for an 8-hour period, 23:00 to 07:00.
MTMA	Manchester Terminal Movement Area.
MTOW	Maximum Take Off Weight – Maximum weight at which the pilot of an aircraft is allowed to attempt to take off, due to structural or other limits.
nm	Nautical Miles – 1 Nautical mile = 1.15 miles or 1,852 metres.
NM&TKS	Noise Monitoring & Track Keeping System – Computer system which incorporates aircraft track keeping and noise monitoring data. LJLA system name is ANOMS provided by Envirosuite.
NMSC	Noise Monitoring Sub-Committee – a technical sub-committee of the Airport Consultative Committee, comprising community and local council representatives.
NMT	Noise Monitoring Terminal. Noise station consisting of a highly sensitive microphone, noise analyser and PC to store and send the data.
PNRs	Preferred Noise Routes for aircraft – where aircraft flight routes are directed over areas of lower population density, to minimise overall noise impact.
QC	Quota Count – a noise ranking system.
QCS	Quota Count Scheme – the scheme which adopts the noise ranking system.
Reverse Thrust	The use of aircraft engines to slow aircraft when landing on a runway.
Runway 09	Used for westerly aircraft arrivals and easterly departures (typically used by 25% of aircraft movements). Arriving over the Wirral Peninsula and departing towards Hale Village.
Runway 27	Used for easterly aircraft arrivals and westerly departures (typically used by 75% of aircraft movements). Arriving over Hale Village and departing towards the Wirral Peninsula.
Section 106 Agreement	Legally binding Planning agreement which Liverpool John Lennon Airport entered into with Liverpool City Council in November 2000 and varied in 2009.
SEL	Single Event Sound Exposure Level – in dB (A) accounting for maximum noise level and duration.
SID	Standard Instrument Departure Route for aircraft – a defined departure route for aircraft departing and airport.
SSR	Secondary Surveillance Radar – provides detailed information on aircraft movements.
UK AIP	UK Aeronautical Information Publication – a technical manual containing information about all UK airports flight procedures (CAA published document).
VFR	Visual Flight Rules – Flight rules where the pilot is expected to "see and avoid" obstacles and other aircraft as opposed to Instrument Flight Rules where instruments are used to aid navigation and separation.